

**DATE** October 2, 2012**PROJECT No.** 11-1365-0012/DCN-104**TO** Veronica Chisholm  
De Beers Canada Inc.**CC** John Faithful and Amy Langhorne, Golder Associates Ltd.**FROM** Nathan Schmidt, Golder Associates Ltd.**EMAIL** Nathan\_Schmidt@golder.com**ANTICIPATED WORKS FOR THE PROPOSED GAHCHO KUÉ PROJECT AND THE NAVIGABLE WATERS PROTECTION ACT**

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This technical memo provides information that is necessary to complete a Navigable Waters assessment, as outlined in the Transport Canada Round 2 Information Requests TC-1 and TC-2. More specifically, this memo provides Transport Canada with a list of all works for the proposed Gahcho Kué Project (Project) that De Beers Canada Inc. (De Beers) anticipates will need to be assessed and evaluated for approval under the *Navigable Waters Protection Act*, or will interest Transport Canada's Navigable Waters Protection Program. This information is provided in Table 1, and includes details pertaining to plans to de-water sections of and deposit tailings in Kennady Lake, water intakes, outfalls, dams, dykes, fish habitat compensation works and any other work in, on, over, under, across or through navigable water. Where possible, the following specific information is provided for each listed work:

- the type of work;
- the location of the work (GPS coordinate in degrees, minutes, seconds);
- the name of the waterway in which work will take place;
- the width and depth of the waterway where work will take place; and
- details of the work that are currently available and have been finalized.

To the extent possible, the tabulated information has been supplemented by figures and other sources of information submitted in the 2010 EIS, 2011 EIS Update, 2012 EIS Supplement, and Information Request responses from Round 1 and Round 2.

Appendix A provides additional information on the minor waters within the Kennady Lake watershed affected by Project works, including figures and tables referenced in Table 1. Appendix B is the Round 1 Information Request Response from the Joint Information Requests from Fisheries and Oceans Canada and Environment Canada, DFO&EC\_26, submitted to the Board on April 6, 2012 (De Beers 2012a), which includes pre-design drawings and other relevant information for the dykes associated with the Project.

Final design details are not yet available for most mine infrastructure components. However, to the extent possible, each of the proposed works for the Life of Mine at this pre-design stage of the Project has been described.



Table 1: Pre-Design Description of Works Planned for the Life of Mine

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-2	Dyke A	<i>Dyke Midpoint</i> 63° 26' 14.5" N 109° 10' 03.4" W	Kennady Lake	<i>Lake at Dyke Alignment</i> Top Width: 70 m Maximum Depth: 2 m	<ul style="list-style-type: none"><li>■ Dyke A will be constructed at the narrows between Kennady Lake Areas 7 and 8, to isolate the Mine Controlled Area from downstream waterbodies through the life of mine until post-closure.</li><li>■ Dyke A will have a crest elevation of 425.0 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate lakebed elevation of 418.7 m. It will consist of an earth- and rock-fill structure, with a slurry trench cutoff wall core to reduce permeability.</li><li>■ Dyke A will be breached at the end of the Closure phase, when water levels are equalized on either side, and water quality in the Kennady Lake Areas 2 to 7 meets standards for release.</li><li>■ <b><i>Dyke A will likely require a Navigable Waters Protection Act (NWP) Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke A is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke A is provided in Figure 2 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-2	Dewatering	<i>Area 3 Midpoint</i> 63° 27' 05.4" N 109° 12' 36.4" W	Kennady Lake Areas 2 to 7	<i>Kennady Lake Areas 2 to 7</i> Surface Area: 6.54 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>■ During the Construction, Operation and Closure Project phases, Kennady Lake Areas 2 to 7 will be closed-circuited and water within this area (the Mine Controlled Area) will be managed. Internal dykes, as described below, will also be constructed, and water levels in various portions of Kennady Lake will vary.</li><li>■ Areas 2 to 7 of Kennady Lake, upstream of Dyke A, will be considered non-navigable during the Construction, Operation and Closure Project phases.</li><li>■ <b><i>Dewatering of Kennady Lake will likely require an NWP Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ Water management in Kennady Lake is described in 2012 EIS Supplement Section 3.9 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Areas 2 to 7 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li><li>■ A detailed table describing changes to water surface elevations in each area of Kennady Lake is provided in 2012 EIS Supplement Table 8.7-6 (De Beers 2012b).</li></ul>
-2	Airstrip	<i>At Waterway</i> 63° 26' 18.0" N 109° 07' 58.4" W	Lake H1a Outlet	<i>Lake H1a Outlet</i> Width: 0.6 m Depth: 0.4 m	<ul style="list-style-type: none"><li>■ The preliminary design for the airstrip at the Project includes an encroachment on the Lake H1a Outlet at the east end of the airstrip.</li><li>■ <b><i>The detailed description of the Lake H1a Outlet shows that it is a Minor Water and an Approval under the NWP is not required.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the airstrip is shown in Figure 1.</li><li>■ The Airstrip is described in 2012 EIS Supplement Section 3.9.6.2.5 (De Beers 2012b).</li><li>■ The location of the stream encroachment is shown in Appendix A, Figure A-8.</li><li>■ A detailed description of the Lake H1a Outlet is provided in Appendix A, Section A1.8.</li></ul>
-2	Discharge Pipeline No. 1 and Outfall	<i>Intake</i> 63° 27' 42.6" N 109° 13' 00.4" W <i>Outfall</i> 63° 28' 39.3" N 109° 14' 40.2" W	Kennady Lake Area 3, Lake N11	<i>Kennady Lake Area 3-5</i> Surface Area: 2.56 km <sup>2</sup> Maximum Depth: 15.7 m <i>Lake N11</i> Surface Area: 5.38 km <sup>2</sup> Maximum Depth: 6.6 m	<ul style="list-style-type: none"><li>■ The discharge pipeline from Kennady Lake Area 3 to Lake N11 will follow site roadways as described below, and will not include any additional watercourse crossings.</li><li>■ This system will include a water intake at Kennady Lake Area 3 and an outfall at Lake N11.</li><li>■ Design details of these infrastructure components are not yet available.</li><li>■ The end-of-pipe discharge points for the lake dewatering operations will be placed at relatively deep water locations in Lake N11, so as to minimize the potential impact to lake bottom sediments. Although not yet designed, simple diffuser structures are contemplated to dissipate the energy of pipeline discharge to further reduce potential erosive energy. Two examples are the use of floating pontoon/barge diffusers at the pipeline discharge point, and a simple end-of-pipe baffle attachment to dissipate the energy outward and upward from the end of the pipeline. In the former, water energy is dissipated on the deck of the pontoon before cascading into the lake, which has been used at Diavik Mine.</li><li>■ The intake structure will likely comprise a floating barge intake with fish exclusion capabilities.</li><li>■ <b><i>Discharge Pipeline No. 1 from Kennady Lake Area 3 to Lake N11 may require an NWP Approval, unless the intakes and outfalls are fully mitigated.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ A conceptual design for the outfall diffuser structure was provided in Round 1 Information Request Response DFO&amp;EC_35, dated April 6, 2012 (De Beers 2012a).</li><li>■ Surface area and depth of Kennady Lake Area 3 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li><li>■ Surface area and depth of Lake N11 are referenced to the 2011 Fish and Aquatic Resources Supplemental Monitoring Report Section 4.1 (Golder 2012a).</li></ul>

Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-2	Discharge Pipeline No. 2 and Outfall	<i>Intake</i> 63° 26' 05.0" N 109° 10' 17.4" W <i>Outfall</i> 63° 26' 14.5" N 109° 09' 59.8" W	Kennady Lake Areas 7 and 8	<i>Kennady Lake Area 7</i> Surface Area: 0.92 km <sup>2</sup> Maximum Depth: 12.2 m <i>Kennady Lake Area 8</i> Surface Area: 1.36 km <sup>2</sup> Maximum Depth: 10.2 m	<ul style="list-style-type: none"><li>■ The discharge pipeline from Kennady Lake Area 7 to Kennady Lake Area 8 will be a short length, over or adjacent to Dyke A, and will not include any additional watercourse crossings.</li><li>■ This system will include a water intake at Kennady Lake Area 7 and an outfall at Kennady Lake Area 8.</li><li>■ Design details of these infrastructure components are not yet available.</li><li>■ The end-of-pipe discharge points for the lake dewatering operations will be placed at relatively deep water locations in Kennady Lake Area 8, so as to minimize the potential impact to lake bottom sediments. Although not yet designed, simple diffuser structures are contemplated to dissipate the energy of pipeline discharge to further reduce potential erosive energy. Two examples are the use of floating pontoon/barge diffusers at the pipeline discharge point, and a simple end-of-pipe baffle attachment to dissipate the energy outward and upward from the end of the pipeline. In the former, water energy is dissipated on the deck of the pontoon before cascading into the lake, which has been used at Diavik Mine.</li><li>■ The intake structure will likely comprise a floating barge intake with fish exclusion capabilities.</li><li>■ <b>Discharge Pipeline No. 1 from Kennady Lake Area 7 to Kennady Lake Area 8 may require an NWPA Approval, unless the intakes and outfalls are fully mitigated.</b></li></ul>	<ul style="list-style-type: none"><li>■ A conceptual design for the outfall diffuser structure was provided in Round 1 Information Request Response DFO&amp;EC_35, dated April 6, 2012 (De Beers 2012a).</li><li>■ Surface area and depth of Kennady Lake Areas 7 and 8 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
-2	Freshwater Intake	<i>Water Intake</i> 63° 26' 19.3" N 109° 09' 38.9" W	Kennady Lake Area 8	<i>Kennady Lake Area 8</i> Surface Area: 1.36 km <sup>2</sup> Maximum Depth: 10.2 m	<ul style="list-style-type: none"><li>■ The Freshwater Intake and pumphouse will be located on the north western shore of Area 8. The intake will consist of vertical filtration wells fitted with vertical turbine pumps that supply water on demand.</li><li>■ The Freshwater Intake will be connected to the pumphouse with piping buried under a rockfilled embankment. The embankment will act as a secondary screen to prevent fish from becoming entrained.</li><li>■ Fresh water will be pumped through an overland pipeline to the freshwater storage tank in the accommodations complex. No additional watercourse crossings by this pipeline are anticipated.</li><li>■ <b>The Freshwater Intake may require an NWPA Approval, unless the intake is fully mitigated.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the Freshwater Intake is shown in Figure 1.</li><li>■ The Freshwater Intake is described in 2012 EIS Supplement Section 3.9.5. (De Beers 2012b)</li><li>■ Surface area and depth of Kennady Lake Area 8 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
-2	Site roadways	<i>Lake N12 Inlet</i> 63° 28' 19.8" N 109° 13' 55.9" W <i>Lake A3 Outlet</i> 63° 27' 43.7" N 109° 10' 43.6" W <i>Lake A6 Outlet</i> 63° 27' 32.6" N 109° 10' 07.7" W <i>Lake A9 Outlet</i> 63° 27' 04.4" N 109° 10' 39.5" W <i>Lake Kb2 Outlet</i> 63° 27' 00.2" N 109° 10' 39.1" W <i>Lake Kb1 Outlet</i> 63° 27' 01.1" N 109° 10' 56.1" W	As indicated	<i>Lake N12 Inlet</i> Width: unknown Depth: unknown <i>Lake A3 Outlet</i> Width: 0.90 m Depth: 0.20 m <i>Lake A6 Outlet</i> Width: unknown Depth: unknown <i>Lake A9 Outlet</i> Width: undefined Depth: undefined <i>Lake Kb2 Outlet</i> Width: undefined Depth: undefined <i>Lake Kb1 Outlet</i> Width: 1.0 m Depth: 0.15 m	<p>Most site roadways follow watershed divides or use dyke crests for watercourse crossings. Planned crossings of other watercourses include (from north to south):</p> <ul style="list-style-type: none"><li>■ Lake N12 Tributary – Navigability to be confirmed (watershed area 0.67 km<sup>2</sup>)</li><li>■ Lake A3 Outlet – Non-navigable by MW criteria (watershed area 0.80 km<sup>2</sup>)</li><li>■ Lake A6 Outlet – Navigability to be confirmed (watershed area 0.08 km<sup>2</sup>)</li><li>■ Lake A9 Outlet – Non-navigable by MW criteria (watershed area 0.14 km<sup>2</sup>)</li><li>■ Lake Kb2 Outlet – Non-navigable by MW criteria (watershed area 0.24 km<sup>2</sup>)</li><li>■ Lake Kb1 Outlet – Non-navigable by NW criteria (watershed area 0.28 km<sup>2</sup>)</li></ul> <p>These watercourse crossings are of ephemeral watercourses, with small or ill-defined channels, and will require the installation of culverts to provide drainage.</p> <ul style="list-style-type: none"><li>■ <b>It is unlikely that site roadway watercourse crossings will require NWPA Approvals. However, characteristics of currently unknown or undefined watercourse crossings should be determined well in advance of construction to confirm this.</b></li></ul>	<ul style="list-style-type: none"><li>■ The locations of the site roadway watercourse crossings are shown in Figure 1.</li><li>■ Site roadways are described in 2012 EIS Supplement Section 3.10.2.8 (De Beers 2012b).</li><li>■ Watercourse widths and depths are discussed in Appendix A, Section A1.9.</li></ul>

Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-2	Dyke H	<i>Dyke Midpoint</i> 63° 26' 08.4" N 109° 13' 55.8" W	Kennady Lake Areas 5 & 6	<i>Lake at Dyke Alignment</i> Top Width: 100 m Maximum Depth: 0.7 m	<ul style="list-style-type: none"><li>■ Dyke H is an internal water-retention dyke, which will be constructed between Kennady Lake Areas 5 and 6, to allow dewatering of Area 6 and mining of Hearne and 5034 pits.</li><li>■ Dyke H will have a crest elevation of 423.5 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 420.0 m. It will consist of a broad earthfill dyke, with a crest width of approximately 30 m. The dyke will be filled with till and will be faced with mine rockfill. Stage 1 construction will occur in Year -2, when the lakebed is exposed by dewatering, and Stage 2 construction will occur prior to Year 3.</li><li>■ Dyke H will be a permanent structure and will form the south border of the West Mine Rock Pile at closure.</li><li>■ <b><i>Dyke H will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke H is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke H is provided in Figure 9 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-2	Dyke I	<i>Dyke Midpoint</i> 63° 26' 19.6" N 109° 13' 08.7" W	Kennady Lake Areas 5 & 6	<i>Lake at Dyke Alignment</i> Top Width: 263 m Maximum Depth: 2.7 m	<ul style="list-style-type: none"><li>■ Dyke I is an internal water-retention dyke, which will be constructed between Kennady Lake Areas 5 and 6, to allow dewatering of Area 6 and mining of Hearne and 5034 pits.</li><li>■ Dyke I will have a crest elevation of 423.5 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 418.0 m. It will consist of a broad earthfill dyke, with a crest width of approximately 50 m. The dyke will be filled with till and will be faced with mine rockfill. Stage 1 construction will occur in Year -2, when a cofferdam is constructed underwater, and Stage 2 construction will occur prior to Year 3.</li><li>■ Dyke I will be a permanent structure and will form the east border of the West Mine Rock Pile at closure.</li><li>■ <b><i>Dyke I will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke I is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke I is provided in Figure 10 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-2	Dyke J	<i>Dyke Midpoint</i> 63° 26' 24.9" N 109° 12' 42.6" W	Kennady Lake Areas 4 & 6	<i>Lake at Dyke Alignment</i> Top Width: 80 m Maximum Depth: 1.7 m	<ul style="list-style-type: none"><li>■ Dyke J is an internal water-retention dyke, which will be constructed between Kennady Lake Areas 5 and 6, to allow dewatering of Area 6 and mining of Hearne and 5034 Pits.</li><li>■ Dyke J will have a crest elevation of 422.5 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 419.0 m. It will consist of a broad earthfill dyke, with a crest width of approximately 30 m. The dyke will be filled with till and will be faced with mine rockfill. Stage 1 construction will occur in Year -2, when the lakebed is exposed by dewatering, and Stage 2 construction will occur prior to Year 3.</li><li>■ The Dyke J crest will be breached during the Closure phase, to an elevation of 418.0 m, compared to the existing mean lake water surface elevation of 420.7 m, to provide navigation and fish habitat. Note that the adjacent Tuzo and 5034 Pit areas will also provide deeper water for navigation.</li><li>■ <b><i>Dyke J will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke J is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 and lowering during closure is described in 2012 EIS Supplement Section 3.9.7.2 (De Beers 2012b).</li><li>■ A preliminary design for Dyke J is provided in Figure 11 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-2	5034 Pit	63° 26' 12.2" N 109° 12' 24.8" W	Kennady Lake Area 6	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>■ 5034 Pit will be open-pit mined to a depth of approximately 300 m, with vertical bench heights of 12 m and bench widths of 7 to 14 m.</li><li>■ Pre-stripping of 5034 Pit will begin in Year -2 for land areas and Year -1 for dewatered lakebed areas.</li><li>■ Mining operations will be completed in Year 6, and fine processed kimberlite (PK) will start to be deposited in the mined-out pit.</li><li>■ By Year 7, mine rock will start to be placed on top of fine PK in 5034 Pit, which will be receive approximately 80.0 Mt of rock. It will be backfilled to an elevation no higher than 418.0 m, to create fish habitat when the original lake elevation of 420.7 m is restored.</li><li>■ <b><i>5034 Pit will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of 5034 Pit is shown in Figure 2 and Figure 3.</li><li>■ Mining operations are described in 2012 EIS Supplement Section 3.5 (De Beers 2012b) and 5034 Pit in 2012 EIS Supplement Section 3.12.6.1 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>



Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-1	Dyke A1	<i>Dyke Midpoint</i> 63° 27' 29.6" N 109° 11' 19.1" W	Lake A1 Outlet	<i>Lake A1 Outlet</i> Width: 1.5 m to 3.9 m Depth: 0.37 m to 0.60 m	<ul style="list-style-type: none"><li>■ Dyke A1 will be constructed across the Lake A1 Outlet and on dry land adjacent to Lake A2, to allow the water levels of those lakes to be raised and to allow water diversion to Lake J1.</li><li>■ Dyke A1 will have a crest elevation of 425.5 m, compared to the existing Kennady Lake mean water surface elevation of 420.7 m, existing Lake A1 mean water surface elevation of 421.3 m, and future maximum Lake A1 mean water surface elevation of 423.0 m. It will consist of an earth- and rock-fill structure, with an internal liner to reduce permeability.</li><li>■ Dyke A1 will be permanent. At post-closure, a new lake outlet will be constructed to convey flow to Kennady Lake, in an area south of the existing outlet. The area downstream of the existing lake outlet in Kennady Lake Area 2 will be filled with the fine PK pile with a mine rock cover.</li><li>■ <b>Dyke A1 will require an NWP A Approval for the encroachment on the Lake A1 Outlet, unless the channel is deemed non-navigable by Transport Canada.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke A1 is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke A1 is provided in Figure 4 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>■ The location of Lake A1 is shown in Appendix A, Figure A-1.</li><li>■ A detailed description of the Lake A1 Outlet is provided in Appendix A, Section A1.1.</li></ul>
-1	Water diversion from Lake A1	<i>Lake Midpoint</i> 63° 27' 15.8" N 109° 11' 07.6" W	Lake A1	<i>Lake A1</i> Surface Area: 0.34 km <sup>2</sup> Maximum Depth: 8.0 m	<ul style="list-style-type: none"><li>■ During the Operations phase of the Project, the water level in Lake A1 will be managed, with discharge to Lake J1b via a pipeline.</li><li>■ The managed high water level of Lake A1 will be 423.0 m, or 1.6 m above the existing nominal lake water surface elevation of 421.4 m.</li><li>■ <b>Raised water levels on Lake A1 will likely not require an NWP A Approval, but this should be confirmed with Transport Canada.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke A1 is shown in Figure 1 and Figure 3.</li><li>■ Pre-development lake surface areas are provided in 2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010).</li><li>■ Pre-development lake depths are provided in 2010 EIS Annex J Appendix J.IV, Section J.IV.5 (De Beers 2010).</li></ul>
-1	Dyke L and Spigotting Berm	<i>Dyke Midpoint</i> 63° 27' 35.9" N 109° 12' 38.2" W  <i>Spigotting Berm</i> 63° 27' 45.7" N 109° 11' 54.2" W	Kennady Lake Area 2	<i>Lake at Dyke Alignment</i> Top Width: 835 m Maximum Depth: 7.7 m	<ul style="list-style-type: none"><li>■ Dyke L is a curved internal water-retention dyke, which will be constructed between Kennady Lake Areas 2 and 3, to allow Area 3 to be used for Fine PK storage.</li><li>■ Dyke L will have a crest elevation of 424.0 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 413.0 m. It will consist of a broad rockfill dyke with armour and filter layers on the Area 2 side, and a crest width of approximately 17 m. Stage 1 construction will occur in Year -1, and Stage 2 construction will occur prior to Year 3.</li><li>■ The Dyke L will be a permanent structure, which forms the outer boundary of the Area 2 Fine PK storage. A small portion of the crest will be lowered at closure to allow drainage of the mine rock cap.</li><li>■ An associated mine rock berm will be constructed inside of Area 2, to allow spigotting of Fine PK into the storage area. This berm will be permanent and will be covered at closure.</li><li>■ <b>Dyke L and the associated Spigotting Berm will likely require an NWP A Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke L is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke L is provided in Figure 13 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-1	Dyke F	<i>Dyke Midpoint</i> 63° 26' 47.6" N 109° 14' 26.4" W	Lake D2 Outlet	<i>Lake D2 Outlet</i> Width: 1.13 m Depth: 0.42 m	<ul style="list-style-type: none"><li>■ To reduce surface inflows to Kennady Lake, a portion of the watershed, including watershed D on the west side of Kennady Lake, will be diverted, so that the runoff from these watersheds is directed away from Kennady Lake. The diversion system will rely on temporary, earth-filled dykes that will be placed across the outlets of these watersheds.</li><li>■ Dyke F will be constructed across the Lake D2 Outlet, to allow the water levels at Lakes D2 and D3 to be raised and to allow water diversion to Lake N14.</li><li>■ Dyke F will have a crest elevation of 428.0 m, compared to the existing ground elevation of 424.0 m, existing Lake D2 mean water surface elevation of 424.2 m, and future maximum Lake D2 mean water surface elevation of 427.0 m. It will consist of an earth- and rock-fill structure, with an internal liner to reduce permeability.</li><li>■ Dyke F will be breached after Year 11.</li><li>■ Effects on Lake N14 are discussed in the associated technical memorandum on the effects to navigation <i>Potential Effects to Navigation Associated with the Proposed Gahcho Kué Project Development</i> (Golder 2012b).</li><li>■ <b>The detailed description of the Lake D2 Outlet shows that it is a Minor Water and an Approval under the NWP A is not required.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke F is shown in Figure 1 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke F is provided in Figure 7 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>■ A detailed description of the Lake D2 Outlet is provided in Appendix A, Section A1.4.</li></ul>

Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-1	Water diversion from Lake D2/D3	<i>Lake Midpoint</i> 63° 26' 49.7" N 109° 15' 09.6" W	Lake D2, Lake D3	<i>Lake D2</i> Surface Area: 0.13 km <sup>2</sup> Maximum Depth: 1.0 m <i>Lake D3</i> Surface Area: 0.38 km <sup>2</sup> Maximum Depth: 3.0 m	<ul style="list-style-type: none"><li>Construction of Dyke F will increase the maximum depth of Lake D2 from 1.0 m to 3.8 m and will increase the maximum depth of Lake D3 from 3.0 m to 4.6 m.</li><li>The combined surface area of the joined lakes will increase from 0.51 km<sup>2</sup> to 1.03 km<sup>2</sup>.</li><li>These diverted lakes will be returned to baseline conditions at closure.</li><li><b><i>Raised water levels on Lakes D2 and D3 will likely not require an NWPA Approval, but this should be confirmed with Transport Canada.</i></b></li></ul>	<ul style="list-style-type: none"><li>The locations of Lakes D2 and D3 are shown in Appendix A, Figure A-4 and Figure A-5.</li><li>Pre- and post-development lake depths and surface areas are provided in 2011 EIS Update Section 8.7, Table 8.7-11 (De Beers 2011).</li><li>A detailed description of the Lake D3 Outlet is provided in Appendix A, Section A1.5.</li></ul>
-1	Dyke G	<i>Dyke Midpoint</i> 63° 25' 56.0" N 109° 15' 32.5" W	Lake E1 Outlet	<i>Lake E1 Outlet</i> Width: 0.52 m Depth: 0.22 m	<ul style="list-style-type: none"><li>To reduce surface inflows to Kennady Lake, a portion of the watershed, including watershed E on the west side of Kennady Lake, will be diverted, so that the runoff from these watersheds is directed away from Kennady Lake. The diversion system will rely on temporary, earth-filled dykes that will be placed across the outlets of these watersheds.</li><li>Dyke G will be constructed across the Lake E1 Outlet, to allow the water level at Lake E1 to be raised and to allow water diversion to Lake N14.</li><li>Dyke G will have a crest elevation of 429.0 m, compared to the existing ground elevation of 425.0 m, existing Lake E1 mean water surface elevation of 425.2 m, and future maximum Lake E1 mean water surface elevation of 426.0 m. It will consist of an earth- and rock-fill structure, with an internal liner to reduce permeability.</li><li>Dyke G will be breached after Year 11.</li><li>Effects on Lake N14 are discussed in the associated technical memorandum on the effects to navigation <i>Potential Effects to Navigation Associated with the Proposed Gahcho Kué Project Development</i> (Golder 2012b).</li><li><b><i>The detailed description of the Lake E1 Outlet shows that it is a Minor Water and an Approval under the NWPA is not required.</i></b></li></ul>	<ul style="list-style-type: none"><li>The location of Dyke G is shown in Figure 1 and Figure 3.</li><li>Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>A preliminary design for Dyke G is provided in Figure 8 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>A detailed description of the Lake E1 Outlet is provided in Appendix A, Section A1.6.</li></ul>
-1	Water diversion from Lake E1	<i>Lake Midpoint</i> 63° 26' 04.9" N 109° 15' 40.6" W	Lake E1	<i>Lake E1</i> Surface Area: 0.20 km <sup>2</sup> Maximum Depth: 3.9 m	<ul style="list-style-type: none"><li>Construction of Dyke G will increase the maximum depth of Lake E1 from 3.9 m to 4.7 m a.</li><li>The surface area of Lake E1 will increase from 0.20 km<sup>2</sup> to 0.27 km<sup>2</sup>.</li><li>This diverted lake will be returned to baseline conditions at closure.</li><li><b><i>Raised water levels on Lake E1 will likely not require an NWPA Approval, but this should be confirmed with Transport Canada.</i></b></li></ul>	<ul style="list-style-type: none"><li>The location of Lake E1 is shown in Appendix A, Figure A-6.</li><li>Pre- and post-development lake depths and surface areas are provided in 2011 EIS Update Section 8.7, Table 8.7-11 (De Beers 2011).</li></ul>
-1	Dyke K	<i>Dyke Midpoint</i> 63° 25' 59.0" N 109° 12' 06.0" W	Kennady Lake Areas 6 & 7	<i>Lake at Dyke Alignment</i> Top Width: 270 m Maximum Depth: 7.7 m	<ul style="list-style-type: none"><li>Dyke K is an internal water-retention dyke, which will be constructed between Kennady Lake Areas 6 and 7, to serve as a haul road and water management structure.</li><li>Dyke K will have a maximum crest elevation of 422.5 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 413.0 m. It will consist of a broad earthfill dyke, with a crest width of approximately 65 m. The dyke will be filled with till and will be faced with mine rockfill. Stage 1 construction will occur in Year -1, when the lakebed is exposed by dewatering, and Stage 2 construction will occur in Year 5 to Year 6.</li><li>A portion of the Dyke K crest will be breached during the Closure phase, to an elevation of 418.0 m, compared to the existing mean lake water surface elevation of 420.7 m, to create a temporary spillway to convey runoff. Dyke K will be breached in Year 11 to provide navigation and fish habitat.</li><li><b><i>Dyke K will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>The location of Dyke K is shown in Figure 1 and Figure 3.</li><li>Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 and lowering during closure is described in 2012 EIS Supplement Section 3.9.7.2 (De Beers 2012b). Note that the dyke will be excavated to an elevation of 417.0 m and then 1.0 m of rockfill will be placed on top.</li><li>A preliminary design for Dyke K is provided in Figure 12 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-1	CP3 Berm	63° 26' 04.9" N 109° 12' 56.7" W	Kennady Lake Area 6	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>CP3 Berm is a water collection pond berm that will be constructed on the dewatered Kennady Lake lakebed. It will be used to intercept runoff above the 5034 Pit.</li><li>Water collection berms will be variable in height and will be constructed of mine rockfill, till and impermeable liners, with a crest width of 8 m and an approximate crest elevation of 412.0 m, compared to the existing mean Kennady Lake water surface elevation of 420.7 m.</li><li>CP3 Berm is a permanent structure, which will not be removed at closure.</li><li><b><i>CP3 Berm will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>The location of the CP3 Berm is shown in Figure 1 and Figure 3.</li><li>A preliminary design for the CP3 Berm is provided in Figure 16 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>

Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
-1	CP4 Berm	63° 26' 14.6" N 109° 12' 54.1" W	Kennady Lake Area 6	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>■ CP4 Berm is a water collection pond berm that will be constructed on the dewatered Kennady Lake lakebed. It will be used to intercept runoff above the 5034 Pit.</li><li>■ Water collection berms will be variable in height and will be constructed of mine rockfill, till and impermeable liners, with a crest width of 8 m and an approximate crest elevation of 418.0 m, compared to the existing mean Kennady Lake water surface elevation of 420.7 m.</li><li>■ CP4 Berm is a permanent structure, which will not be removed at closure.</li><li>■ <b>CP4 Berm will likely require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the CP4 Berm is shown in Figure 1 and Figure 3.</li><li>■ Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li><li>■ A preliminary design for the CP3 Berm is provided in Figure 16 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
-1	CP5 Berm	63° 25' 46.0" N 109° 13' 51.0" W	Kennady Lake Area 6	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>■ CP5 Berm is a water collection pond berm that will be constructed on the dewatered Kennady Lake lakebed. It will be used to intercept runoff above the Hearne Pit.</li><li>■ Water collection berms will be variable in height and will be constructed of mine rockfill, till and impermeable liners, with a crest width of 8 m and an approximate crest elevation of 416.0 m, compared to the existing mean Kennady Lake water surface elevation of 420.7 m.</li><li>■ CP5 Berm is a permanent structure, which will not be removed at closure.</li><li>■ <b>CP5 Berm will likely require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the CP5 Berm is shown in Figure 1 and Figure 3.</li><li>■ A preliminary design for the CP3 Berm is provided in Figure 16 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>■ Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
-1	South Mine Rock Pile	63° 25' 42.7" N 109° 12' 27.7" W	Kennady Lake Area 6; Lake F1 Outlet	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m <i>Lake F1 Outlet</i> Width: 3.2 m Depth: 0.35 m	<ul style="list-style-type: none"><li>■ The preliminary design for the South Mine Rock Pile at the Project includes an encroachment on Kennady Lake Area 6 and the Lake F1 Outlet.</li><li>■ The South Mine Rock Pile will include approximately 73.1 Mt of rock.</li><li>■ The maximum height of the West Mine Rock Pile will be approximately 80 m.</li><li>■ <b>Approval under the NWPA will likely be required for Works in Kennady Lake Area 6.</b></li><li>■ <b>The South Mine Rock Pile will require an NWPA Approval for the encroachment on the Lake F1 Outlet, unless the channel is deemed non-navigable by Transport Canada.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the South Mine Rock Pile is shown in Figure 1 and Figure 3.</li><li>■ Mine Rock Piles are described in 2012 EIS Supplement Section 3.9.6.2.2 (De Beers 20112b).</li><li>■ Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li><li>■ The location of the stream encroachment is shown in Appendix A, Figure A-7.</li><li>■ A detailed description of the Lake F1 Outlet is provided in Appendix A, Section A1.7.</li></ul>
-1	Discharge Pipeline from Lake A1 to Lake J1b	<i>Intake</i> 63° 27' 08.1" N 109° 10' 57.8" W <i>Outfall</i> 63° 26' 57.6" N 109° 09' 16.3" W	Lake A1; Lake J1b	<i>Lake A1</i> Surface Area: 0.34 km <sup>2</sup> Maximum Depth: 8.0 m <i>Lake J1</i> Surface Area: 0.52 km <sup>2</sup> Maximum Depth: 4.3 m	<ul style="list-style-type: none"><li>■ The discharge pipeline from Lake A1 to Lake J1b will follow a watershed divide and will not include any watercourse crossings.</li><li>■ This system will include a water intake at Lake A1 and an outfall at Lake J1b.</li><li>■ Design details of these infrastructure components are not yet available.</li><li>■ <b>The Discharge Pipeline from Lake A1 to Lake J1b may require an NWPA Approval, unless the intakes and outfalls are fully mitigated.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the Lake A1 Discharge Pipeline is shown in Figure 1.</li><li>■ The Lake A1 Discharge Pipeline is described in 2012 EIS Supplement Section 3.9.2 (De Beers 2012b).</li><li>■ Pre-development lake surface areas are provided in 2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010).</li><li>■ Pre-development lake depths are provided in 2010 EIS Annex J Appendix J.IV, Section J.IV.5 (De Beers 2010).</li></ul>
1 to 3	Dyke D	<i>Dyke Midpoint</i> 63° 27' 56.9" N 109° 12' 01.2" W	n/a	n/a	<ul style="list-style-type: none"><li>■ Dyke D is a saddle dyke that will not cross any existing waterbody. It will be constructed between Kennady Lake Area 2 and Lake N7 to contain water, Fine PK, and the mine rock cap that will be placed in Area 2.</li><li>■ Dyke D will have a crest elevation of 425.5 m, compared to the existing mean Kennady Lake water surface elevation of 420.7 m and an approximate minimum ground elevation of 421.5 m. It will consist of an earth- and rock-fill structure, with an internal liner to reduce permeability.</li><li>■ Dyke D is a permanent structure.</li><li>■ <b>Dyke D will not require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke D is shown in Figure 2 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke D is provided in Figure 5 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>



Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
1 to 3	Dyke E	<i>Dyke Midpoint</i> 63° 27' 50.1" N 109° 12' 52.2" W	Lake B1 Outlet	<i>Lake B1 Outlet</i> Width: 1.17 m Depth: 0.32 m	<ul style="list-style-type: none"><li>■ To reduce surface inflows to Kennady Lake, a portion of the watershed, including watershed B on the west side of Kennady Lake, will be diverted, so that the runoff from these watersheds is directed away from Kennady Lake. The diversion system will rely on temporary, earth-filled dykes that will be placed across the outlets of these watersheds.</li><li>■ Dyke E will be constructed across the Lake B1 Outlet, to allow water diversion to Lake N8. The water surface elevation of Lake B1 will not be raised.</li><li>■ Dyke E will have a crest elevation of 426.0 m, compared to the existing ground elevation of 421.7 m, and existing and future Lake B1 mean water surface elevation of 423.0 m. It will consist of an earth- and rock-fill structure, with an internal liner to reduce permeability.</li><li>■ Dyke E will be breached after Year 11.</li><li>■ These works will not significantly affect the water level regime of Lake B1.</li><li>■ Effects on Lake N14 are discussed in the associated technical memorandum on the effects to navigation <i>Potential Effects to Navigation Associated with the Proposed Gahcho Kué Project Development</i> (Golder 2012b).</li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke E is shown in Figure 2 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke E is provided in Figure 6 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li><li>■ A detailed description of the Lake B1 Outlet is provided in Appendix A, Section A1.2.</li></ul>
1 to 3	Dyke M	<i>Dyke Midpoint</i> 63° 26' 34.4" N 109° 12' 46.1" W	n/a	n/a	<ul style="list-style-type: none"><li>■ Dyke M is a saddle dyke that will not cross any existing waterbody. It will be constructed between Kennady Lake Areas 4 and 5 to accommodate water level fluctuations in the mine controlled area during operations.</li><li>■ Dyke M will have a crest elevation of 424.0 m, compared to the existing mean Kennady Lake water surface elevation of 420.7 m and an approximate minimum ground elevation of 421.0 m. It will consist of an earth- and rock-fill structure.</li><li>■ Dyke M is a permanent structure.</li><li>■ <b>Dyke K will not require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke M is shown in Figure 2 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 (De Beers 2012b).</li><li>■ A preliminary design for Dyke M is provided in Figure 14 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
1 to 3	Fine PK Containment Facility	63° 27' 45.7" N 109° 11' 54.2" W	Kennady Lake Area 2	<i>Kennady Lake Area 2</i> Surface Area: 0.62 km <sup>2</sup> Maximum Depth: 7.7 m	<ul style="list-style-type: none"><li>■ The preliminary design for the Fine PKC Facility at the Project includes an encroachment on Kennady Lake Area 2, between the Kennady Lake shoreline and Dyke L.</li><li>■ The Fine PK Containment Facility will include approximately 3.32 Mt of fine PK.</li><li>■ <b>The Fine PK Containment Facility will likely require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the Fine PKC Facility is shown in Figure 2 and Figure 3.</li><li>■ The Fine PKC Facility is described in 2012 EIS Supplement Sections 3.7.4 and 3.9.6.2.4 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 2 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
1 to 3	West Mine Rock Pile	63° 26' 23.5" N 109° 14' 02.1" W	Kennady Lake Area 5; Lake D1 Outlet	<i>Kennady Lake Area 3-5</i> Surface Area: 2.56 km <sup>2</sup> Maximum Depth: 15.7 m <i>Lake D1 Outlet</i> Width: 1.53 m Depth: 0.48 m	<ul style="list-style-type: none"><li>■ The preliminary design for the West Mine Rock Pile at the Project includes an encroachment on Kennady Lake Area 5 and the Lake D1 Outlet.</li><li>■ The West Mine Rock Pile will include approximately 73.3 Mt of rock.</li><li>■ The maximum height of the West Mine Rock Pile will be approximately 94 m.</li><li>■ <b>Approval under the NWPA will likely be required for Works in Kennady Lake Area 5.</b></li><li>■ <b>The detailed description of the Lake D1 Outlet shows that it is a Minor Water and an Approval under the NWPA is not required.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the West Mine Rock Pile is shown in Figure 2 and Figure 3.</li><li>■ Mine Rock Piles are described in 2012 EIS Supplement Sections 3.7.3 and 3.9.6.2.2 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 5 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li><li>■ The location of the stream encroachment is shown in Appendix A, Figure A-3.</li><li>■ A detailed description of the Lake D1 Outlet is provided in Appendix A, Section A1.3.</li></ul>
1 to 3	Coarse PK Pile	63° 26' 53.6" N 109° 11' 03.8" W	Kennady Lake Area 4	<i>Kennady Lake Area 4</i> Surface Area: 0.74 km <sup>2</sup> Maximum Depth: 16.2 m	<ul style="list-style-type: none"><li>■ The preliminary design for the Coarse PK Pile at the Project includes a small encroachment on Kennady Lake Area 4.</li><li>■ The Coarse PK Pile will include approximately 9.36 Mt of coarse PK and grits.</li><li>■ <b>The Coarse PK Pile will likely require an NWPA Approval.</b></li></ul>	<ul style="list-style-type: none"><li>■ The location of the Coarse PK Pile is shown in Figure 2 and Figure 3.</li><li>■ The Coarse PK Pile is described in 2012 EIS Supplement Sections 3.7.4 and 3.9.6.2.3 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 4 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>



Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
4	Dyke B	<i>Dyke Midpoint</i> 63° 26' 55.6" N 109° 11' 53.2" W	Kennady Lake Areas 3 & 4	<i>Lake at Dyke Alignment</i> Top Width: 730 m Maximum Depth: 9.7 m	<ul style="list-style-type: none"><li>■ Dyke B is an internal water-retention dyke, which will be constructed between Kennady Lake Areas 3 and 4, to allow dewatering of Area 4 and mining of Tuzo Pit.</li><li>■ Dyke B will have a crest elevation of 424.0 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 411.0 m. It will consist of two parallel rockfill dykes, approximately 130 m apart, with a till fill in between. The Area 4 side of the dyke will also include a low permeability till filter layer.</li><li>■ A portion of the Dyke B crest will be breached during the Closure phase, to an elevation of 418.0 m, compared to the existing mean lake water surface elevation of 420.7 m, to create a temporary spillway to convey runoff. Dyke B will be breached in Year 11 to provide navigation and fish habitat.</li><li>■ <b><i>Dyke B will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke B is shown in Figure 2 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 and lowering during closure is described in 2012 EIS Supplement Section 3.9.7.2 (De Beers 2012b). Note that the dyke will be excavated to an elevation of 417.0 m and then 1.0 m of rockfill will be placed on top.</li><li>■ A preliminary design for Dyke B is provided in Figure 3 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
4	Hearne Pit	63° 25' 55.1" N 109° 13' 43.7" W	Kennady Lake Area 6	<i>Kennady Lake Area 6</i> Surface Area: 1.70 km <sup>2</sup> Maximum Depth: 18.2 m	<ul style="list-style-type: none"><li>■ Hearne Pit will be open-pit mined to a depth of approximately 205 m, with vertical bench heights of 12 m and bench widths of 7 to 14 m.</li><li>■ Pre-stripping of Hearne Pit will begin in Year 4 on the dewatered lakebed.</li><li>■ Mining operations will be completed in Year 7, and fine PK will start to be deposited in the mined-out pit.</li><li>■ Hearne Pit will be backfilled with fine PK to an elevation of approximately 100 m below the original lakebed.</li><li>■ <b><i>Hearne Pit will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Hearne Pit is shown in Figure 2 and Figure 3.</li><li>■ Mining operations are described in 2012 EIS Supplement Sections 3.5 and 3.7.5.3 and Hearne Pit in 2012 EIS Supplement Section 3.12.6.2 9 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 6 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
4	Dyke N	<i>Dyke Midpoint</i> 63° 25' 54.4" N 109° 13' 23.7" W	Kennady Lake Area 6	<i>Lake at Dyke Alignment</i> Top Width: 372 m Maximum Depth: 7.7 m	<ul style="list-style-type: none"><li>■ Dyke N is an internal water-retention dyke, which will be constructed to bisect Kennady Lake Area 6 and isolate Hearne Pit from the remainder of Kennady Lake.</li><li>■ Dyke N will have a maximum crest elevation of 423.0 m, compared to the existing mean lake water surface elevation of 420.7 m and an approximate minimum lakebed elevation of 413.0 m. It will consist of a broad earthfill dyke, with a crest width of approximately 65 m. The dyke will be filled with till and will be faced with mine rockfill. Stage 1 construction will occur in Year 4, when the lakebed is exposed by dewatering, and Stage 2 construction will occur in Year 9.</li><li>■ A portion of the Dyke N crest will be breached during the Closure phase, to an elevation of 418.0 m, compared to the existing mean lake water surface elevation of 420.7 m, to create a temporary spillway to convey runoff. Dyke N will be breached in Year 11 to provide navigation and fish habitat.</li><li>■ <b><i>Dyke N will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Dyke N is shown in Figure 2 and Figure 3.</li><li>■ Dyke descriptions are provided in 2012 EIS Supplement Table 3.9-1 and lowering during closure is described in 2012 EIS Supplement Section 3.9.7.2 (De Beers 2012b). Note that the dyke will be excavated to an elevation of 417.0 m and then 1.0 m of rockfill will be placed on top.</li><li>■ A preliminary design for Dyke N is provided in Figure 15 of Round 1 Information Request Response DFO&amp;EC_26, dated April 6, 2012 (Appendix B). Construction materials and methods are also described in that document.</li></ul>
5	Tuzo Pit	63° 26' 32.7" N 109° 12' 03.9" W	Kennady Lake Area 4	<i>Kennady Lake Area 4</i> Surface Area: 0.74 km <sup>2</sup> Maximum Depth: 16.2 m	<ul style="list-style-type: none"><li>■ Tuzo Pit will be open-pit mined to a depth of approximately 300 m, with vertical bench heights of 12 m and bench widths of 7 to 14 m.</li><li>■ Pre-stripping of Tuzo Pit will begin in Year 5 on the dewatered lakebed.</li><li>■ Mining operations will be completed in Year 11.</li><li>■ Tuzo Pit will not be backfilled and will have a final bottom elevation of 120 m.</li><li>■ <b><i>Tuzo Pit will likely require an NWPA Approval.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ The location of Tuzo Pit is shown in Figure 2 and Figure 3.</li><li>■ Mining operations are described in 2012 EIS Supplement Section 3.5 and Tuzo Pit in 2012 EIS Supplement Section 3.12.6.3 (De Beers 2012b).</li><li>■ Surface area and depth of Kennady Lake Area 4 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
6 to 11	No new mine infrastructure					

Table 1: Pre-Design Description of Works Planned for the Life of Mine (continued)

Year Constructed	Works	Location of Work <sup>(a)</sup>	Name of Waterway	Waterway Dimensions	Details of the Work	References, Tables and Figures
Interim Reclamation	Lake Refilling Pipeline	<i>Intake</i> 63° 28' 39.3" N 109° 14' 40.2" W <i>Outfall</i> 63° 27' 42.6" N 109° 13' 00.4" W	Lake N11, Kennady Lake Area 3	<i>Lake N11</i> Surface Area: 5.38 km <sup>2</sup> Maximum Depth: 6.6 m <i>Kennady Lake Area 3-5</i> Surface Area: 2.56 km <sup>2</sup> Maximum Depth: 15.7 m	<ul style="list-style-type: none"><li>■ The discharge pipeline from Lake N11 to Kennady Lake Area 3 will reverse the alignment of Discharge Pipeline No. 1, as described above, and will not include any additional watercourse crossings.</li><li>■ This system will include a water intake at Lake N11 and an outfall at Kennady Lake Area 3.</li><li>■ Design details of these infrastructure components are not yet available.</li><li>■ As per Table 9.6-4 of Section 9 of the 2011 EIS Update (De Beers 2011), the intake will be designed with best practices to prevent the impingement and entrainment of fish. The option of using a rock structure to avoid the need for screens, or in combination with screens, will be evaluated; infiltration gallery- type designs are commonly used for water intakes across Canada. If fish screens are used to limit the fish entering into the water intake, the screens would be designed according to the DFO Freshwater Intake End-of-Pipe Fish Screen Guideline. The selection of the intake site and assessment of the habitat at the site will be completed during the detailed design phase of the Project.</li><li>■ A specific application for approval to construct the intake will be developed once a footprint and site have been finalized, which will account for the timing of construction and location of the intake within the lake. The intake design will also include consideration of approach velocities across the screen or infiltration gallery, such that the DFO end-of-pipe guidelines for the species and life stages of fish expected to be in contact will be met to mitigate for the potential of impingement and entrainment of fish.</li><li>■ No outfall structure has yet been designed.</li><li>■ <b><i>The Lake Refilling Pipeline from Lake N11 to Kennady Lake Area 3 may require an NWPA Approval, unless the intakes and outfalls are fully mitigated.</i></b></li></ul>	<ul style="list-style-type: none"><li>■ Surface area and depth of Lake N11 are referenced to the 2011 Fish and Aquatic Resources Supplemental Monitoring Report (Golder 2012a).</li><li>■ Surface area and depth of Kennady Lake Area 3 are derived from Round 1 Information Request Response GKP 14, Table GKP 14-1, dated April 4, 2012 (De Beers 2012c).</li></ul>
Closure	The closure state of all mine infrastructure elements has been described in previous entries.					

<sup>(a)</sup> Coordinates are indicative of the midpoint of the stream crossing or centre of the structure in a lake setting.



Figure 1: Works Constructed during the Project Construction Phase (prior to Project Year 1)

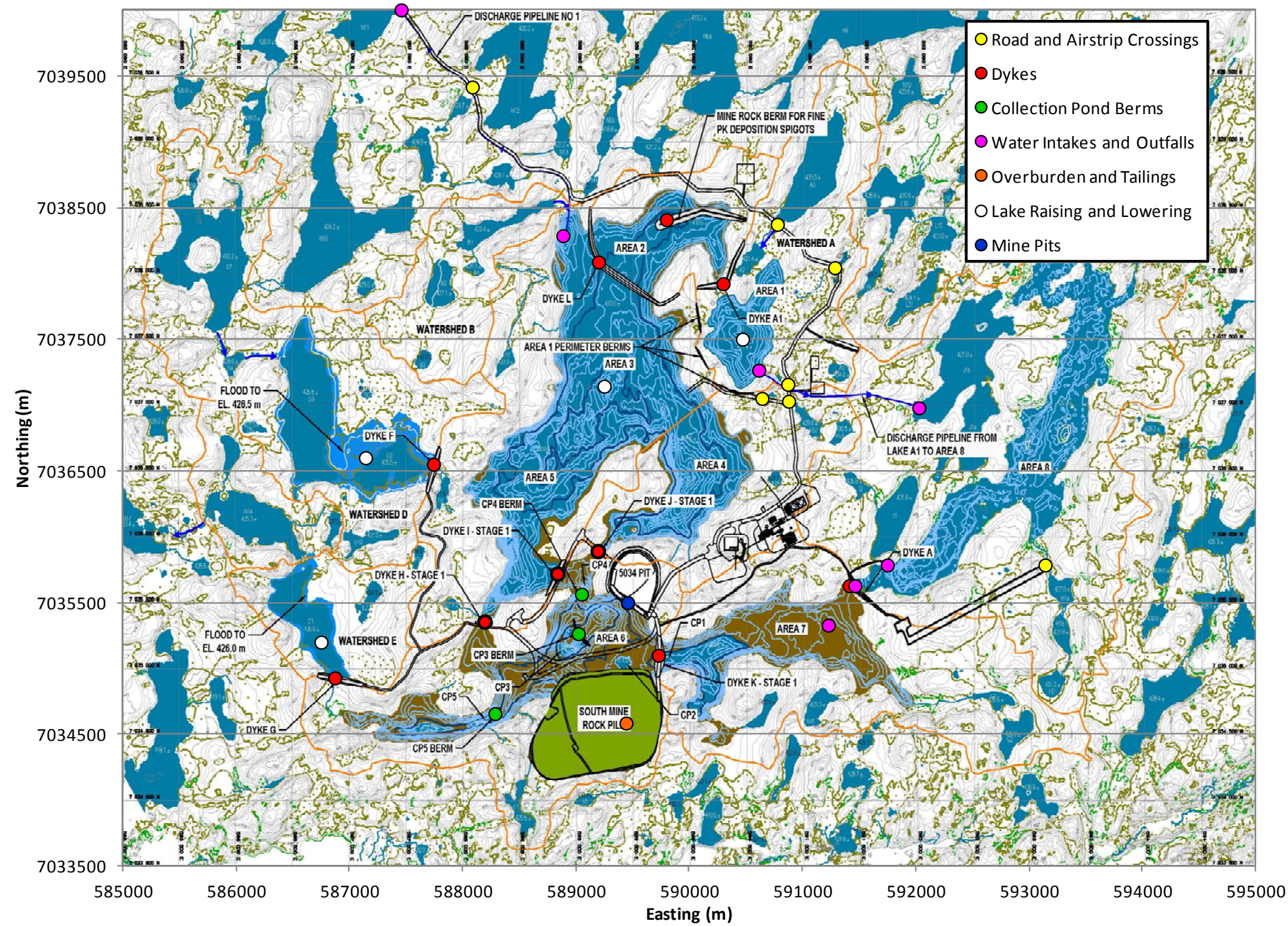




Figure 2: Works Constructed during the Project Operations and Closure Phases (Year 1 to Year 11)

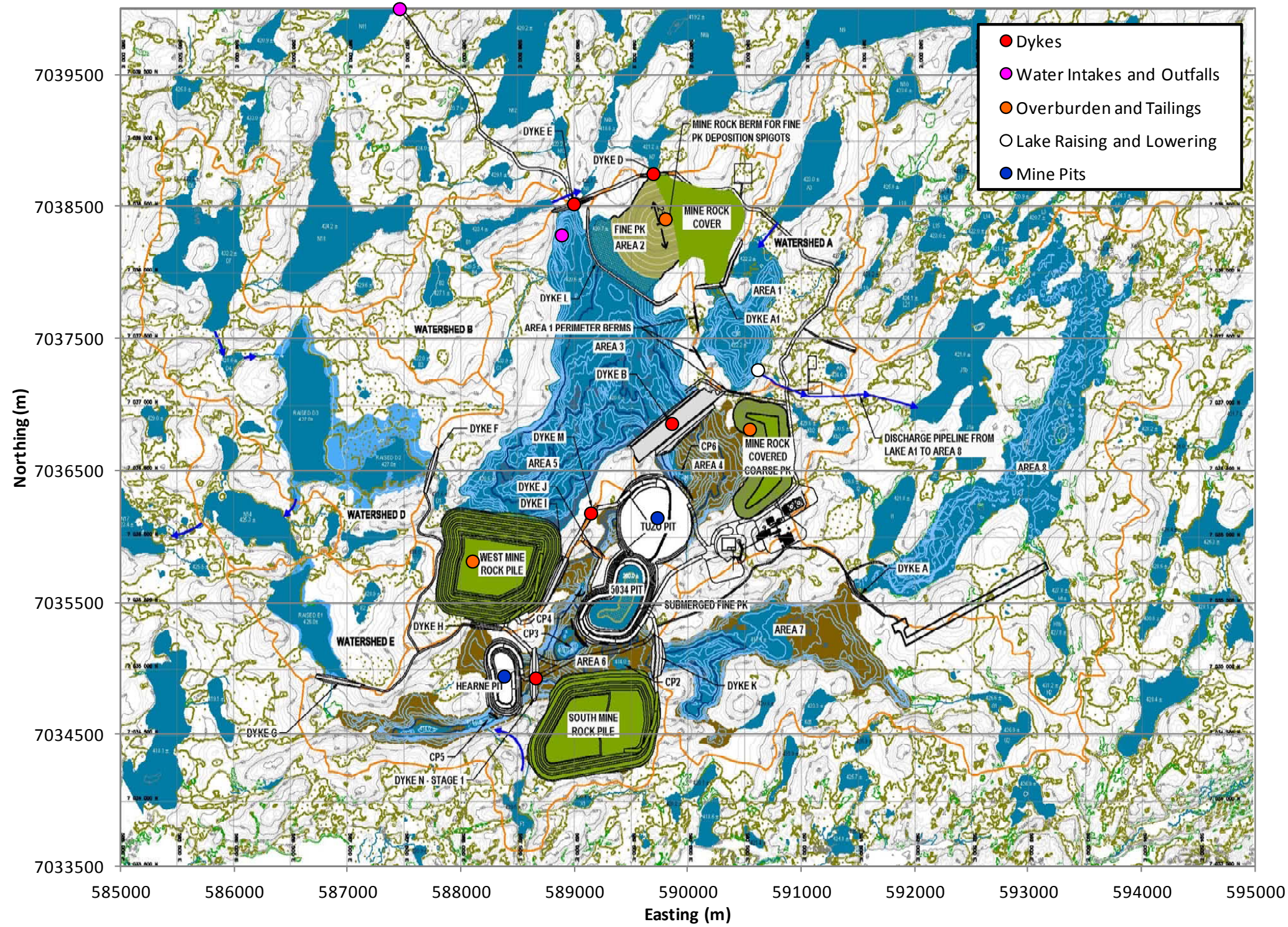
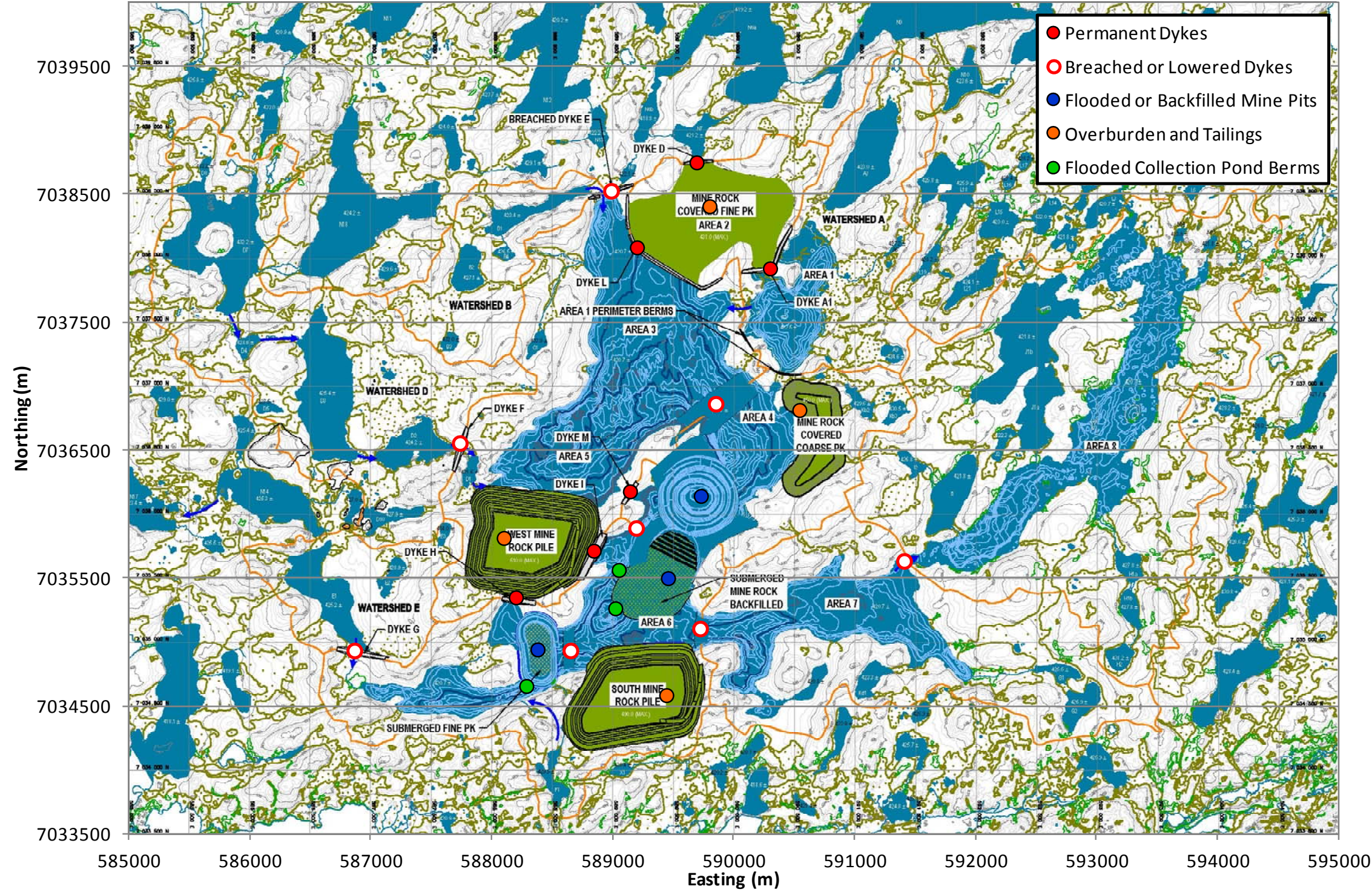




Figure 3: Works Remaining in Project Post-Closure Phase





## Closure

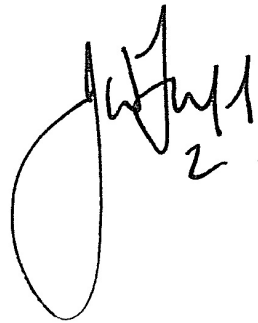
We trust this technical memorandum provides you with the information you require at this time. Should you have any questions, or require further information please contact the undersigned.

**GOLDER ASSOCIATES LTD.**

**Reviewed by:**



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Associate, Senior Water Quality Specialist

NS/JF/kl



## References

- De Beers (De Beers Canada Inc.). 2010. Environmental Impact Statement for the Gahcho Kué Project. Volumes 1, 2, 3a, 3b, 4, 5, 6a, 6b, 7 and Annexes A through N. Submitted to Mackenzie Valley Environmental Impact Review Board. December 2010.
- De Beers. 2011. Environmental Impact Statement for the Gahcho Kué Project. Volumes 3a Revision 2, 3b Revision 2, 4 Revision 2, and 5 Revision 2. Submitted to the Mackenzie Valley Environmental Impact Review Board in Response to the Environmental Impact Statement Conformity Review. July 2011.
- De Beers. 2012a. Fisheries & Oceans Canada and Environment Canada Joint Information Request Responses – Gahcho Kué Project Environmental Impact Review. Submitted to Mackenzie Valley Environmental Impact Review Board. April 2012.
- De Beers. 2012b. Environmental Impact Statement Supplemental Information Submission for the Gahcho Kué Project. Submitted to the Mackenzie Valley Environmental Impact Review Board, Yellowknife, NWT, Canada.
- De Beers. 2012c. Gahcho Kué Panel Information Request Responses – Gahcho Kué Project Environmental Impact Review. Submitted to Mackenzie Valley Environmental Impact Review Board. April 2012.
- Golder (Golder Associates Ltd.). 2012a. 2011 Fish and Aquatic Resources Supplemental Monitoring Report. Report No. 11-1365-0001/DCN-054. Submitted to De Beers Canada Inc. March 2012.
- Golder. 2012b. Potential Effects to Navigation Associated with the Proposed Gahcho Kué Project Development. Submitted to De Beers Canada Inc. October 2012.

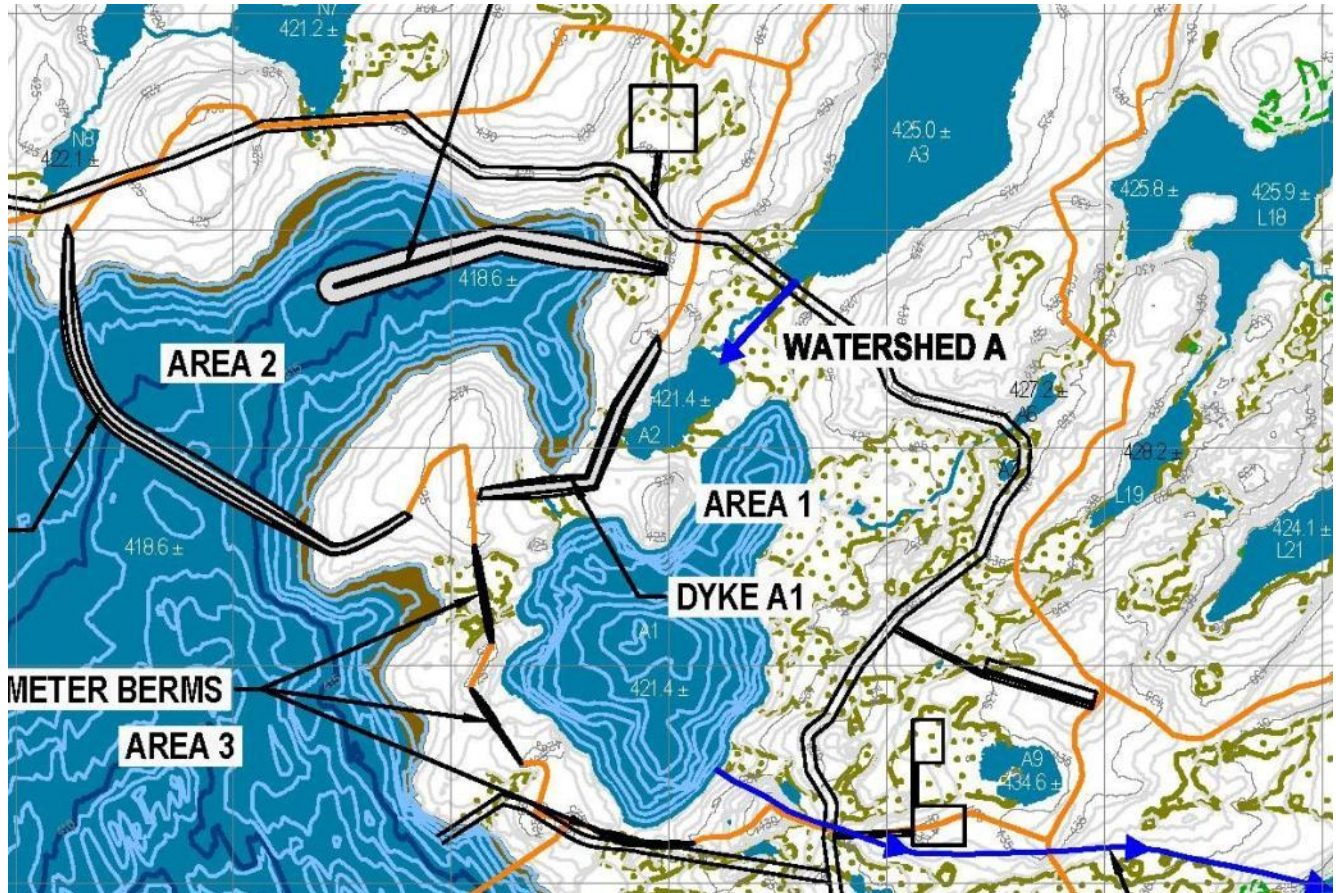
## **APPENDIX A**

### **MINOR WATERS AFFECTED BY PROJECT WORKS**

### A1.1 Lake A1 Outlet

Dyke A1 at the Project is intended to divert the Lake A1 Outlet channel, a tributary of Kennady Lake Area 2, as shown in Figure A-1.

*Figure A-1: Project Dyke A1 Area showing Encroachment on Lake A1 Outlet*



A field reconnaissance was performed on the Lake A1 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-1 and photographs are provided in Table A-2.

The reconnaissance was performed on 26 September 2007, and included aerial and land-based photography. No channel measurements were performed. The outlet channel was observed to have multiple small channels in upstream and downstream areas, dispersed amongst bouldery, vegetated ground, with a single channel in the middle reach of the outlet channel.



**Table A-1: Lake A1 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	2.24 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	100 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	0.7 m	421.4 m – 420.7 m
Channel Slope	0.007 m/m	Derived (0.7%)
Bed Material	Cobble/Boulder	Site reconnaissance
Mean Bankfull Width <sup>(a)</sup>	1.50 m	Estimated based on site reconnaissance
Mean Bankfull Depth <sup>(a)</sup>	0.60 m	Estimated based on site reconnaissance
2-year Flood Discharge	0.19 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.29 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.080 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.021 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.014 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.005 m <sup>3</sup> /s	Water balance modelling

<sup>(a)</sup> 2010 EIS Annex J, Appendix J.I, Table J.I-51 indicates a bankfull width of 3.9 m and a bankfull depth of 0.37 m (De Beers 2010).

It is not possible to declare this channel a Minor Water, either by Initial Screening or Secondary Review criteria, due to the mean bankfull width possibly being slightly greater than the maximum value of 3.0 m (2010 EIS [De Beers 2010, Annex J, Appendix J.I, Table J.I-51]) and the mean bankfull depth possibly being as large as the maximum value of 0.60 m. However, this channel has a small watershed area (only 2.24 km<sup>2</sup>), an extremely variable channel form, with areas of multiple, smaller channels, and multiple obstacles in the form of a bouldery bed.

It is recommended that Transport Canada be asked to rule on the navigability of this channel, as it appears that it may be non-navigable.

**Table A-2: Photographs at Lake A1 Outlet, 26-Sep-07**



*Aerial View of Lake A1 Outlet from West (flow top to bottom)*



*A1 Outlet Channel at Upstream Location – View Upstream*



*A1 Outlet Channel at Midstream Location – View Downstream*

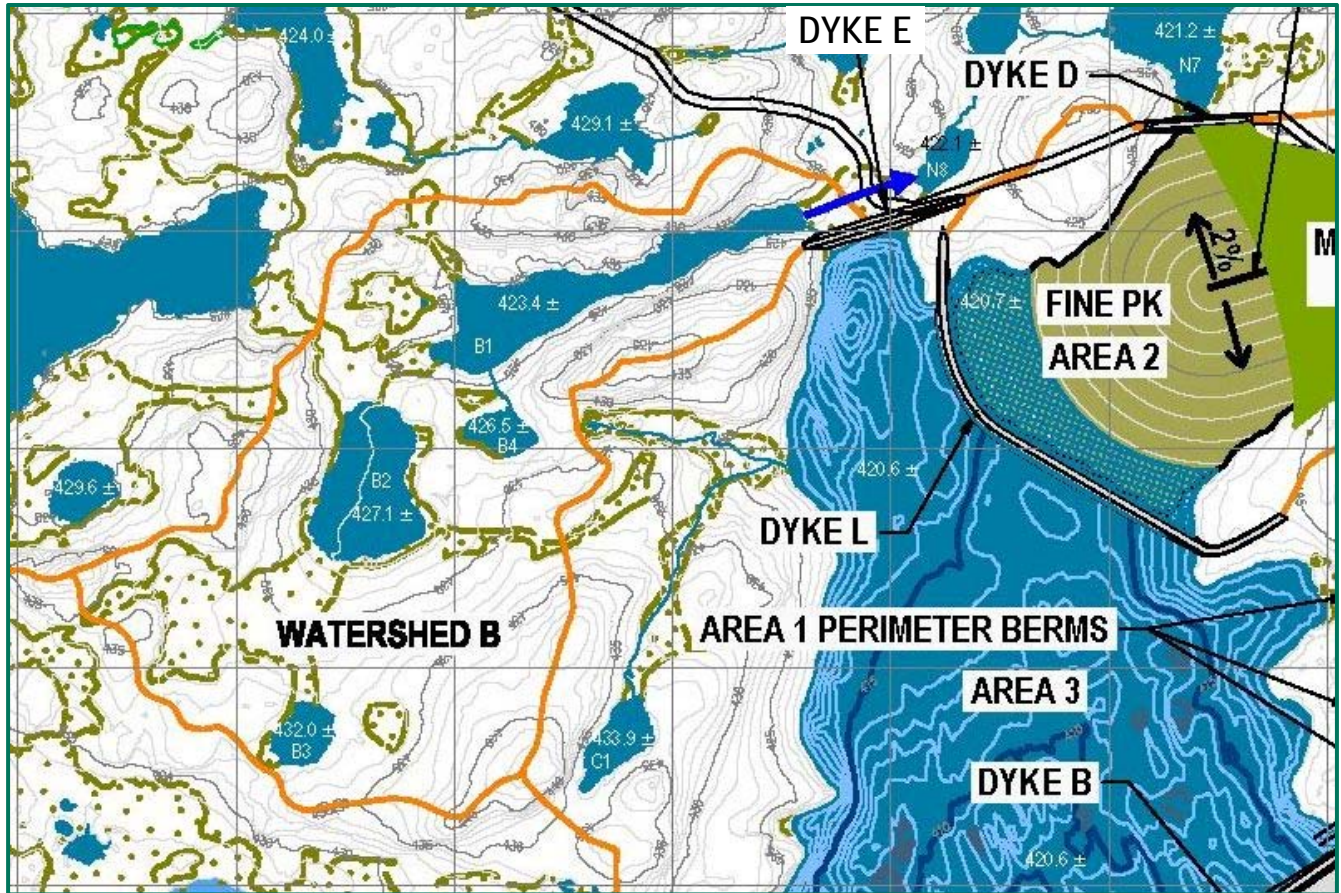
*A1 Outlet Channel at Midstream Location – View Upstream*



## A1.2 Lake B1 Outlet

Dyke E at the Project is intended to divert the Lake B1 Outlet channel, a tributary of Kennady Lake Area 3, as shown in Figure A-2.

*Figure A-2: Project Dyke E Area showing Encroachment on Lake B1 Outlet*



A field reconnaissance was performed on the Lake B1 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-3 and photographs are provided in Table A-4.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 588821 m E, 7038503 m N – NAD 83, Zone 12): Bankfull width 1.0 m, bankfull depth 0.35 m, water depth 0.20 m, boulder garden located above this section.
- Midpoint (UTM 588855 m E, 7038471 m N – NAD 83, Zone 12): Bankfull width 1.4 m, bankfull depth 0.25 m, water depth 0.15 m, heavily vegetated upstream and downstream from this section.
- Downstream (UTM 588862 m E, 7038451 m N – NAD 83, Zone 12): Bankfull width 1.1 m, bankfull depth 0.35 m, water depth 0.25 m.



**Table A-3: Lake B1 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	1.27 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	94 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	2.7 m	423.4 m – 420.7 m
Channel Slope	0.029 m/m	Derived (2.9%)
Bed Material	Cobble/Boulder	Site reconnaissance
Mean Bankfull Width	1.17 m	Site reconnaissance at 3 locations
Mean Bankfull Depth	0.32 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.26 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.45 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.053 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.010 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.012 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.004 m <sup>3</sup> /s	Water balance modelling

The Lake B1 Outlet is considered non-navigable by the Initial Review under Minor Waters criteria, on the basis of having an average bankfull width <1.2 m. Numerous boulders projecting upwards in the channel above the floodplain elevation may also constitute natural obstacles.

**Table A-4: Photographs at Lake B1 Outlet, 13-Sep-12**



*Aerial View of Lake B1 Outlet from North (flow right to left)*



*B1 Outlet Channel at Downstream Location*



*B1 Outlet Channel at Upstream Location*



*B1 Outlet Channel at Upstream Location – View Upstream*



*B1 Outlet Channel at Midstream Location – View Downstream*



*B1 Outlet Channel at Midstream Location*



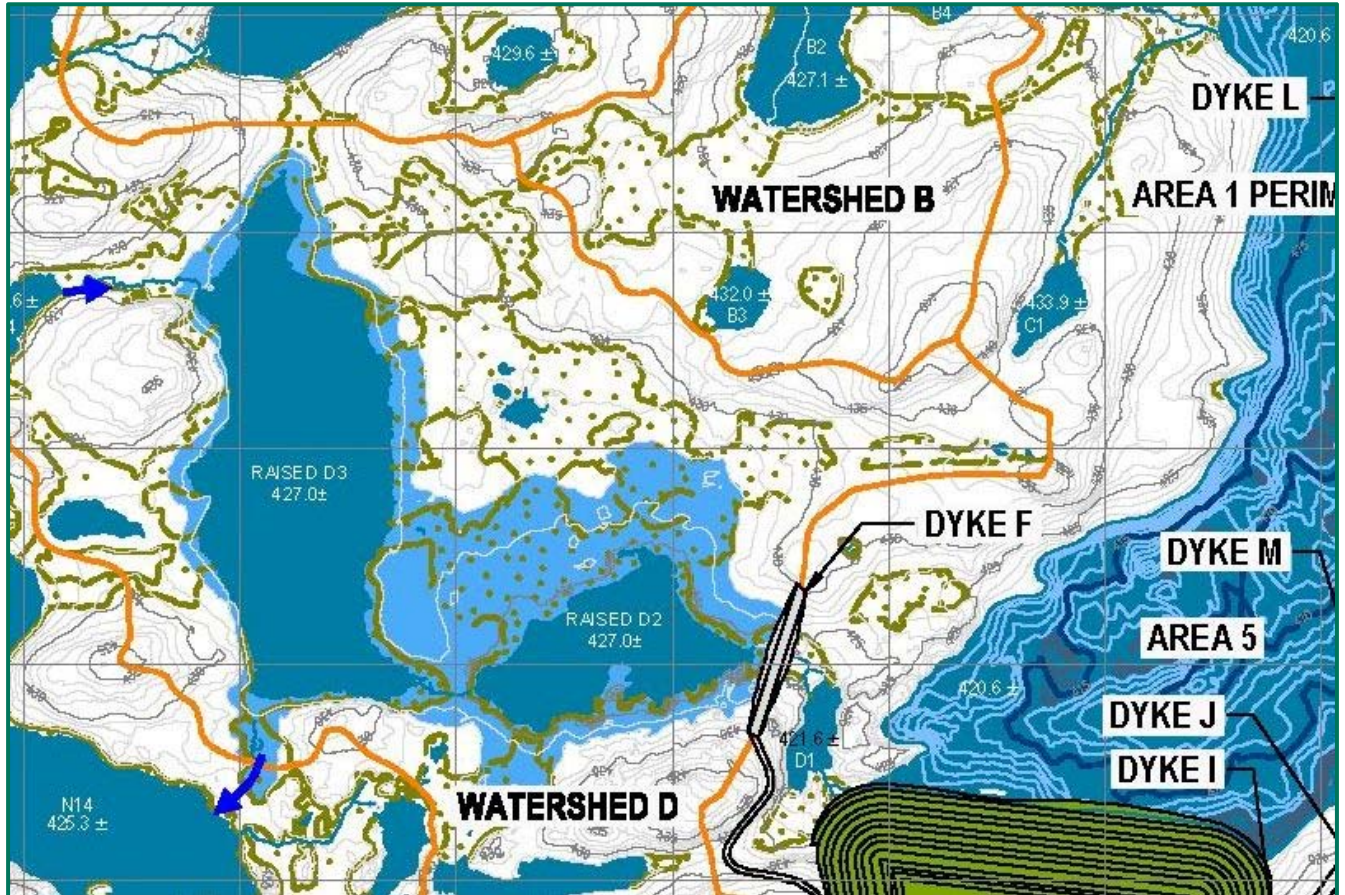
*B1 Outlet Channel at Midstream Location – View Upstream*



### A1.3 Lake D1 Outlet

Dyke F at the Project is intended to divert flow from upstream of Lake D1. The preliminary design for the West Mine Rock Pile also shows encroachment on the Lake D1 Outlet channel, a tributary of Kennady Lake Area 5, as shown in Figure A-3.

*Figure A-3: Project Dyke F Area showing Downstream Lake D1 Outlet and Encroachment by West Mine Rock Pile*



A field reconnaissance was performed on the Lake D1 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-5 and photographs are provided in Table A-6.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 587847 m E, 7036235 m N – NAD 83, Zone 12): Bankfull width 1.9 m, bankfull depth 0.30 m, water depth 0.20 m, boulder garden located above this section.
- Midpoint (UTM 587865 m E, 7036199 m N – NAD 83, Zone 12): Bankfull width 1.8 m, bankfull depth 0.55 m, water depth 0.40 m, many large rocks throughout the stream, downstream flows through impassable rock garden.
- Downstream (UTM 587889 m E, 7036195 m N – NAD 83, Zone 12): Bankfull width 0.9 m, bankfull depth 0.40 m, water depth 0.30 m, stream flows through rock garden and rock interstices.

**Table A-5: Lake D1 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	4.50 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	118 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	0.9 m	421.6 m – 420.7 m
Channel Slope	0.008 m/m	Derived (0.8%)
Bed Material	Cobble/Boulder	Site reconnaissance
Mean Bankfull Width	1.53 m	Site reconnaissance at 3 locations
Mean Bankfull Depth	0.48 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.40 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.66 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.170 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.044 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.036 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.016 m <sup>3</sup> /s	Water balance modelling

The Lake D1 Outlet does not pass the Initial Review under Minor Waters criteria (mean depth <0.30 m or mean width <1.20 m). However, it passes the Secondary Review (mean width <3.00 m and mean depth <0.60 m). Numerous boulders projecting upwards in the channel above the floodplain elevation may also constitute natural obstacles.



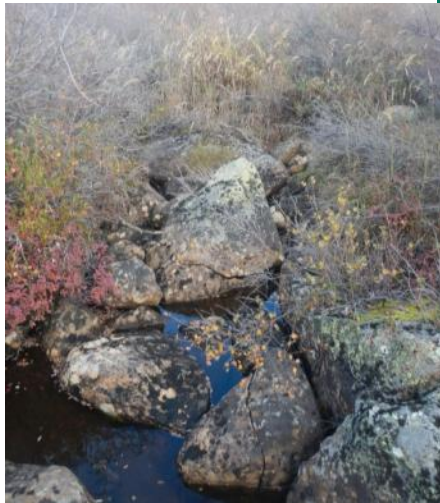
**Table A-6: Photographs at Lake D1 Outlet, 13-Sep-12**



*Aerial View of Lake D1 Outlet from South (flow from left to right)*



*D1 Outlet Channel at Downstream Location*



*D1 Outlet Channel at Downstream Location – Boulderly Channel*



*D1 Outlet Channel at Upstream Location*



*D1 Outlet Channel at Midstream Location – View Downstream*



*D1 Outlet Channel at Midstream Location*



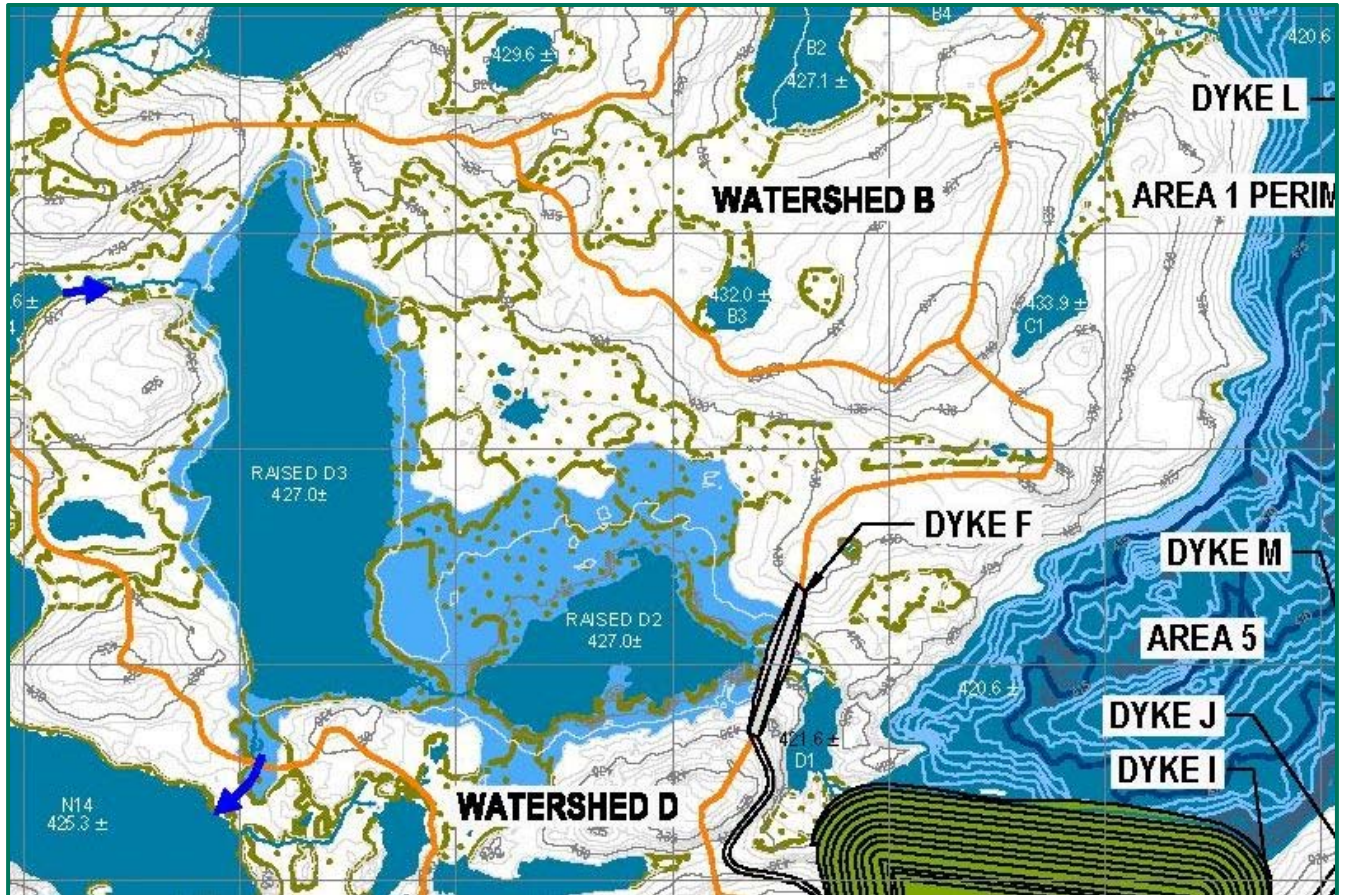
*D1 Outlet Channel at Midstream Location – View Upstream*



#### A1.4 Lake D2 Outlet

Dyke F at the Project is intended to divert the Lake D2 Outlet channel, a tributary of Lake D1 and ultimately Kennedy Lake Area 5. This will also raise the water level in Lake D2, as shown in Figure A-4.

*Figure A-4: Project Dyke F Area showing Encroachment on Lake D2 Outlet*



A field reconnaissance was performed on the Lake D2 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-7 and photographs are provided in Table A-8.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 587795 m E, 7036512 m N – NAD 83, Zone 12): Bankfull width 1.2 m, bankfull depth 0.30 m, water depth 0.20 m, stream flowing through boulder garden.
- Midpoint (UTM 587820 m E, 7036493 m N – NAD 83, Zone 12): Bankfull width 0.8 m, bankfull depth 0.25 m, water depth 0.15 m, flow upstream through boulder garden.
- Downstream (UTM 587854 m E, 7036477 m N – NAD 83, Zone 12): Bankfull width 1.4 m, bankfull depth 0.70 m, water depth 0.60 m, flow constricted through vegetation.



**Table A-7: Lake D2 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	4.27 km <sup>2</sup>	Measured from available mapping
Channel Length	228 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	2.6 m	424.2 m – 421.6 m
Channel Slope	0.011 m/m	Derived (1.1%)
Bed Material	Cobble/Boulder	Site reconnaissance
Mean Bankfull Width	1.13 m	Site reconnaissance at 3 locations
Mean Bankfull Depth	0.42 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.38 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.65 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.155 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.039 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.031 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.014 m <sup>3</sup> /s	Water balance modelling

The Lake D2 Outlet is considered non-navigable by the Initial Review under Minor Waters criteria, on the basis of having an average bankfull width <1.2 m. Numerous boulders projecting upwards in the channel above the floodplain elevation may also constitute natural obstacles.

**Table A-8: Photographs at Lake D2 Outlet, 13-Sep-12**



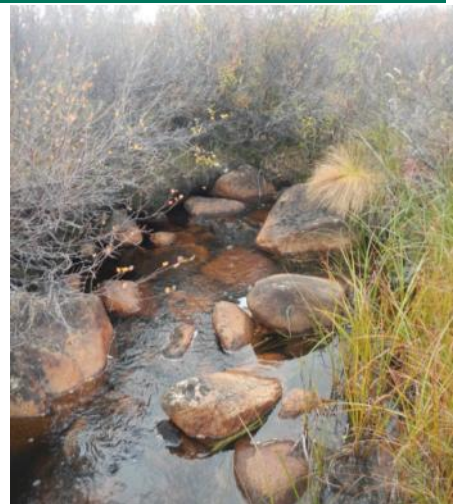
*Aerial View of Lake D2 Outlet from Northeast (flow from right to left)*



*D2 Outlet Channel at Downstream Location*



*D2 Outlet Channel at Downstream Location*



*D2 Outlet Channel at Midstream Location – View Upstream*



*D2 Outlet Channel at Midstream Location – View Downstream*



*D2 Outlet Channel at Midstream Location*



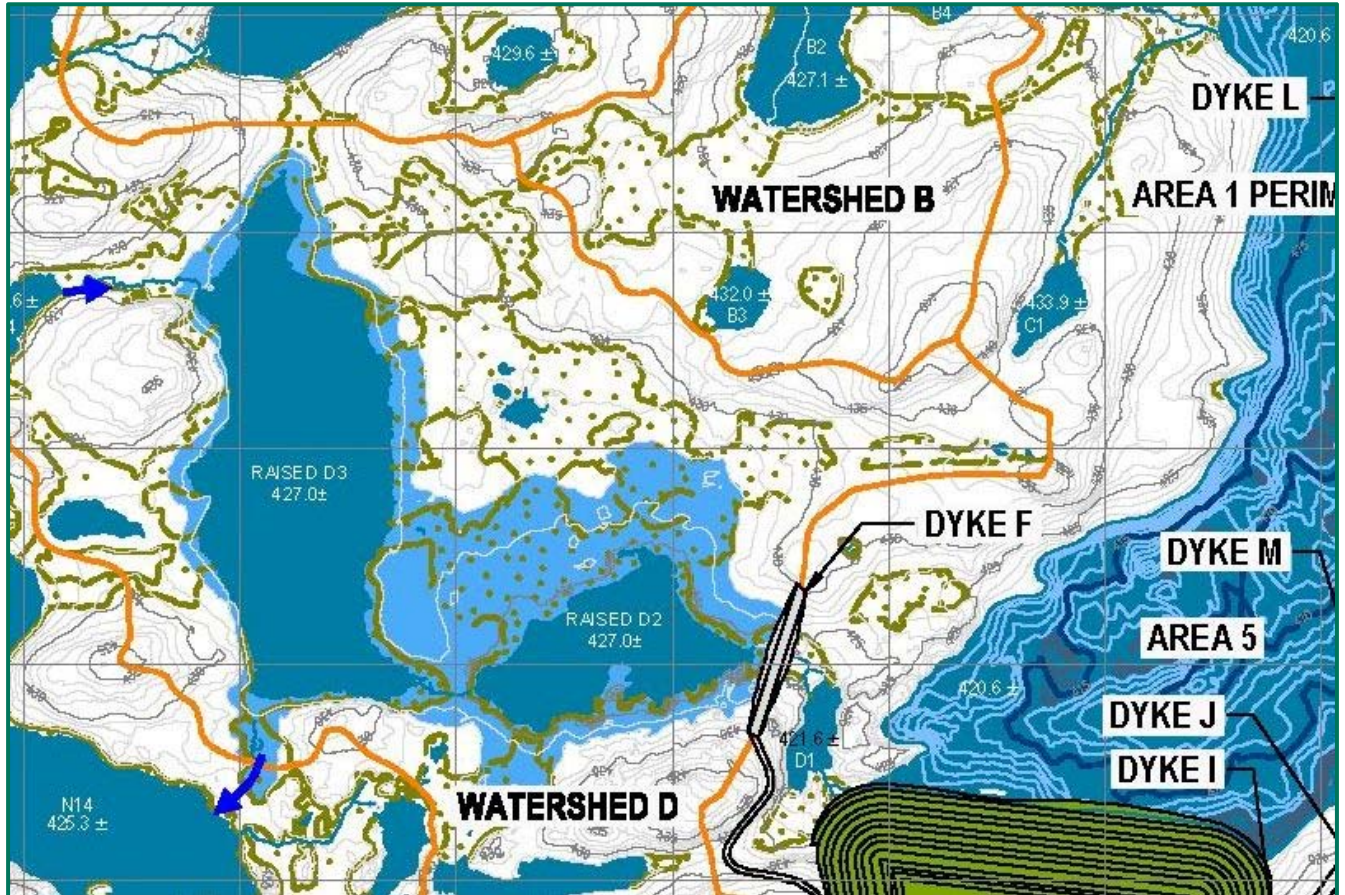
*D2 Outlet Channel at Midstream Location – View Upstream*



## A1.5 Lake D3 Outlet

Dyke F at the Project is intended to divert the Lake D2 Outlet channel, a tributary of Lake D1 and ultimately Kennady Lake Area 5. This will inundate the Lake D3 Outlet channel and raise the water level in Lake D3, as shown in Figure A-5.

Figure A-5: Project Dyke F Area showing Inundation of Lake D3 Outlet



A field reconnaissance was performed on the Lake D3 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-9 and photographs are provided in Table A-10.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 586956 m E, 7036432 m N – NAD 83, Zone 12): Bankfull width 1.2 m, bankfull depth 0.30 m, water depth 0.20 m, this section is directly upstream of a boulder garden.
- Midpoint (UTM 586982 m E, 7036432 m N – NAD 83, Zone 12): Bankfull width 2.1 m, bankfull depth 0.35 m, water depth 0.25 m, boulder gardens are located upstream and downstream of this section.
- Downstream (UTM 587005 m E, 7036427 m N – NAD 83, Zone 12): Bankfull width 1.2 m, bankfull depth 0.20 m, water depth 0.10 m.

**Table A-9: Lake D3 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	3.34 km <sup>2</sup>	Measured from available mapping
Channel Length	97 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	1.2 m	425.4 m – 424.2 m
Channel Slope	0.012 m/m	Derived (1.2%)
Bed Material	Cobble/Boulder	Site reconnaissance
Mean Bankfull Width	1.50 m	Site reconnaissance at 3 locations
Mean Bankfull Depth	0.28 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.25 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.41 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.107 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.028 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.020 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.009 m <sup>3</sup> /s	Water balance modelling

The Lake D3 Outlet does not pass the Initial Review under Minor Waters criteria (mean depth <0.30 m or mean width <1.20 m). However, it passes the Secondary Review (mean width <3.00 m and mean depth <0.60 m). Numerous boulders projecting upwards in the channel above the floodplain elevation may also constitute natural obstacles.



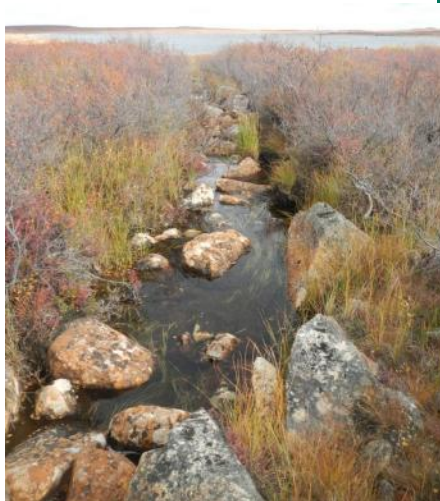
**Table A-10: Photographs at Lake D3 Outlet, 13-Sep-12**



*Aerial View of Lake D3 Outlet from North (flow from right to left)*



*D3 Outlet Channel at Downstream Location*



*D3 Outlet Channel at Downstream Location – Boulder Garden*



*D3 Outlet Channel at Upstream Location*



*D3 Outlet Channel at Midstream Location – View Downstream*



*D3 Outlet Channel at Midstream Location*



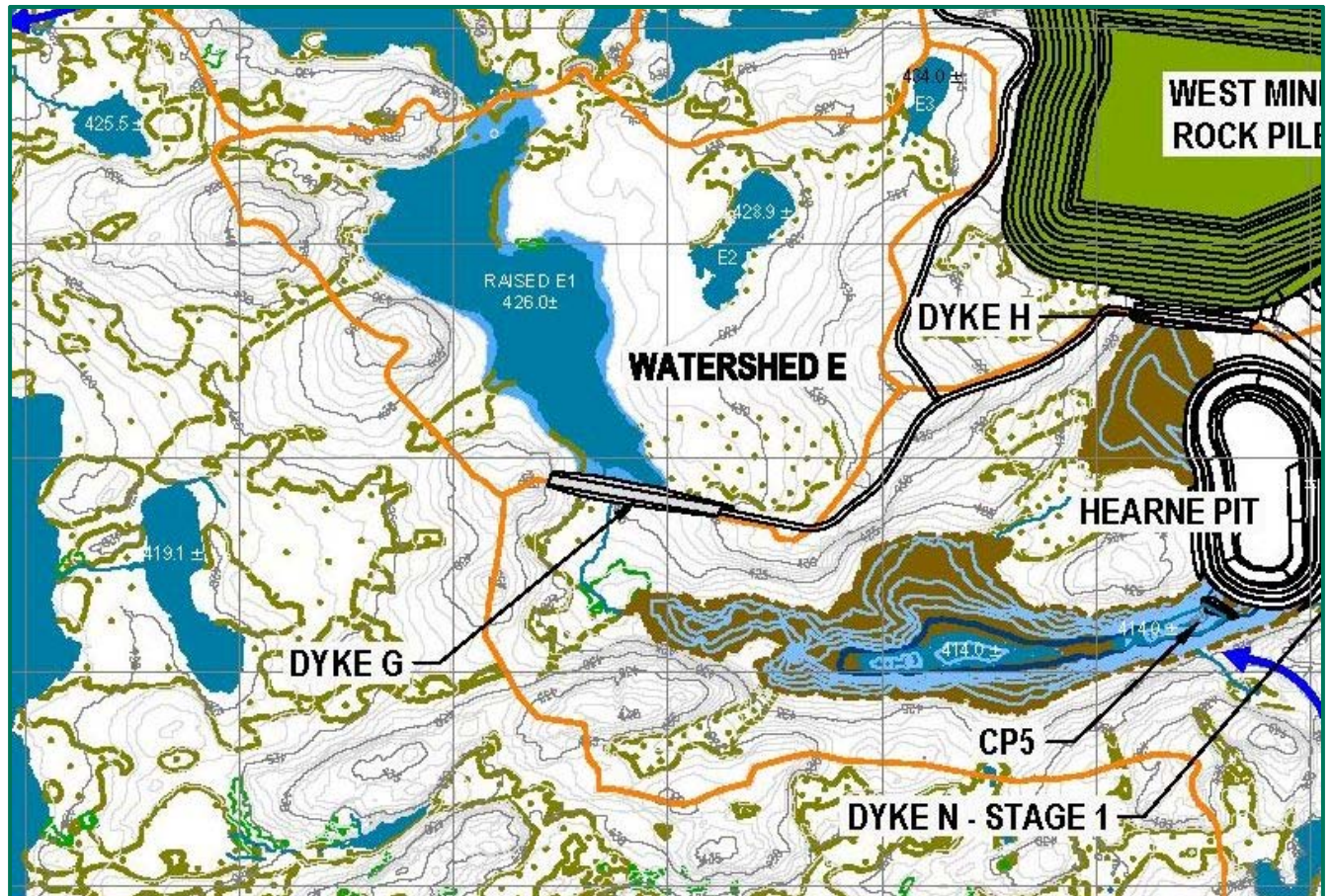
*D3 Outlet Channel at Midstream Location – View Upstream*



## A1.6 Lake E1 Outlet

Dyke G at the Project is intended to divert the Lake E1 Outlet channel, a tributary of Kennady Lake Area 6. This will also raise the water level in Lake E1, as shown in Figure A-6.

*Figure A-6: Project Dyke G Area showing Encroachment on Lake E1 Outlet*



A field reconnaissance was performed on the Lake E1 Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-11 and photographs are provided in Table A-12.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 586850 m E, 7034837 m N – NAD 83, Zone 12): Bankfull width 0.7 m, bankfull depth 0.20 m, water depth 0.10 m, ill-defined channel, mostly saturated muskeg.
- Midpoint (UTM 586808 m E, 7034765 m N – NAD 83, Zone 12): Bankfull width 0.2 m, bankfull depth 0.20 m, water depth 0.10 m, ill-defined channel, mostly just a clear area through saturated muskeg.
- Downstream (UTM 586795 m E, 7034711 m N – NAD 83, Zone 12): Bankfull width 0.65 m, bankfull depth 0.25 m, water depth 0.15 m, saturated muskeg.



**Table A-11: Lake E1 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	1.39 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	426 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	4.5 m	425.2 m – 420.7 m
Channel Slope	0.011 m/m	Derived (1.1%)
Bed Material	Vegetated/Organics	Site reconnaissance
Mean Bankfull Width	0.52 m	Site reconnaissance at 3 locations
Mean Bankfull Depth	0.22 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.23 m <sup>3</sup> /s	Water balance modelling
100-year Flood Discharge	0.50 m <sup>3</sup> /s	Water balance modelling
Median June Discharge	0.050 m <sup>3</sup> /s	Water balance modelling
Median July Discharge	0.009 m <sup>3</sup> /s	Water balance modelling
Median August Discharge	0.010 m <sup>3</sup> /s	Water balance modelling
Median September Discharge	0.004 m <sup>3</sup> /s	Water balance modelling

The Lake E1 Outlet is considered non-navigable by the Initial Review under Minor Waters criteria, on the basis of having an average bankfull width <1.2 m.

**Table A-12: Photographs at Lake E1 Outlet, 13-Sep-12**



*Aerial View of Lake E1 Outlet from East (flow right to left)*



*E1 Outlet Channel at Downstream Location*



*E1 Outlet Channel at Upstream Location*



*E1 Outlet Channel at Midstream Location – View Downstream*



*E1 Outlet Channel at Midstream Location*



*E1 Outlet Channel at Midstream Location – View Upstream*



The preliminary design for the South Mine Rock Pile at the Project encroaches on the Lake F1 Outlet channel, a tributary of Kennady Lake Area 6, as shown in Figure A-7.

A detailed topographic map of the South Mine area. The map features a large green-shaded area labeled 'SOUTH MINE ROCK PILE'. To its left is a smaller, irregularly shaped area labeled 'HEARNE PIT'. Several orange lines represent dykes, with labels 'DYKE H' and 'DYKE N - STAGE 1'. Contour lines are shown in brown and white, with elevations ranging from 400 to 430 meters. A blue area labeled 'AREA 6' is located near the rock pile. Other labels include 'CP2', 'CP3', 'CP4', and 'CP5'. A blue arrow points from the rock pile towards the hearne pit. The map is overlaid with a grid showing coordinates such as '587 000 E' and '588 000 E'.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 588568 m E, 7034208 m N – NAD 83, Zone 12): Bankfull width 6.2 m, bankfull depth 0.30 m, water depth 0.24 m.
- Midpoint (UTM 588581 m E, 7034219 m N – NAD 83, Zone 12): Bankfull width 10.0 m (boulder garden), bankfull depth 0.40 m, water depth 0.25 m, flow through boulder garden and heavy vegetation.
- Downstream (UTM 588596 m E, 7034279 m N – NAD 83, Zone 12): Bankfull width 5.0 m (poorly defined), bankfull depth undefined, water depth 0.10 m, flow through boulder garden and heavy vegetation.

**Table A-13: Lake F1 Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	0.30 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	168 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	8.8 m	429.5 m – 420.7 m
Channel Slope	0.052 m/m	Derived (5.2%)
Bed Material	Boulder	Site reconnaissance
Mean Bankfull Width <sup>(a)</sup>	3.2 m (ill-defined)	2010 EIS Annex J, Appendix J.I, Table J.1-51 (De Beers 2010)
Mean Bankfull Depth	0.35 m (ill-defined)	Site reconnaissance at 3 locations
Discharges	Not modelled	

<sup>(a)</sup> The site reconnaissance indicated a mean bankfull width of 7.1 m based on measurements at three locations, though with an extremely ill-defined channel.

It is not possible to declare this channel a Minor Water, either by Initial Screening or Secondary Review criteria, due to the mean bankfull width being slightly greater than the maximum value of 3.0 m. However, this channel has an extremely small watershed area (only 0.30 km<sup>2</sup>), multiple obstacles in the form of a bouldery bed, and a mean bed slope of 5.2% (exceeding the secondary screening criterion of 4.0%).

It is recommended that Transport Canada be asked to rule on the navigability of this channel, as it appears to be non-navigable.



**Table A-14: Photographs at Lake F1 Outlet, 13-Sep-12**



*Aerial View of Lake F1 Outlet from Northeast (flow from left to right)*



*F1 Outlet Channel at Downstream Location*



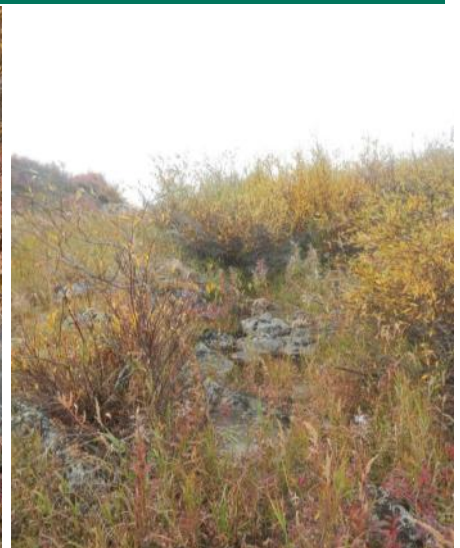
*F1 Outlet Channel at Upstream Location*



*F1 Outlet Channel at Midstream Location – View Downstream*



*F1 Outlet Channel at Midstream Location*



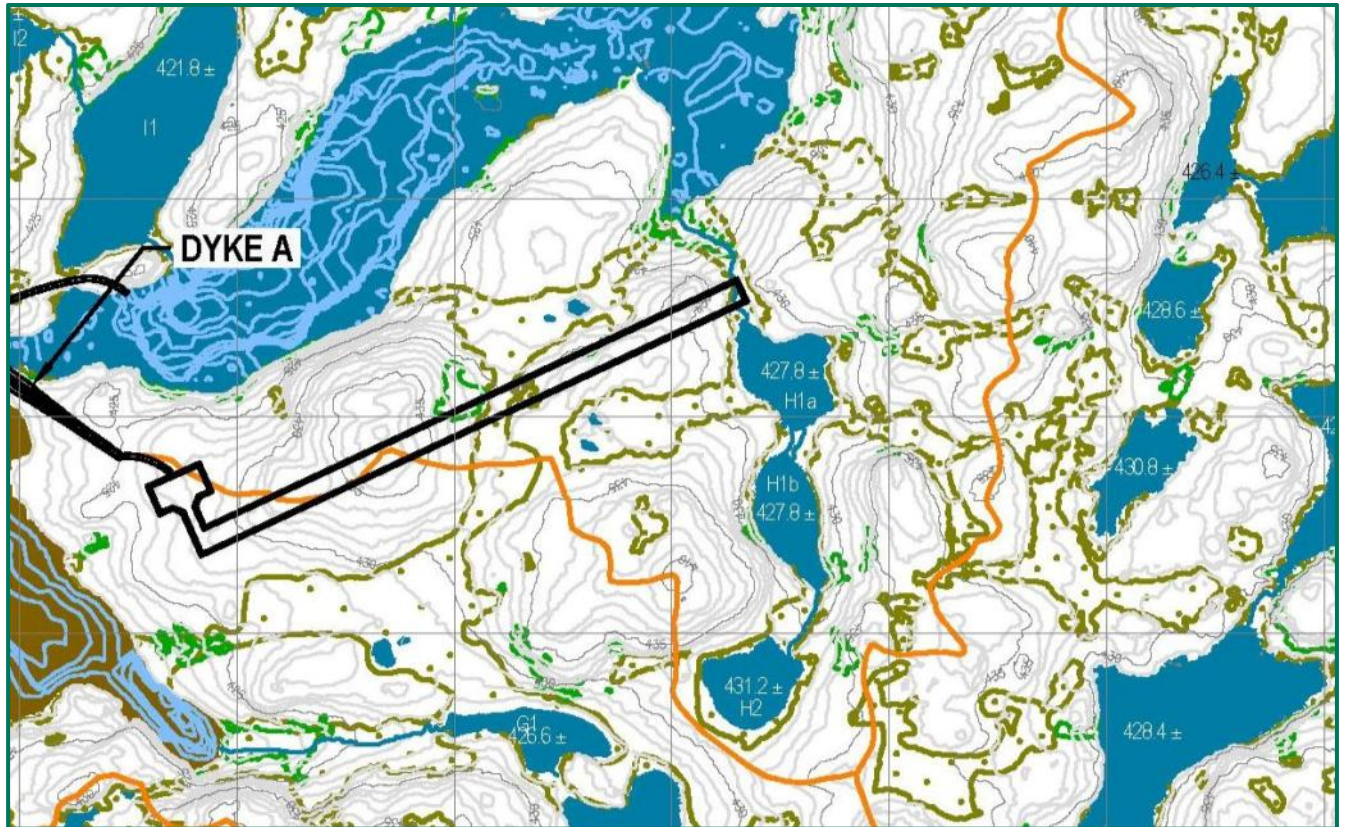
*F1 Outlet Channel at Midstream Location – View Upstream*



## A1.8 Lake H1a Outlet

The preliminary design for the airstrip at the Project encroaches on the Lake H1a Outlet channel, a tributary of Kennedy Lake Area 8, as shown in Figure A-8.

*Figure A-8: Project Airstrip Area showing Encroachment on Lake H1a Outlet*



A field reconnaissance was performed on the Lake H1a Outlet and additional information was sourced from the 2010 EIS (De Beers 2010). This information is summarized in Table A-15 and photographs are provided in Table A-16.

The reconnaissance was performed on 13 September 2012, and included aerial and land-based photography and measurements of channel bankfull width and depth obtained at three locations along the length of the channel. Observations included:

- Upstream (UTM 593149 m E, 7035807 m N – NAD 83, Zone 12): Bankfull width 4.4 m, bankfull depth 0.45 m, water depth 0.37 m, section heavily vegetated, channel ill-defined in downstream area.
- Midpoint (UTM 593105 m E, 7035880 m N – NAD 83, Zone 12): Bankfull width 2.5 m, bankfull depth 0.35 m, water depth 0.25 m, heavily vegetated.
- Downstream (UTM 593076 m E, 7035929 m N – NAD 83, Zone 12): Bankfull width 0.3 m, bankfull depth 0.40 m, water depth 0.28 m, stream below this point spreads out into low-lying muskeg with an ill-defined channel.



**Table A-15: Lake H1a Outlet - Physical Characteristics**

Parameter	Value	Source
Watershed Area	0.83 km <sup>2</sup>	2010 EIS Annex H, Appendix H.IV, Table H.IV-2 (De Beers 2010)
Channel Length	331 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
Elevation Drop	7.1 m	427.8 m – 420.7 m
Channel Slope	0.024 m/m	Derived (2.4%)
Bed Material	Vegetated / Muskeg	Site reconnaissance
Mean Bankfull Width <sup>(a)</sup>	0.60 m	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
Mean Bankfull Depth	0.40 m	Site reconnaissance at 3 locations
2-year Flood Discharge	0.16 m <sup>3</sup> /s	Water balance modeling
100-year Flood Discharge	0.27 m <sup>3</sup> /s	Water balance modeling
Median June Discharge	0.033 m <sup>3</sup> /s	Water balance modeling
Median July Discharge	0.006 m <sup>3</sup> /s	Water balance modeling
Median August Discharge	0.007 m <sup>3</sup> /s	Water balance modeling
Median September Discharge	0.002 m <sup>3</sup> /s	Water balance modeling

<sup>(a)</sup> The site reconnaissance indicated a mean bankfull width of 3.6 m based on measurements at three locations, though with an extremely ill-defined channel. The mean depth from the site reconnaissance is identical to that reported in 2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010).

The Lake H1a Outlet is considered non-navigable by the Initial Review under Minor Waters criteria, on the basis of having an average bankfull width <1.2 m. Given the ill-defined, bouldery channel in this reach, it would also qualify as a Minor Water if the bankfull width was up to 3.0 m, based on the mean bankfull depth of <0.60 m.

**Table A-16: Photographs at Lake H1a Outlet, 13-Sep-12**



*Aerial View of Lake H1a Outlet from Northeast (flow left to right)*



*H1a Outlet Channel at Downstream Location*



*H1a Outlet Channel at Upstream Location*



*H1a Outlet Channel at Midstream Location – View Downstream*



*H1a Outlet Channel at Midstream Location*



*H1a Outlet Channel at Midstream Location – View Upstream*



The site road network in general follows watershed divides and dyke crests, avoiding watercourse crossings. However, several small watercourses are crossed by site roads, as shown in Figure 1 and Figure A-9.

[illegible]

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**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings**

Crossing	Parameter	Value	Source
N12 Inlet	Channel Length	360 m	Available mapping
	Map Gradient	0.010 m/m	(423.7 m – 420.2 m) / 360 m
	Drainage Area	0.67 km <sup>2</sup>	Available mapping
	Bankfull Width	unknown	
	Bankfull Depth	unknown	
	Bed Material	unknown	
	Fish Passage	-	Not reported

No site reconnaissance has been performed at the Lake N12 Inlet. However, based on the extremely small drainage area, it is unlikely that the channel exceeds Minor Waters criteria. This assessment will be completed prior to construction and Approvals will be applied for if necessary.

*No photos of the N12 Inlet Channel are currently available*



**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings (continued)**

Crossing	Parameter	Value	Source
A3 Outlet	Channel Length	294 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Map Gradient	0.006 m/m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Drainage Area	0.80 km <sup>2</sup>	Available mapping
	Bankfull Width	0.90 m	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Bankfull Depth	0.20 m	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Bed Material	Fines with Cobble/Boulder	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Fish Passage	Yes	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)

The A3 Outlet Channel has been declared non-navigable by Transport Canada.



*A3 Outlet Channel Aerial View – Looking Downstream (24 June 2010)*

**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings (continued)**

Crossing	Parameter	Value	Source
A6 Outlet	Channel Length	610 m	Available mapping
	Map Gradient	0.010 m/m	(427.2 m – 421.3 m) / 610 m
	Drainage Area	0.08 km <sup>2</sup>	Available mapping
	Bankfull Width	unknown	
	Bankfull Depth	unknown	
	Bed Material	unknown	
	Fish Passage	-	Not reported

No site reconnaissance has been performed at the Lake A6 Outlet. However, based on the extremely small drainage area, it is unlikely that the channel exceeds Minor Waters criteria. This assessment will be completed prior to construction and Approvals will be applied for if necessary.



*A6 Outlet Channel Aerial View – Looking Downstream (14 September 2005)*



**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings (continued)**

Crossing	Parameter	Value	Source
A9 Outlet	Channel Length	440 m	
	Map Gradient	0.018 m/m	(434.6 m – 426.5 m) / 440 m
	Drainage Area	0.14 km <sup>2</sup>	Available mapping
	Bankfull Width	EIS Appendix J.IV-5 states that no apparent outlet to this lake was observed during the survey.	
	Bankfull Depth		
	Bed Material	Vegetated	See above
	Fish Passage	-	Not reported

No site reconnaissance has been performed at the Lake A9 Outlet. However, based on the extremely small drainage area and previous observations, it is unlikely that the channel exceeds Minor Waters criteria. This assessment will be completed prior to construction and Approvals will be applied for if necessary.



*A9 Outlet Channel Aerial View – Looking Downstream (14 September 2005)*

**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings (continued)**

Crossing	Parameter	Value	Source
Kb2 Outlet	Channel Length	181 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Map Gradient	0.023 m/m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Drainage Area	0.24 km <sup>2</sup>	Available mapping
	Bankfull Width	2010 EIS Annex J, Appendix J.IV, Section J.IV-5 states that the outlet channel was undefined.	
	Bankfull Depth		
	Bed Material	Not reported	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Fish Passage	No	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)

No site reconnaissance has been performed at the Lake Kb2 Outlet. However, based on the extremely small drainage area and previous observations, it is unlikely that the channel exceeds Minor Waters criteria. This assessment will be completed prior to construction and Approvals will be applied for if necessary.



*Kb2 Outlet Channel Aerial View – Looking Upstream (14 September 2005)*



**Table A-17: Physical Characteristics of Watercourses at Site Road Crossings (continued)**

Crossing	Parameter	Value	Source
Kb1 Outlet	Channel Length	300 m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Map Gradient	0.014 m/m	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)
	Drainage Area	0.28 km <sup>2</sup>	Available mapping
	Bankfull Width	1.00 m	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Bankfull Depth	0.15 m	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Bed Material	Organics	2010 EIS Annex J, Appendix J.I, Table J.I-51 (De Beers 2010)
	Fish Passage	No	2010 EIS Annex J, Table J4.1-4 (De Beers 2010)

No site reconnaissance has been performed at the Lake Kb1 Outlet. However, based on the extremely small drainage area and prior observations, it is unlikely that the channel exceeds Minor Waters criteria. This assessment will be completed prior to construction and Approvals will be applied for if necessary.



*Kb1 Outlet Channel Aerial View – Looking Downstream (14 September 2005)*