

SET NO.

JOB NO. 41 01 C799 001 02 02

DATE JULY, 1997

INDIAN AND NORTHERN AFFAIRS CANADA  
WASTE MANAGEMENT YUKON  
FOR THE  
SITE REMEDIATION OF THE  
BORDER PUMP STATION AND RAINY HOLLOW SITES  
BRITISH COLUMBIA, CANADA

**CONSTRUCTION SPECIFICATIONS**

**FOR THE**

**SITE REMEDIATION OF THE**

**BORDER PUMP STATION AND**

**RAINY HOLLOW SITES**

**BRITISH COLUMBIA, CANADA**

July, 1997

UMA ENGINEERING LTD.

ENGINEERS AND PLANNERS

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#### Drawing No.

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**PART I - FORM OF TENDER**

**SCHEDULE A**

1. Tendered prices for the following items shall be lawful money of Canada and include all costs for materials, equipment, labour and associated expenses, sales taxes, markups, etc.
2. The following list of addenda have been received and acknowledged. The modifications to the Contribution Agreement noted therein have been considered and are provided for in the following schedule of unit prices.

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_

3. Schedule of Unit Prices

I/We agree that the following table is the Unit Price Table to be used for the purposes of the Contribution Agreement.

Item No.	Class of Labour, Plant or Material	Unit of Measurement	Estimated Total Quantity	Price Per Unit	Estimated Total Price
1.	Excavation, transport and disposal of DDT contaminated soil	Cubic Metres	50	\$ _____	\$ _____
2.	Excavation and on-site disposal of selected hydrocarbon contaminated soil	Cubic Metres	5	\$ _____	\$ _____
3.	Clearing and grubbing	Square Metres	500	\$ _____	\$ _____
4.	Transport, placement and compaction of backfill soil for grading and capping	Cubic Metres	4,500	\$ _____	\$ _____
5.	Sealing/Resetting Monitoring Wells	Lump Sum	1	\$ _____	\$ _____
<b>Total Estimated Amount</b>					\$ _____

DIVISION 1

GENERAL REQUIREMENTS

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1. References .1 National Building Code of Canada (NBC) (1985) including all amendments up to tender closing date.
2. Description of Work .1 Work under this Contribution Agreement covers but is not limited to the following:
- .1 Mobilization and demobilization of all personnel, equipment, support facilities and materials required to undertake the work.
  - .2 Excavation and transport to a licensed disposal facility of surface soil affected with DDT concentrations > 10 ppm.
  - .3 Excavation and on-site disposal of selected surface soil affected with petroleum hydrocarbons.
  - .4 Capping with 0.5 metres of clean fill all surface soil affected with DDT concentrations between 1 and 10 ppm.
  - .5 Capping with 0.5 metres of clean fill surface soil above 1000 mg/kg extractable petroleum hydrocarbon (EPH).
  - .6 Grading all areas of work to blend into the natural site topography.
  - .7 Excavation or filling of unaffected areas (where appropriate) to improve site drainage.
  - .8 General site restoration.
  - .9 Sealing or resetting of monitoring wells.
3. Codes .1 Perform work in accordance with National Building Code of Canada (NBC) and any other code of provincial or local application provided that in any case of conflict or discrepancy, the more stringent requirements shall apply.
- .2 Meet or exceed requirements of:
- .1 contribution agreement,
  - .2 specified standards, codes and referenced documents.

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4. Documents Required .1 Maintain at job site, one copy each of the following:
- .1 Contribution Agreement.
  - .2 Specifications.
  - .3 Addenda.
  - .4 Change orders.
  - .5 Other modifications to Contract.
  - .6 Field test reports.
  - .7 Copy of approved work schedule.
5. Site Conditions .1 The information presented in the specifications that describes the work is based on site conditions during site visits in 1994, 1995 and 1996.
6. Work Schedule .1 Provide within 21 working days after Contribution Agreement award, schedule showing anticipated progress stages and final completion of work.
- .2 Interim reviews of work progress based on work schedule will be conducted as decided by Engineer and schedule updated by Contractor in conjunction with and to approval of Engineer.
7. Measurement for Payment .1 Notify Engineer sufficiently in advance of operations to permit required measurements for payment.
8. Contractor's Use of Site .1 The Contractor is responsible for security until all work is completed.
- .2 The Contractor shall not unreasonably encumber site with materials or equipment.
- .3 The Contractor shall provide control of the site to prohibit access by unauthorized persons, but allow unrestricted access to the site for fire, maintenance, security and other authorized persons and vehicles.
- .4 The Contractor shall store any equipment, materials or fuels required to complete this work only on the upper bench Border Pump Station site.
9. Project Meetings .1 The Engineer will arrange project meetings and assume responsibility for setting times and recording and distributing minutes.
10. Setting Out of Work .1 The Engineer will lay out the work covered by this Contribution Agreement. The Contractor shall provide and

pay for all stakes, markers, tools and any help reasonably required in driving stakes and setting out the work. The personnel supplied shall be acceptable to the Engineer.

- .2 Wherever possible the Contractor shall make the same personnel available to the Engineer throughout the course of the work.
- .3 The Contractor, upon entering the site for the purpose of beginning work, shall locate all reference points and take all necessary precautions to prevent their destruction. The Contractor shall pay all restoration charges for damaged legal survey bars, stakes, markers, etc.
- .4 Before commencing work, the Contractor shall satisfy himself as to the meaning and correctness of all stakes, markers and grade sheets. The Contractor shall give the Engineer at least 24 hours notice in writing before requiring any levels, lines or stakes on any portion of the work.

#### 11. Permits

- .1 The Owner will obtain any permits required to undertake the work.
- .2 DIAND will provide copies of permits/authorizations to the Contractor who shall agree to abide by all terms and conditions contained in the permits/authorizations.

#### 12. Additional Drawings

- .1 Engineer may furnish additional drawings for clarification. These additional drawings have meaning and intent as if they were included with plans referred to in Contribution Agreement documents.

#### 13. Examination of Site

- .1 Although the drawings and specifications for this work indicate some of the as-built and existing site conditions, the Contractor shall not be relieved from the responsibility of making an inspection and survey of the existing site of the project and surrounding properties before submitting a bid to become familiar with existing conditions that may in any manner affect cost, progress or performance of the work, including any federal, provincial, municipal laws, ordinances, rules or regulations.
- .2 Claims for additional costs will not be entertained with respect to conditions which would reasonably have been ascertained by an inspection of the site prior to tender closing time.



14. Hours of Work .1 Carry out work during normal daytime hours 07:00 - 19:00 or as arranged with the Engineer.
15. Workmanship and Materials
- .1 Use qualified tradepersons to perform work of this contract. Submit proof or qualifications to the Engineer, if requested.
- .2 Post warning signs for safety purposes and to avoid unauthorized tampering.
- .3 Workmanship shall be of a high standard and in accordance with good building practice.
- .4 Make good or replace work resulting from defective materials or inferior workmanship at own expense.
- .5 Be responsible to produce an end result acceptable to the Engineer regardless of labour time or material quantities required.
- .6 Make good, to approval of the Engineer, any damage to property resulting from, or attributable to, work of this Contribution Agreement. Pay all costs.
- .7 All workmanship and all materials furnished and supplied under this Specification are subject to inspection and testing by the Engineer. The Engineer reserves the right to reject any materials or works which are not in accordance with the requirements of this Specification.
16. Site Supervision .1 Designate a competent and qualified supervisor to be on site at all times during construction, to have full authority to make decisions for the Contractor, to be knowledgeable of the requirements of the Contribution Agreement and to act upon the Engineer's instructions.
17. Record Drawings .1 The Engineer shall record all changes made during construction and provide record drawings to the Owner upon completion of the work.
18. Site Maintenance .1 Keep the site free from the accumulation of waste materials and debris as specified in Section 01560.

- .2 Upon completion of the work, clean away and dispose of all surplus material, supplies, rubbish and temporary works leaving the site neat and tidy to the requirements of the Engineer.

END OF SECTION 01005

1. General

- .1 The work specified in this Section comprises the provision of all labour, equipment and materials, and the performance of all work necessary for mobilization to and demobilization from the site.
- .2 Mobilization shall include transportation to the site of the Contractor's labour, equipment and materials.
- .3 Demobilization shall include the removal from the site of all the Contractor's equipment and materials, clean-up of the site and transportation of labour from the site.

END OF SECTION 01110

1. Related Requirements  
Specified Elsewhere

- .1 Particular requirements for inspection and testing to be carried out by testing laboratory designated by Engineer are specified under various sections.

2. Appointment  
and Payment

- .1 Engineer will appoint and pay for services of testing laboratory except for the following:
  - .1 Inspection and testing required by laws, ordinances, rules, regulations or orders of public authorities.
  - .2 Inspection and testing performed exclusively for Contractor's convenience.
  - .3 Tests specified to be carried out by Contractor and witnessed by the Engineer.
  - .4 Additional tests specified in paragraph 2.2.
- .2 Where tests or inspections by designated testing laboratory reveal work not in accordance with contract requirements, Contractor shall pay costs for additional tests or inspections as may be required to verify acceptability of corrected work.

3. Contractor's  
Responsibilities

- .1 Furnish labour and facilities to:
  - .1 Provide access to work to be inspected and tested.
  - .2 Facilitate inspections and tests.
  - .3 Make good work disturbed by inspection and test.
  - .4 Provide assistance to Engineer as may be required.
- .2 Notify Engineer sufficiently in advance of operations to allow for assignment of laboratory personnel and scheduling of test.
- .3 Where materials are specified to be tested, deliver representative samples in required quantity to testing laboratory.
- .4 Pay costs for uncovering and making good work that is covered before required inspection or testing is completed and approved by Engineer.

END OF SECTION 01410

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|---|----|---|
| <u>1. Access</u>                          | .1 | Provide and maintain adequate access to project site and existing facilities.   |
|   | .2 | Build and maintain temporary roads as directed during period of work.   |
|   | .3 | If authorized to use existing roads for access to project site, maintain such roads for duration of Contribution Agreement and make good damage resulting from Contractor's use of roads. |
| <u>2. Contractor's Site Office</u>        | .1 | Provide office (including temporary power) of sufficient size to accommodate site meetings and furnish with drawing laydown table.  |
| <u>3. Sanitary Facilities</u>             | .1 | Provide sanitary facilities for work force in accordance with governing regulations and ordinances.   |
|   | .2 | Post notices and take such precautions as required by local health authorities. Keep area and premises in sanitary condition.   |
| <u>4. Parking</u>                         | .1 | Parking will be permitted on upper bench (Border Pump Station) site only. Maintain and administer this space as directed.   |
| <u>5. Removal of Temporary Facilities</u> | .1 | Remove temporary facilities from site when no longer required.  |

END OF SECTION 01500

1. General

The Contractor shall be responsible for the safety of all persons and property on or about the project and for ensuring that the Work is performed in accordance with all applicable safety requirements. The Owner will provide the Contractor with specific plans for handling/managing any contaminated soil.

Without in any way limiting the generality of the foregoing, the Contractor shall comply fully with the following provisions:

- .1 Observe and enforce construction safety measures of the National Building Code of Canada, the Worker's Compensation Act, The Workplace Safety and Health Act, The Department of Labour, Municipal Statutes, Bylaws and any other authorities applicable to this project. The Contractor is responsible for compliance with these standards for all workers engaged in the work of this Contribution Agreement.
- .2 In event of conflict between any provisions of above authorities, the most stringent provision will apply.
- .3 Fires or burnings are not permitted on the project site.
- .4 Develop, maintain and supervise for the duration of the work a comprehensive safety program that will effectively incorporate and implement all required safety precautions. The program shall, as a minimum, respond fully to the requirements of all applicable laws, ordinances, rules, regulations and orders and general construction practices for the safety of persons or property, including without limitation any general safety rules and regulations of the Owner and any Workers' Compensation or Occupational Health and Safety legislation or regulations that may be applicable (eg. WHMIS).
- .5 Supply and maintain, at his own expense, at his site office or other well known place at the job site, safety equipment necessary to protect the workers and general public against accident or injury as prescribed by the governing authorities.

- .6 Except as otherwise agreed to in the Contribution Agreement, supply and maintain all articles necessary for giving first-aid to any person who may be injured on the job site and shall establish an emergency procedure for the immediate removal of any injured person to a hospital or a doctor's care in accordance with applicable legislative and regulatory requirements.
- .7 Report in writing to the Owner and the Engineer all accidents of any sort arising out of or in connection with the performance of the Work whether on or adjacent to the job site, giving full details and statements of witnesses. If death or serious injuries or damages are caused, the accident shall be promptly reported by the Contractor to the Owner and the Engineer by telephone or messenger in addition to any reporting required under provincial laws and regulations.
- .8 If a claim is made by anyone against the Contractor or any subcontractor on account of any accident, the Contractor shall promptly report the facts in writing to the Owner and the Engineer, giving full details of the claim.
- .9 Night work will only be performed by the Contractor if permission is given beforehand by the appropriate authorities. When work is carried out at night, the Contractor shall supply a sufficient number of electric or other approved lights to enable the work to be done in a safe and satisfactory manner.
- .10 Perform all work in a fire-safe manner and comply with all applicable governmental legislation and, without limiting the generality of the foregoing, shall supply and maintain at the job site adequate and proper fire fighting equipment.

2. Work in  
Hazardous Areas

- .1 The Contractor shall abide by and follow the requirements of the Owner for working with contaminated soils.
- .2 Before commencing the day's work and while working in areas which may contain an explosive, toxic or oxygen deficient atmosphere, the Contractor shall test for explosive or toxic gases or oxygen deficiency. If a hazardous condition is found, the Contractor shall make the work area safe before commencing or continuing work.

3. General  
Safety Requirements

- .3 Use non-sparking tools in areas where an explosive atmosphere may exist.
- .4 Provide, mount and maintain signs warning all of the hazards and of the proper procedures required for working in the hazardous areas.
- .1 Provide signal worker where signs or barricades do not provide adequate control and where excavation equipment is in usage, such worker must be qualified to perform the work.
- .2 All openings must be guarded with proper barricades or appropriate covers with warning identification.
- .3 Wear appropriate protective clothing suitable for the task to cover and protect the body.
- .4 CSA approved Industrial Headware/Z94.1 M1977.
- .5 CSA approved Protective Footwear/Z195 M1984.
- .6 Approved containers used to store drinking water must be clearly marked and must not be used for any other purpose.
- .7 All excavations and trenches must be prepared and maintained in accordance with safety regulations.
- .8 Instruct all workers of the emergency procedures established for the work site and their required response.
- .9 Only authorized workers are permitted to operate, adjust and repair equipment. No equipment should be left running unattended.
- .10 Alcohol and unauthorized drugs are prohibited on the property of the work site. Personnel using a medically prescribed drug may impair performance or judgement and must inform their supervisor in order that tasks may be assigned to ensure worker safety is considered.



- .11 All tools and equipment must comply to standards and regulations having jurisdiction at the work site. The Contractor assumes all risks for the use of same. This applies for the duration of the project.

END OF SECTION 01545

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|---|----|---|
| <u>1. General</u>   | .1 | Develop, maintain and supervise for the duration of the work a fire safety program that includes fire prevention, fire protection and fire fighting requirements.   |
|   | .2 | Ensure that subcontractor and other contractor personnel on site are briefed on fire safety requirements and are familiar with the fire prevention, fire protection and fire fighting program.  |
|   | .3 | Personnel used to provide fire fighting services must be provided with training for any special hazards that may be present. These personnel must also be provided with protective equipment as required by the Canada Labour Code.   |
| <u>2. Reporting Fires</u>                                   | .1 | A person discovering a fire shall report the incident immediately to the Engineer.  |
|   | .2 | A person discovering a fire shall, if possible, remain in the vicinity to direct the fire fighting personnel.   |
| <u>3. Fire Extinguishers/<br/>Fire Protection Equipment</u> | .1 | Provide and maintain fire extinguishers and fire protection equipment in sufficient quantity to protect, in an emergency, the work in progress.   |
|   | .2 | Fire protection equipment shall not be used other than for fire fighting purposes.  |
| <u>4. Smoking Precautions</u>                               | .1 | Smoking shall not be permitted in hazardous areas. Care shall be exercised in the use of smoking materials in non-restricted areas.   |
| <u>5. Flammable Liquids</u>                                 | .1 | The handling, storage and use of flammable liquids shall be governed by the current National Fire Code of Canada.   |
|   | .2 | Flammable liquids such as gasoline, kerosene and naphtha may be kept for ready use in quantities not exceeding 45 litres provided they are stored in approved safety cans bearing the Underwriter's Laboratory of Canada or Factory Mutual seal of approval. Storage of quantities of flammable liquids exceeding 45 litres for work purposes, requires the permission of the permitting authority. |
|   | .3 | Do not transfer flammable liquids in the vicinity of open flames or any type of heat-producing devices.   |

- .4 Do not use flammable liquids having a flash point below 38°C such as naphtha or gasoline as solvents or cleaning agents.
- .5 Store flammable waste liquids, for disposal, in approved containers located in a safe ventilated area. Quantities are to be kept to a minimum and the Engineer is to be notified when disposal is required.
- .6 Dispose of all flammable liquids in accordance with all applicable environmental regulations.

END OF SECTION 01546

1. Fires

- .1 Fires and burning of rubbish on site are permitted only when approved by appropriate Environmental Officer.
- .2 Where fires or burning are permitted, prevent staining or smoke damage to on-site materials or vegetation which is to be preserved. Restore, clean and return to new condition stained or damaged areas.
- .3 Provide supervision, attendance and fire protection measures as outlined in Section 01546.

2. Disposal of Wastes

- .1 Do not bury rubbish and waste materials on site.
- .2 Do not dispose of waste or volatile materials, such as mineral spirits, oil or paint thinner into adjacent waterways.

3. Drainage

- .1 Provide temporary drainage and pumping as necessary to keep excavations and site free from water.
- .2 Do not pump water containing suspended materials into adjacent waterways.
- .3 Control disposal or runoff of water containing suspended materials or other harmful substances in accordance with local authority requirements.

4. Site Clearing  
& Plant Protection

- .1 Protect trees and plants on site and adjacent properties where indicated.
- .2 Restrict stripping of topsoil and vegetation to areas indicated or designated by Engineer.
- .3 Restrict tree removal to areas indicated or designated by Engineer.
- .4 Review requirements of Section 02111.

5. Pollution Control

- .1 Maintain temporary erosion and pollution control features installed under this contract.
- .2 Control emissions from equipment and plant to local authorities emission requirements.
- .3 Cover or wet down dry materials and rubbish to prevent blowing dust and debris. Provide dust control for temporary roads.

- .4 Reduce noise to as great an extent as possible at all times. The exhausts of all gasoline motors or other power equipment shall be provided with mufflers.

END OF SECTION 01560

DIVISION 2  
SITE WORK

## 1. GENERAL

- |  |    |  |               |
|--|----|--|---------------|
| <u>1.1 Related Work</u>                | .1 | General Instructions   | Section 01005 |
|  | .2 | Testing Laboratory Services  | Section 01410 |
|  | .3 | Safety Requirements  | Section 01545 |
|  | .4 | Environmental Protection   | Section 01560 |
|  | .5 | Clearing and Grubbing  | Section 02111 |
|  | .6 | Capping and Grading  | Section 02209 |
|  | .7 | Excavation and Backfilling   | Section 02223 |
| <br><u>1.2 Protection</u>              | .1 | Prevent damage to trees, landscaping, natural features, bench marks, water courses and monitoring wells which are to remain. Correct any damage caused by construction operations.   |               |
| <br><u>1.3 Qualifications</u>          | .1 | The Contractor shall be thoroughly familiar with and knowledgeable about existing site conditions, scope of work and specification requirements.   |               |
|  | .2 | The Contractor shall satisfy all Federal and Provincial requirements to carry out the specified works.   |               |
|  | .3 | The Contractor shall follow at all times, guidelines such as those established in Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities.  |               |
| <br><u>1.4 Site Conditions</u>         | .1 | The Contractor shall inspect the site and verify with the Engineer items designated for removal and items to be retained.  |               |
|  | .2 | The Engineer may direct that operations be suspended wherever climatic conditions are unsatisfactory for excavation, grading or capping.   |               |
|  | .3 | After occurrence of heavy rains, do not operate equipment in designated areas until the material has dried sufficiently to prevent excessive rutting or potential spreading of contaminated material.  |               |
| <br><u>1.5 Measurement for Payment</u> | .1 | The excavation of DDT contaminated soil will be measured for payment in cubic metres based on the surface area and depth of excavation as measured by the Engineer. No extra payment shall be made for soil removed beyond the limit specified by the Engineer. Costs for this work shall include: |               |
|  | .1 | Excavation of the contaminated soil.   |               |

- .2 Transport and disposal of the contaminated soil to a licensed disposal facility.
- .2 The excavation of selected petroleum hydrocarbon contaminated soil will be measured for payment in cubic metres based on the surface area and depth of excavation as measured by the Engineer. Costs for this work shall include:
  - .1 Excavation of the contaminated soil.
  - .2 Transport and disposal of the contaminated soil to a designated area on site.
- .3 Transport, placement and compaction of borrow material to backfill the excavations shall be measured as described in Section 02223.
- .4 The following items are considered incidental to the work and will not be measured separately:
  - .1 Provision of all necessary safety equipment, clothing, warning signs and security measures as described in Section 01005, 01545, 01546 and 01560.
  - .2 Equipment decontamination.
  - .3 Maintenance of site access routes.
  - .4 Provision of any temporary construction fencing around the excavation area.
  - .5 Site restoration as described in Section 02223.
  - .6 Delays due to inclement weather.
  - .7 Delays resulting from analytical testing to verify excavation or capping limits.
  - .8 Off-site disposal of the existing snow fencing and tarp located at the former DDT excavation site.

## 2. PRODUCTS

### 2.1 Materials

- .1 Class 4 backfill in accordance with Section 02223.

## 3. EXECUTION

### 3.1 Excavation of Contaminated Soil

- .1 Personnel involved in the on-site excavations shall wear protective clothing and equipment acceptable to Labour Canada as suitable for exposure in the work area. This should include but not be limited to Tyvex suits, gloves and dust masks.



- .2 The selection of the earth moving equipment shall be left to the Contractor. All equipment shall be cleaned prior to leaving the site. The equipment shall be released from the site only after inspection and approval by the Engineer.
- .3 Care should be exercised in loading the material into the trucks so that contaminated material does not fall outside the truck box.
- .4 Contaminated soils shall be carefully excavated to minimize mixing with clean soils and to avoid disposal of excessive volumes of material.
- .5 Equipment used in the loading of contaminated material shall remain within the limits of the excavation areas for the duration of the excavation/backfilling activities.
- .6 All equipment used in the excavation of contaminated soils must be decontaminated prior to leaving the excavation areas. Decontamination shall take place over impacted areas which are to be capped. Care should be taken to ensure that all wastewater generated from this activity is contained to the designated area.
- .7 At no time during the cleanup operation will the Contractor be allowed to work if there is no inspector on site.
- .8 The area to be excavated is shown on the Contract Drawings. The aerial limit of the excavation and depth have been assumed based on the point concentrations observed during surface sampling. As the limit of the proposed excavation is reached, the perimeter walls and base of excavation shall be sampled and analyzed using field test kits. The field test kits will be used to direct the excavation of material. The Engineer shall direct the excavation process, complete all testing and confirm the extent of material to be removed.
- .9 The Contractor shall assume a slow and tedious excavation process for the purpose of pricing his work.
- .10 Should any soil samples test higher than the required guidelines, additional excavation shall take place in that area, and new samples shall be analyzed. Samples testing less than the specified guidelines shall confirm that the area is adequately remediated.

- .11 Off-site disposal of the DDT contaminated soil shall include the existing snow fence and tarp located at the former DDT excavation area.

3.2 Transport of Contaminated  
Soils to Landfarm Site

- .1 Transport and disposal of contaminated soil to be carried out by a licensed hazardous waste hauler.
- .2 Vehicles leaving the excavation area must be kept clean to prevent the tracking of contaminated soil. All loose material adhering to the outside of the truck shall be removed as required.
- .3 Trucks used in transporting the contaminated soil shall be kept out of the contaminated areas while loading to minimize the potential tracking of contaminated soil.
- .4 All loads shall be covered with a tarpaulin.
- .5 Equipment used for the transport of contaminated soils to the disposal area shall not be used for hauling clean backfill soils until all contaminated soil has been removed.
- .6 The Contractor shall keep clean at all times the haul route due to spillage of contaminated or clean backfill soil.

3.3 Backfill

- .1 Backfill the excavation with Class 4 material in accordance with Section 02223.

3.4 Site Grading

- .1 Grade all areas in accordance with Section 02209.

3.5 Restoration

- .1 Reinstate areas backfilled to match condition of adjacent undisturbed areas.

END OF SECTION 02066

## 1. GENERAL

<u>1.1 Related Work</u>	.1	General Instructions	Section 01005
	.2	Environmental Protection	Section 01560
	.3	Excavation and Disposal of Contaminated Soil	Section 02066
	.4	Grading and Capping	Section 02209
	.5	Excavation and Backfilling	Section 02223

<u>1.2 Protection</u>	.1	Prevent damage to trees, landscaping, natural features, bench marks, water courses and monitoring wells which are to remain. Correct any damage caused as a result of construction operations.
	.2	Protect root systems of trees to remain.

<u>1.3 Measurement for Payment</u>	.1	Clearing and grubbing will be measured for payment only in areas designated to be cleared and grubbed. Measurement will be made on an area basis based on the total area in square metres staked for clearing and acceptably cleared and grubbed.
	.2	Stripping and stockpiling of topsoil will be considered incidental to the work.

## 3. EXECUTION

<u>3.1 Clearing and Grubbing</u>	.1	Review area designated for clearing with Engineer prior to commencement. Engineer will stake limits of work and identify any trees and shrubs within those limits to remain.
	.2	Cut down all trees and shrubs in area designated for clearing and grubbing except those marked for preservation.
	.3	Grub out all stumps and roots to a minimum depth of 600 mm below grade.
	.4	The Contractor shall cut and stockpile all timber and bury all stumps and roots in areas designated by the Engineer.

- .5 Topsoil stripping shall be limited to the borrow area. Material shall be temporarily stockpiled for restoration of the site following completion of the proposed works.
- .6 Topsoil stripping shall be to a sufficient depth to ensure removal of all organic material.

END OF SECTION 02111

## 1. GENERAL

<u>1.1 Related Work</u>	.1	General Instructions	Section 01005
	.2	Testing Laboratory Services	Section 01410
	.3	Safety Requirements	Section 01545
	.4	Environmental Protection	Section 01560
	.5	Clearing and Grubbing	Section 02111
	.6	Excavation and Backfilling	Section 02223

<u>1.2 Definitions</u>	.1	Capping: The placement of a minimum of 0.5 metres of clean borrow material in designated areas where:
	.1	Surface concentrations of DDT exceed 1 ppm.
	.2	Surface concentrations of extractable petroleum hydrocarbons (EPH) exceed 1000 mg/kg.
	.2	Grading: The placement of borrow material outside the designated areas for capping to blend in with the natural terrain or to provide positive drainage.
	.3	Unclassified Excavation: Excavation of deposits of whatever nature to improve site drainage around designated areas to be capped or graded.

<u>1.3 Protection</u>	.1	Prevent damage to trees, landscaping, natural features, bench marks, water courses and monitoring wells which are to remain. Correct any damage caused as a result of construction operations.
	.2	Protect root systems of trees to remain.

<u>1.4 Measure for Payment</u>	.1	Material for capping and grading will be measured in cubic metres as per Section 02223 based on measurements made by the Engineer.
	.2	Unclassified excavation shall be considered incidental to the work.

## 2. PRODUCTS

<u>2.1 Materials</u>	.1	Class 4 Backfill as per Section 02223.
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### 3. EXECUTION

#### 3.1 Site Preparation

- .1 With the exception of the following, no existing material shall be removed or disturbed prior to capping or grading:
  - .1 Areas to be excavated as per Section 02066.
  - .2 Areas designated for clearing and grubbing.
  - .3 Areas designated for unclassified excavation.

#### 3.2 Stockpiling

- .1 Stockpile materials at a location satisfactory to the Engineer and at locations that will neither endanger the work nor unnecessarily obstruct pedestrian or vehicular access.
- .2 Protect stockpiled materials from contamination.

#### 3.3 Placement and Compaction

- .1 Advise Engineer in advance of placing fill material.
- .2 Haul fill material from borrow site to areas designated for capping and grading.
- .3 Do not travel directly over areas designated for capping and grading. Equipment should push material over impacted areas and work on top of the clean fill to prevent vehicle contamination and tracking of contaminated soil around the site.
- .4 Place and compact fill material in accordance with Section 02223 to the lines, grades, elevations and dimensions indicated on the Contribution Agreement Drawing and as directed by the Engineer.
- .5 Final areas for capping to be defined by on-site testing completed by the Engineer.
- .6 Maintain natural drainage patterns and grade depressions to avoid any ponding of water adjacent to the areas designated for capping.
- .7 Areas designated for capping shall be crowned to ensure ready runoff of surface water.

3.4 Unclassified  
Excavation

- .1 Excavate in accordance with Section 02223 to lines, grades, elevations and dimensions as indicated on the Contribution Agreement Drawings and as directed by the Engineer to improve site drainage around the designated areas to be capped.
- .2 Do not excavate in areas of identified soil contamination other than as indicated in Section 02066.
- .3 Excavated material shall be blended into natural topography.

3.5 Borrow Area

- .1 Upon completion of the proposed site work, the borrow area shall be graded to blend into the natural site topography.
- .2 All excavation slopes shall be graded to create a safe and stable condition.

END OF SECTION 02209

## 1. GENERAL

- |                                    |    |   |               |
|------------------------------------|----|---|---------------|
| <u>1.1 Related Work</u>            | .1 | General Instructions  | Section 01005 |
|                                    | .2 | Testing Laboratory Services   | Section 01410 |
|                                    | .3 | Safety Requirements   | Section 01545 |
|                                    | .4 | Environmental Protection  | Section 01560 |
|                                    | .5 | Excavation and Disposal of Contaminated Soil  | Section 02066 |
|                                    | .6 | Clearing and Grubbing   | Section 02111 |
|                                    | .7 | Grading and Capping   | Section 02209 |
| <br>                               |    |   |               |
| <u>1.2 Definitions</u>             | .1 | Common excavation: excavation of materials of whatever nature, including dense tills, hardpan, frozen materials and partially cemented materials which can be ripped and excavated with heavy construction equipment.   |               |
|                                    | .2 | Topsoil: organic material capable of supporting good vegetative growth and suitable for use in top dressing, landscaping and seeding.   |               |
| <br>                               |    |   |               |
| <u>1.3 Protection</u>              | .1 | Existing surface features:  |               |
|                                    | .1 | Conduct, with Engineer, condition survey of existing trees and other plants and monitoring wells which may be affected by work.   |               |
|                                    | .2 | Protect existing surface features which may be affected by work from damage while work is in progress and repair damage resulting from work.  |               |
|                                    | .3 | Where excavation necessitates root or branch cutting, do so in a manner that will not cause permanent damage to the tree.   |               |
| <br>                               |    |   |               |
| <u>1.4 Shoring, Bracing</u>        | .1 | Comply with Section 01545 - "Safety Requirements" and applicable local regulations and as necessary to protect existing features.   |               |
| <br>                               |    |   |               |
| <u>1.5 Measurement for Payment</u> | .1 | Shoring, bracing and de-watering of excavation will be incidental to work and will not be measured separately.  |               |
|                                    | .2 | Material for backfilling will be measured in cubic metres after compaction for the material types specified based on measurements made by the Engineer and shall include excavation and transport from the borrow area. |               |
|                                    | .3 | Restoration will be considered incidental to other items of work and will not be measured separately.   |               |



- .4 Excavation of contaminated soils will be measured in cubic metres as per Section 02066 based on measurements made by the Engineer.
- .5 Stripping and stockpiling of topsoil will be considered incidental to the work.

## 2. PRODUCTS

### 2.1 Materials

- .1 Class 4 Backfill:
  - .1 Selected native material approved by Engineer for use intended, unfrozen and free from rocks larger than 150 mm, cinders, ashes, sods, refuse or other deleterious materials.

## 3. EXECUTION

### 3.1 Site Preparation

- .1 Remove obstructions from surfaces to be excavated within limits indicated.
- .2 Strip topsoil (borrow area only) from within limits of excavation and stockpile as directed by the Engineer and in accordance with Section 02111.

### 3.2 Stockpiling

- .1 Stockpile materials at a location satisfactory to the Engineer and at locations that will neither endanger the work or unnecessarily obstruct pedestrian or vehicular access.
- .2 Protect stockpiled materials from contamination.

### 3.3 Shoring, Bracing

- .1 Construct temporary works to necessary depths, heights and locations.

### 3.4 Dewatering

- .1 Keep excavations free of water while work is in progress.
- .2 Protect open excavations against flooding and damage due to surface run-off.
- .3 Dispose of water in a manner not detrimental to the public or environment.

### 3.5 Excavation

- .1 Advise Engineer in advance of excavation operations to enable original cross sections to be taken.
- .2 Excavate to required lines, grades, elevations and dimensions as directed by Engineer.

- .3 Do not obstruct flow of surface drainage or natural water courses.
- .4 Over-excavation shall be filled with Class 4 backfill compacted to minimum of 90% of the Maximum Dry Density as determined by the Standard Proctor Compaction Test.
- .5 Obtain Engineer's approval of completed excavation.

3.6 Backfill Types  
and Compaction

- .1 Use fill of types as indicated or specified below.
  - .1 Class 4: Backfilled in layers not exceeding 300 mm. Compacted by mechanical means to a density equivalent to the surrounding unexcavated material.

3.7 Backfilling

- .1 Do not proceed with backfilling operations until Engineer has inspected and completed required testing.
- .2 Areas to be backfilled to be free from debris, snow, ice, water or frozen ground.
- .3 Do not use backfill material which is frozen or contains ice, snow or debris.

3.8 Grading

- .1 Rough grade to levels, profiles and contours as directed by the Engineer as per Section 02209.

3.9 Restoration

- .1 Upon completion of work, remove surplus materials and debris, and correct defects noted by Engineer.
- .2 Reinststate area compatible to surrounding conditions and elevations.
- .3 Re-instate site drainage as noted on the Construction Drawings or as directed by Engineer.

END OF SECTION 02223

## PART 1 - GENERAL

### 1.1 References

- .1 ANSI/AWWA A100-90, Water Wells.
- .2 ANSI/AWWA C200-91, Water Pipe, 150 mm and Larger, Steel.
- .3 ANSI/AWWA C654-87, Disinfection of Wells.
- .4 ASTM B124M-90, Specification for Copper and Copper Alloy Forging Rod, Bar and Shapes (Metric).
- .5 CAN/CSA A5-M93, Portland Cement.
- .6 ASTM A53-90b, Specification for Pipe, Steel, Black and Hot Dipped, Zinc Coated, Welded and Seamless.
- .7 ASTM F480-90, Specification for Thermoplastic Water Wall Casing Pipe and Couplings Made in Standard Dimension Ratios (SDR), Sch 40 and Sch 80.

### 1.2 Description of Work

- .1 Eleven 50 mm monitoring wells are to be sealed and properly abandoned. Eighteen monitoring wells are to be retained but lowered to below ground surface. The location of the wells is shown on Drawing C799-001-002-02-05.

### 1.3 Location Conditions

- .1 Soils at both the Upper Bench (former Border Pump Station) and Lower Bench (Rainy Hollow) are sands and gravels.

### 1.4 Definitions

- .1 Annular space: space between well casing and borehole wall.
- .2 Aquifer: part of formation or group of formations that is water bearing.

### 1.5 Measurement for Payment

- .1 The work associated with Sealing and Resetting of Monitoring Wells will be paid for on a lump sum basis.

## PART 2 - PRODUCTS

### 2.1 Granular Fill

- .1 The Owner will provide access to a source of clean sand and gravel to backfill the lower portion of wells to be sealed. The volume of granular fill required will be less than 0.5 cubic metres.

- 2.2 Bentonite .1 Solid bentonite pieces or chips will be used to fill the top 1 to 2 m of the monitoring wells to be sealed. Bentonite will also be placed around the outside of all 50 mm well casings. The estimated volume of bentonite required is 20 bags.
- 2.3 PVC Well Caps .1 Friction fit caps will be placed on any 50 mm well which does not have such a cap to protect against objects or material falling into the well. The estimated quantity of caps required is 24.
- 2.4 Protective Steel Casings .1 150 mm diameter by 1.2 m long protective steel casings will be required for 2 of the monitoring wells which are to be reset below grade. Casings should be designed such that they can be fitted with a keyed padlock which the Owner will supply.

### PART 3 - EXECUTION

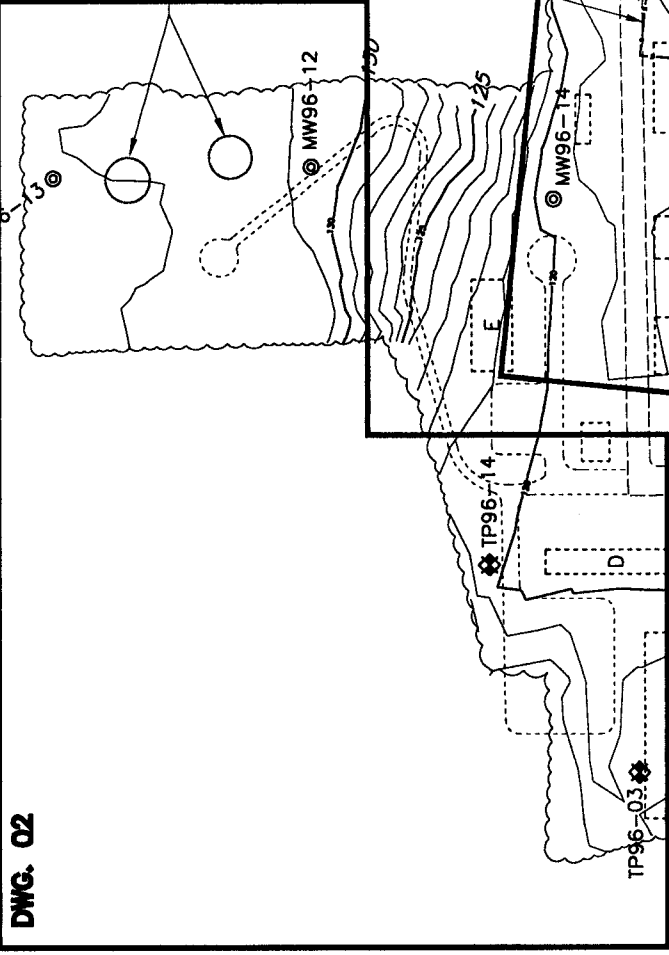
- 3.1 Well Abandonment .1 Eleven 50 mm monitoring wells are to be abandoned (see Drawing C799-001-002-02-05). The process for this will be to excavate around the PVC well casing to a depth of 1 metre below ground surface. The casing will be cut off at this depth. The inside of the well will be backfilled with clean sand and gravel to within 1 metre of the top. The top 1 metre will be filled with solid bentonite pieces. A friction fit cap will be placed on the top of the monitoring well if none exist and then the excavation will be backfilled to surface and graded to match existing contours.
- 3.2 Resetting of Monitoring Wells .1 Eighteen monitoring wells are to be reset below ground surface. These wells are located on the Upper Bench (Border Pump Station) and Lower Bench (Rainy Hollow) (see Drawing C799-001-002-02-05 for location).
- .2 The purpose of this task is to remove the visibility of the monitoring wells at the site and reduce the potential for tampering. Excavate around the well casing to a depth of at least 0.5 metres. Cut off the steel protective casing at a depth of 0.3 m below ground surface using a pipe cutter. Use of a cutting torch is prohibited to avoid damage to the PVC wells inside the steel protective casing. Cut down the 50 mm PVC well casings below the top of the steel casing

to a sufficient depth to allow friction fit well caps to be placed and the locking cap to close on the steel casing. Re-attach the lockable lid to the steel protective casing. Backfill to ground surface and grade to match surrounding ground.

- .3 At monitoring wells WP-7 and WP-13, no protective steel casing exists. At these two locations, protective steel casings must also be installed as part of the lowering of these wells below ground surface.

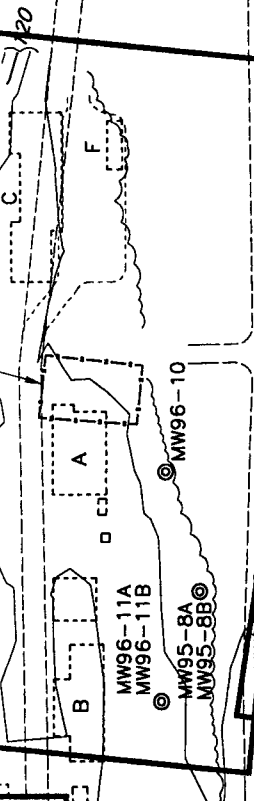
END OF SECTION 02521

DWG. 02



DDT STORAGE  
(REMOVED FALL 1996)

DWG. 03

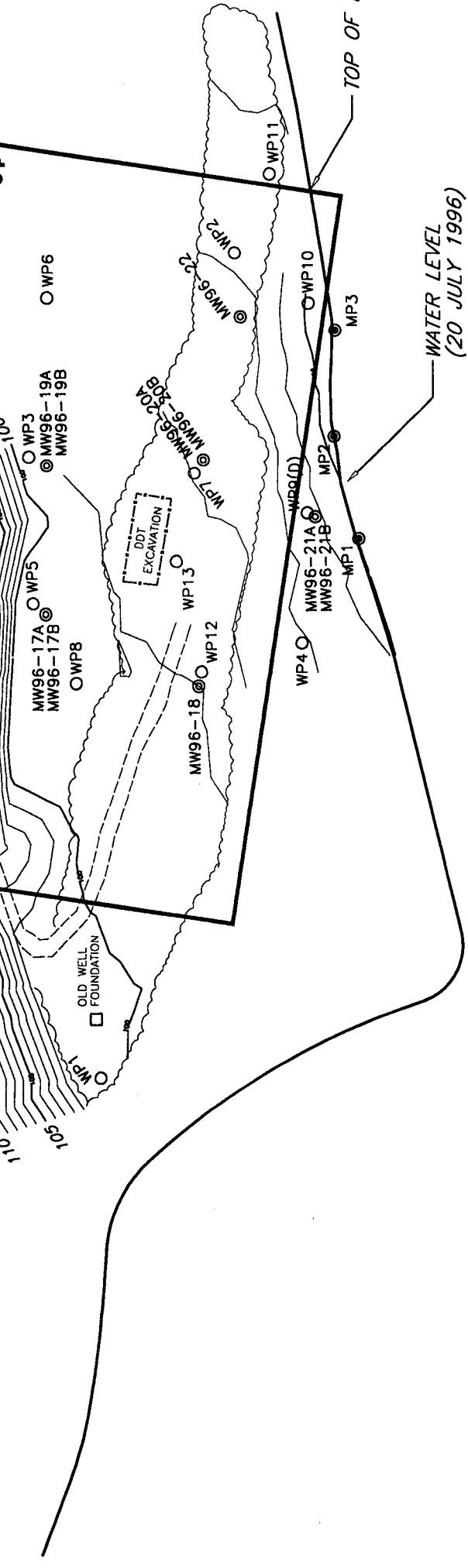


HAINES ROAD

(Old Highway)

TOP OF SLOPE

DWG. 04



WATER LEVEL  
(20 JULY 1996)  
EL 93.26

KLEHINI RIVER

LEGEND

- MONITORING WELL (UMA 1995, 1996)
- MINI PIEZOMETER (UMA 1996)
- WELL POINT (Golder Associates 1994)
- TEST PIT (UMA 1996)

- EDGE OF ROAD
- FORMER EDGE OF ROAD
- TREE LINE
- ELEVATION CONTOUR
- CREEK

APPROX. LOCATION OF FORMER BUILDINGS

- A - MAIN LINE PUMP BUILDING
- B - UTILITY BUILDING
- C - WAREHOUSE/SHOP/GARAGE
- D - APARTMENT COMPLEX
- E - DORMITORY
- F - PUMP ISLAND

Scale 1:2000

Indian and Northern Affairs Canada  
Waste Management Yukon

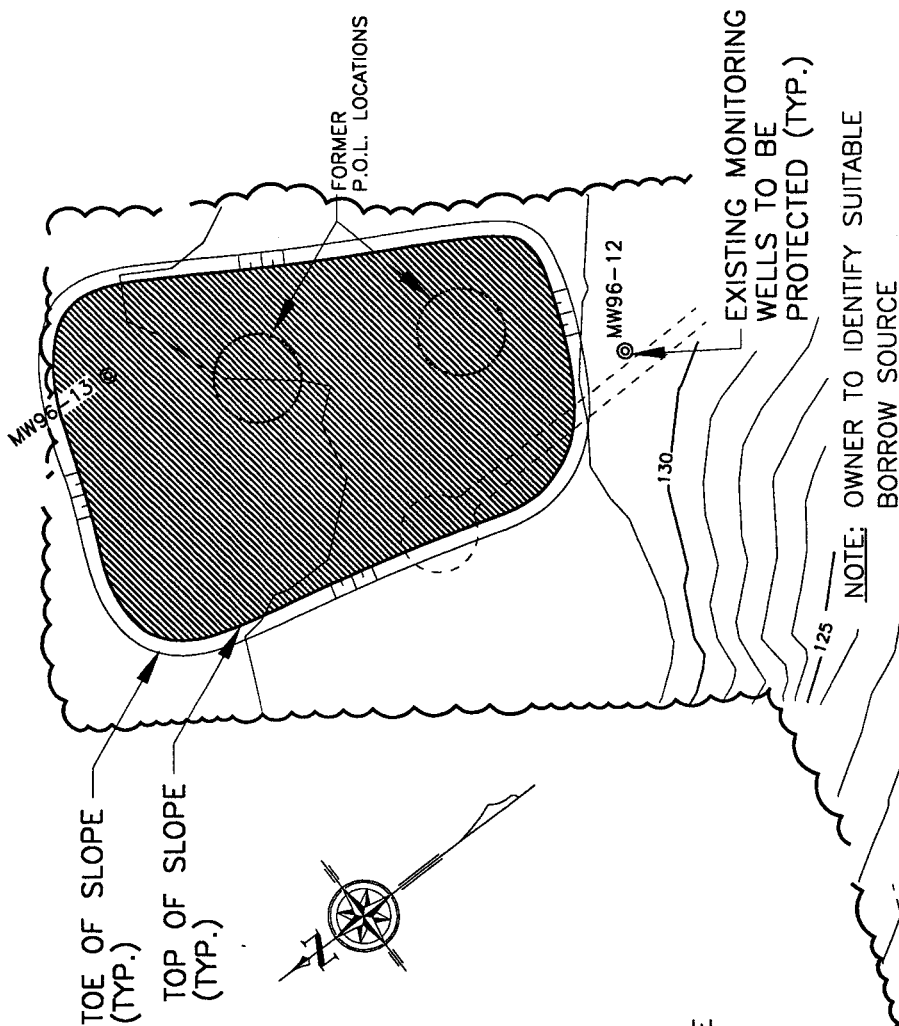
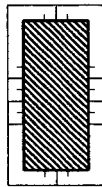
SITE REMEDIATION - BORDER PUMP STATION / RAINY HOLLOW	
TITLE: GENERAL SITE PLAN	
JOB No. C799-001-02-02	DATE: APRIL 1997
DRAWN: MAG/RN	DWG. No. 1
CHECKED: AMH/LB	

ROYAL ROADS  
UNIVERSITY

UMA Engineering Ltd.  
Engineers and Planners  
1479 Buffalo Place, Winnipeg, Manitoba, Canada R3T 1L7

# **LEGEND**

- ⊙ MONITORING WELL (UMA 1995, 1996)
- WELL POINT (Golder Associates 1994)
- ⊕ TEST PIT (Golder Associates 1994)
- ⊗ TEST PIT (UMA 1996)
- EDGE OF ROAD
- ~ TREE LINE
- ~ ELEVATION CONTOUR
- ESTIMATED AREA OF SURFACE SOIL AFFECTED WITH PETROLEUM HYDROCARBONS (TO BE CAPPED WITH 0.5m OF CLEAN BORROW MATERIAL AND BLENDED INTO THE NATURAL TOPOGRAPHY)



**NOTE:** AREA SHOWN IS APPROXIMATE AND SUBJECT TO CHANGE FOLLOWING FIELD TESTING THAT WILL BE CONDUCTED DURING CONSTRUCTION

CONTRACTOR TO REMOVE LOCALIZED SURFACE STAINED SOIL AT TP96-14 TO A DEPTH OF ±0.20m AND PLACE AT TP96-03 PRIOR TO CAPPING. AREA AT TP96-14 TO BE BACKFILLED WITH CLEAN FILL

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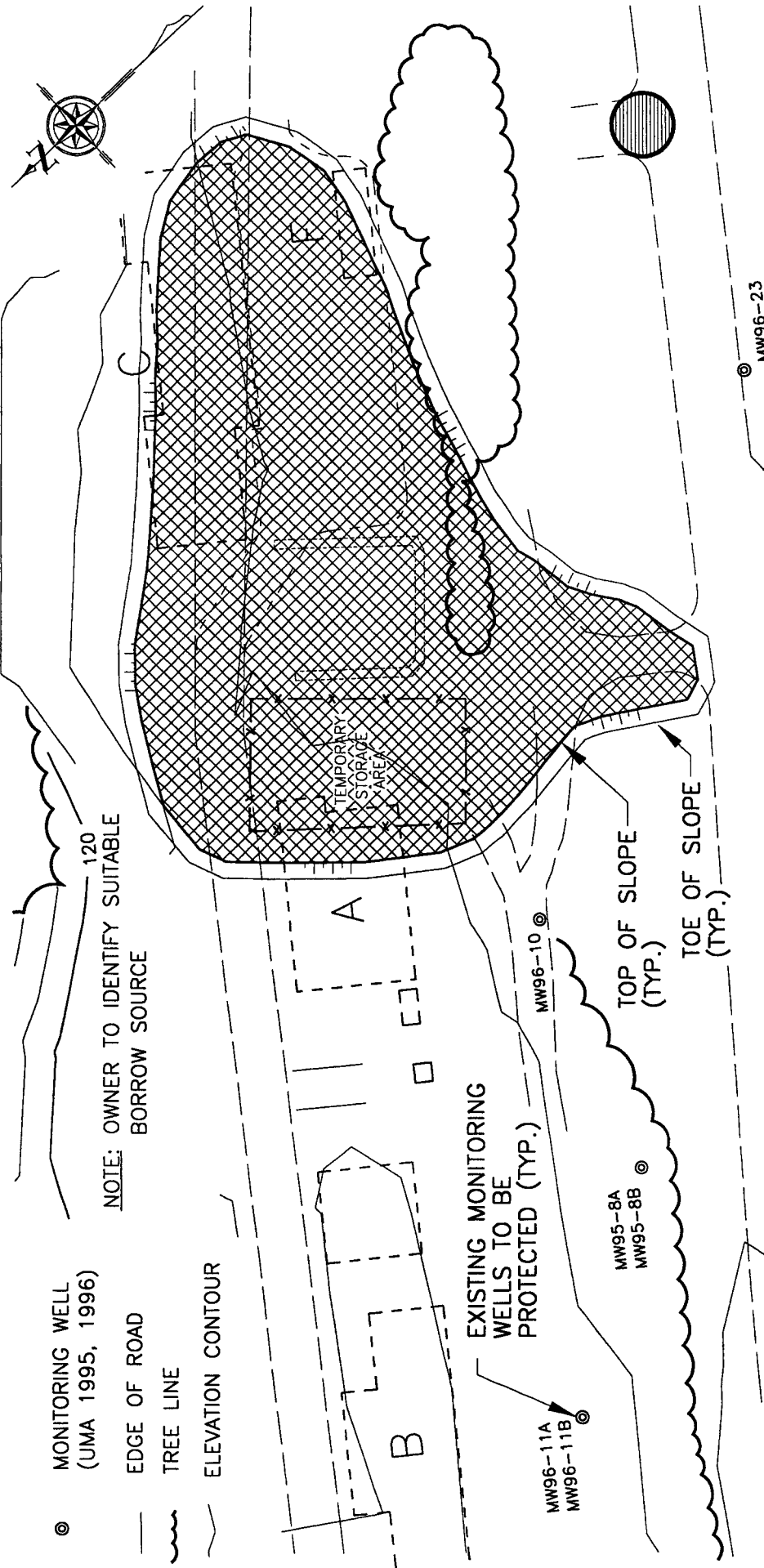
**Indian and Northern Affairs Canada**  
Waste Management Yukon

SITE REMEDIATION - BORDER PUMP STATION / RAINY HOLLOW  
TITLE: CAPPING LOCATIONS FOR SURFACE SOIL AFFECTED WITH PETROLEUM HYDROCARBONS

JOB No.	C799-001-02-02	DATE:	JULY 1997
DRAWN:	MAG/RN	DWG. No.	2
CHECKED:	AMH/LB		

Scale 1:1000

CST-DWG3  
 PLOT 1=1.75  
 Plotted Jul. 22/97



## LEGEND

- ESTIMATED AREA OF SURFACE SOIL AFFECTED WITH DDT CONCENTRATIONS >10ppm (MATERIAL TO BE REMOVED AND DISPOSED OFF SITE AS PER SECTION 02066)
- ESTIMATED AREA OF SURFACE SOIL AFFECTED WITH DDT CONCENTRATIONS 1-10ppm (TO BE CAPPED WITH 0.5m OF CLEAN BORROW MATERIAL AND BLENDED INTO THE NATURAL TOPOGRAPHY)

NOTE: AREA SHOWN IS APPROXIMATE AND SUBJECT TO CHANGE FOLLOWING FIELD TESTING THAT WILL BE CONDUCTED DURING CONSTRUCTION

Scale 1:750

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Indian and Northern Affairs Canada  
 Waste Management Yukon

SITE REMEDIATION - BORDER PUMP STATION / RAINY HOLLOW  
 TITLE: CAPPING LOCATIONS FOR SURFACE SOIL AFFECTED WITH DDT - UPPER LEVEL

JOB No.	C799-001-02-02	DATE:	JULY 1997
DRAWN:	MAG/RN	DWG. No.	3
CHECKED:	AMH/LB		



CST-DWG4  
PLOT 1=1  
Plotted Jul. 22/97

NOTE: OWNER TO IDENTIFY SUITABLE  
BORROW SOURCE

- ⊙ MONITORING WELL (UMA 1995, 1996)
- WELL POINT (Golder Associates 1994)
- EDGE OF ROAD
- TREE LINE
- ELEVATION CONTOUR

EXISTING MONITORING  
WELLS TO BE  
PROTECTED (TYP.)

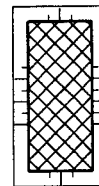
TOP OF SLOPE  
(TYP.)

TOE OF SLOPE  
(TYP.)

DDT  
EXCAVATION

EXISTING TARP AND SNOW FENCE  
TO BE DISPOSED OFF SITE

LEGEND



— ESTIMATED AREA OF SURFACE SOIL AFFECTED WITH DDT  
CONCENTRATIONS >10ppm (MATERIAL TO BE REMOVED AND  
DISPOSED OFF SITE AS PER SECTION 020666)

— ESTIMATED AREA OF SURFACE SOIL AFFECTED WITH DDT  
CONCENTRATIONS 1-10ppm (TO BE CAPPED WITH 0.5m  
OF CLEAN BORROW MATERIAL AND BLENDED INTO  
THE NATURAL TOPOGRAPHY)

NOTE: AREA SHOWN IS APPROXIMATE AND SUBJECT TO CHANGE  
FOLLOWING FIELD TESTING THAT WILL BE CONDUCTED  
DURING CONSTRUCTION

Scale 1:1000

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SITE REMEDIATION - BORDER PUMP STATION / RAINY HOLLOW  
TITLE: CAPPING LOCATIONS FOR SURFACE SOIL  
AFFECTED WITH DDT - LOWER LEVEL

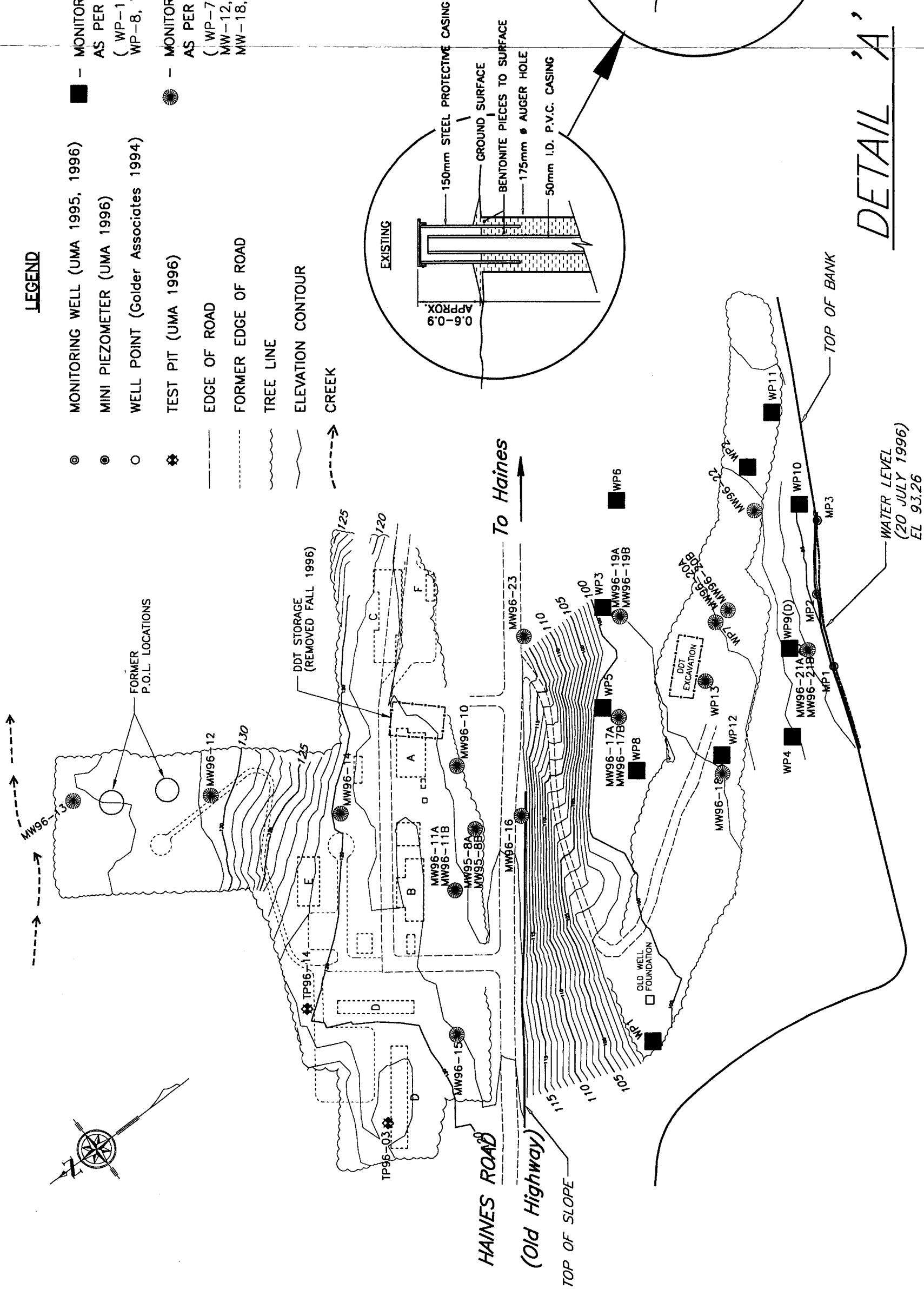
JOB No. C799-001-02-02 DATE: JULY 1997

DRAWN: MAG/RN

DWG. No.

CHECKED: AMH/LB

4



**LEGEND**

- MONITORING WELL (UMA 1995, 1996)
- MINI PIEZOMETER (UMA 1996)
- WELL POINT (Golder Associates 1994)
- ⊛ TEST PIT (UMA 1996)
- EDGE OF ROAD
- - - FORMER EDGE OF ROAD
- ~ TREE LINE
- ELEVATION CONTOUR
- - - CREEK
- MONITORING WELL TO BE SEALED AND ABANDONED AS PER SPECIFICATION (LISTED BELOW)  
( WP-1, WP-2, WP-3, WP-4, WP-5, WP-6, WP-8, WP-9, WP-10, WP-11, WP-12 )
- ⊛ MONITORING WELL TO BE MODIFIED TO BELOW GRADE AS PER DETAIL 'A' (LISTED BELOW)  
( WP-7, WP-13, MW-8, MW-10, MW-11a, MW-11b, MW-12, MW-13, MW-14, MW-15, MW-16, MW-17, MW-18, MW-19, MW-20, MW-21, MW-22, MW-23 )

**DETAIL 'A'**

Scale 1:2000

**KLEHINI RIVER**

**ROYAL ROADS UNIVERSITY**

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Waste Management Yukon

SITE REMEDIATION - BORDER PUMP STATION / RAINY HOLLOW  
TITLE: WELL MODIFICATIONS PLAN / DETAILS

JOB No.	C799-001-02-02	DATE:	JULY 1997
DRAWN:	MAG/RN	DWG. No.	5
CHECKED:	AMH/LB		