

RED CHRIS DEVELOPMENT COMPANY LTD.

RED CHRIS MINE

Emergency Preparedness and Response Plan (EPRP)

Version 001

As of November 27, 2014

A definitive Plan to establish a clear emergency response structure specific to the Red Chris Mine TIA. This Plan is a standalone document as Emergency Preparedness and Response Plan (EPRP) but also is included as Section 9 of the Operations, Maintenance and Surveillance Manual (OMS).

PREAMBLE

General Information

The Emergency Preparedness and Response Plan (EPRP) are activated when a project-related emergency, accident or malfunction especially related to the Tailings Impoundment Area occurs, or if such an incident is foreseeable.

At the time of writing this EPRP the Red Chris Mine is nearing the construction completion and commissioning activities are in progress. As such this EPRP has not been tested as yet. Red Chris Development Company Ltd. (RCDC), a wholly owned subsidiary of Imperial Metals Corporation, is committed to test this EPRP and for updating this EPRP if gaps are identified.

Annual Review, Testing and Record of Changes

This EPRP will be reviewed and tested at least annually and if required updated. A record will document all significant changes that have been incorporated in the EPRP subsequent to the latest annual review.

Distribution List

RCDC will maintain a distribution list for the EPRP providing information about all parties that receive this plan including mine personnel, departments, and outside agencies.

RECORD OF VERSIONS

[illegible]

RECORD OF DISTRIBUTION LIST

Copy No.	Department / Agency	Contact	Telephone Number
1 and 2	Head Office	Brian Kynoch	(604) 488 2654
3	General Manager	Tim Fisch	Site: 604-800-9200 ext 101
4	Health and Safety Superintendent	Walter (Wally) Rennie	Site: 604-800-9200 ext. 142
5	Mine Operations Superintendent	Tim Nehring	Site: 604-800-9200 ext 115
6	Environmental Superintendent	Jack Love	Site: 604-800-9200 ext 109
7	Mine Engineers		Site: 604-800-9200 ext. 229, 155
8	Mine Supervisors		Site: 604-800-9200 ext. 186, 187, 189, 190
9	Mill Maintenance Superintendent	Darcy Hannas	Site: 604-800-9200 ext 110
10	Mill Operations Superintendent	Peter Nelega	Site: 604-800-9200 ext 152
11	Mill Operators		Site: 604-800-9200. ext. 141, 221, 223, 224
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14	ML/ARD Consultant	Steven Day, SRK	(604) 681 4196
15	Dam Safety Review Consultant	TBD	To be determined
16	Director (Provincial Emergency Program PEP)	24/7 Contact Number	1-800-663-3456
17	Emergency Response Officer – MOE (Smithers)	Norm Fallows	250-847-7259
18	Chief Inspector of Mines – MEM (Victoria)	Al Hoffman	250-952-0494
19	Senior Inspector of Mines – MEM (Smithers)	Doug Flynn	250-847-7386
20			
21			
22			

RECORD OF EPRP TESTS

Date	Test No.	Any Gaps in EPRP Identified	Summary Lessons

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9.0 EMERGENCY PREPAREDNESS AND RESPONSE PLAN

From MAC guidelines:

- EPR plans to identify potential for accidents, respond to emergency situations, prevent and mitigate environmental and safety impacts
- List warning signs and potential consequences
- Specify call-out procedures
- Specify lines of communication – inside and outside site, with names and contact information
- Identify Process for notifying external parties
- Specify verification procedures to ensure parties have been contacted
- Ensure emergency response plans are widely distributed within the organization
- Typical contents of ERP
 - Identification of failure modes
 - Identification of roles and responsibilities
 - Regulatory requirements for reporting
 - Available resources
 - Public relations plans
 - Contact information of all relevant persons/organizations and communication system
 - Risk analysis of effects
 - Inundation maps
 - Basis to activate emergency response
 - How personnel will be trained
 - Post event investigation procedures
 - Contingency plans
 - How to restore normal operations
 - Tests/drills of the response plan

From Canadian Dam Association Guidelines:

- Emergency response plan should include
 - Roles and responsibilities
 - Priority of notifications
 - Should cover full range of potential flood issues (large storm and structural failures of dam)
 - How to address transition from normal conditions to emergency situation
- Method of assessing level of emergency, with predefined trigger levels
 - Hazardous condition or incident – does not pose immediate danger, but could develop into one
 - Potential emergency – need to prepare downstream areas for flood management
 - Imminent or actual emergency
- Emergency Identification and evaluation
 - Conditions/events indicating a potential emergency – what are potential failure modes and what are warning signs?
 - How to identify – what are monitoring and inspection procedures?
 - How to assess severity of emergency – pre defined trigger levels

- Who is responsible to activate emergency response when required
- Preventative and remedial action – describe what can be do prevent and slow or make less severe an emergency situation
- Notification procedures
 - Provide all contact info
 - Should be in order of priority
 - Should include – local authorities, agencies involved in emergency response, owner of facility, downstream users, government authorities
 - Communication with media
- Provide information on site access
 - By various methods (road, foot, helicopter)
 - In various conditions (night, storm, winter)
 - Location of communication infrastructure and material available for emergency response
 - Site plans
- Inundation maps if available

9.1. Purpose and Introduction

This Emergency Preparedness and Response Plan serve to establish a clear emergency response structure specific to the Red Chris Mine TIA. RCDC plans for and responds to emergency situations that could cause significant harm to people or the environment. In planning for emergencies, RCDC has developed a list of potential emergency situations and works cooperatively to ensure adequate response capabilities in case of an incident.

This plan details the conditions or events that indicate existing or potential emergencies, provides a means of identifying an existing or potential emergency, outlines procedures for assessing the severity and magnitude of an existing or potential emergency, and designates the persons(s) responsible for identifying and evaluating the emergency and activating the emergency response.

Additionally, this plan lists and classifies site-specific warning signs with reference to potential tailings and water management facility failure modes or emergencies—from both structural failure and failure due to environmental impacts. Notification procedures are both outlined and presented in figure form to ensure appropriate and effective lines of communication in the event of an emergency. Plan training, testing, and updating guidelines are also included to ensure uniformity across the organization.

9.2. Authority

This Emergency Preparedness and Response Plan is issued for the Red Chris TIA by the owner and operator RCDC. It has been prepared in accordance with guidelines established by Provincial and Federal agencies, the Mining Association of Canada, and Canadian Dam Association.

9.3. Emergency Preparedness

9.3.1. Project Location, Description and Effects of Inundation

CDA Guidelines: *Identify Dam owner and the on-site person directly responsible for safety of the dam (identified by position). Include general contact information, such as 24-hour telephone numbers. Also include description of the dam and a site layout figure/map. Provide a general overview of the timing and hazardous conditions likely to develop at various downstream reaches in a major dam-related or flood-related emergency. For effects of inundation, illustrate best estimate of areas that would be affected by inundation. Approximate travel times and the river stages for the flood wave. Includes site-specific Information such as site access, inundation maps, general site plans, and check sheets.*

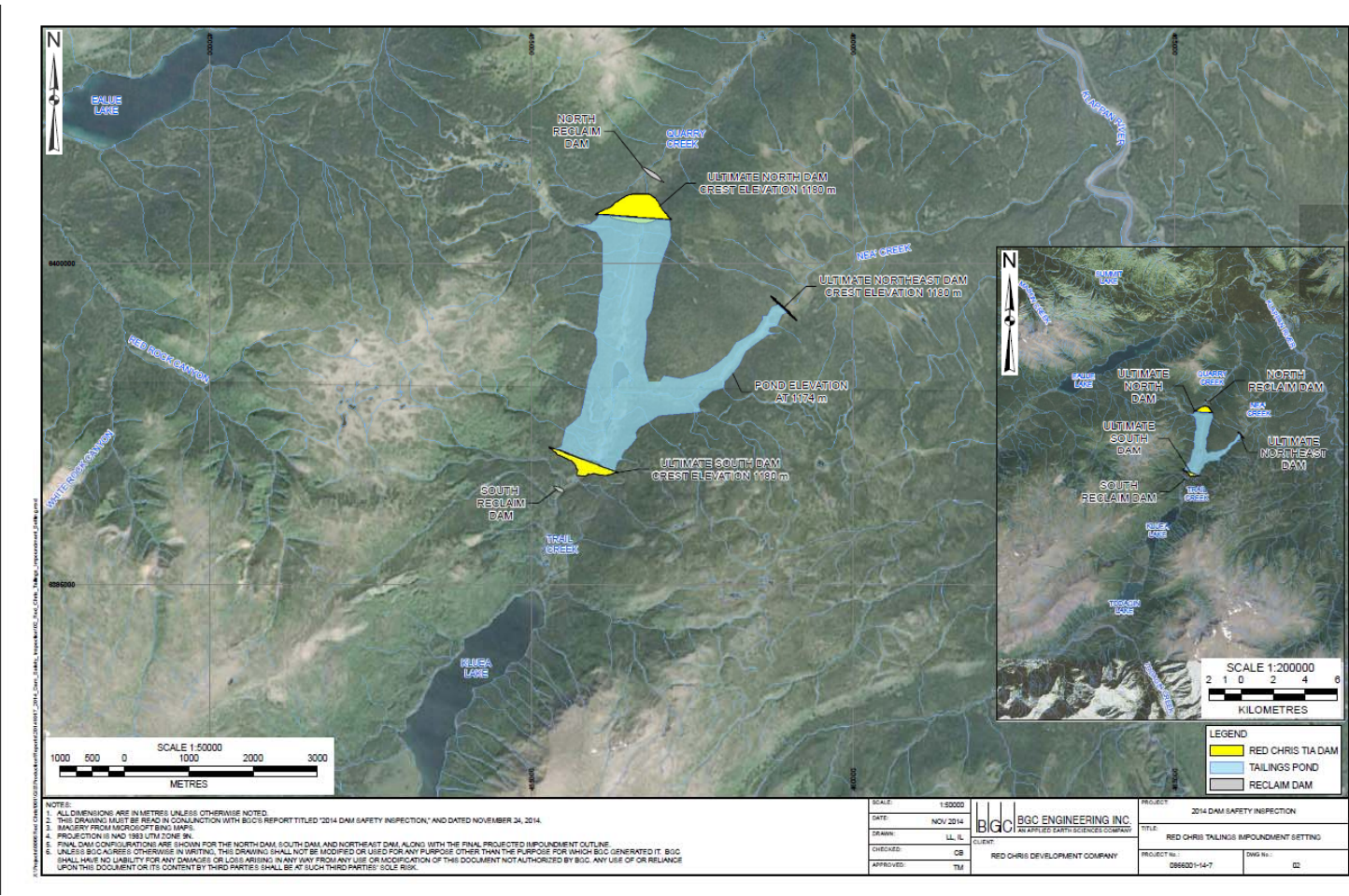
Project Location and Description

The Red Chris Mine is 100% owned and operated by RCDC, a wholly owned subsidiary of Imperial Metals Corporation. RCDC was previously a wholly owned subsidiary of BC Metals, which was acquired by Imperial in 2007 and merged with RCDC. A 1.8% net smelter return royalty is held by Xstrata Canada Corporation. RCDC was founded in 2002 and is based in Vancouver, Canada. The mine is scheduled to begin its first year of production in the fourth quarter of 2014.

The Red Chris Mine comprises a conventional open pit mining, crushing, grinding, and flotation process and includes construction, operation, maintenance, reclamation, closure, and monitoring of an open pit mining and milling operation producing copper and gold concentrate that will be trucked to the Port of Stewart and shipped to overseas smelters. The site is located in northwest British Columbia, approximately 18 km southeast of the village of Iskut and 80 km south of Dease Lake by road. Access to the site is obtained by traveling 18.5 km from Highway 37 on a gravel-surfaced mine road.

The property is located within the designated area for mineral resource development in the Cassiar Iskut-Stikine Land and Resource Management Plan. The mine site is located on the northeastern portion of the Todagin Plateau, an upland plateau which lies along the northern edge of the Skeena Mountains, between the Ealue and Kluea Lakes. The Todagin plateau is a subdivision of the Klastline Plateau, a subplateau of the Stikine Plateau. The tailings impoundment area (TIA) of the site is situated in a Y-shaped valley containing Black Lake, Todagin Lake, and Kluea Lake. The Todagin Plateau has elevations of approximately 1500 m or higher. The property is centred on latitude 57° 42' N, longitude 129° 47' W within NTS map sheet 104H/12W, Liard Mining Division.

The Red Chris project site is located on a terrace at the boundary of two regional watersheds: the Klappan and Iskut Rivers (see Drawing 02). The project area drains to the northeast via Quarry and Nea' Creeks, to the northwest via Red Rock and White Rock Canyons and to the south via Trail Creek. Quarry and Nea' Creeks flow directly into the Klappan River approximately 13 km and 5 km, respectively, northeast of the site.



Drawing 02

The Red Chris project represents the construction, operation, maintenance, reclamation, closure, and monitoring of an open pit mining and milling operation for the production of copper and gold in concentrate form, from deposits located on the Todagin Plateau. The project is situated in the traditional territory of the Tahltan First Nation, between Ealue and Kluea Lakes in north-western British Columbia, approximately 18 km southeast of the village of Iskut and 450 km north of the town of Smithers. A location plan is shown on Drawing 01. The project will include:

- Two open pits (Main and East Zone) that will eventually merge into a single pit
- A processing plant for the production of copper concentrate
- A waste rock dump
- Low grade ore stockpiles
- A tailings impoundment area (TIA), including three tailings dams (North, South and Northeast), and two downstream runoff and seepage reclaim dams (North and South)
- Runoff diversions, as required, to reduce non mine-affected waters reporting to the tailings impoundment
- A run-off collection system to direct mine-affected waters to the tailings impoundment, via the process plant
- A 18 km access road to link with Highway 37
- A new power line from the nearest BC Hydro Grid to the minesite
- Concentrate storage and ship-loading facilities at the Port of Stewart.

The process plant design is based on a milling rate of 30,000 tons of ore per day, to produce a daily average of approximately 318 tons of concentrate containing copper and gold. The concentrate will be trucked to the Stewart Bulk Terminals via the site access road and Highway 37.

Effects of Inundation

Dam break and Inundation Studies were completed by BGC Engineering Inc. (BGC) in September 2014 (BGC, 2014) following the Dam Safety Guidelines published by the Canadian Dam Association (CDA, 2013). Seventeen inundation maps based on the study are presented in Drawings 04 to 20 of Appendix I.

As shown in the Appendix I drawings, in the very unlikely event of a dam overtopping failure with the dam crest at El. 1180 m, the following would be at risk from the subsequent flooding:

- Highway 37 Crossing with the Stikine River
- Community of Tahltan
- Community of Telegraph Creek

- Lodges, cabins, and campgrounds along the shores of Kluea, Todagin, Tatogga, and Eddontenajon Lakes

The drawings also indicate that in the unlikely event of a piping failure, with the pond level at El. 1174 m and the dam crest at El. 1180 m, lodges, cabins, and campgrounds along the shores of Kluea, Todagin, Tatogga, and Eddontenajon Lakes would be at risk of subsequent flooding.

The overtopping scenario assumes that the dams would be overtopped after the available flood storage in the tailings impoundment above the operating pond level of El. 1174 m is consumed by the flood caused by seven 24-hr PMF events or three 10-day PMF events. The piping scenario assumes that the dams would be breached by internal erosion, which usually would be preceded by rapid increase of the rate of seepage through the tailings dams and/or their foundations together with unexplained cloudy appearance of the seepage.

Neither of the above two scenarios would develop instantaneously. The extreme hydrological events, that could cause dam overtopping, would be caused by unusual combination of storms and snowmelt. However, weather systems that could produce large and prolonged storms at the site are tracked by Environment Canada, as they travel across the Pacific Ocean. Severe build-up of snow packs would also be tracked by regular snow surveys at nearby stations. The detection of increased rate of dam seepage and/or its cloudy appearance also provides an early warning of potential development of piping in progress.

Failure of the tailings impoundment could result in loss of life, property damage and/or environment damage downstream. It would also involve interruption of RCDC mining activities. Although the possibility of such an event is extremely remote, the following sections outline possible emergency situations, and procedures to be taken and personnel and agencies to be contacted under such circumstances. Appropriate actions described here shall be taken promptly to prevent and mitigate any undesirable consequences of such emergency situations.

9.3.2. Being Prepared

All Employees

All employees, contractors and visitors to the Red Chris Mine Site are provided a mine site orientation regarding any hazard awareness and protective measures to be taken prior to performing any work on the site. Overview of BC's Mine Health and Safety Act and roles and responsibilities of supervision and worker, camp rules, personal protective equipment requirements, emergency response provisions, environmental awareness, fire extinguisher use and any specific hazard awareness related to the area being worked are covered in this orientation. A medical conditions form is completed by all on site personnel detailing personal contact information, health care number, medications and conditions relevant to their own health.

Mill Employees

In addition to the general orientation provided to all employees all Mill Employees will be provided specific training / awareness related to Mill operations and the TIA including the emergency response procedures outlined in the EPRP.

Outside Agencies

A copy of the EPRP is provided to all outside agencies and stakeholders directly involved should a dam emergency or breach occur. A distribution list is provided at the beginning of the plan. Each agency or stakeholder that is involved in the EPRP is asked to review the plan to become familiar with their role and responsibility.

9.4. Key Personnel and Government Agencies

Roles and responsibilities of key personnel for tailings facilities stewardship are as outlined in Table 9.1.

Table 9.1. Positions, Roles and Responsibilities Matrix

Position	Name and Contact Information	Shift Schedule / Site Presence	Role	Responsibility	Authority
President	Brian Kynoch Office: 604.669.8959 [REDACTED] Email: bkynoch@imperialmetals.com	Based in Imperial Metals Vancouver office	Corporate level operations oversight.	Confirms that tailings facilities stewardship is in conformance with Mining Association of Canada (MAC) guidelines, appropriate resources are in place to maintain conformance, and reports to the Board of Directors of Imperial Metals Corporation on tailings stewardship.	Overall operations authority.
Chief Operating Officer	Don Parsons Office: 604-488-2652 [REDACTED] Email: donparsons@imperialmetals.com	Based in Imperial Metals Vancouver office	Corporate level operations oversight.	Ensures that tailings facilities stewardship is in conformance with Mining Association of Canada (MAC) guidelines, and that required personnel and financial resources are in place to support this.	Overall operations authority.
General Manager (GM)	Tim Fisch Site: 604-800-9200 ext 101 [REDACTED] Email: tfisch@redchrismine.ca	Schedule Varies	Site-based oversight of tailings stewardship.	Ensures that departments/groups involved in tailings facilities stewardship are meeting assigned responsibilities. Confirms these personnel are interfacing as required, and that appropriate personnel/resources are in place to support tailings facilities stewardship.	Direction of all senior site personnel and consultants. Allocation of personnel resources and budgets.
Mine Operations Superintendent	Tim Nehring Site: 604-800-9200 ext 115 [REDACTED] Email: tnehring@redchrismine.ca	1 week on, 1 week off with cross-shift.	Site-based oversight of tailings dam construction. Direction of mine waste management planning, operations and construction interfaces, and direction of mining engineering group.	Delegate design / construction responsibilities. Coordinate ongoing work with Tailings Dam Design Consultant. Review consultant reports. Ensure MAC guideline compliance. Determine facility design and construction needs. Review construction designs. Make necessary recommendations to GM. Review system water balance with Environmental Superintended, Mill Maintenance Superintendent and Tailings Engineer. Coordinate and manage mining engineering team. Ensure adequate training is provided to Operation, Maintenance and Surveillance (OMS) manual holders and operations personnel. Ensure construction equipment and personnel availability. Maintain on-site weather stations and plot/record/disseminate climate data.	Hire consultants in coordination with GM. Coordination with Mill Operations Superintendent. Report design and construction issues to GM. Propose design changes in coordination with the GM.
Environmental Superintendent	Jack Love Site: 604-800-9200 ext 109 [REDACTED] Email: jlove@redchrismine.ca	1 week on, 1 week off with cross-shift.	Environmental compliance oversight	Review system water balance with Mill Operations and Mill Maintenance Superintendents and Tailings Engineer. OMS manual Champion – review and update the OMS manual on an annual basis. Owns and maintains the mass and water balance for the TIA, and the overall site water balance. Oversee water quality sampling and testing in accordance with approved protocols. Validate laboratory test results. Interpret environmental (facility water quality and flows) data in coordination with Mine and Mill Operation Superintendents.	Supervise environmental technician personnel, and direct ML/ARD consultant. Indicate water quality sampling locations, sample collection protocols and analytical parameters. Determine when TIA water quality is suitable for discharge, and when water at other permitted discharge locations is suitable for discharge or must be retained. Engage ML/ARD consultant

Position	Name and Contact Information	Shift Schedule / Site Presence	Role	Responsibility	Authority
				Monitor compliance surplus water discharge water quality requirements, and report non-compliance events or trends to the General Manager. RCDC’s contact for Ministry of Environment (MOE) oversight of TIA – annual water quality reports to MOE, and quarterly reports to Ministry of Energy and Mines (MEM) for metal leaching/acid rock drainage (ML/ARD). Liaise with ML/ARD consultant.	assistance as required. Arranges for the Annual inspection of the TIA. Plans for future design raises and submits required permit amendments. Responsible for ensuring that mining and milling activities comply with the requirements of the applicable regulations governing the milling and tailings facilities.

The communications directory is outlined in Table 9.2.

Table 9.2. Key Personnel for Emergency Preparedness and Response

POSITION	NAME	NAME AND CONTACT INFORMATION
President	Brian Kynoch	Office: 604-488-2654 [REDACTED] Email: bkynoch@impermetals.com
Chief Operating Officer	Don Parsons	Office: 604-488-2652 [REDACTED] Email: donparsons@impermetals.com
General Manager (GM)	Tim Fisch	Site: 604-800-9200 ext 101 [REDACTED] Email: tfisch@redchrismine.ca
Health and Safety Superintendent	Walter (Wally) Rennie	Site: 604-800-9200 ext. 142 [REDACTED] Email: wrennie@redchrismine.ca
Mine Operations Superintendent	Tim Nehring	Site: 604-800-9200 ext 115 [REDACTED] Email: tnehring@redchrismine.ca
Environmental Superintendent	Jack Love	Site: 604-800-9200 ext 109 [REDACTED] Email: jlove@redchrismine.ca
Mine Engineers	A – Tracy Whitehead B – Kiera Dickson	(A) Site: 604-800-9200 ext. 229 [REDACTED] (B) Site: 604-800-9200 ext. 155 Home: 250-296-4363
Mine Supervisors	(A) Casey Cawston (B) Ron Thibeault (C) Brandon Willburn (D) Bill Baker	Site: 604-800-9200 (A) Ext. 187 (B) Ext. 186 (C) Ext. 189 (D) Ext. 190
Mill Maintenance Superintendent	Darcy Hannas	Site: 604-800-9200 ext 110 [REDACTED] Email: dhannas@redchrismine.ca

POSITION	NAME	NAME AND CONTACT INFORMATION
Mill Operations Superintendent	Peter Nelega	Site: 604-800-9200 ext 152 [REDACTED] Email: pnelega@redchrismine.ca
Mill Operators	(A) Don Reimer (B) John MacDonald (C) Mike Whitmarsh (D) Rick Mills	Site: 604-800-9200 (A) Ext. 221 (B) Ext. 141 (C) Ext. 223 (D) Ext. 224
Tailings Engineer	TBD	TBD Site: Cell:
TAILINGS DAM CONSULTANT PERSONNEL		
Tailings Dam Consultant	BGC Engineering Inc.	800-1045 Howe Street Vancouver, B.C. V6Z 2A9 (604) 684-5900
Project Manager	Daryl Dufault	Office ext. 41191 [REDACTED] Home: (604) 931-6368
Senior Engineer	Todd Martin	Office ext. 41244 [REDACTED] Home: (604) 327-6225
ML/ARD Consultant	SRK Consulting Steven Day, Principal	Oceanic Plaza 22nd Floor , 1066 West Hastings Street Vancouver, BC (604) 681 4196
Dam Safety Review Consultant	TBD	To be determined
GOVERNMENT AGENCIES		
Director (Provincial Emergency Program PEP)	24/7 Contact Number	1-800-663-3456

POSITION	NAME	NAME AND CONTACT INFORMATION
Emergency Response Officer – MOE (Smithers)	Norm Fallows	250-847-7259
Chief Inspector of Mines – MEM (Victoria)	Al Hoffman	250-952-0494
Senior Inspector of Mines – MEM (Smithers)	Doug Flynn	250-847-7386

9.5. Emergency Response Plan

9.5.1. Activation of the Plan

The person who discovers a situation that may threaten the structural integrity of the dam will advise the following persons immediately:

- Mill General Foreman or Mine Shift Supervisor, as most appropriate to the situation; and
- Mine General Manager

The Mine General Manager or, if unavailable, Mill General Foreman or Mine Shift Supervisor will assess the situation and make an alert level determination. If the situation is determined to be Level 2 – Emergency, or Level 3 – Crisis, the Emergency Response Plan, per the communication procedure as outlined in Section 9.5.7.6, will be activated. The procedure for the determination and activation of the plan is as shown in Figure 9.1.

The communications directory for key personnel for Emergency Preparedness and Response is provided in Table 9.2.

9.5.2. Level 1 – Unusual Condition (Slowly Developing)

An event or observed change at any of the dams that is not normal, but has not yet threatened the operation or structural integrity of the dam. This situation has potential to harm the integrity of the dam if it is not mitigated. The General Manager (or their alternate) should be contacted to investigate the situation and recommend actions to be taken.

The condition of the dams should be closely monitored to detect any development of a potential or imminent failure situation. The situation should be escalated to Level 2 - Emergency, if it is determined by the person in command that the conditions may possibly develop into a worse situation that may require emergency actions. Communication of the unusual condition should remain internal to RCDC.

9.5.3. Level 2 – Emergency, Potential Dam Failure Situation (Rapidly Developing)

A situation that may eventually lead to dam failure and flash flooding downstream, but there is not an immediate threat of dam failure. The Emergency Response Team (ERT) and others

specified in the emergency reporting procedure should be notified of this emergency situation, and the RCDC evacuation procedure for personnel working on and around the dam shall be initiated. The General Manager (or their alternate) and the design engineer should take remedial actions, closely monitor the condition of the dam, and periodically report the status to the ERT or Incident Commander.

Local emergency response agencies should be ready to initiate evacuations if flooding occurs. Pre-evacuation notices may be issued at this time. The situation shall be escalated to Level 3 - Crisis, if it is determined by the person in command that there is a total loss of control and a dam break or serious downstream flooding is imminent.

9.5.4. Level 3 – Crisis, Dam Failure Appears Imminent or is in Progress (Urgent)

An extremely urgent situation when a dam failure is occurring or is about to occur and cannot be prevented. Flash flooding will occur downstream of the dam. Local emergency response agencies are to ensure that all access roads are guarded to prevent entry into the affect area and begin evacuations of all people at-risk. The ERT shall ensure that all personnel in and around the dam have evacuated.

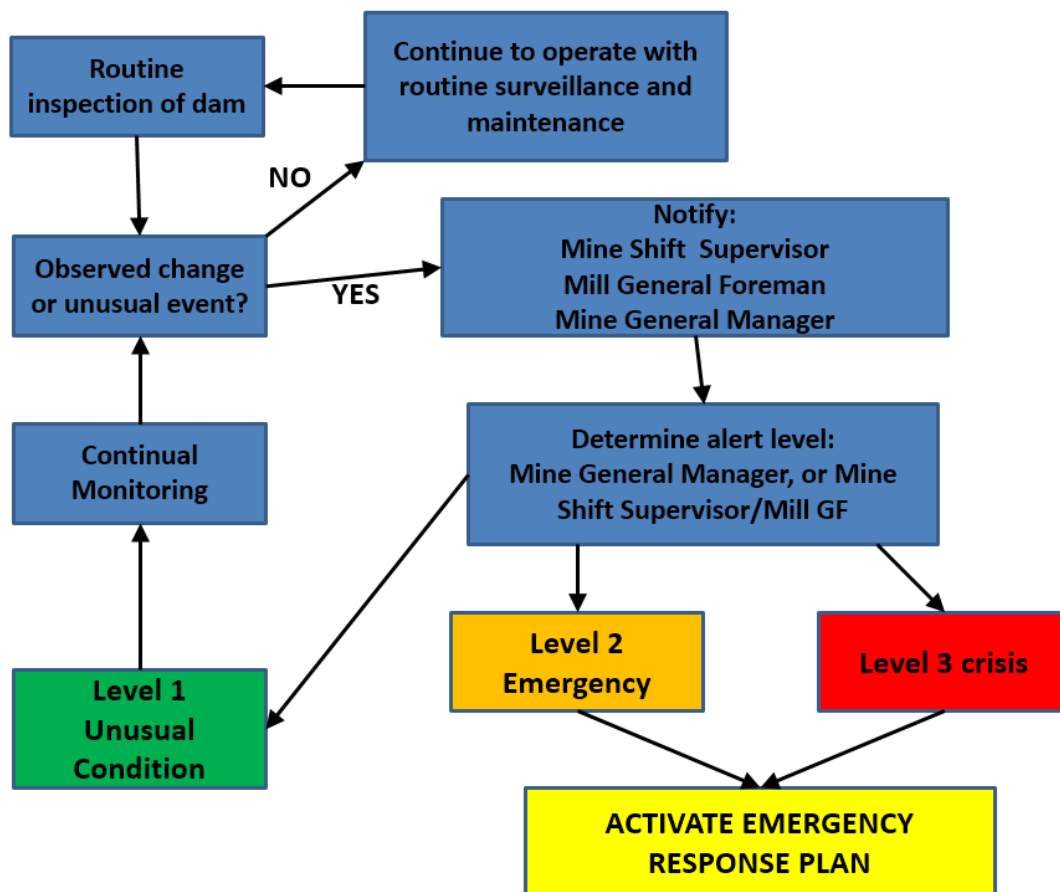


Figure 9.1. Alert Level Determination and Emergency Response Plan Activation

9.5.5. Emergency Identification and Evaluation

From CDA guidelines:

- Emergency Identification and evaluation
 - Conditions/events indicating a potential emergency – what are potential failure modes and what are warning signs?
 - How to identify – what are monitoring and inspection procedures?
 - How to assess severity of emergency – pre defined trigger levels
 - Who is responsible to activate emergency response when required

This section covers only those emergency situations that could potentially pose a threat to the structural integrity of the tailings dams or result in the release of tailings materials, tailings transportation water, and/or supernatant pond water into the surrounding environment. In the event of an emergency, prompt action shall be taken to avoid delays which could have serious consequences. Responsible persons and agencies listed in Table 9.2 shall be informed and contingency plans put into effect.

Emergency situations may include, but are not limited to, the following:

- Failure or suspect impending failure of the tailings dams
- Overtopping of the tailings dams
- Slumping, sliding, cracking or bulging of tailings dams
- Rapid increase or unexplained cloudy appearance of seepage through the tailings dams and/or their foundations
- Formation of sinkholes on the tailings beach or dams
- Breakage of tailings pipelines, which may result in dam erosion and/or release of tailings slurry
- Large earthquakes
- Extreme flood
- Severe storms
- Sabotages and other criminal activities

Particular attention shall be given to inspecting and, where necessary, repairing the Red Chris TIA following unusual or extreme events. All unusual events shall be reported to supervisory personnel. In an unlikely event that high seepage flows occur downstream of the tailings dams, and particularly if seepage water is carrying soil particles from the dams or their foundations, an early indication of a potential piping problem, it shall be reported immediately and the engineering consultant notified.

In the event of an emergency or unusual situation, all instrumentation in the affected area shall be monitored during and/or immediately following the event by either the engineering

consultant, if on-site, or by RCDC personnel. This information shall be forwarded to the design engineer(s) immediately so that the situation can be assessed and any required remedial actions taken promptly.

Unusual conditions are corresponding alert levels are outlined in Table 9.3.

Table 9.3. Guidelines for Alert Level Ranking for Unusual Conditions

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
Rising Water Levels, Freshet, and Overtopping	Impoundment water level is rising and approaching specified depth below embankment crest (minimum freeboard elevation)	1
	Impoundment water level above specified depth to embankment crest or freeboard (e.g., 1 meter)	2
	Water is flowing over the dam	3
	Water is flowing over an abutment or saddleback rim of impoundment	3
Extreme Precipitation Event	Threat of flash flood condition from excessive rain or rapid snow melt	1
	Threat of avalanche into pool	1
	Threat of land slide into pool	1
	Observed ground saturation near or on dam embankment	1
	Water starting to flow through emergency spillway	1
	Localized slumping or instability on dam face	1
	Impoundment water level is rising (see 'Rising Water Levels and Overtopping' section above)	*
Extreme Wind Event	Erosion visible on face the dam	1
Extreme Snowpack	See 'Rising Water Levels and Overtopping' section above	*
Spillway Erosion or Blockage	Minor erosion / turbidity apparent in emergency spillway flow	1
	Emergency spillway flowing with bottom erosion with active headcut advancing toward control section	2
	Emergency spillway blocked by significant debris or landslide material with impoundment level approaching minimum freeboard elevation	2
	Emergency spillway flowing with erosion at control section	3
Seepage	Change in vegetation growth indicating increased embankment saturation	1
	New seepage areas or increased discharge from internal drain outlet within or near dam	1
	New seepage areas or internal drain discharge with cloudy flow (increasing turbidity) and increasing flow rate	2
	Seepage at greater than a specified flow rate or causing erosion (excessive turbidity or sediment) of the dam or foundation	3
Delivery Pipe Failure	Leaking outlet or tailings pipelines causing minor dam surface erosion and/or release of tailings slurry	1
	Leaking outlet or tailings pipelines causing down cutting in dam	2

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
	surface erosion and/or release of tailings slurry	
	Breakage of outlet or tailings pipelines possible causing significant to catastrophic dam surface erosion and/or release of tailings slurry	3
Sinkholes	Sinkhole with non-structural impacts	1
	Observation of new sinkhole in impoundment area or on embankment	2
	Rapidly enlarging sinkhole	3
Embankment and Abutment Cracking	New cracks in the embankment or abutments at greater than specified width	1
	New cracks in the embankment with associated seepage	2
	New cracks in the abutment with seepage and increasing flow rate	3
Embankment Movement	Observed movement/slippage or bulging of embankment toe, slope, or crest	1
	Observed movement/slippage or bulging of embankment toe, slope, or crest where there is a direct threat to the structural integrity of the dam	2
	Sudden or rapidly proceeding slides at embankment slope	3
	Sudden or rapidly proceeding subsidence at embankment crest	3
Animal Evidence	Damage to monitoring instruments from animals	1
	Animal burrows present on dam face or abutment	1
Instrumentation	Measurement instrument readings beyond specified values	1
Control	Failure of outlet/inlet controls with no impacts to the functioning of the dam	1
	Failure of outlet/inlet controls that has resulted in seepage flow	2
	Failure of outlet/inlet controls that has resulted uncontrolled water release	3
Earthquake	Measurable earthquake felt or recorded within specified distance of dam	1
	Measurable earthquake with observed structural damage to facility and or dam controls	2
	Measurable earthquake resulting damage to outlet/inlet controls, dam or appurtenances that has resulted in uncontrolled water release	3
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	2
	Detonated bomb that has resulted in damage to the dam or appurtenances	3
Vandalism	Vandalism to tailings delivery pipeline system with no leaking evident	1
	Vandalism to outlet/inlet controls, dam or appurtenances with no impacts to the functioning of the dam	1
	Vandalism to measurement instrumentation	1
	Vandalism to tailings delivery pipeline system resulting in leak	*

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
	(See 'Delivery Pipe Failure' section above)	
	Vandalism with damage to outlet/inlet controls, dam or appurtenances that has resulted in seepage flow	2
	Vandalism with damage to outlet/inlet controls, dam or appurtenances that has resulted in uncontrolled water release	3
Other Situations	Any unusual event or condition on or around the dam with potential to harm the dam	1
	Any unusual event or condition that has caused visible damage to the dam and requires mitigation efforts to restore structural integrity of the dam	2
	Any unusual event or condition that has resulted in, or will likely result in, an uncontrolled release of water or tailings from the impoundment	3
	*See other section specified in for this item for a more detailed description of circumstances	

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
Rising Water Levels, Freshet, and Overtopping	Impoundment water level is rising and approaching specified depth below embankment crest (impinging upon required IDF storage)	1
	Impoundment water level above specified depth to embankment crest or freeboard (e.g., 1 meter)	2
	Water is flowing over the dam	3
	Water is flowing over an abutment or saddleback rim of impoundment	3
Extreme Precipitation Event	Threat of flash flood condition from excessive rain or rapid snow melt	1
	Threat of avalanche into pool	1
	Threat of land slide/pit wall failure into pool	1
	Observed ground saturation near or on dam embankment	1
	Water starting to flow through emergency spillways of the Reclaim Dams	1
	Localized slumping or instability on dam face	1
	Impoundment water level is rising (see 'Rising Water Levels and Overtopping' section above)	*
Extreme Wind	Wave erosion of tailings beach	1

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
Event	Severe wind erosion/dusting from exposed tailings beaches	1
Extreme Snowpack	See 'Rising Water Levels and Overtopping' section above	*
Spillway Erosion or Blockage	Minor erosion / turbidity apparent in the Reclaim Dams emergency spillway flow	1
	Emergency spillway flowing with bottom erosion with active headcut advancing toward control section (Reclaim ponds)	2
	Emergency spillway blocked by significant debris or landslide material with impoundment level approaching minimum freeboard elevation (Reclaim ponds)	2
	Emergency spillway flowing with erosion at control section (Reclaim ponds)	3
Seepage	Change in vegetation growth indicating increased embankment saturation	1
	New seepage areas or increased discharge	1
	Rapid and substantial increase in seepage discharge, but seepage running clear	1
	New seepage areas or internal drain discharge with cloudy flow (increasing turbidity) and increasing flow rate	2
	Seepage at greater than a specified flow rate or causing erosion (excessive turbidity or sediment) of the dam or foundation	3
Tailings Delivery Pipe Failure	Leaking outlet or tailings pipelines causing minor dam surface erosion and/or release of tailings slurry	1
	Leaking outlet or tailings pipelines causing down cutting in dam surface erosion and/or release of tailings slurry	2
	Breakage of outlet or tailings pipelines possible causing significant to catastrophic dam surface erosion and/or release of tailings slurry	3
Sinkholes	Sinkhole with non-structural impacts	1
	Sinkhole observed on the dam crest, within the till core	2
	Observation of new sinkhole in impoundment area or on embankment	2
	Rapidly enlarging sinkhole	3
Embankment and Abutment	New cracks in the embankment or abutments at greater than specified width	1

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
Cracking	New cracks in the embankment with associated seepage	2
	New cracks in the abutment with seepage and increasing flow rate	3
Embankment Movement	Observed movement/slippage or bulging of embankment toe, slope, or crest	1
	Observed movement/slippage or bulging of embankment toe, slope, or crest where there is a direct threat to the structural integrity of the dam	2
	Sudden or rapidly proceeding slides at embankment slope	3
	Sudden or rapidly proceeding subsidence at embankment crest	3
Animal Evidence	Damage to monitoring instruments from animals	1
	Animal burrows present on dam face or abutment	1
Instrumentation	Measurement instrument readings beyond specified threshold values (see Section Error! Reference source not found. of the OMS Manual)	1
Earthquake	Measurable earthquake felt or recorded within specified distance of dam	1
	Measurable earthquake with observed structural damage to facility and or dam controls	2
	Measurable earthquake resulting damage to outlet/inlet controls, dam or appurtenances that has resulted in uncontrolled water release	3
Security Threat	Verified bomb threat that, if carried out, could result in damage to the dam	2
	Detonated bomb that has resulted in damage to the dam or appurtenances	3
Vandalism	Vandalism to tailings delivery pipeline system with no leaking evident	1
	Vandalism to outlet/inlet controls, dam or appurtenances with no impacts to the functioning of the dam	1
	Vandalism to measurement instrumentation	1
	Vandalism to tailings delivery pipeline system resulting in leak (See 'Delivery Pipe Failure' section above)	*
	Vandalism with damage to outlet/inlet controls, dam or appurtenances that has resulted in seepage flow	2
	Vandalism with damage to outlet/inlet controls, dam or	3

Alert Level Rankings for Unusual Conditions and Emergencies at Red Chris TIA		
Event or Observation	Situation	Alert Level
	appurtenances that has resulted in uncontrolled water release	
Other Situations	Any unusual event or condition on or around the dam with potential to harm the dam	1
	Any unusual event or condition that has caused visible damage to the dam and requires mitigation efforts to restore structural integrity of the dam	2
	Any unusual event or condition that has resulted in, or will likely result in, an uncontrolled release of water or tailings from the impoundment	3
	*See other section specified in for this item for a more detailed description of circumstances	

9.5.6. Designations of the Person(s) Responsible for Identifying and Evaluating the Emergency and Activating the ERP

Only the General Manager or their designated alternate have the authority to activate the Emergency Response Plan and initiate appropriate responses in the event of an emergency or crisis at the Red Chris TIA.

9.5.7. Preventive and Remedial Action

In an unlikely event, the Red Chris TIA could fail due to the breach of any of the three dams with the ensuing flood threatening the downstream areas. The dam breach could be triggered by piping or overtopping. It is difficult to predict where a dam breach would be initiated and precisely what corrective actions would be required. Nevertheless, to assist the mine in dealing with emergency situations threatening the dams, this section describes the resources available and outlines the potential course of actions that could be taken promptly to avert a dam breach. These actions are summarized as: (1) lower tailings pond level; (2) arrest or retard dam internal erosion; and/or (3) arrest or retard dam external erosion. Section 9.5.7.5 describes the necessary actions to be taken to mitigate potential impacts on the downstream area, as the efforts to control the dam incident are underway.

9.5.7.1. Construction Equipment, Materials, Labour and Engineering Expertise

The current mining operation requires continual personnel presence around the Red Chris TIA. If a situation arises that requires immediate attention, RCDC has the necessary equipment, material, labour and engineering expertise to respond immediately. These resources include those within the mine and those available through outside contractors and consultants.

9.5.7.2. Lower Tailings Pond Level

In the early stages of a piping failure or overtopping scenario, the most effective action to reduce the threat of further development of the failure mechanism is to lower as fast as practical the level of water in the tailings pond. This can be accomplished by control methods initiated by the General Manager (or designate) and/or by order of the Ministry of Environment (MOE) or Ministry of Mines (MEM).

The immediate actions to be taken are grouped under “Internal Actions” and “Actions Requiring Governmental Approval” as follows:

Internal Actions

Shut down the mill operating process. This will effectively cease the flow of process water and tailings to the Red Chris TIA. With the mill production is stopped, water could be removed from the tailings pond by utilizing the reclaim system to divert water the open pit for temporary storage. This control method can be performed entirely with permission from the General

Manager (or designate). If this action does not resolve the issue the actions requiring Ministry approval must be initiated immediately (see following section).

Actions Requiring Governmental Approval

The General Manager (or delegate) shall request the Ministry of Environment to *declare a state of emergency*, and to permit RCDC to release tailings pond water, in necessary amounts exceeding their permitted volume (or outside of the permitted discharge window) downstream of the North Dam and North Starter Dam into Quarry Creek and the South Reclaim Dam into Trail Creek. With the governmental approval, the following actions can be taken to release water from the tailings pond:

1. Release tailings pond water via Quarry Creek through the discharge line and eventually into the Klappan River.
2. Allow the reclaim dams to spill into their respective drainages (Quarry Creek to the north, Trail Creek to the south), thus preventing the discharge from entering into the tailings pond.

If the Ministry of Environment does not permit tailings pond water to be discharged from the Mine Site, the Open Pit basin area must be readied to receive discharge via the Reclaim System. (1) All Personnel and Equipment will be evacuated from the Open Pit and (2) connect the reclaim System to the Open Pit dewatering line and (3) reverse the dewatering pumps.

This method can accomplish the lowering of tailings pond level rapidly and allow for the storage of a large volume of water.

9.5.7.3. Arrest or Retard Dam Internal Erosion

Once excess and/or murky seepage caused by internal erosion of the dam is detected, actions can be taken to arrest the further development of the erosion, which could lead to piping failure of the dam. In the area where excess and/or murky seepage exit from the dam toe, a weighted filter buttress berm should be promptly placed along the seepage exit area. The filter berm would allow free exit of seepage water without carrying away existing dam fill and/or foundation materials. The filter berm is to be constructed of filter and drainage materials with progressively increasing particle size towards the berm outer surface.

If in the seepage exit area, the initial flow velocity is too high for the placement of filter materials of appropriate size, materials of larger size and heavier weight may have to be placed first. As the seepage velocity being reduced by these oversized materials, the properly zoned filter berm could then be placed to arrest further development of internal erosion of the dam.

If sinkholes develop, they should be immediately filled with dam fill materials compatible with the internal zoning of the dam. If the sinkholes are located upstream of the vertical glacial till core (for the North Dam), efforts should be made to prevent pond water flowing into the sinkholes. This could be accomplished by placing additional earthfill in the surrounding area to block any potential access of pond water to the sinkholes, and/or discharging tailings materials to move

the tailings beach/water contact line further away from the sinkholes. If sinkholes are located upstream of the South Dam material should be placed to block any potential access of pond water to the sinkholes.

Existing borrow areas and stockpiles of available drainage and filter materials in the vicinity of the dams that could be used to construct the seepage-control filter berm are listed below:

Rock fill: Non-Acid Generating (NAG) rock is the largest size material to be used for filter material. This is readily available from run-of-mine (ROM) stockpiles located on the mine site and can be readily transported to the dam with haulage trucks via the TIA access road.

Filter Gravel (Zone 3B): The next coarsest material to be place for filter. This material exists naturally within the TIA area. A stockpile of this material will also be kept for emergency use nearby.

Select Sand and Gravel: The finest size material used for filter material. A stockpile of this material is kept in the area downstream of the North Tailings Dam.

Besides above materials located around the dams, large quantities of waste rock are available in the waste rock storage pile near the open pit. These materials can be transported to the TIA with haulage trucks via Pit Haulage roads that connect with the TIA access road.

The selection of materials and dimensions of the filter berm is to be directed by the General Manager (or designate) in consultation with the Engineering Design Consultant. Digital photographs of seepage conditions prior to and during the construction of the filter berm are to be sent promptly to the Engineering Design Consultant for ongoing review.

9.5.7.4. Arrest or Retard Dam External Erosion

As the dam freeboard decreases during a major hydrological event, additional actions can be taken to arrest external erosion of the dam. Concurrent to lowering the tailings pond level, the existing north dam crest could be raised by placing additional glacial till fill on the crest. While raising the crest uniformly across the entire dam, additional till material should be placed in local areas where signs of weakening such as slope slumps, crest deformations and cracks are discovered. The south dam crest will always be maintained at a higher crest elevation than the North Dam and thereby overtopping is not a failure mechanism.

In an event that an open channel begins to form on the dam crest, granular materials should be used to plug the channel. Materials of sufficient size and weight can be dozed into the breach from alternate side of the channel. As the channel is gradually being closed, the materials used to plug the channel should increase in size and weight to cope with the increasing flow velocity. After the channel is completely closed, additional glacial till material should be placed upstream of the granular-fill plug in order to stop the seepage through the plug.

9.5.7.5. Actions to Mitigate Downstream Consequence

As soon as a dangerous situation is perceived to be developing, downstream residents should be notified and alerted to the fact that RCDC has an unusual situation occurring related to its TIA. If conditions deteriorate, depending on the situation and water level in the tailings pond, downstream residents should be alerted to move livestock to higher ground. In the unlikely event that the flood storage available in the pond is being used up, while the storm is not abating and the condition of the dam is deteriorating, the conditions may warrant the notification of imminent threat of dam breach. Downstream residents should be required to evacuate people and valuables from homes located in the low-lying areas.

If a dam break does occur of the North Dam from a piping failure, it will take approximately 30 minutes for the flood to reach the Klappan River. It will take approximately 140 minutes for the flood to reach the Stikine River. A dam break of the South Dam due to piping will take approximately 12 minutes for the flood to reach Kluea Lake. It will take approximately 35 minutes for the flood to reach Todagin Lake from a south dam piping failure. If a dam break does occur of the Northeast Dam from a piping failure, it will take approximately 95 minutes for the flood to reach the Klappan River. It will take approximately 10 hours for the flood to reach the Stikine River.

If a dam break does occur of the North Dam by overtopping, it will take approximately 65 minutes for the flood to reach the Klappan River. It will take approximately 120 minutes for the flood to reach the Stikine River, approximately 155 minutes to reach the Highway 37 crossing with the Stikine River, approximately 4.8 hours to reach Tahltan, and approximately 5.9 hours to reach Telegraph Creek. A dam break of the South Dam due to overtopping will take approximately 40 minutes for the flood to reach Kluea Lake, approximately 60 minutes for the flood to reach Todagin Lake, approximately 3.5 hours to reach Tatogga Lake, and approximately 17.5 hours to reach the outlet of Kinaskan Lake. If a dam break does occur of the Northeast Dam from an overtopping failure, it will take approximately 30 minutes for the flood to reach the Klappan River. It will take approximately 150 minutes for the flood to reach the Stikine River, approximately 3.9 hours to reach the Highway 37 crossing with the Stikine River, approximately 7.1 hours to reach Tahltan, and approximately 8.3 hours to reach Telegraph Creek.

By providing effective communications with agencies and residents in the downstream affected communities, the impact to the downstream area can be kept to a minimum.

9.5.7.6. Notification Procedures

CDA guidelines: *Notification procedures:*

- Provide all contact info
- Should be in order of priority
- Should include – local authorities, agencies involved in emergency response, owner of facility, downstream users, government authorities

- Communication with media

In the event of an emergency or unusual situation, the standard reporting procedure described below and outlined on the attached flow chart (Table 4) shall be followed as quickly as possible:

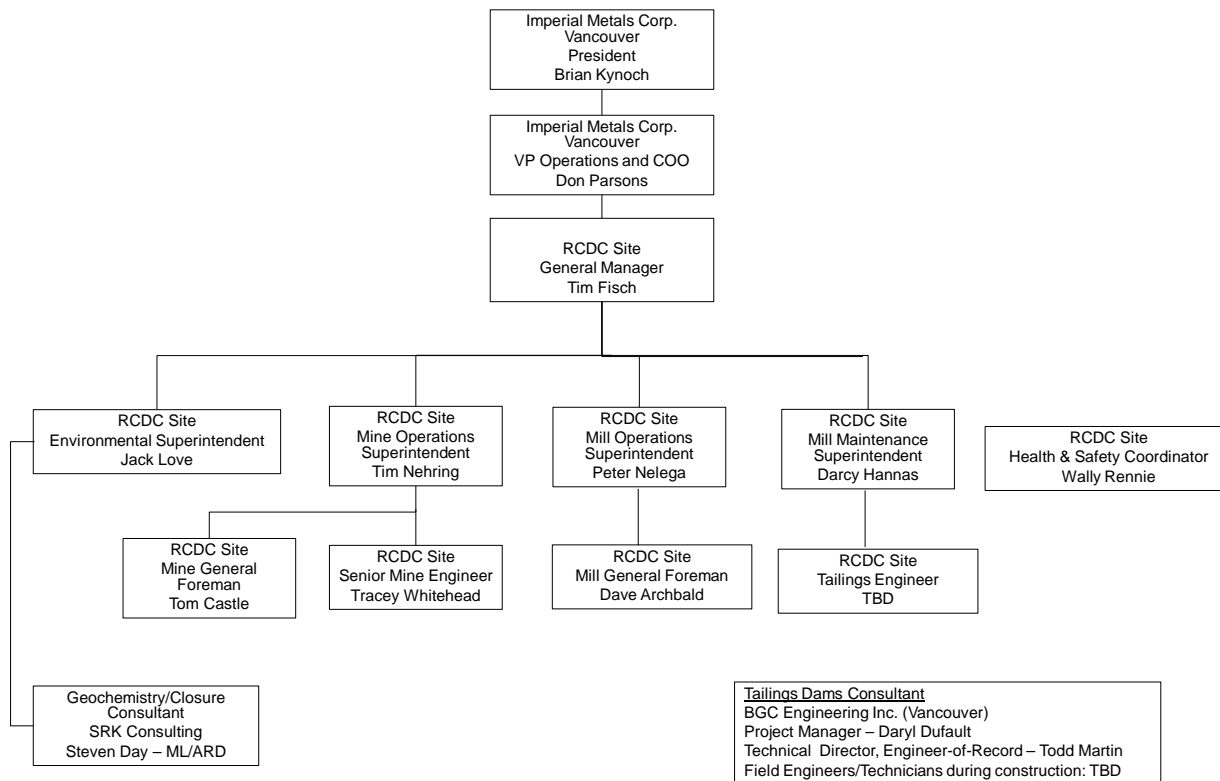
1. The person first noticing an emergency or unusual situation shall notify one of the following:
 1. The Mill Shift Operating Foreman
 2. The Foreman notified shall:
 - Initiate corrective actions
 - Notify the Mill Operations Superintendent
 3. The Superintendent shall
 - Notify the General Manager (or Designate)
 4. The General Manager (or Designate) shall:
 - Review the actions taken to control the situation
 - Notify the Engineering Consultant
 - Notify Corporate Management (President of Imperial Metals))
 5. In the event of an emergency situation which may threaten the stability of the tailings dams or the integrity of the tailings storage facility, the General Manager (or Designate) shall notify:
 - Local Bands that may be affected (Talthan, Iskut)
 - District Mines Inspector (Smithers)
 - Ministry of Environment (Smithers)
 - The R.C.M.P.
 - Provincial Emergency Program (P.E.P)
 6. An Incident Report shall be submitted by the General Manager (or Designate) to the Ministry of Energy and Mines (Mining and Minerals Division).
 7. An Incident Report shall be submitted by the General Manager (or Designate) to the Ministry of Environment (M.O.E)
 8. The Report shall include the location and nature of the Incident; the steps taken to mitigate or control the situation; the names of persons involved and time sequencing of the event particulars.

9.5.7.7. Notification Chart

CDA (and MAC) Guidelines: *Illustrate how dam owner will notify all responders. There may be different charts for a potential flood emergency and an imminent flood emergency. Who contacts whom, in order of priority by organization and position, but it need not include phone numbers.*

RCDC's internal Organization Chart is shown on the next page.

RCDC's Organization Chart



9.5.7.8. Key Contact Numbers – Downstream Contacts

CDA Guidelines: *Key contact numbers to also include list of downstream water users and affected stakeholders.*

Table 9.4 Key Contact Numbers – Downstream Contacts

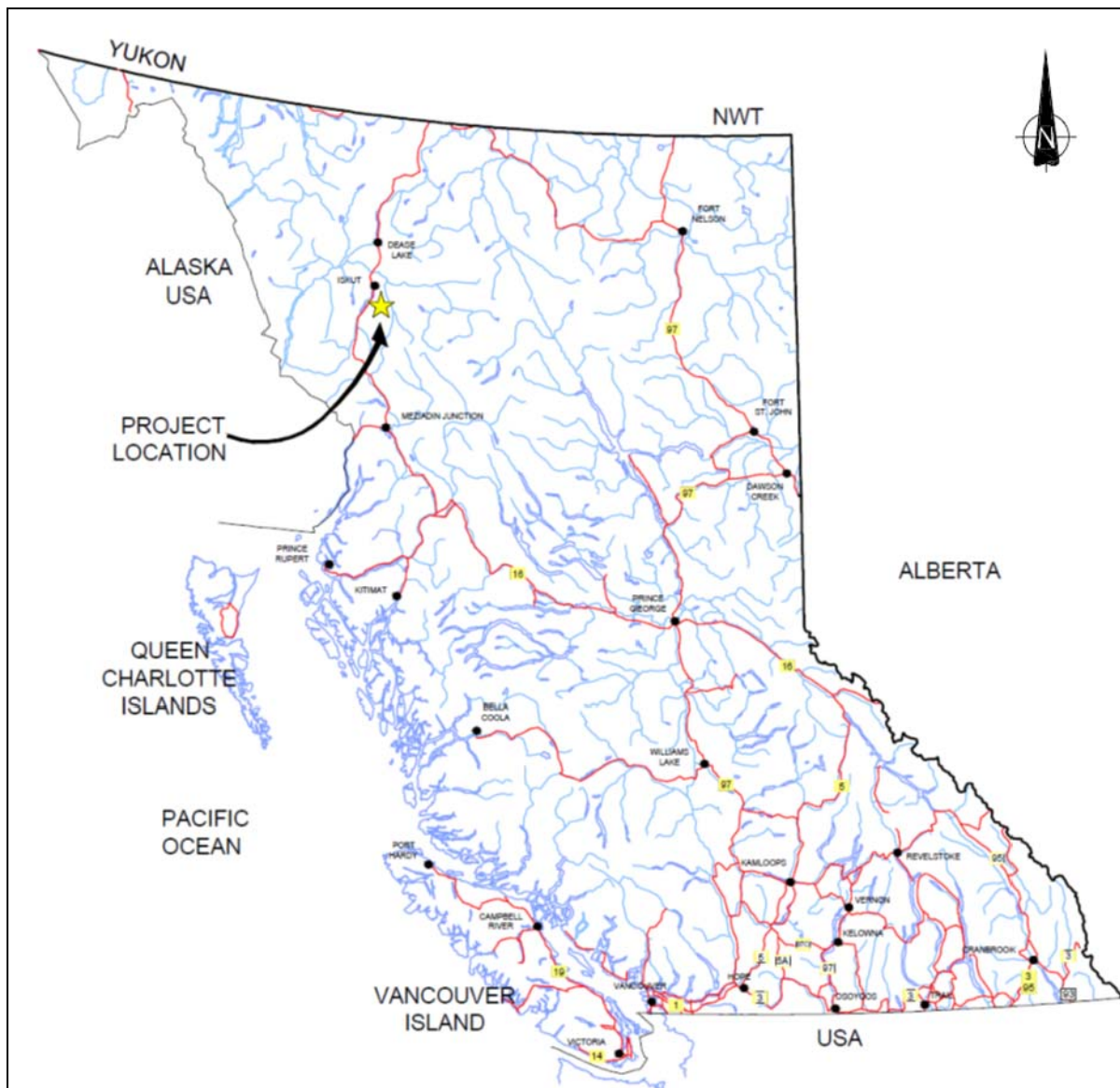
Name	Position	Work	Home	Cell
Tahltan Band Office				
Iskut Band Office				
BC Parks	Stikine Region Office	250-771-4591		

9.5.7.9. Site Access

CDA guidelines: *Provide information on site access.*

- By various methods (road, foot, helicopter)
- In various conditions (night, storm, winter)
- Location of communication infrastructure and material available for emergency response
- Site plans

The Red Chris Mine site is located in northwest British Columbia, approximately 80 km south of Dease Lake by road as shown in Drawing 01. Access to the site is obtained by traveling 18.5 km from Highway 37 along a gravel-surfaced, radio-controlled mine road. An alternate means of accessing the site is via helicopter. Mine haul roads on the property connect the main mine area to the tailings facility.



Drawing 01. Mine Location

9.5.7.10. Communication Systems, Equipment, and Materials

CDA (and MAC) Guidelines: *Full details of internal and external communications systems as they apply to an emergency response. Location and availability should be included for equipment, emergency power sources, contractors, and stockpiled materials that are critical to the emergency response.*

TBD

9.5.7.11. Warning Systems

CDA Guidelines: *If warning systems are to be used to warn nearby residents, campgrounds, and parks, full details of procedures for issuing the warnings should be included in the ERP.*

TBD

9.5.8. Additional Information

CDA Guidelines: *General site plans may be useful additions to the ERP. Drawings showing the potential breach location used in the inundation study may be included. Tables showing the variation in flood stage with time at key locations in the flooded area should also be considered.*

TBD

9.6. Municipal or Local Emergency Plans

The Canadian Dam Association Dam Safety Guidelines 2013 state that “The care and control of citizens and property rest with the local authority in most jurisdictions. Local authorities are generally required to prepare municipal or regional emergency plans with procedures for warning and evacuating residents within floodplains.” RCDC has developed the Emergency Preparedness and Response Plan to communicate potential impacts to people and property downstream of the TIA in the event of a potential or actual flood emergency. The information will aid in the development of internal response procedures at the mine site, and will be useful to local agencies when developing or updating municipal or local emergency plans. The corresponding responses based on the emergency level will allow municipal or local response agencies to define protocol for notification of the public in the event of a flood emergency at the Red Chris TIA. RCDC is committed to assisting municipal and local emergency response agencies with the development and refinement of associated plans, or annexes to existing plans.

9.7. Training, Testing and Updating

CDA guidelines:

- *Training provided so that site personnel are familiar with contents of ERP and EPP*
- *Qualified personnel are trained to deal with an emergency and implement remedial measures (both emergency and on emergency)*
- *Tests of the ERP should be conducted (eg drills)*
- *Plan should be updated annually or as frequently as deemed appropriate, contact information should be updated annually*

9.7.1. Training

Training for the Emergency Preparedness and Response Plan will be undertaken in conjunction with the annual OMS workshop to be held at site.

All Red Chris Mine employees who are identified as emergency responders will be provided appropriate training and information pertaining to TSF emergencies. EPRP will be periodically reviewed ensuring familiarity with all the elements of the EPRP.

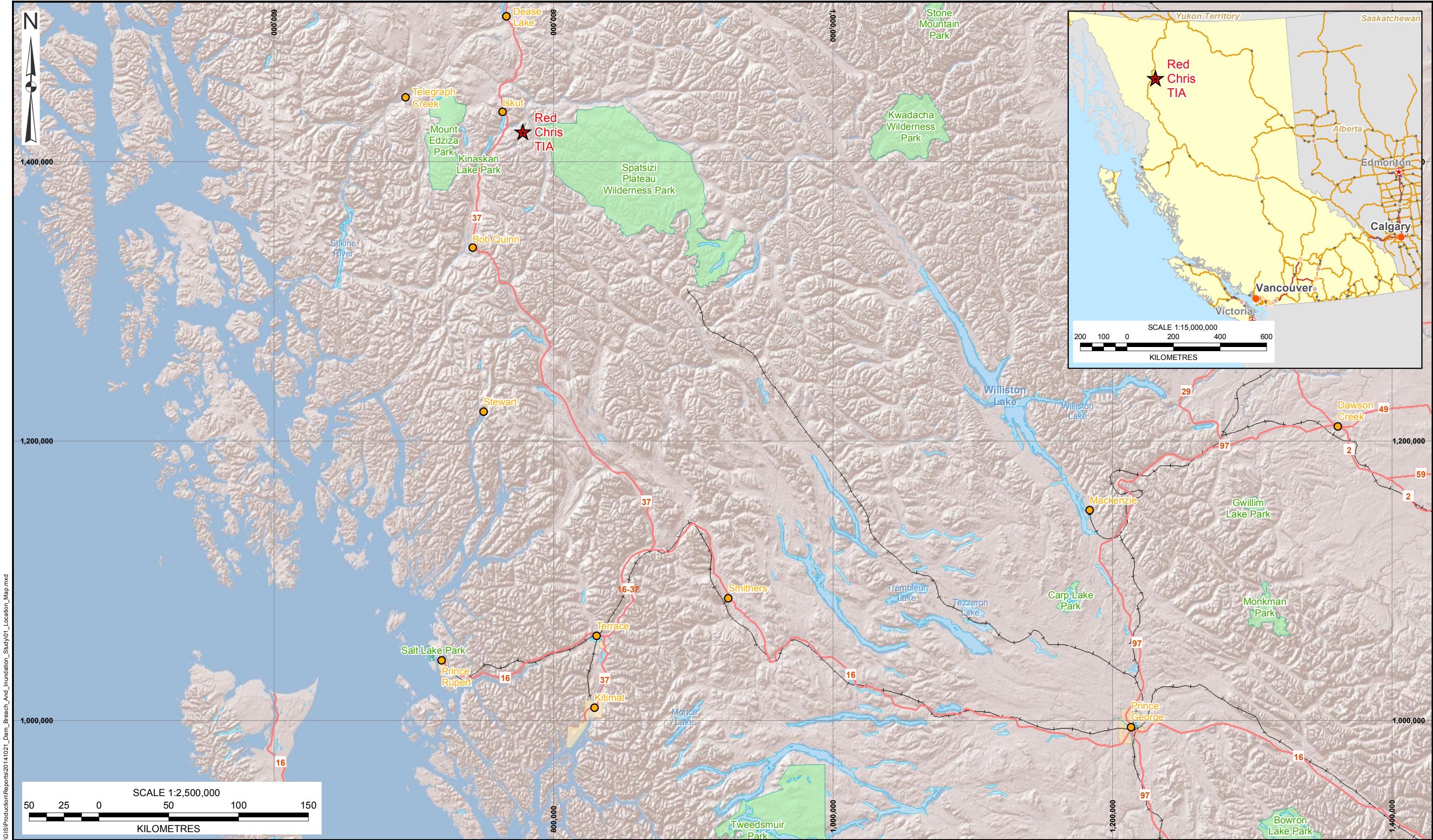
9.7.2. Testing

An annual tabletop exercise shall be conducted to test the plan.

9.7.3. Updating

The RCDC Environment Department staff members are responsible for updating the Emergency Preparedness and Response Plan. Updates may include but be not limited to: procedures, phone list, roles and responsibilities. Revisions will be circulated to all affected agencies

APPENDIX I INUNDATION STUDY BASED MAPS



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NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
3. PROJECTION IS NAD 1983 BC ENVIRONMENT ALBERS.
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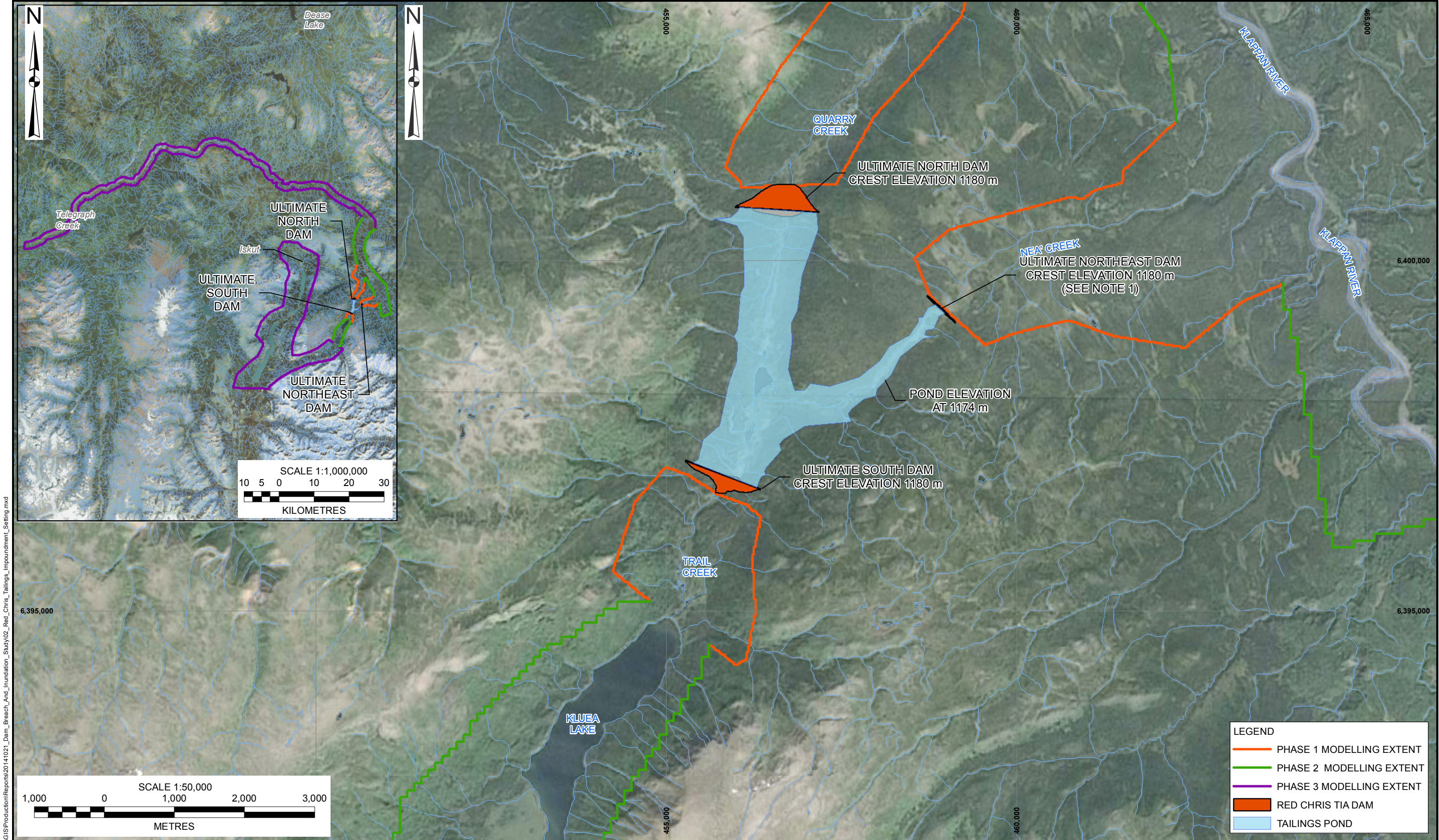
CLIENT:



Red Chris

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PROJECT: DAM BREACH AND INUNDATION STUDY	
TITLE: LOCATION MAP	
PROJECT No.: 0866-001-15	DWG No.: 01



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NOTES:
1. THE NORTHEAST DAM CREST WAS ASSUMED TO BE 1180 m FOR DAM BREACH MODELLING, BUT WILL IN REALITY BE SLIGHTLY LOWER THAN THE CREST ELEVATIONS OF THE NORTH AND SOUTH DAMS.
2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
4. IMAGERY OBTAINED FROM GOOGLE EARTH AND MICROSOFT BING MAPS.
5. PROJECTION IS NAD 1983 UTM ZONE 9N.
6. FINAL DAM CONFIGURATIONS ARE SHOWN FOR THE NORTH DAM, SOUTH DAM, AND NORTHEAST DAM, ALONG WITH THE FINAL PROJECTED IMPOUNDMENT OUTLINE.
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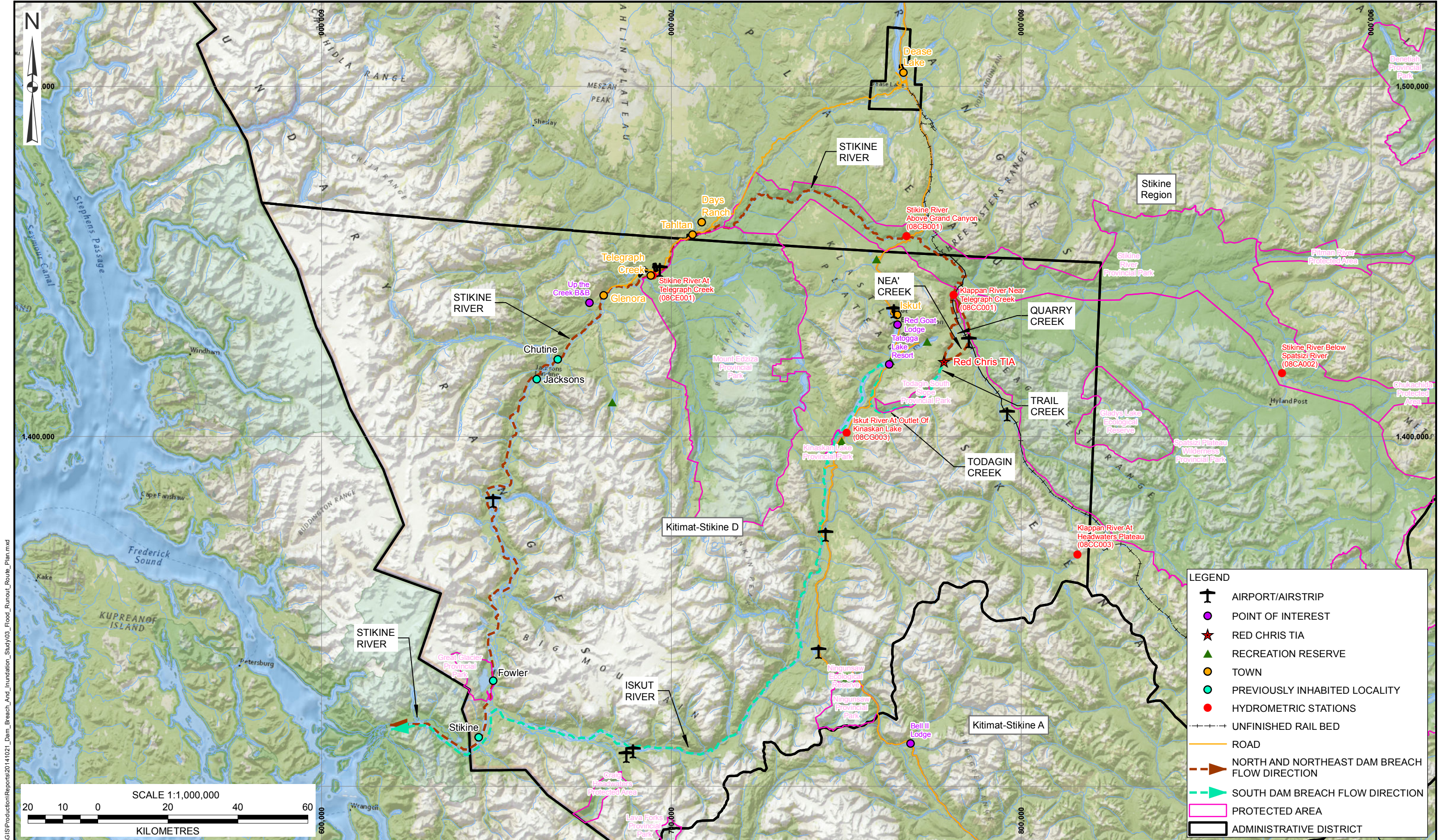
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CLIENT:

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PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	RED CHRIS TAILINGS IMPOUNDMENT SETTING
PROJECT No.:	0866-001-15
DWG No.:	02



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NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
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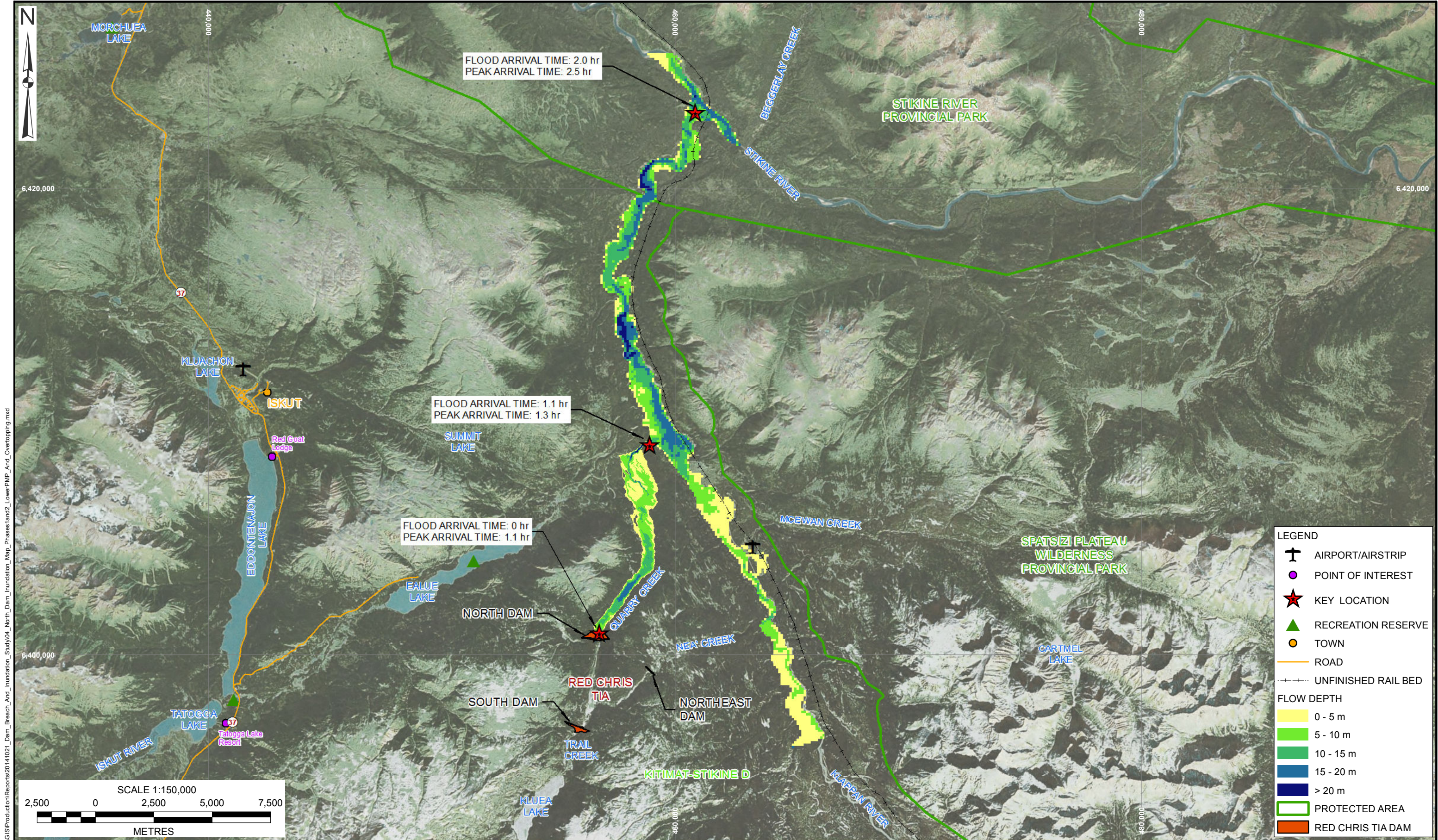
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PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	FLOOD RUNOUT ROUTE PLAN
PROJECT No.:	0866-001-15
	03



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NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. IMAGERY OBTAINED FROM MICROSOFT BING MAPS.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
4. PROJECTION IS NAD 1983 UTM ZONE 9N.
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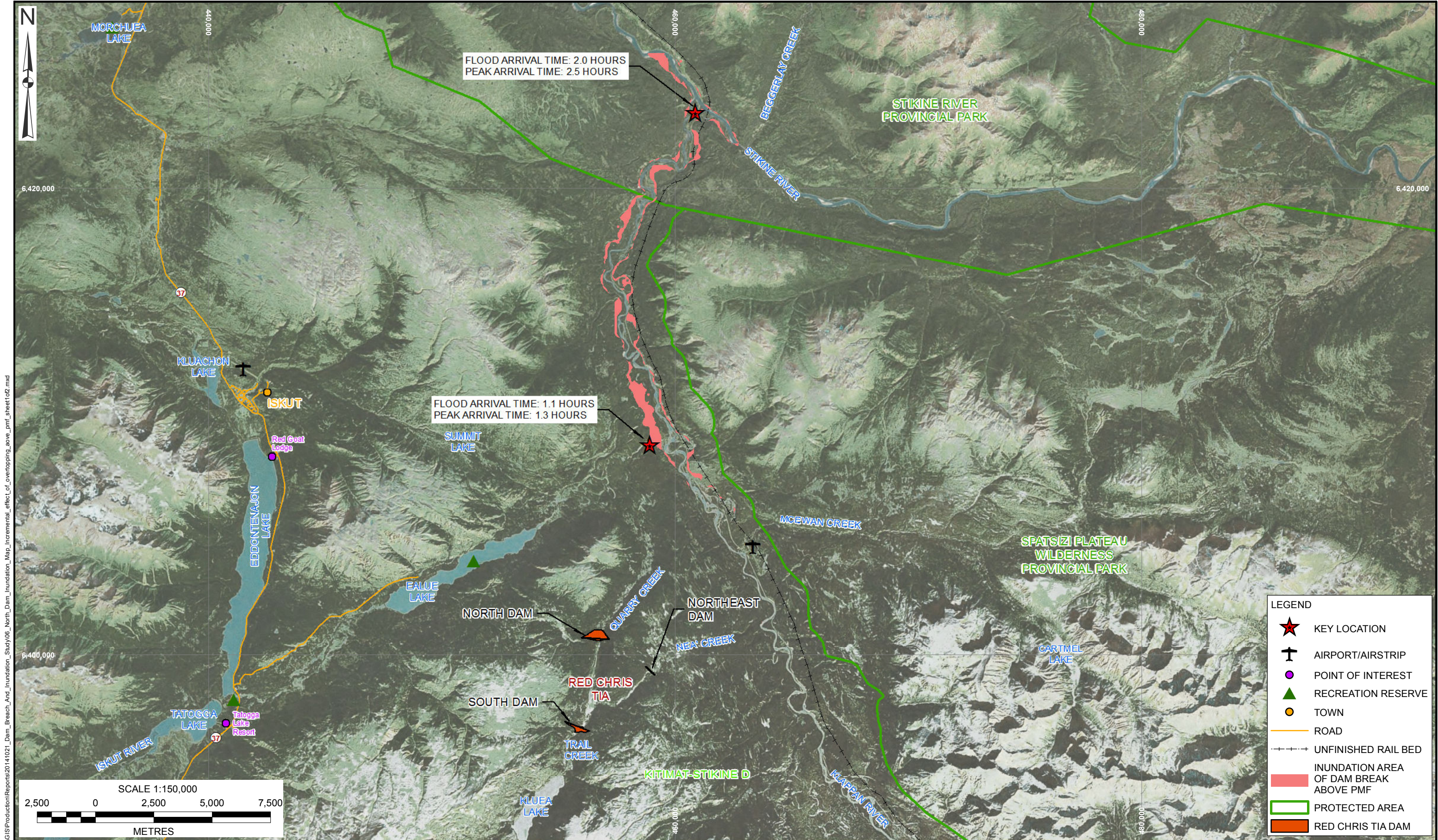
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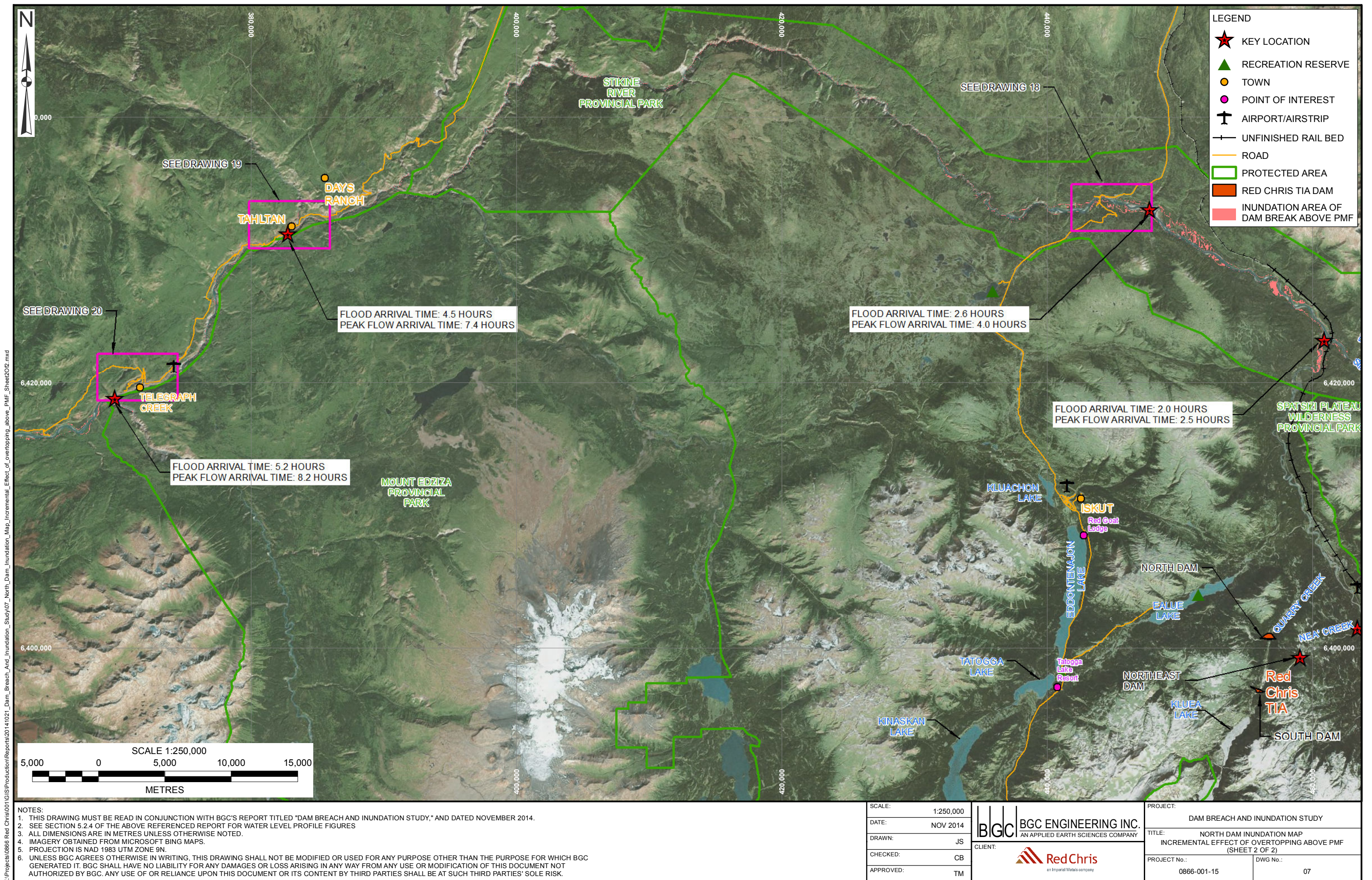
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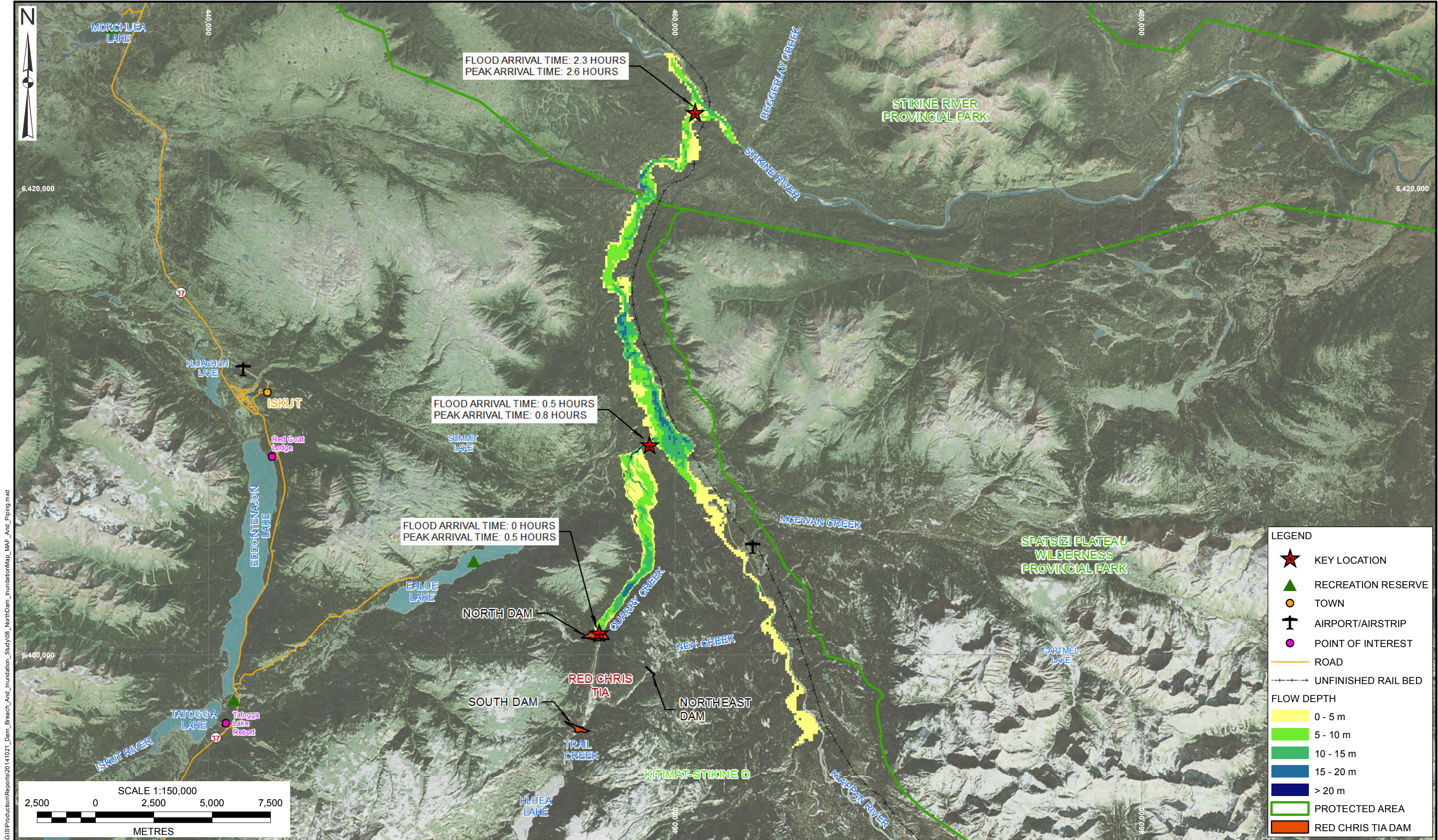
PROJECT: DAM BREACH AND INUNDATION STUDY	
TITLE: NORTH DAM INUNDATION MAP PMF + OVERTOPPING (SHEET 1 OF 2)	
PROJECT No.: 0866-001-15	DWG No.: 04



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SCALE:	1:150,000	 BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY  <small>an Imperial Metals company</small>	PROJECT: DAM BREACH AND INUNDATION STUDY	
DATE:	NOV 2014		TITLE: NORTH DAM INUNDATION MAP INCREMENTAL EFFECT OF OVERTOPPING ABOVE PMF (SHEET 1 OF 2)	
DRAWN:	JDC		PROJECT No.:	DWG No.:
CHECKED:	CB		0866-001-15	06
APPROVED:	TM			





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NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. IMAGERY OBTAINED FROM MICROSOFT BING MAPS.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
4. PROJECTION IS NAD 1983 UTM ZONE 9N.
5. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.


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CHECKED:	CB
APPROVED:	TM

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CLIENT:



an Imperial Metals company

PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	NORTH DAM INUNDATION MAP MAF + PIPING
PROJECT No.:	0866-001-15
DWG No.:	08



LEGEND

KEY LOCATION

RECREATION RESERVE

TOWN

AIRPORT/AIRSTRIP

POINT OF INTEREST

ROAD

UNFINISHED RAIL BED

INUNDATION AREA OF DAM BREAK ABOVE MAF

PROTECTED AREA

RED CHRIS TIA DAM

NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. IMAGERY OBTAINED FROM MICROSOFT BING MAPS.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
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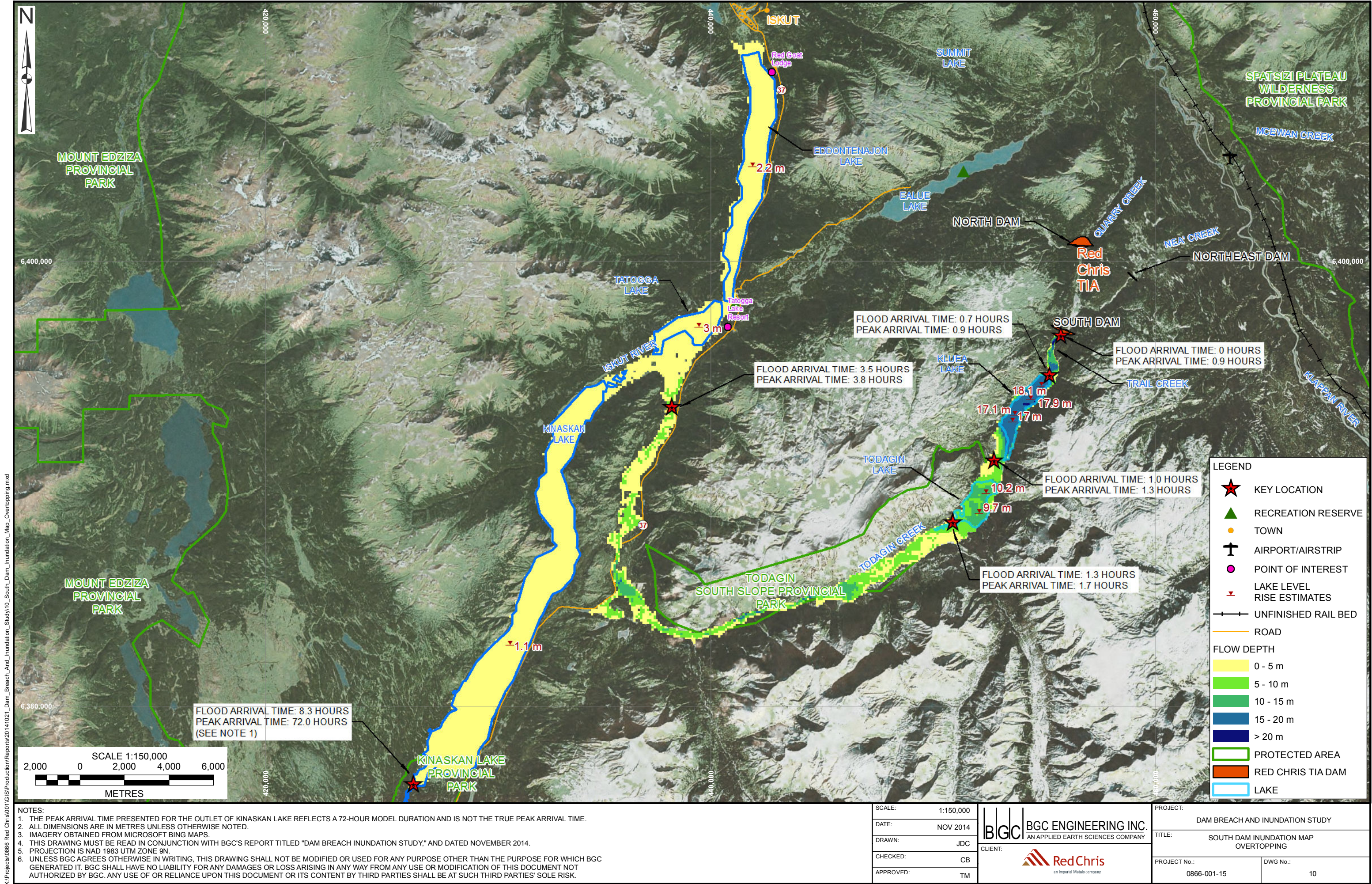
SCALE: 1:150,000
DATE: NOV 2014
DRAWN: JDC
CHECKED: CB
APPROVED: TM

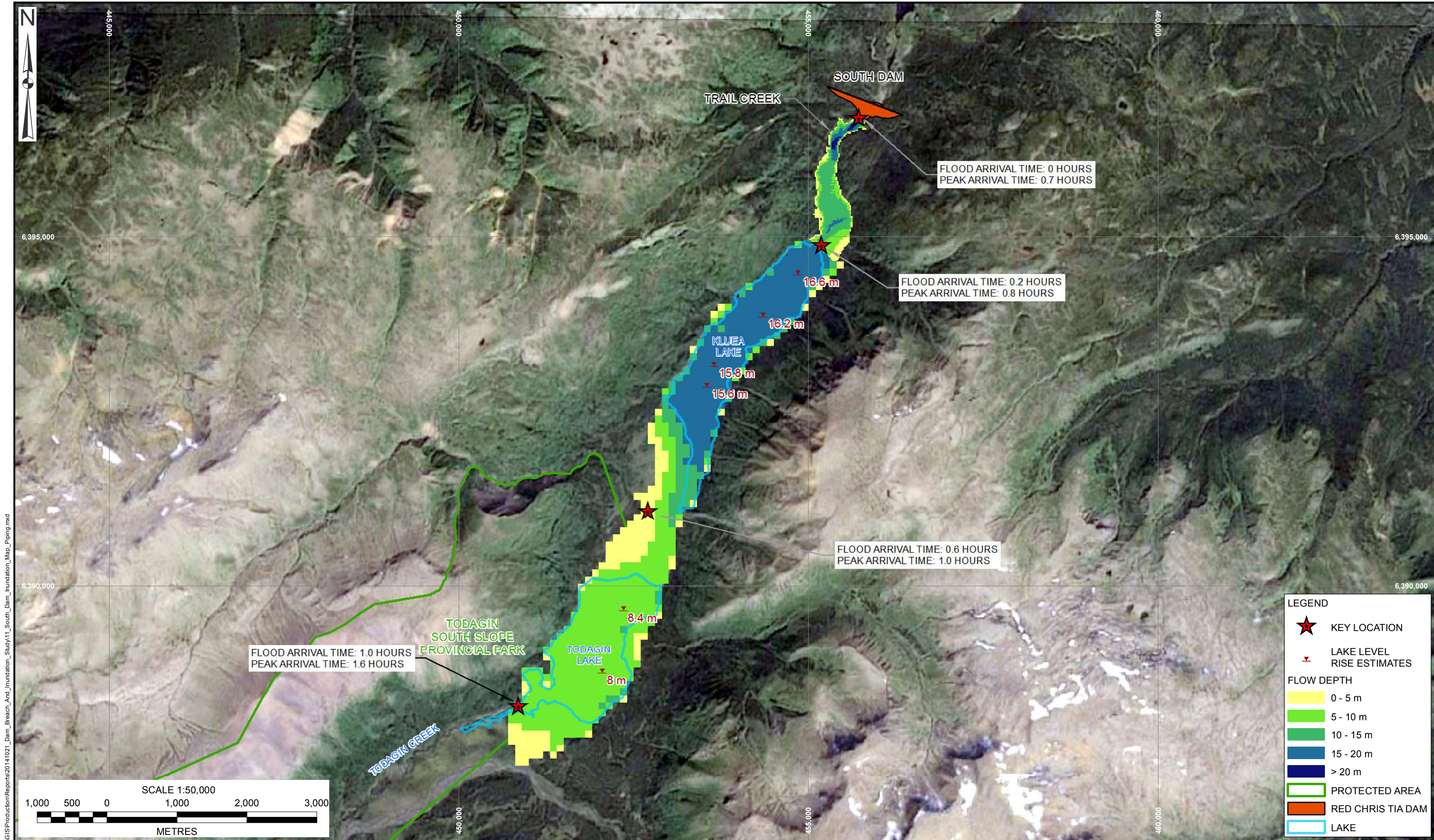
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AN APPLIED EARTH SCIENCES COMPANY

CLIENT:

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PROJECT: DAM BREACH AND INUNDATION STUDY
TITLE: NORTH DAM INUNDATION MAP
INCREMENTAL EFFECT OF PIPING ABOVE MAF
PROJECT No.: 0866-001-15
DWG No.: 09





LEGEND

KEY LOCATION

LAKE LEVEL
RISE ESTIMATES

FLOW DEPTH

0 - 5 m

5 - 10 m

10 - 15 m

15 - 20 m

> 20 m

PROTECTED AREA

RED CHRIS TIA DAM

LAKE

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. IMAGERY OBTAINED FROM GOOGLE EARTH, DATED 4/9/2013.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
4. PROJECTION IS NAD 1983 UTM ZONE 9N.
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APPROVED:	TM

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CLIENT:

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an Imperial Metals company

PROJECT: DAM BREACH AND INUNDATION STUDY	
TITLE: SOUTH DAM INUNDATION MAP PIPING	
PROJECT No.: 0866-001-15	DWG No.: 11



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- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
 2. IMAGERY OBTAINED FROM GOOGLE EARTH, DATED 4/9/2013.
 3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
 4. PROJECTION IS NAD 1983 UTM ZONE 9N.
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DATE:	NOV 2014
DRAWN:	JDC
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APPROVED:	TM

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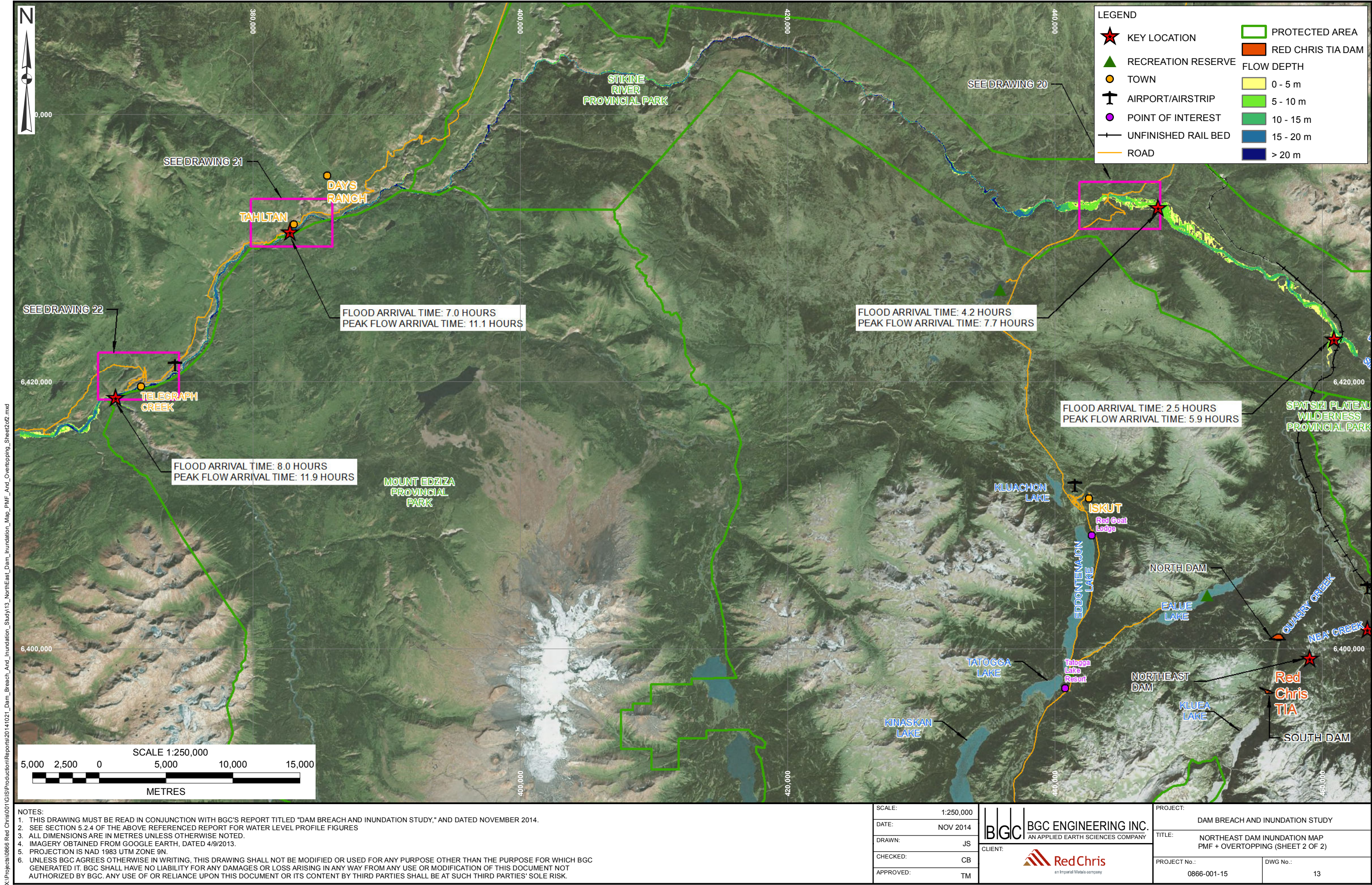
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:



an Imperial Metals company

PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	NORTHEAST DAM INUNDATION MAP PMF + OVERTOPPING (SHEET 1 OF 2)
PROJECT No.:	0866-001-15
DWG No.:	12





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- NOTES:
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
 2. IMAGERY FROM ARCGIS WORLD IMAGERY MAP SERVICE, LAST UPDATED OCTOBER 2014.
 3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
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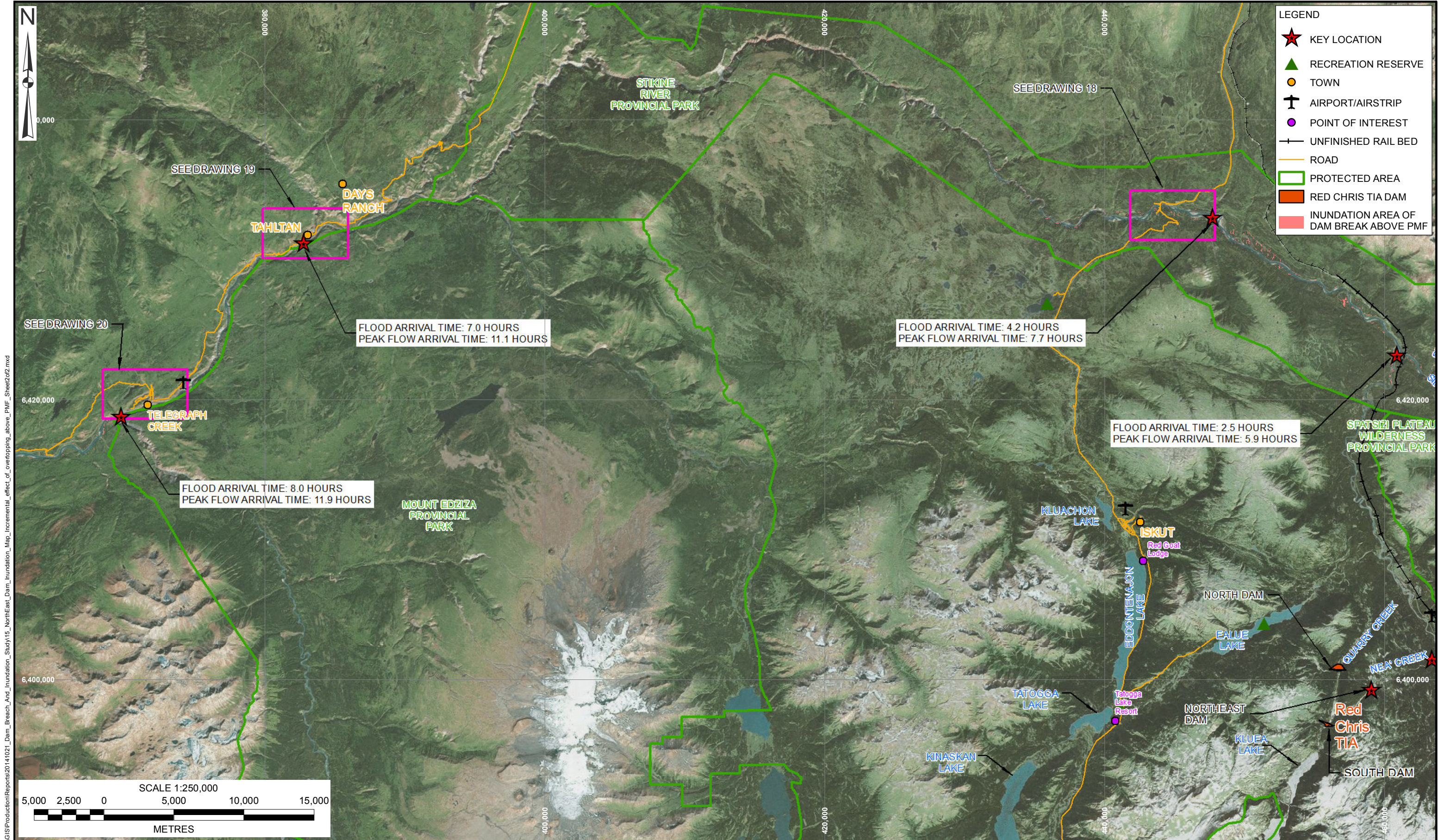
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CLIENT:

RedChris

an Imperial Metals company

PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	NORTHEAST DAM INUNDATION MAP INCREMENTAL EFFECT OF OVERTOPPING ABOVE PMF (SHEET 1 OF 2)
PROJECT No.:	0866-001-15
DWG No.:	14



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NOTES:

1. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.

2. SEE SECTION 5.2.4 OF THE ABOVE REFERENCED REPORT FOR WATER LEVEL PROFILE FIGURES

3. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

4. IMAGERY OBTAINED FROM GOOGLE EARTH, DATED 4/9/2013.

5. PROJECTION IS NAD 1983 UTM ZONE 9N.

6. UNLESS BGC AGREES OTHERWISE IN WRITING, THIS DRAWING SHALL NOT BE MODIFIED OR USED FOR ANY PURPOSE OTHER THAN THE PURPOSE FOR WHICH BGC GENERATED IT. BGC SHALL HAVE NO LIABILITY FOR ANY DAMAGES OR LOSS ARISING IN ANY WAY FROM ANY USE OR MODIFICATION OF THIS DOCUMENT NOT AUTHORIZED BY BGC. ANY USE OF OR RELIANCE UPON THIS DOCUMENT OR ITS CONTENT BY THIRD PARTIES SHALL BE AT SUCH THIRD PARTIES' SOLE RISK.

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CLIENT:

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PROJECT:DAM BREACH AND INUNDATION STUDY

TITLE:NORTHEAST DAM INUNDATION MAP
INCREMENTAL EFFECT OF OVERTOPPING ABOVE PMF
(SHEET 2 OF 2)

PROJECT No.:0866-001-15

DWG No.:15

Project0866-Red Chris001



LEGEND

KEY LOCATION

RECREATION RESERVE

TOWN

AIRPORT/AIRSTRIP

POINT OF INTEREST

ROAD

UNFINISHED RAIL BED

0 - 5 m

5 - 10 m

10 - 15 m

15 - 20 m

> 20 m

PROTECTED AREA

RED CHRIS TIA DAM

NOTES:

1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.

2. IMAGERY OBTAINED FROM GOOGLE EARTH, DATED 4/9/2013.

3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.

4. PROJECTION IS NAD 1983 UTM ZONE 9N.

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AN APPLIED EARTH SCIENCES COMPANY

CLIENT:

an Imperial Metals company

PROJECT:

DAM BREACH AND INUNDATION STUDY

TITLE:

NORTHEAST DAM INUNDATION MAP
MAF + PIPING

PROJECT No.:

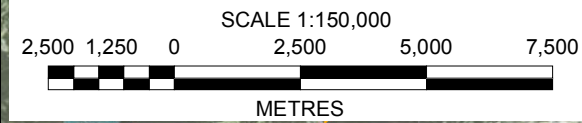
0866-001-15

DWG No.:

16



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LEGEND

- ★ KEY LOCATION
- ▲ RECREATION RESERVE
- TOWN
- ✈ AIRPORT/AIRSTRI
- POINT OF INTEREST
- ROAD
- - - UNFINISHED RAIL BED
- INUNDATION AREA OF DAM BREAK ABOVE MAF
- PROTECTED AREA
- RED CHRIS TIA DAM

NOTES:

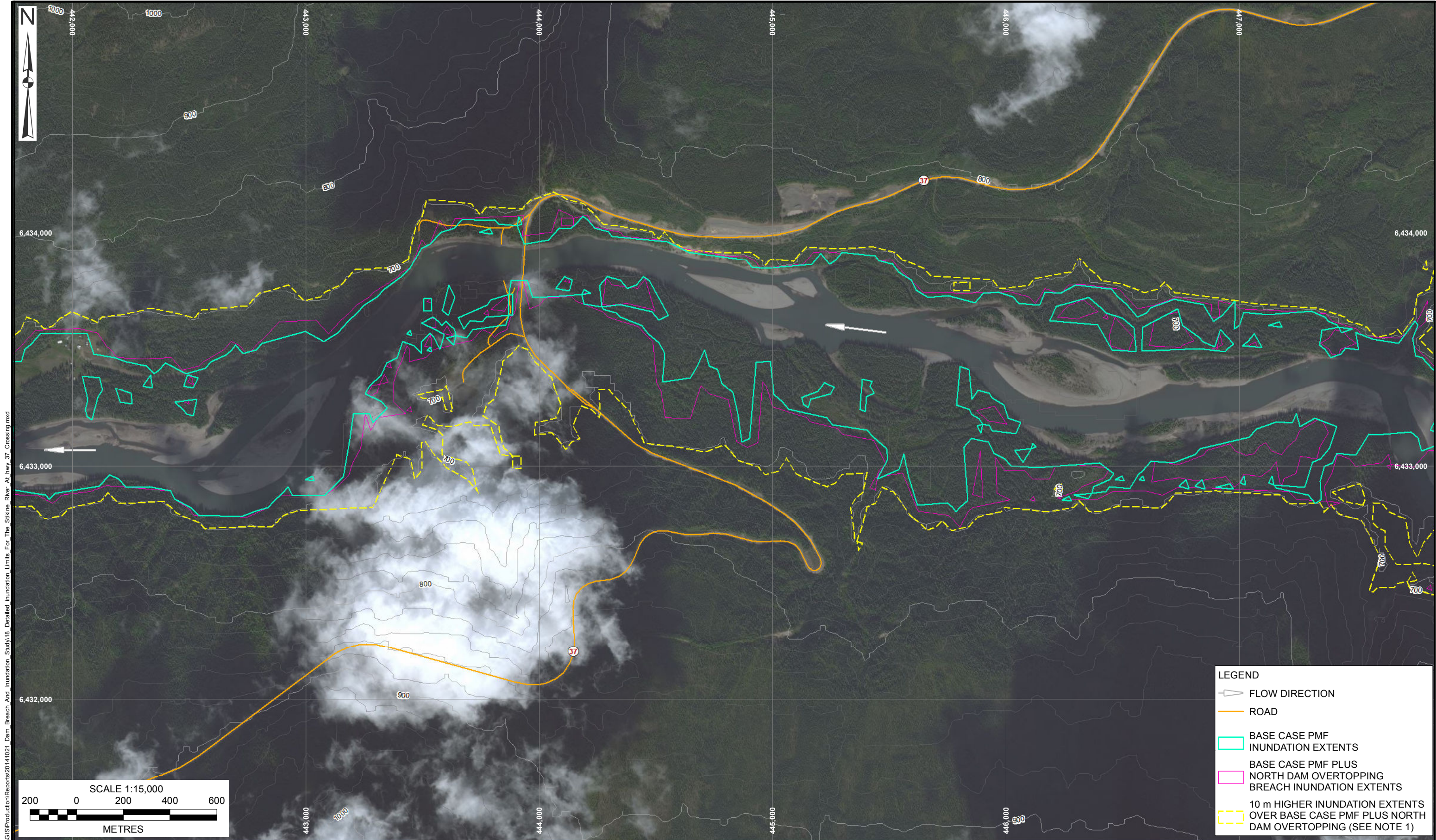
1. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
2. IMAGERY OBTAINED FROM GOOGLE EARTH, DATED 4/9/2013.
3. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
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AN APPLIED EARTH SCIENCES COMPANY

CLIENT: **RedChris**
an Imperial Metals company

PROJECT:	DAM BREACH AND INUNDATION STUDY
TITLE:	NORTHEAST DAM INUNDATION MAP INCREMENTAL EFFECT OF PIPING ABOVE MAF
PROJECT No.:	0866-001-15
DWG No.:	17



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- NOTES:
1. THE 10 m HIGHER INUNDATION EXTENTS WERE DERIVED USING THE COASTAL PMF RELATIONSHIP, WHICH IS JUDGED TO REPRESENT NON-PLAUSIBLE INUNDATION EXTENTS.
 2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
 3. SEE SECTION 5.2.4 OF THE ABOVE REFERENCED REPORT FOR WATER LEVEL PROFILE FIGURES
 4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
 5. BASE TOPOGRAPHIC DATA PROVIDED BY GEOBASE (NDED). CONTOUR INTERVAL = 20 m.
 6. IMAGERY OBTAINED FROM MICROSOFT BING MAPS.
 7. PROJECTION IS NAD 1983 UTM ZONE 9N.
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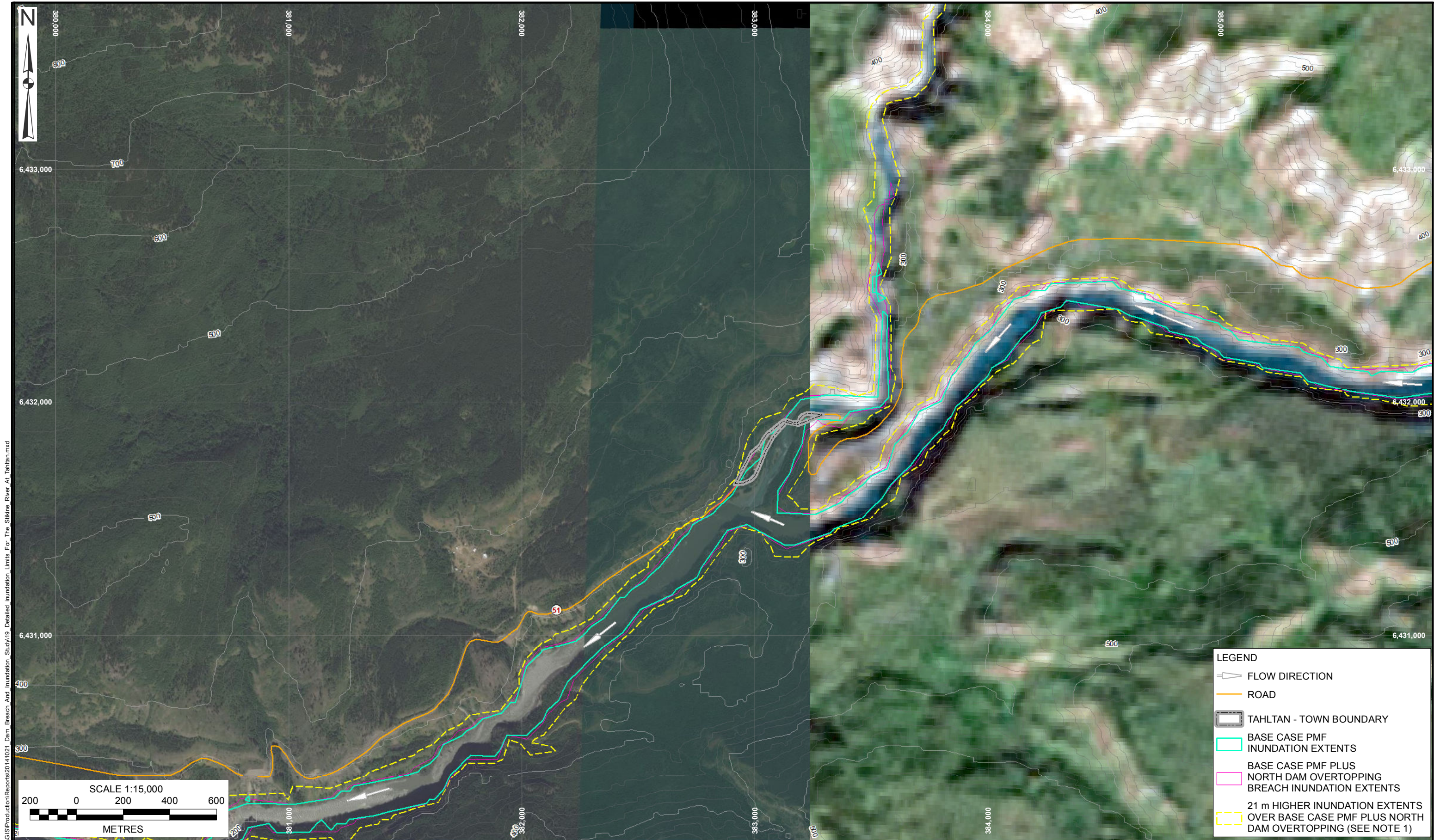
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PROJECT: DAM BREACH AND INUNDATION STUDY	
TITLE: DETAILED INUNDATION LIMITS FOR THE STIKINE RIVER AT HIGHWAY 37 CROSSING	
PROJECT No.: 0866-001-15	DWG No.: 18



LEGEND

FLOW DIRECTION

ROAD

TAHLTAN - TOWN BOUNDARY

BASE CASE PMF INUNDATION EXTENTS

BASE CASE PMF PLUS NORTH DAM OVERTOPPING BREACH INUNDATION EXTENTS

21 m HIGHER INUNDATION EXTENTS OVER BASE CASE PMF PLUS NORTH DAM OVERTOPPING (SEE NOTE 1)

NOTES:
1. THE 21 m HIGHER INUNDATION EXTENTS WERE DERIVED USING THE COASTAL PMF RELATIONSHIP, WHICH IS JUDGED TO REPRESENT NON-PLAUSIBLE INUNDATION EXTENTS.
2. THIS DRAWING MUST BE READ IN CONJUNCTION WITH BGC'S REPORT TITLED "DAM BREACH AND INUNDATION STUDY," AND DATED NOVEMBER 2014.
3. SEE SECTION 5.2.4 OF THE ABOVE REFERENCED REPORT FOR WATER LEVEL PROFILE FIGURES
4. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE NOTED.
5. BASE TOPOGRAPHIC DATA PROVIDED BY GEOBASE (NDED). CONTOUR INTERVAL = 20 m.
6. IMAGERY OBTAINED FROM MICROSOFT BING MAPS AND ESRI WORLD IMAGERY SERVICE.
7. PROJECTION IS NAD 1983 UTM ZONE 9N.
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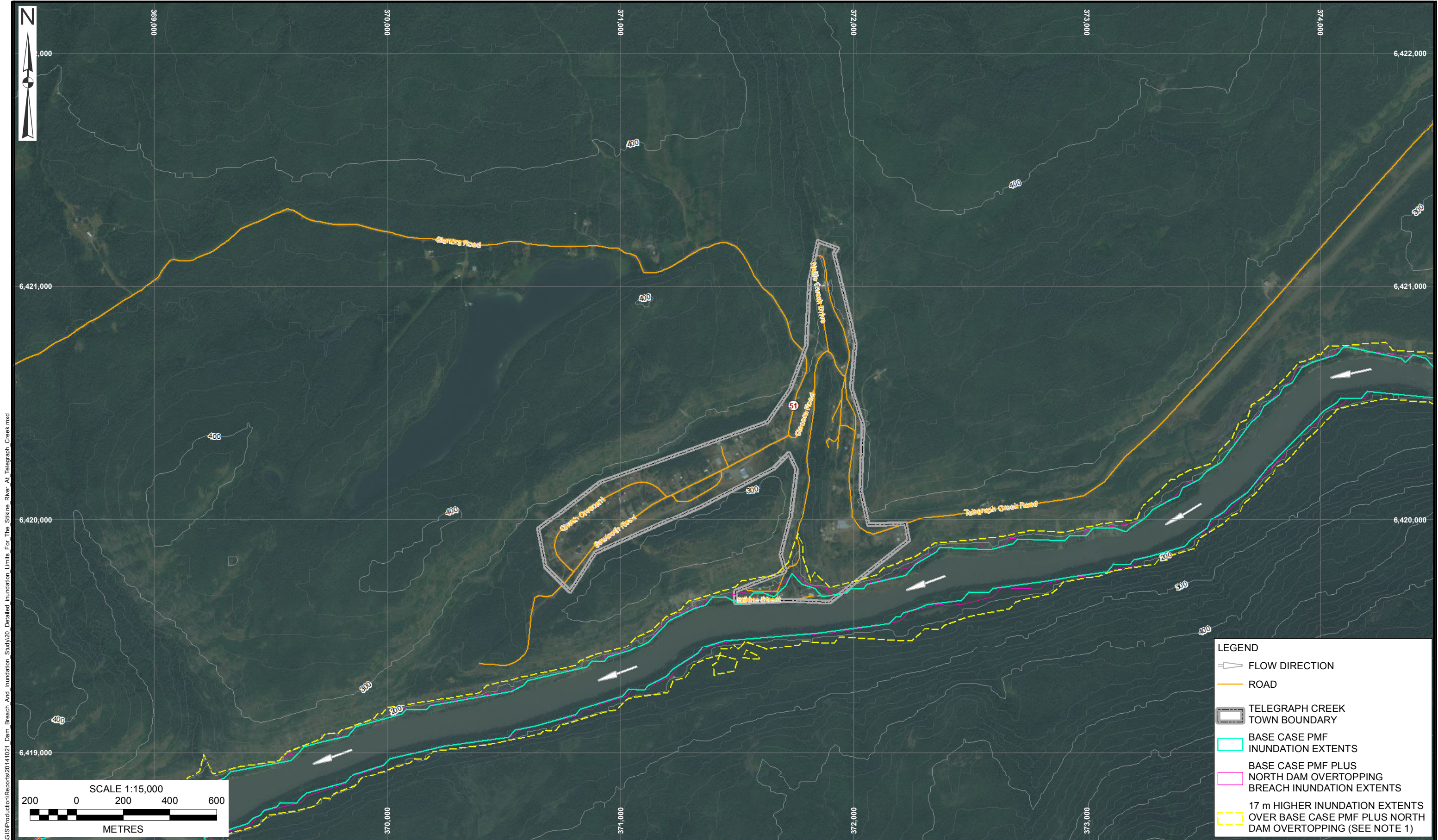
SCALE: 1:15,000
DATE: NOV 2014
DRAWN: JS
CHECKED: CB
APPROVED: TM

BGC ENGINEERING INC.
AN APPLIED EARTH SCIENCES COMPANY

CLIENT:

RedChris
an Imperial Metals company

PROJECT: DAM BREACH AND INUNDATION STUDY
TITLE: DETAILED INUNDATION LIMITS FOR THE STIKINE RIVER AT TAHLTAN
PROJECT No.: 0866-001-15
DWG No.: 19



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SCALE:	AS SHOWN	BGC BGC ENGINEERING INC. AN APPLIED EARTH SCIENCES COMPANY	PROJECT: DAM BREACH AND INUNDATION STUDY	
DATE:	NOV 2014		TITLE: DETAILED INUNDATION LIMITS FOR THE STIKINE RIVER AT TELEGRAPH CREEK	
DRAWN:	JS		PROJECT No.:	DWG No.:
CHECKED:	CB		0866-001-15	20
APPROVED:	TM	CLIENT: 