REQUEST FOR PROPOSALS

RFP-MCC-2422

HEADWORKS UPGRADE DETAILED DESIGN AND TENDER

SPRINGHILL, NS

MUNICIPALITY OF CUMBERLAND

UPPER NAPPAN SERVICE CENTRE
1395 BLAIR LAKE ROAD
UPPER NAPPAN, NS
B4H 3Y4

August 27, 2024

MUNICIPALITY OF CUMBERLAND

REQUEST FOR PROPOSALS

HEADWORKS UPGRADE DETAILED DESIGN AND TENDER

INTRODUCTION

The Municipality of Cumberland (Municipality) is requesting proposals from qualified firms, to carry out engineering design for the preparation of construction drawings, tender document preparation, and contractor selection, for upgraded influent screening equipment and rock trap for the Wastewater Treatment Facility in Springhill, NS.

This Request for Proposal (RFP) and any supporting documents supplied with it define both the form and content required of your proposal. We urge you to structure your response in accordance with the terms of this RFP. It will be by these criteria that we will determine whether a Proposal is complete, appropriate and competitive. **Proposals that do not conform to these terms and conditions may be given lesser weight than others or may be rejected.**

This document is not intended to limit the content of your Proposal, but rather, to provide a common framework for the Municipality to assess each Proposal in a professional manner in a demonstrably fair process. You may provide unsolicited information if you consider it to be relevant.

Proposal packages may be subject to disclosure under Part XX of the Nova Scotia Municipal Government Act. By submitting a Proposal, the Proponent agrees to the appropriate disclosure of the information supplied, subject to the provisions of the governing law. The Municipality cannot guarantee the confidentiality of the complete content of any Proposal after the procurement has been awarded to the successful Proponent.

SECTION 1 - TERMS AND CONDITIONS

SUBMISSION OF PROPOSALS

The following is to be used in the preparation and submission of a proposal to provide the necessary engineering, cost estimation, and tender documentation preparation for the Headworks Upgrade Detailed Design and Tender.

1. Completed vendor proposals and other correspondence should be submitted to:

   MUNICIPALITY OF CUMBERLAND
   UPPER NAPPAN SERVICE CENTRE
   1395 BLAIR LAKE ROAD
   UPPER NAPPAN, NS
   B4H 3Y4

   ATTENTION: Mr. JUSTIN WAUGH-CRESS, P. Eng.
   DIRECTOR, ENGINEERING AND OPERATIONS

   Any proposals submitted by fax or telephone will not be accepted under any circumstances.

2. Proposals may be submitted electronically, in a PDF document, to the below email. It is the responsibility of the vendor to confirm receipt of their proposal by the Municipality. This email address is for document submission only.

   procurement@cumberlandcounty.ns.ca

   The vendor agrees that the electronic signatures of the vendor on this document is intended to have the same force and effective as manual/original signatures. Delivery of an executed copy of a proposal by electronic means permitted in this request for proposals constitutes valid and effective delivery.

3. Proposals submitted as hard copies must be submitted in a sealed envelope clearly marked **"RFP-MCC-2422 HEADWORKS UPGRADE DETAILED DESIGN AND TENDER. – Springhill, NS"**.

4. Please provide **three (3) copies** of your proposal.

5. **Closing Time and Date:**

   Proposals are due and will not be accepted any later than **2:00 pm local time on Tuesday, September 10, 2024**.

6. Late proposals will not be accepted and will be returned unopened.

7. Proposals must be submitted on firm letterhead duly signed by an authorized person.

8. Proposals will be opened on **Tuesday, September 10, 2024** at the Upper Nappan Service Centre, 1395 Blair Lake Road, Upper Nappan, NS, immediately following closing at 2:00 pm local time. The opening of proposals at that time is to record receipt of them. Details of the submissions will not be publicly disclosed at that time.
   The opening of proposals will not be open to the public.

9. **Terms and Conditions**
   The terms and conditions of the **"HEADWORKS UPGRADE DETAILED DESIGN AND TENDER"** proposal submitted by you are to remain firm and irrevocable for sixty days from the proposed closing date**,** and if you receive our letter of acceptance, become part of the contract with the Municipality, expiring at the completion of the tender phase of the project. This time period for review and acceptance is necessary to permit Municipal Council review and approval of the proposal. Proposal costs must remain effective during this Municipal Council approval period, which can extend to up to 60 calendar days.

PROPOSAL REGULATIONS

1. Submission of a Proposal indicates acceptance by the submitter of all the conditions contained in this RFP unless otherwise clearly and specifically noted in the Proposal submitted.

2. **Municipality's Right to Reject**

   The Municipality of Cumberland reserves the right, without prejudice,
   - to accept any Proposal,
   - to reject any or all Proposals,
   - to not be obligated to accept the lowest Proposal,
   - to accept any Proposal that it considers to be in its best interests.
   - to waive formality, informality or technicality in any Proposal.

- to reject any proposal that it feels incapable of providing the necessary resources to perform the work in a satisfactory manner.

Proponents may be required to demonstrate financial stability, authorization to provide the services being acquired, and/or regulatory agency approval or registration as needed or otherwise clarify the Proponent's capability to satisfy the invitation requirements.

3. No adjustments will be allowed to any submitted Proposals. Proposals, may however, be withdrawn by written request prior to the proposal submission closing date and time.

4. Late proposals will be rejected.

5. The submitter must be prepared to include in the contract for services any oral or written representations, undertakings or guarantees that are made prior to the final agreement, including the entire response to this RFP, or parts thereof.

6. Proposals not completed in permanent, unalterable form of print will be rejected.

7. The Municipality of Cumberland shall pay no fee to any firm for the preparation and delivery of its Proposal in response to the Municipality's RFP. The Municipality will not be responsible for any costs, expenses, losses, damages or liability incurred by the Proponent as a result of, or arising out of data/information collection, the submission of any proposal, or due to the Municipality not accepting or rejecting any proposal.

8. In case of any disputes over the completeness, accuracy and/or interpretation of this RFP, the versions of such documents held by the Municipality will be considered correct. Information, offers, commitments or instruction obtained by any source other than the Municipality of Cumberland will not be binding on the Municipality.

9. Inquiries regarding this request for proposals can be directed to:

Shelby Hum
Procurement Officer
Phone: 902-667-3204
shelbyhum@cumberlandcounty.ns.ca

Enquiries and responses given may be recorded and may be distributed to all other Proponents as an Addendum. No responses shall be binding on the Municipality unless made in writing. All enquiries regarding the interpretation of these Terms and Conditions, general procurement policy or procedures must be made to the Municipality.

10. It is recommended that all parties interested in responding to this RFP, **provide their name and contact information to Shelby Hum** by email at shelbyhum@cumberlandcounty.ns.ca to ensure the receipt of any addendums or other information relative to this RFP prior to the closing date. It is however, the responsibility of all respondents to check the Municipality of Cumberland web site (www.cumberlandcounty.ns.ca) and the Nova Scotia provincial procurement website on a regular basis for any addendums or information releases for this RFP.

11. No addendums or other relevant information related to the RFP will be issued within **three (3) business days** of the RFP closing date and time of **2:00 PM Local Time Tuesday, September 10, 2024**.

12. It is mandatory that all submitted proposals comply with **Section 3 – PROPOSAL REQUIREMENTS**.

SECTION 2 – SCOPE OF WORK

1. Background

The Springhill Wastewater Treatment Plant has been in operation since 1995, with much of its original equipment still in operation. During rain events and snow melt, the plant receives higher flows than it is capable of screening, resulting in raw sewage being discharged to Coalmine Brook. In November of 2022, staff received a directive from Nova Scotia Environment and Climate Change to engage with a consultant to investigate options for screening of these bypass and overflow events. CBCL was hired to assess flow conditions and make recommendations for screening equipment. As a result of this process, it was determined that as an alternative to adding additional equipment to screen the bypass flows, it would be more feasible to replace the existing screening equipment with a more capable modern system.

Another Directive requirement, and an important component to ensure proper function of the screening equipment, is the addition of a concrete settling channel upstream of the treatment plant. This will be designed to capture grit and rocks larger than 6mm diameter which could cause equipment damage and result in plant flooding.

The purpose of this RFP is to invite interested proponents to provide proposals for detailed design and tender of replacement screening equipment and influent rock trap.

2. Project Area

The project location is 220 Lagoon Road, Springhill N.S., as shown on Map No. 1.

The settling channel is to be located outside the facility in the adjacent field, while the screening equipment will be located inside the building.

3. Existing Equipment

The existing headworks consists of two screening channels: primary and bypass. The primary channel contains a mechanically raked bar screen. This is further detailed in the attached CBCL Memo.

4. Main Project Components

The proposed project components would include:

- Removal of existing screening equipment.
- Re-alignment of concrete channels to facilitate installation of new equipment.
- Installation and commissioning of new screening equipment.

- Installation of a concrete settling channel adjacent to the facility.
- Installation of a 900 mm bypass line to divert inflow past the treatment plant to the treatment lagoon.

5. Proposal Scope and Deliverables

The consultant is expected to include within their proposals the estimated costs and time to:

- Review existing information and host kick-off meeting to discuss preferred design options with the Municipality.
- Complete engineering design services for detailed design for the proposed upgrades.
- Obtain approval for the project from Nova Scotia Environment.
- Prepare tender documents and "issued for tender" drawings based on final approved engineering design.
- Receive and respond to Contractor questions during tender period. Issue Addenda as necessary.
- Receive, open and conduct an evaluation of the submitted tender documents and provide a recommendation for award.
- Prepare Issue for Construction drawing set.
- Conduct project kick-off meeting with Municipality and the Contractor.
- Conduct on-site inspection as necessary to confirm work conforms to design. Assume six (6) inspections.
- Prepare record drawings.
- Other project components as consultant deems necessary to complete the upgrade project.

As a guide to creating this overall schedule, the Municipality requires that the tender be ready for release by October 15, 2024.

6. Information Available

1. Springhill Wastewater Treatment Facility Record Drawings

2. CBCL Springhill WWTP Overflow Bypass Screening Options Memo

The consultant should provide a project schedule as part of their proposal. This would include the consultants design and engineering time, tending preparation, submission, receipt and review time periods, and the estimated earliest start of construction.

7. COST ESTIMATE:

The consultant is permitted to present their anticipated costs to complete the work identified in this RFP in whatever fashion they wish to address the proposal requirements. Cost estimates must include hourly rates and anticipated level of effort for identified staff.

Please indicate in your proposal cost estimate if any administration, travel or other costs are subject to a mark-up, and if so, what the mark-up percentage is.

8. Units

Units used in the engineering design and all other documentation relating to the project are to be metric. All drawings must use NAD83 CSRS98 UTM Zone 20 N coordinate system.

9. Site Visit

It is recommended that prior to any proposal preparation and submission interested proponents make a site visit to the Springhill Wastwater Treatment Facility. With advance notice, a Municipal representative can be available to conduct a site tour, answer questions and provide other project related information.

To schedule a site visit, please contact Andrew Thomas at (902) 664-1083 or by email at athomas@cumberlandcounty.ns.ca.

SECTION 3 – PROPOSAL REQUIREMENTS

Please provide the information requested below in the proposal submission. Please be brief and concise in your response.

1. **The Consulting Team and References**

    - Provide a general description of your firm.
    - Indicate the consulting team to be assigned to the work including the names of any sub-consultants or partners that would be utilized.
    - Detail the extent of the team's relevant experience.
    - Please list your major municipal clients and references that would relate to this project.

2. **Methodology and Approach**

    - Outline the methodology and approach to this study and the general steps in the design process.
    - Explain how you would plan to produce each of the key deliverables in the work scope.

3. **Project Work Plan and Schedule**

    - Provide a detailed plan for completing the detailed design and tender package, with a schedule that will meet the reporting date identified above.
    - Identify any key progress meetings or conference calls required during the study process.
    - Identify activities by consultant and time spent on each major component of the work plan.

4. **Project Fees**

    The proposal should provide a breakdown of consulting fees and estimated expenses that will conform to the Work Plan. Proponents should assume that construction will take place during the 2024 construction season. Full time construction supervision is not required for this project, site inspections at critical junctures, answering Contractor/Owner questions, progress claim review, and virtual attendance at project meetings. Proponents will assume 6 site inspections and provide a lump sum cost per additional inspections.

    In addition, please provide any specific invoicing conditions or requirements that impact the overall costing for the study.

5. **Evaluation Criteria**

Each response to this Request for Proposal will be evaluated by the Municipality to determine the degree to which it responds to the requirements as set out. Because this is a Request for Proposal, other factors in addition to price will be considered when submissions are evaluated. Factors to be considered are as follows:

Criteria	**Weighting**
Qualifications, References of the Consulting team	**30%**
Methodology and Approach	**20%**
Work Plan and Schedule	**20%**
Cost	**30%**

6. **Termination**

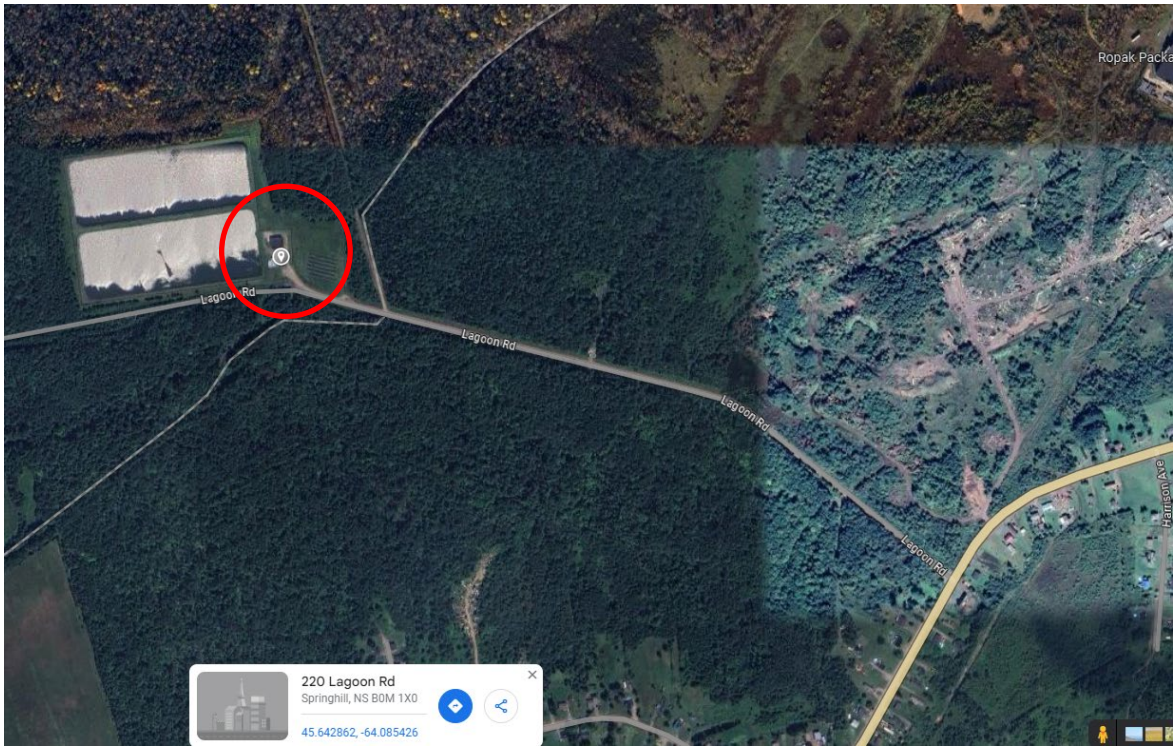
In the event that the Respondent fails to comply with any of the terms and conditions set forth in this document, the Respondent will be notified in writing and will be given fifteen days to comply with the violated sections. At the expiration of the stated period of time, if the Respondent has not complied with same, to the satisfaction of the Municipality, the Contract will be terminated. Any termination of the contract by the Municipality as aforesaid shall be without prejudice to any other rights or remedies the Municipality may have.

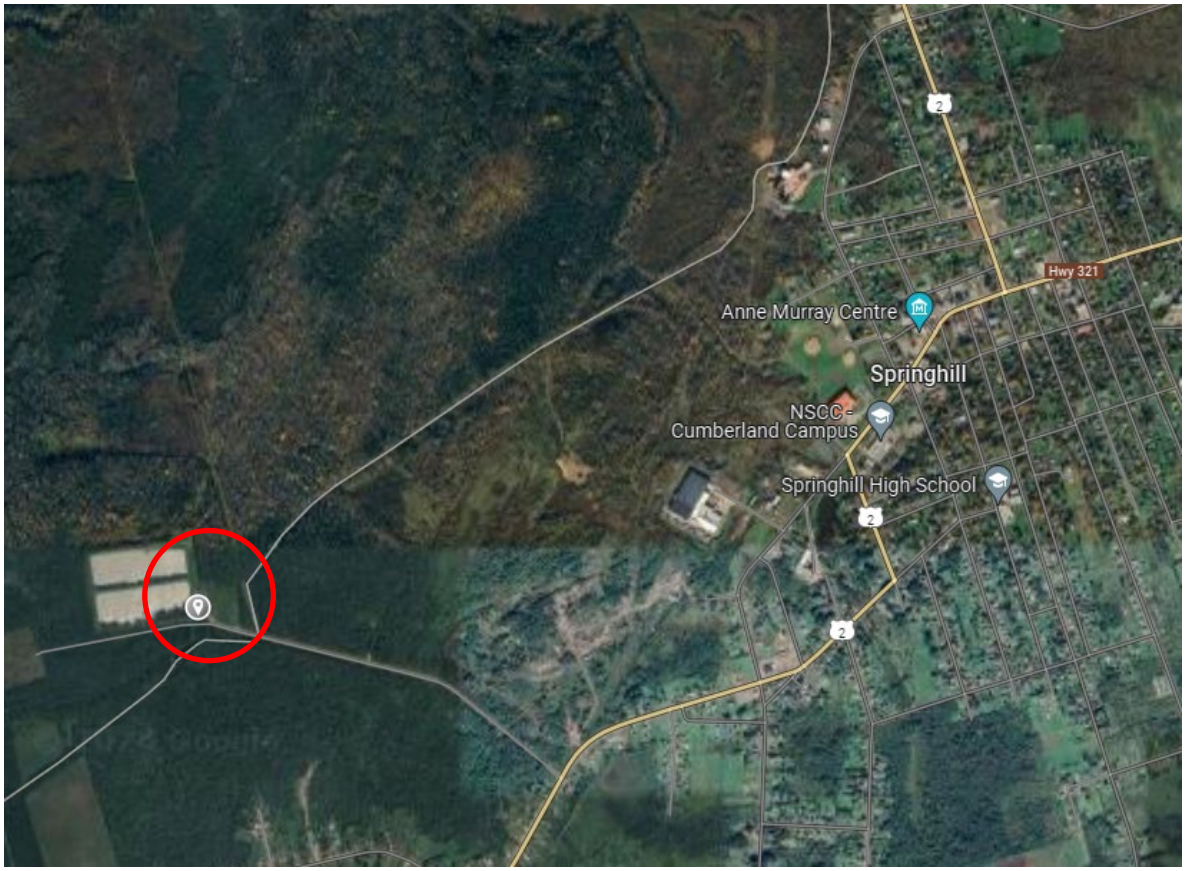
7. **General**

Provide any other information and/or comments which you feel are appropriate for the Municipality to consider in making its decision. Response to this RFP should not exceed ten (10) pages, excluding appendices.

……End of Request for Proposal ……

MAP 1


Ropak Packa
Lagoon Rd
Lagoon Rd
Lagoon Rd
Lagoon Rd
Harrison Ave
220 Lagoon Rd
Springhill, NS B0M 1X0
45.642862, -64.085426


2
Hwy 321
Anne Murray Centre
Springhill
NSCC - Cumberland Campus
Springhill High School
2
2

Preliminary Design and Options Review

Memo

Project Name:	Springhill WWTP Overflow Bypass Screening	Project No.:	230825.00
Date:	December 6, 2023		
Subject:	Identification/Evaluation of Screening Options		
To:	A. Thomas		
From:	D. Trudel, P.Eng.		
Copies to:	J. Waugh-Cress, P.Eng.		

Background

The Springhill Wastewater Treatment Plant (WWTP), located approximately 3 kms west of the community (off Highway 2), was commissioned in the fall of 1995. The WWTP has a nominal capacity of 10,000 m^3/d (10 ML/d). The facility consists of influent screening, four cell aerated lagoon, sand filters, and Ultraviolet (UV) disinfection. The process building houses the enclosed headworks, blowers, sand filters, UV disinfection, and operator amenities. A flow control/splitting chamber is located adjacent the process building.

Operations staff report that during peak flow conditions influent wastewater overtops the weir in the flow control/splitting chamber and is discharged directly to Coal Mine Brook. This has resulted in a Directive from Nova Scotia Environment and Climate Change requesting that the Municipality investigate screening options for the overflow (bypass) to the brook.

Basis of Design

Table 1 summarizes the design hydraulic capacity of the WWTP.

Table 1: Summary of the Design Hydraulic Capacity

Parameter	Hydraulic Capacity
Average Dry Weather Flow (ADWF)	3,560 m^3/d
Average Daily Flow (ADF)	4,090 m^3/d
Peak Daily Flow (PDF)	16,400 m^3/d
Peak Hourly Flow (PHF)	37,100 m^3/d
Peak Instantaneous Flow (PIF)	122,310 m^3/d

Wastewater Generation

Historical flowrates (SCADA data) were obtained from operations staff for 2022. A 230 mm (9”) Montana flume (913 m^3/h capacity) is located downstream the screen. Results are summarized in Figure 1. Average Daily Flow (ADF) for this period was approximately 5,100 m^3/d. For comparison

purposes, the 91st percentile of results (10,008 m^3/d) is approximately equal to the nominal plant capacity.

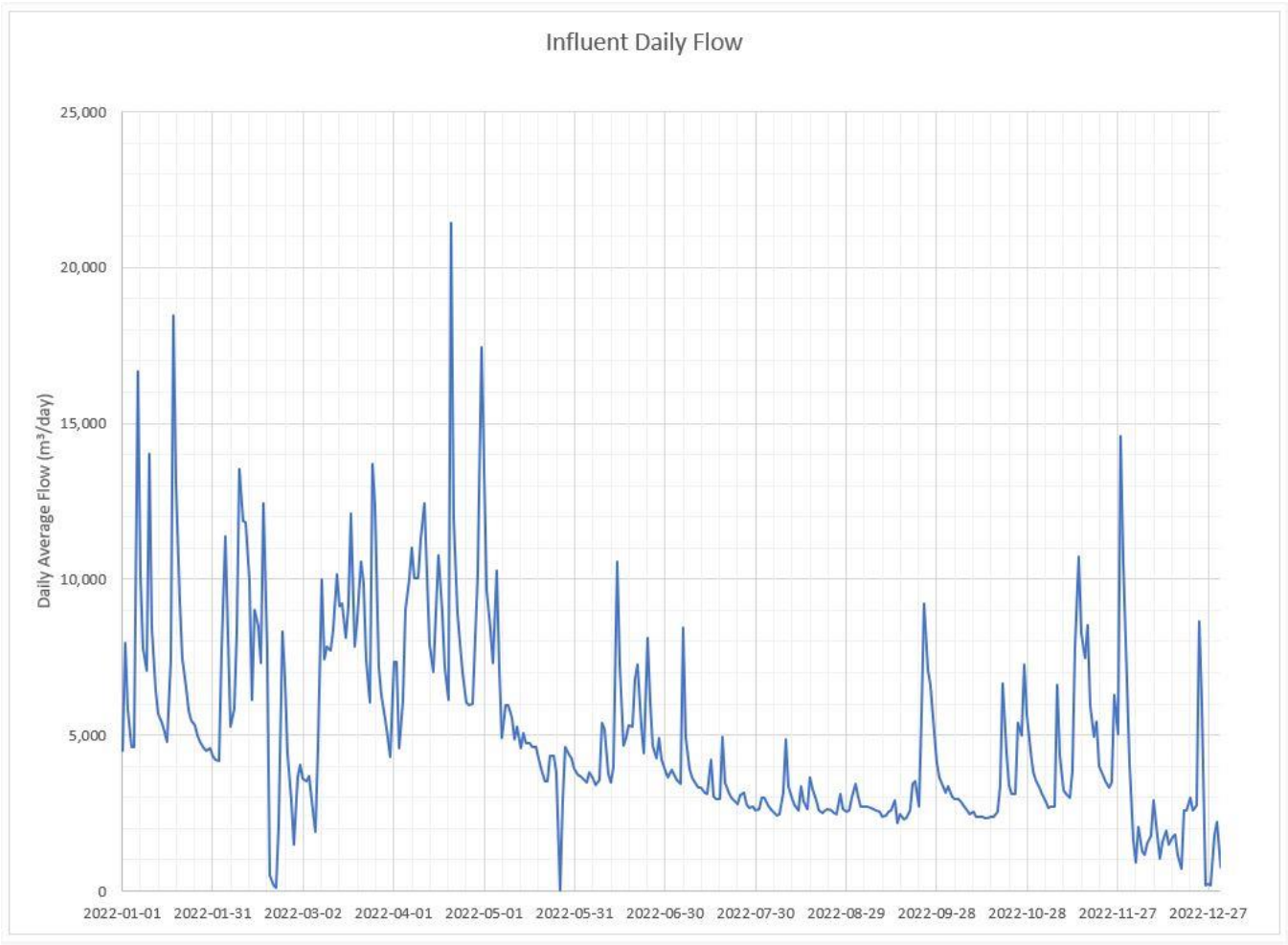


Figure 1: Influent Daily Flow (2022)

Peak Daily Flow for this period was approximately 21,400 m^3/d. The next highest daily flow observed was approximately 18,460 m^3/d. For comparison purposes, the 99th percentile was approximately 15,350 m^3/d which results in a PDF to ADF ratio of approximately 3.00. Maximum Monthly Flow (MMF) ranged from approximately 4,870 m^3/d (August) to 21,400 m^3/d (April).

As anticipated, Peak Hourly Flow (PHF) is approximately 900 m^3/h which is roughly equal to the flume capacity. For reference, approx. 0.75% of the hourly flows were more than 750 m^3/h. Approximately 0.50% more than 800 m^3/h. Hourly flow data for the months of April, May, and September appears to be limited.

Existing Arrangement

The existing headworks consists of two screening channels: primary and bypass. The primary channel contains a mechanically raked bar screen. The unit has a reported capacity of approximately 16,400 m^3/d. Bar spacing is 19 mm (3/4”). At the time of site visit, the mechanical rake was not operational. Operations staff report that the bar screen blinds off during peak flow events (first flush in trunk sewer) which can result in an over torque condition (protective shut down). The unit is reaching the end of its useful life and is due for replacement. The bypass channel is provided with a manually raked bar screen. Bar spacing is 32 mm (1 $\frac{1}{4}$”).



Figure 2: Existing Mechanically Raked Bar Screen (Arm Removed)

The primary screening channel is approximately 1,200 mm (4’) deep, 900 mm (3’) wide ahead of the screen, and 600 mm (2’) wide at the screen. Water level downstream of the screen is controlled by the Montana flume. The bypass channel is 760 mm (2’-6”) wide from start to finish. A 790 mm (2’-8”) long overflow weir connects the primary to the bypass channel.

Design Criteria

Typically, capacity is provided for the peak hourly flow arriving at the facility. Table 2 summarizes the screen design parameters.

Table 2: Summary of Screen Design Parameters

Parameter	Value
Application	Municipal Wastewater (Aerated Lagoon)
Maximum Flow	37,100 m^3/d
Screen Opening Size	6 mm
Materials	304 Stainless Steel
Installation	Concrete Channel
Power Supply	600V/3Ø/60Hz
Classification	Class 1, Zone 1

Initially, the Municipality considered installing a fine screen on the existing 760 mm (30") effluent pipe to the brook but considering the current state & rated capacity of the existing mechanically raked bar screen it was reconsidered. Additionally, installing a fine screen down stream of a bar screen is not considered standard practice. Instead, design should maximize capacity to existing channel(s) while increasing the overall solids capture (i.e., remove objectional material prior to flow control/splitting chamber). The Municipality should also consider a rock trap upstream of the headworks for the coarser material contained within first flush events. Tankage would be complete with removeable cover to permit removal of captured material. Approximate inside dimensions are 7.0 m (23.0 ft) long by 3.0 m (9.8 ft) wide by 3.5 m (11.5 ft) deep. Dimensions similar for all options.

Identification of Screening Options

There are several different types of equipment options that can be used to satisfy the screening requirement. Media differs by option. For municipal wastewater applications, continuous (mobile or travelling) media type and stationary (static) media type are most common. Continuous media type is typically used on larger facilities; static type for smaller installations. Continuous media installations often include a stand-alone washer/compactor. Static type can be supplied with integral washer/compactor.

Several equipment representatives/vendors were approached for screening options that maximize hydraulic capacity to the existing channel dimensions. Table 3 summarize the screening options under consideration.

Table 3: Summary of Wastewater Screening Option

Category	Screening Technology
Continuous Media	Rotating Element Screen
Static Media	Step Screen
	Shaftless Spiral (Auger) Screen

Option #1 - Rotating Element Screen

Rotating element screens are designed based on a continuous mobile media type, using multiple panels with holes. These units provide bidirectional screening (captures debris in two directions). The perforated panels are fabricated with a structural shelf to lift captured material out of the influent wastewater stream. Panels are carried on heavy duty chains. A self-adjusting brush and spray wash system clean material from the panels. A stand-alone washer/compactor is required. Typically, units are operated on differential level (upstream vs. downstream). Screening Capture Ratio (SCR) ranges from 70% to 85%. Table 4 summarizes design parameters for the largest rotating element screen that fits within the existing primary channel.

Table 4: Rotating Element Design Parameters

Parameter	Value
Peak Flow	21,580 m^3/d
Screen Opening Size	6 mm
Capture Ratio	79%
Installation Angle	60º
Channel Width	900 mm
Channel Depth	1,200 mm
Capital Cost (Supply Only)**	$320,000 (ea.)

** - Includes washer/compactor.

Option #2 - Step Screen

Step screens are designed based on two sets of flat bars shaped like a staircase. One set is stationary, while the other is mobile (cam driven). The mobile set oscillates to provide back cleaning of the stationary media. These units provide unidirectional screening (captures debris in one direction) but rely on the formation of a 'screenings filter mat' for improved screenings capture. SCR ranges from 30% to 40% but operating with filter mat may provide capture equivalent to that of rotating element screens (lower end). They are designed to handle large flow rates with lower headloss. Units are operated on differential level to promote filter mat (i.e., clean panel by panel vs. all panels). Typically, a spray wash system is not provided; however, a stand-alone washer/compactor is required. Table 5 summarizes design parameters for a step screen that fits within the existing bypass channel. Bypass channel was selected due to limitations of primary channel (downstream width; level control).

Table 5: Step Screen Design Parameters

Parameter	Value
Peak Flow	37,100 m^3/d
Bar Spacing	6 mm
Capture Ratio	30 - 70%
Installation Angle	50º
Channel Width	760 mm
Channel Depth	1,200 mm
Capital Cost (Supply Only)**	$240,000 (ea.)

** - Includes washer/compactor.

Option #3 - Shaftless Spiral (Auger) Screen

Shaftless spiral (auger) screens rely on the use of a slow rotating shaftless inclined spiral to clean captured debris from the stationary basket. Spray wash zones are provided at the lower end of the unit to keep the perforations clean, and in the transport zone to wash off the organics. Flight spacing decreases as screening approach the discharge end to provide a compaction zone. This unit provides screenings capture, dewatering, and compaction within a single unit. A stand-alone washer/compactor is not required. It operates on differential level. SCR ranges from 30% to 65%. Table 6 summarizes design parameters for the largest shaftless spiral screen that fits within the existing primary channel.

Table 6: Shaftless Spiral Screen Design Parameters

Parameter	Value
Peak Flow	20,450 m^3/d
Screen Opening Size	6 mm
Capture Ratio	52%
Installation Angle	35º
Channel Width	900 mm
Channel Depth	1,200 mm
Capital Cost (Supply Only)	$140,000 (ea.)

Screen Comparison

When comparing the three different screening options, basic operation is relatively similar. They all lift captured material from the influent wastewater stream in an effort to protect downstream equipment and receiving waters. The key differences are unidirectional vs. bidirectional screening, free area, and lifting mechanism.

Perforated media screening elements have a maximum permissible solid size (bidirectional) at any given time, whereas step screens present a vertical gap between flat bars until a 'screening filter mat' is developed. Slender solids can pass through during the interim period. Basically, the SCR has little fluctuation for bidirectional options and large fluctuations for unidirectional options.



Figure 3: Screening Media Comparison (L to R – Rotating Element, Step, Shaftless Spiral)

The existing mechanically raked bar screen has a SCR ranging from 30% to 35%. Regardless of option, volume of screenings collected is anticipated to increase. It is also important to consider how susceptible the downstream treatment technology is to solids capture. Aerated lagoons are generally less susceptible than most secondary treatment facilities. For this application, removal of larger objectionable material prior to flow control/splitter chamber by maximizing hydraulic screening capacity is of greater importance.

Single vs. Duplex Arrangement

For Options #1 & #3, a single screen arrangement provides capacity for approximately 55% to 60% of the PHF. A duplex arrangement is required to approach the PHF requirement. Utilizing the bypass channel in a duplex arrangement provides capacity for approximately 94% to 96% of the PHF. Under these scenarios, it will be important to consider bypass of the screening units in the event of equipment failure or maintenance. A rock trap with emergency overflow direct to Lagoon Cell #1 is an option. Emergency overflow would be via a long rectangular weir complete with baffle to minimize solids carryover.

Alternatively, the headworks area could be reworked (demolition/modifications) to provide channels for 50% redundancy including a third bypass channel. Under this scenario, the area adjacent mandoor #3 to the process corridor would be repurposed for the third channel. The Municipality was not in favour of this option due to concerns over what might be uncovered or encountered during the demolition process. As such, it will not be carried forward for consideration.

For Option #2, a single step screen arrangement within the bypass channel provides capacity for approximately 100% of the PHF. However, upstream water level is approaching finished floor

elevation. As such, available freeboard for overflow to manually raked screen is very limited (even when weir length maximized). Manufacturer's preliminary submission recommended installation of concrete curb to maintain freeboard. Similar to Options #1 & #3, a rock trap with emergency overflow is an option.

Evaluation of Screening Options

Screening options were evaluated based on economic and non-economic comparisons. These include capital/lifecycle costs, footprint requirements, performance, operational complexity, and construction sequencing. A summary of this evaluation is presented below.

Capital/Lifecycle Costs

This opinion of probable costs is presented on the basis of experience, qualifications, and best judgement. It has been prepared in accordance with acceptable principles and practices. Market trends, non-competitive bidding situations, unforeseen labour and material adjustments and the like are beyond the control of CBCL. As such we cannot warrant or guarantee that actual costs will not vary from the opinion provided.

A preliminary cost estimate has been prepared based on the systems described herein and depicted on the sketches provided. The estimated costs include contingencies for Design Development (20%) and Construction (10%). The Design Development Contingency is to allow for increases in both quantity and material/equipment costs as the work is better defined. The Construction Contingency is to allow for the cost of additional work, over and above the original construction contract price. The estimates exclude taxes. Table 7 summarizes the Class D construction cost estimates by option.

Table 7: Summary of Opinion of Probable Costs by Option

Description	Option #1 Rotating Element Screen (Duplex)	Option #2 Step Screen (Single)	Option #3 Shaftless Spiral Screen (Duplex)
General Requirements	$138,500	$99,400	$95,800
Site Works	$168,600	$243,600	$168,600
Reinforced Concrete**	$158,000	$158,000	$158,000
Miscellaneous Metals	$40,000	$40,000	$40,000
Process Equipment Supply	$595,000	$240,000	$280,000
Mechanical (Bldg./Process)	$206,100	$138,000	$139,600
Electrical & Controls	$151,800	$127,000	$125,800
Sub-Total Costs	**$1,458,000**	**$1,046,000**	**$1,007,800**
Design Development (20%)	$291,600	$209,200	$201,560
Construction (10%)	$145,800	$104,600	$100,780

Description	Option #1 Rotating Element Screen (Duplex)	Option #2 Step Screen (Single)	Option #3 Shaftless Spiral Screen (Duplex)
Engineering (10%)	$145,800	$104,600	$100,780
Total Costs	**$2,041,200**	**$1,464,400**	**$1,410,900**

** - Concrete costs include provision of rock trap upstream of the headworks.

Horsepower requirements are relatively similar for each option. Screen motors range from 1.0 to 1.5 hp, while washer/compactors units are approximately 2.0 hp. Total connected hp ranges from approximately 2.0 hp (Option #3) to 3.5 hp (Option #1) by option. For reference, the existing mechanically raked bar screen is approximately ¾ hp. As such, the facility will experience a slight increase in power consumption on a yearly basis regardless of option.

For comparison purposes, installing a fine screen on the existing effluent pipe to the brook is estimated to be on the order of $1,300,000 to $1,500,000 (not including contingencies). This is based on recent (2022) tender closing information for a stand-alone screening building.

Footprint Requirements

Option #2 is favourable because of its overall footprint requirements. This option also has the lowest equipment profile (headroom). Options #1 & #3 (duplex screen) require similar footprint. Option #3 has an advantage due to its integral compaction zone (stand-alone unit not required). For Option #1, clearance for installation of the washer/compactor for the primary channel is very limited (proximity to North wall). Typically, this type of screen is paired with its own washer/compactor. Due to clearance concerns, the manufactured indicated this unit was not a good fit for the application.

Performance

In terms of performance, options that can balance SCR and hydraulic capacity are preferred. With respect to SCR, Option #1 is favourable because of its efficient bidirectional screening, followed by Options #3 and #2. Option #2 may surpass #3 when operated to promote a 'screenings filter mat'. With respect to hydraulic capacity, Option #2 is favourable because only a single unit is required. Operations can be tailored to hydraulic conditions (i.e., present clean screen area). Options #1 & #3 require duplex arrangement to approach the PHF requirement.

Combined trunk sewer systems can carry larger objects that may be difficult to handle for some fine screens (first flush gravel/solids load) without coarse screening or grit removal ahead of them. By nature, step screens (narrow bar screen) are slightly less susceptible to grit and gravel. The addition of a rock trap upstream of the headworks should reduce the amount of gravel making its way to screening and improve peak flow operating conditions for all options.

Operational Complexity

Option #3 provides screening, washing and compaction in a single unit, whereas Options #1 & #2 require a separate washer/compactor. Options #1 & #3 require a spray wash system. In terms of operational complexity, the less mechanically intensive Option #3 is preferred. Option #2 has an advantage over Option #1 due to its numerous moving parts and spray wash system. Additionally, Option #2 requires only a single screening unit.

Construction Sequencing

Options #1 & #3 will require channel modifications to split the flow between two channels, while Option #2 requires channel modifications to reassign channels. Construction challenges associated with these options are moderate. For all options considered, the rock trap should be installed prior to the screening unit(s) to provide flexibility for management of peak flow events during construction. Additionally, the screen would be installed within the existing bypass channel first. Influent flow would continue to pass through the existing mechanically raked bar screen during this interim period. Once all work is complete within bypass channel (demolition, concrete channel modifications, etc.), forces would be directed to the primary channel. Temporary watertight bulkheads could be used to isolate the channels during construction. Equipment replacement should focus on keeping a single channel operational at all times. Ultimately, construction methodology & sequencing will be developed by the Contractor in consultation with the Municipality to minimize disruptions to the treatment process.

Evaluation Matrix

Table 8 presents a summary of the evaluations undertaken above. This is a simplistic comparison between options. One of five ratings is provided for each of the parameters evaluated. The ratings are as follows:

(--) Option is inferior to the other options(s) regarding this parameter.
(-) Option is slightly inferior to the other option(s) regarding this parameter.
(o) Option is neither inferior nor superior to the other options(s) regarding this parameter.
(+) Option is slightly superior to the other option(s) regarding this parameter.
(++) Option is superior to the other option(s) regarding this parameter.

Table 8: Comparison of Screening Options

Description	Option #1 Rotating Element Screen (Duplex)	Option #2 Step Screen (Single)	Option #3 Shaftless Spiral Screen (Duplex)
Capital/Lifecycle Costs	--	++	++
Footprint Requirements	--	++	+
Performance	+	++	+
Operational Complexity	--	-	+
Construction Sequencing	o	o	o

Recommendations

From a performance perspective, options that can balance SCR and hydraulic capacity are preferred. As such, Option #2 is favourable in most of the evaluation criteria considered. Option #3 is a close second. Options #2 & #3 have very similar capital/lifecycle costs. The slight difference is due to Option #2 requiring more demolition/modifications to the existing concrete channels (reassigning channels, addition of concrete curb, etc.). The determining factor may be how the Municipality feels the curbs (similar to typical step height) may impact traffic/access to this area.

Option #1 presents the highest costs and installation does not appear to be feasible due to lack of clearance on North wall (washer/compactor). As such, this option will not be considered further.

It is recommended that the Municipality consider implementing the rock trap in conjunction with the screening upgrades to improve peak flow operating conditions for the new unit(s).

Appendix - Sketches

Option #2 – Step Screen (23166-01)
Option #3 – Shaftless Spiral Screen (SK01)

ORDERED U.V. POWER
TRIBUTION CENTER
ORDERED U.V.
IPS
3/4"ø PVC
POLYMER
FEED
4
10
40
3
E
118
10"ø PVC
FILTER
DISCHARGE
14
C
8"HIGH x
4"WIDE CURB
24"ø FLANGED
ACCESS PORT
1"ø PVC DRAIN
PIPE TO FUNNEL
FLOOR DRAIN
9'-6" DIA.
ALUM
TANK
4500 gal.
D
L
ATOR
22
23
24
E
118
6" THK. EQUIPMENT
PAD
ERED
6'-0"
5'-9"
BLOWER
No. 1
BLOWER
No. 2
Discharge Tube Can
Be Shifted Towards
Channel with Short
Elongation & Rotation
of Discharge Tube
Screenings
Bin
Sutro Weir Plate
(Removable / Adjustable);
Enables Fine Screen Control
Panel Flow Reporting / Logging
"MONTANA" STYLE
PARSHALL FLUME
(REFER TO SPECIFICATION
SECTION 16900)
1494
600
Channel Clear for Walking
Upstream of this Location
Channel Curbs (Height of
Conventional Step)
Extent of
Screen Pivot
Level Sensor
Mounting
Tube (Typ. 2)
Reuse of
Existing
Grating
New Manual Screen
(Pivotable)
Precautionary High-Level
Float Switch (Typ. 2)
915
2000
Bypass Weir (Also Can Be
Divided into 2 x 1000mm Weirs
to Facilitate Channel Covers
Support)
INFLUENT CHANNEL

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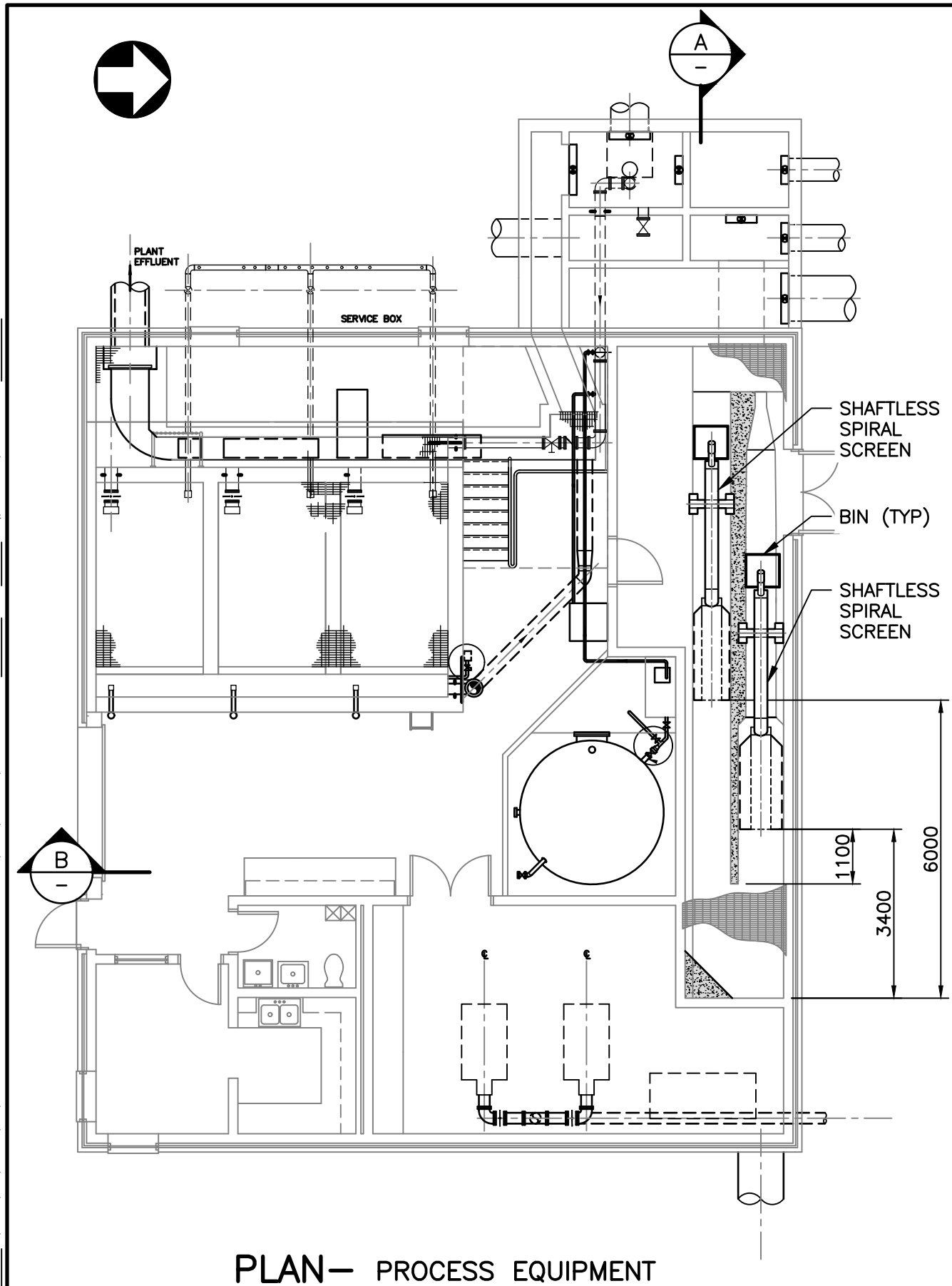
Rev	Date	Description
1	051123	For Information
0	251023	For Information

Rev. 01; 051123; PJR

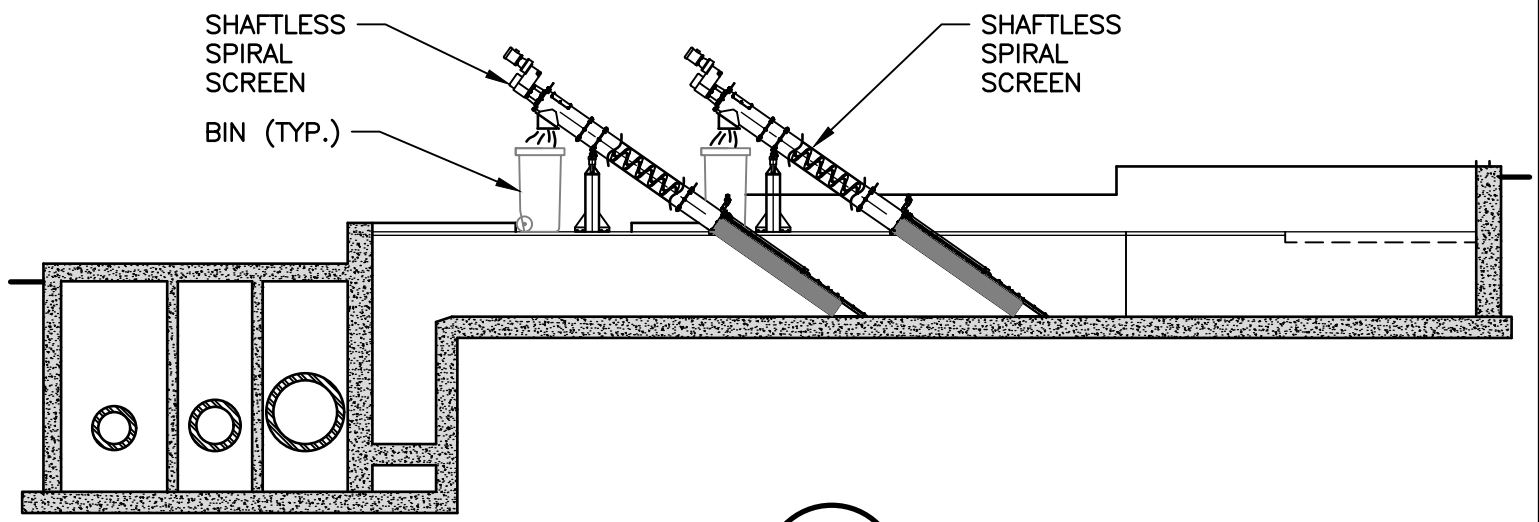
Claro™
www.claroglobal.com
e-mail: info@claroglobal.com; tel.: 514.562.4575

Cumberland, NS
Proposed Arrangement
Plan View

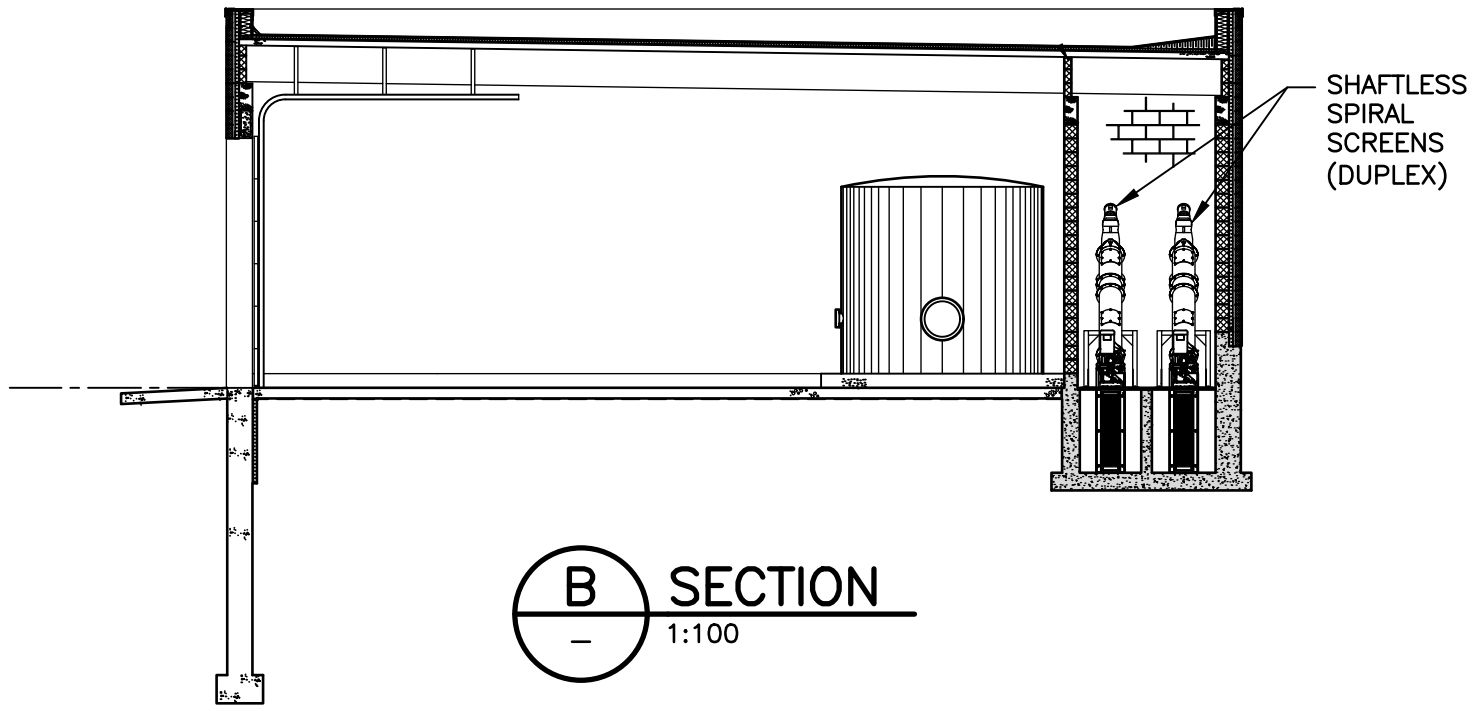
DRAWN BY	DATE	SCALE	DRAW.NR.	REV
SL + PJR	251023	NTS	23166-01	1



PLAN– PROCESS EQUIPMENT
1:100



A – SECTION
1:100



B – SECTION
1:100

Date	Scale	Designed	Drawn	Checked	Approved	CBCL No.	Contract
NOV. 2023	AS NOTED	DT	DB	DT	DT	230825.00	230825

CBCL

SPRINGHILL WWTP OVERFLOW BYPASS SCREENING

PLAN AND SECTIONS

Drawing **SK01**

DRAWING NAME: Y:\HALIFAX\DATA\PROJECTS\2023\230825.00 SPRINGHILL WWTP OVERFLOW BYPASS SCREENING\44 CAD\06 PROCESS\230825.00 - SK01.DWG LAYOUT NAME: PAPER PLOT DATE: Friday, November 10, 2023 2:59:29 PM CAD OPERATOR: DBIRBO

Springhill WWTP Record Drawings

1995

NORTH

N82°17'00"E — 1200.00'

45'

20'

120'

10'

145'

DISPOSAL AREA FOR GRUBBED MATERIAL

650.00'

S07°43'00"E

N07°43'00"W

N82°19'08"E — EXISTING SURVEY CUT LINE

110'

70' OFFSET

PROPOSED LAGOON BERMS (TYPICAL)

EXISTING SURVEY CUT LINE

LIMIT OF GRUBBING

30'

S82°17'0"W 505.19'

LIMIT OF CLEARING

60'

337.46'

S63°46'19"W

40'

S82°16'58"W 265.0'

EXISTING SURVEY CUT LINE

CHA. 0+00
(EQUALS N 16587613.53
E 18150699.14)

S82°17'00"W 373.41'

S75°40'56"E 338.85'

S63°07'00"W 101.35'

EDGE OF COAL MINE BROOK

S39°11'26"W 232.54'

PROPOSED CONTROL BUILDING

BASELINE 'Y'

SETTING OUT POINT

BASELINE 'X'

ACCESS ROAD COMPLETED 15' BEYOND MANHOLE

N82°17'00"E — 300.00'

TRUNK MAIN

ONE 38"ø CONC. PIPE LENGTH

TERMINAL MANHOLE — No. 1
INVERT — OUT ELEVATION = 388.40'
MH No. 1

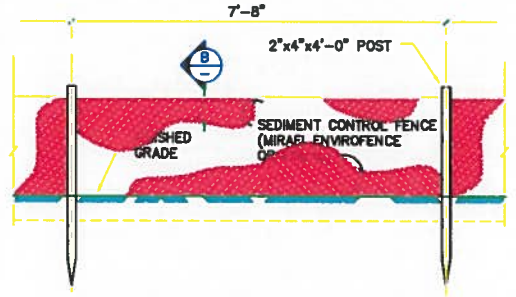
EXISTING ABANDONED RAILWAY BED

N39°11'26"E

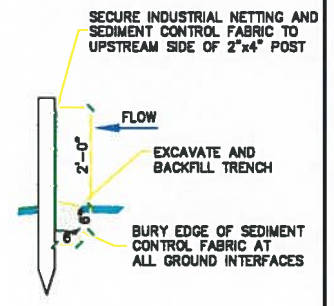
466.72'

TRUNK MAIN

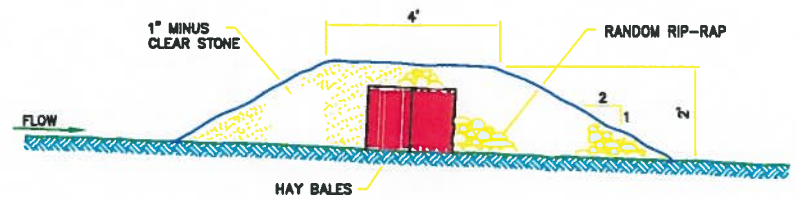
S07°43'00"E



ELEVATION — SEDIMENT CONTROL FENCE
NTS



SECTION — SEDIMENT CONTROL FENCE
NTS



SECTION — SEDIMENT CONTROL BERM
1/2" = 1'-0"

GENERAL NOTES:

1. CONTOURS SHOWN ARE FOR GRADES PRIOR TO CLEARING AND GRUBBING OPERATIONS.
2. CONTOURS ARE IN FEET TO CANADIAN GEODETIC DATUM.
3. SEDIMENT (ENVIRONMENTAL) CONTROL DEVICES WERE LOCATED WHERE DIRECTED AND IN ACCORDANCE WITH NSDOE REQUIREMENTS.

DATE:	REVISION	APPROVED
08/07/94	ISSUED FOR TENDER	J. deC
30/08/94	ISSUED FOR APPROVAL	J. deC

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

STP SITE
CLEARING AND GRUBBING

DRAWN: MRH | DESIGNED:
SCALE: 1" = 80' OR AS NOTED | DWG. No. 944101-101
DATE: 30/08/94

TYPICAL SOIL PROFILE FOR ENTIRE SITE

GROUND SURFACE	LAYER THICKNESS	COLOUR
ROOT MAT	0.5 – 1.5 FEET	BLACK
LOOSE SILTY SAND	1.0 – 2.0 FEET	GREY
SANDY CLAY TILL (THIS IS THE BERM CONSTRUCTION MATERIAL)	> 30 (NO ROCK ENCOUNTERED)	RED/ BROWN

NOTES:

1. THE CONTOURS SHOWN ON THIS DRAWING ARE ORIGINAL GRADE ELEVATIONS FROM SURVEY INFORMATION OBTAINED IN MAY/ JUNE OF 1994.
2. A SERIES OF BORE HOLES WERE DRILLED AT THE LOCATIONS INDICATED TO OBTAIN GEOTECHNICAL INFORMATION. REFER TO JACQUES WHITFORD REPORT – PROJECT 9817, DATED JULY 6, 1994.
3. COMPLETED AREA TO SUBGRADE.
4. HYDROSEEDED SURFACES DISTURBED DURING CONSTRUCTION AND WHERE INDICATED ON THE DRAWINGS.

LEGEND:

- FENCING
- LIMITS OF CLEARING
- LIMITS OF GRUBBING
- LIMITS OF STRIPPING
- LIMITS OF GRUBBING DISPOSAL AREA
- + 368.5' FINISH GRADE ELEVATIONS
- BH#1 BORE HOLE LOCATIONS
- (NIC) NOT IN CONTRACT
- 375 ORIGINAL GRADE CONTOUR (SEE NOTE 1)

DISPOSED OF EXCESS SILTY SAND MATERIAL IN THIS AREA AND HYDROSEEDED
NORTH
LIMITS OF CLEARING
GRUBBING DISPOSAL AREA
LIMITS OF GRUBBING
STRIPPED AREA WITHIN THIS LIMIT.
25' RADIUS (TYP.)
365.0' (TOP OF BERM)
LAGOON A
CELL No. 1
CELL No. 2
LAGOON A ℄ Y = 0+17
368.0' (BOTTOM OF LAGOON)
CENTER BERM Y = 4+41
SEE NOTE 6 FOR THIS AREA
ADDITIONAL CLEARING WAS DONE IN THIS AREA APPROX. 100' WEST
FINISHED EDGES OF BOTTOM OF LAGOON (TYP.)
℄ LAGOONS X = 5+69
REFER TO DWG. 104 FOR LAGOON CONSTRUCTION DETAILS
CELL No. 4
LAGOON B
CELL No. 3
LAGOON B ℄ Y = 2+65
365.0' (TOP OF BERM)
FINISHED EDGES OF TOP OF BERMS (TYP.)
368.0' (BOTTOM OF LAGOON)
FILLED AREA WITH STRIPPED SILTY SAND MATERIAL, AND AND HYDROSEEDED
Y = 4+50
BASELINE 'Y'
X = 0+00
TERMINAL MANHOLE
TRUNK SEWER (NIC)
GATE
Y = 1+25
EXISTING ABANDONED RAILWAY BED
EXIST. DITCH
NEW UTILITY TERMINAL POLE
FENCE
18"ø CONC. CULVERT
BASELINE 'X' Y = 0+00
SETTING OUT POINT
LIMIT OF ACCESS ROAD CONSTRUCTION
30' WIDE (2:1 SIDE SLOPES)
ACCESS ROAD (NIC)
DISPOSED OF EXCESS SILTY SAND MATERIAL IN THIS AREA AND HYDROSEEDED
SURVEY MARKER
SURVEY CUT
COAL MINE BROOK
BH#1 BH#2 BH#3 BH#4 BH#5 BH#6 BH#7 BH#8

Record drawing

Date.....19.....

Approved.....P.Eng

DATE	REVISION	APPROVED
95,08,29	RECORD DRAWING	S.G.
94,09,07	ISSUED FOR CONSTRUCTION	D.J.L.
94,07,29	RE-ISSUED FOR TENDER – ADDENDUM No.2	J. deC.
94,07,18	ISSUED FOR TENDER	J. deC.
94,07,18	ISSUED FOR APPROVAL	J. deC.

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NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL

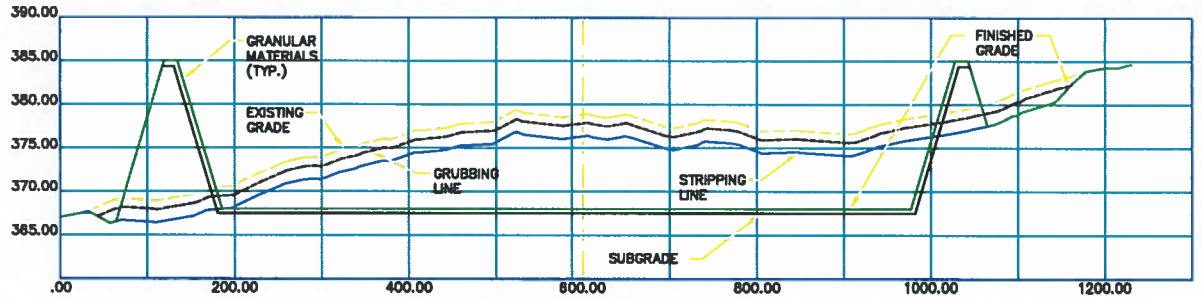
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

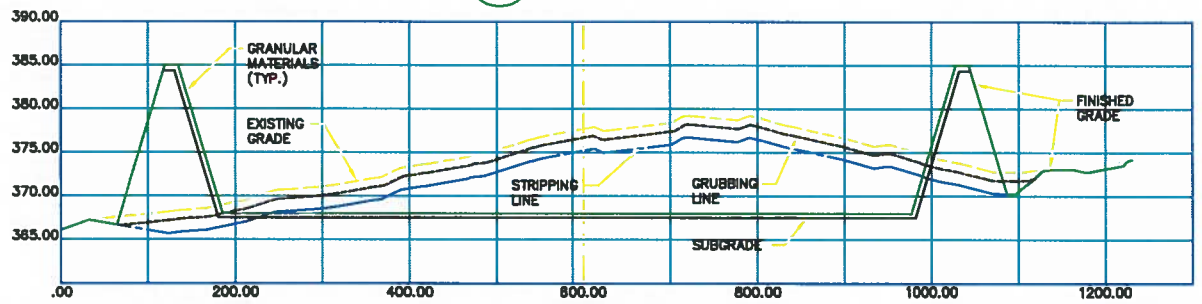
STP– LAGOON CONSTRUCTION SEWAGE LAGOON SITE LAYOUT

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SCALE: 1" = 80' OR AS NOTED | DWG. No. 944101-102
DATE: 94,07,18

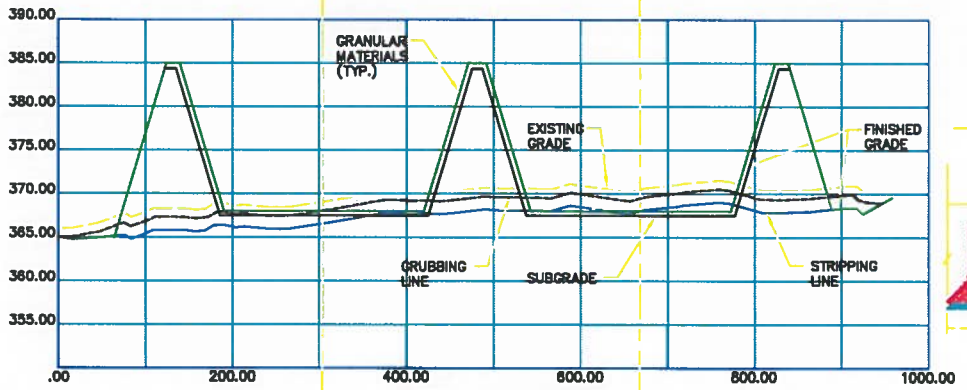
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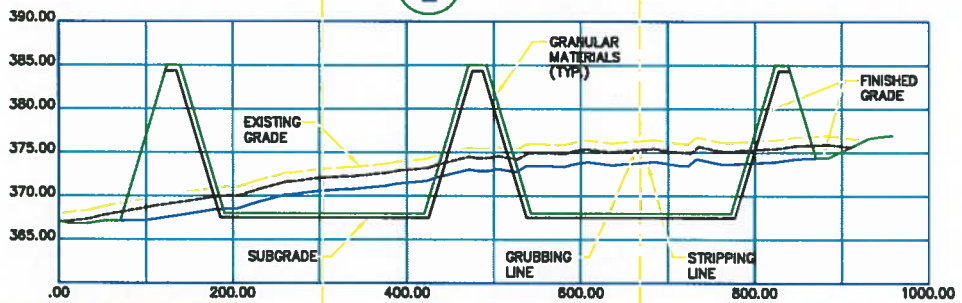
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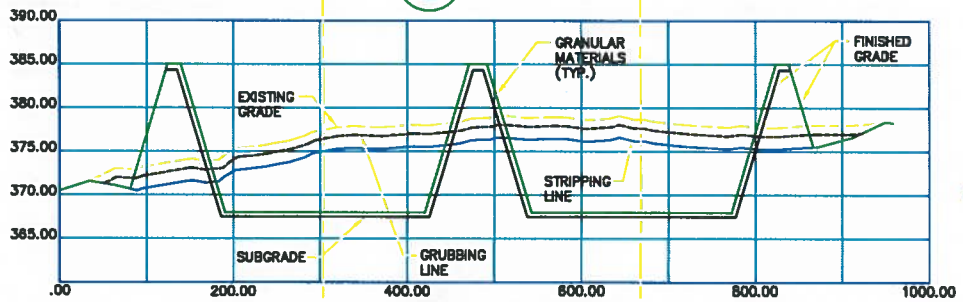
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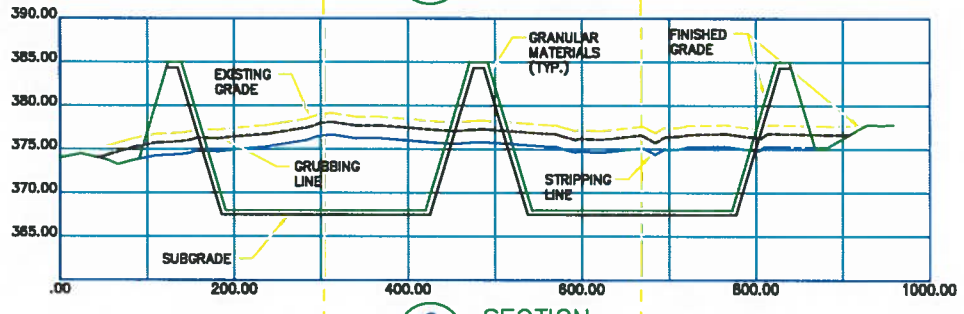
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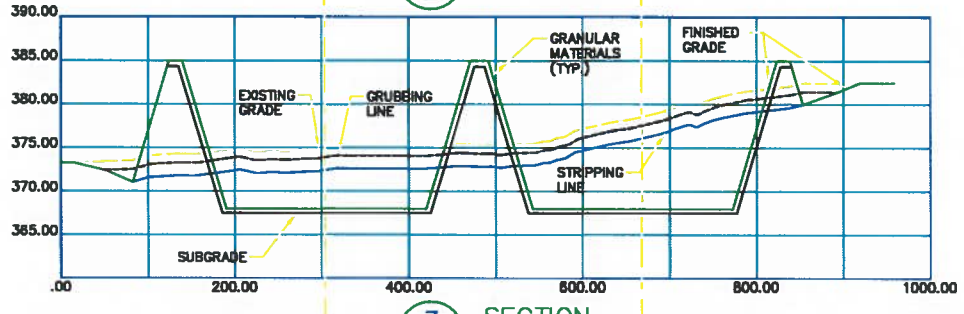
4 SECTION



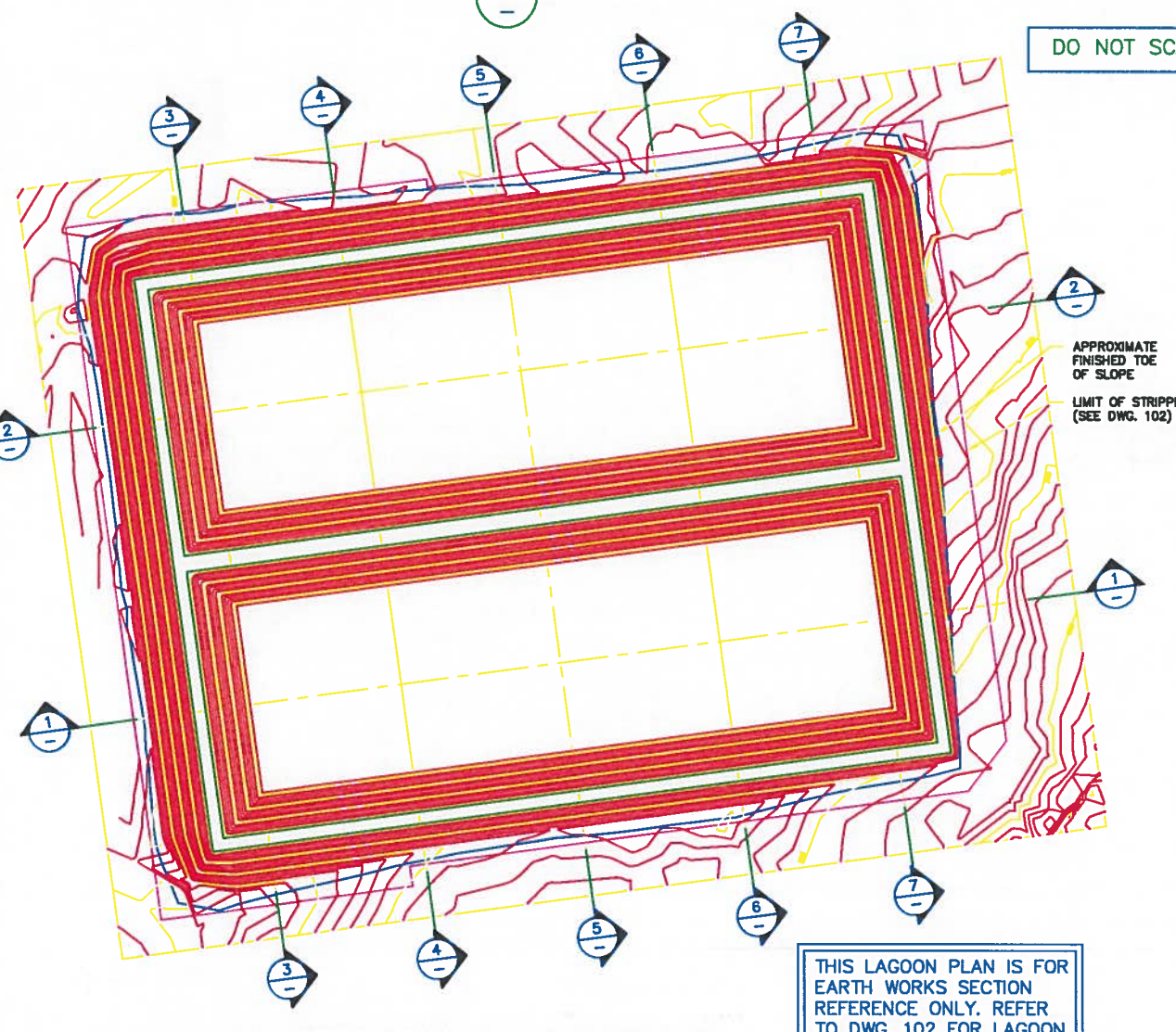
5 SECTION



6 SECTION



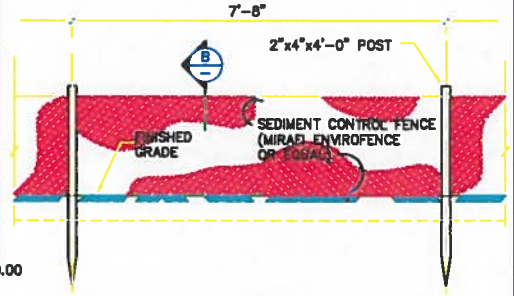
7 SECTION



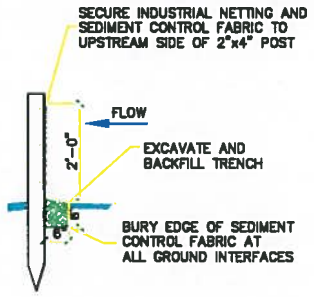
LAGOON PLAN—FINISH GRADE CONTOURS
N.T.S.

DO NOT SCALE THE DRAWINGS

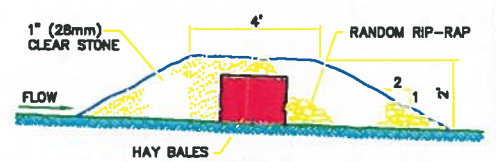
THIS LAGOON PLAN IS FOR EARTH WORKS SECTION REFERENCE ONLY. REFER TO DWG. 102 FOR LAGOON LAYOUT AND SETTING OUT DIMENSIONS.



ELEVATION— SEDIMENT CONTROL FENCE
NTS



SECTION B — SEDIMENT CONTROL FENCE
N.T.S.



SECTION— SEDIMENT CONTROL BERM
N.T.S.

Record drawing

Date.....19.....

Approved.....P.Eng

95,06,29	RECORD DRAWING	S.G.
94,09,07	ISSUED FOR CONSTRUCTION	D.J.L.
94,07,29	RE-ISSUED FOR TENDER - ADDENDUM No.2	J. deC.
94,07,18	ISSUED FOR TENDER	J. deC.
94,07,18	ISSUED FOR APPROVAL	J. deC.
DATE:	REVISION	APPROVED

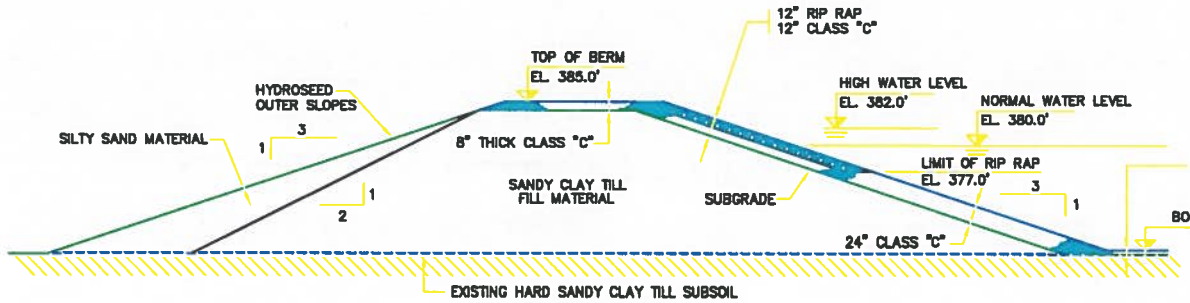
ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

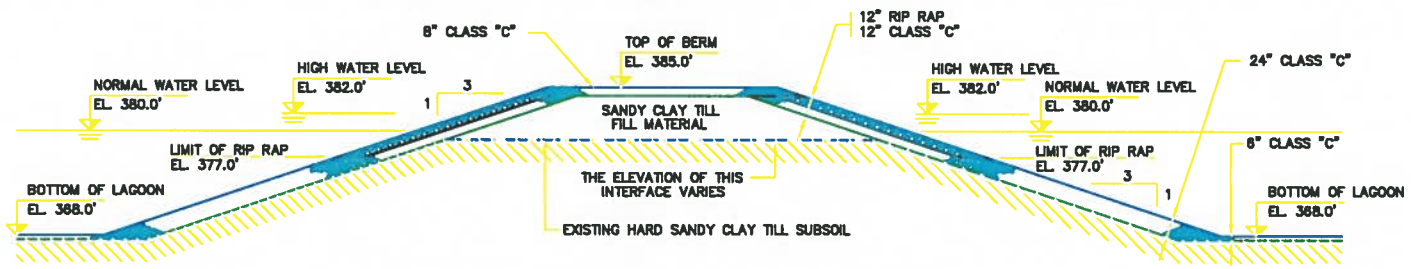
TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA
POLLUTION ABATEMENT PROJECT
STP— LAGOON CONSTRUCTION
LAGOON
SUBGRADE SECTIONS

DESIGN: MRH | SIGNED:
SCALE: HZ. 1"=100', VERT. 1"=10' | DWG. No. 944101-103
DATE: 94.07.18

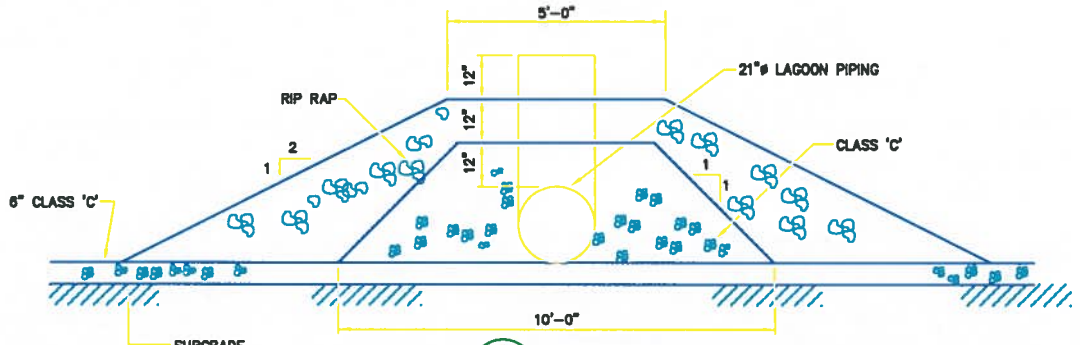
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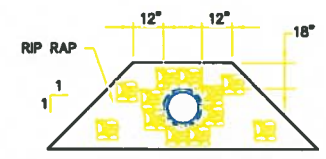
1/102 DETAIL—EXTERIOR BERM AT WEST END
SCALE: 1" = 10'



2/102 DETAIL—INTERIOR BERM
SCALE: 1" = 10'



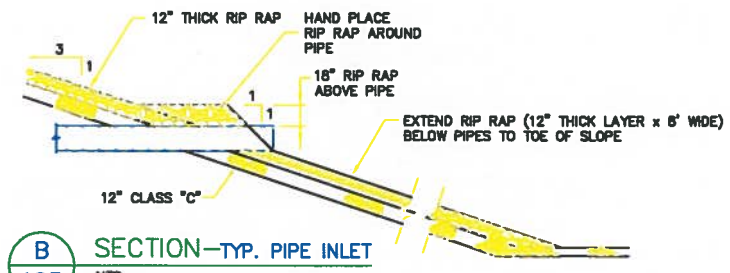
E/— SECTION
1/2"=1'-0"



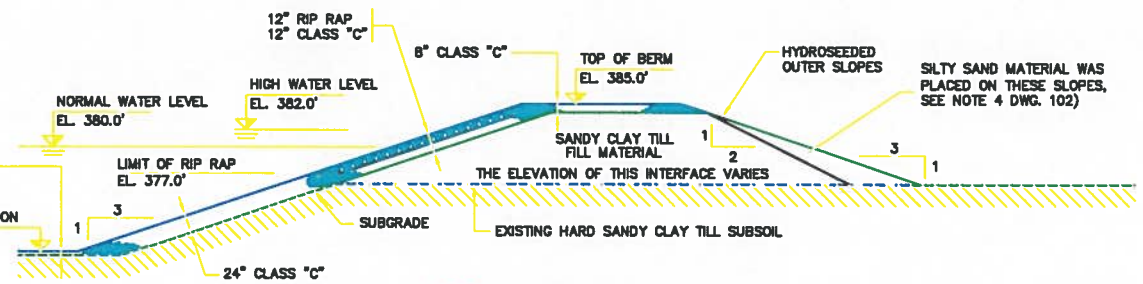
4/— DETAIL—ELEVATION TYP. PIPE INLET & OUTLET
NTS



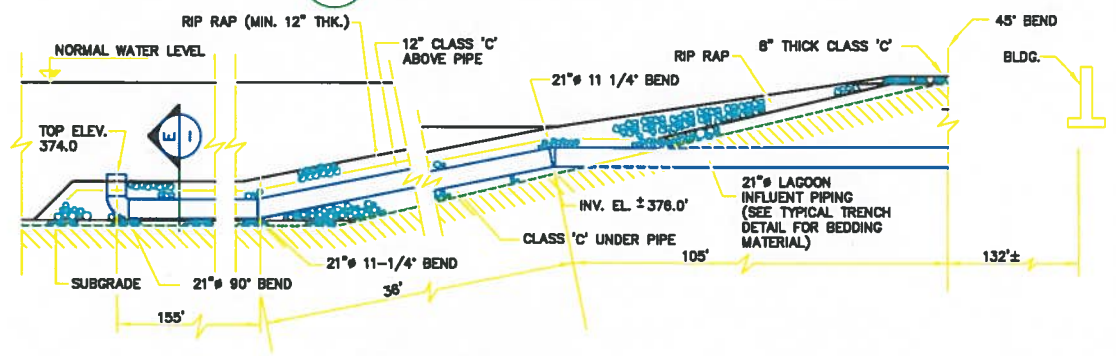
D/102 SECTION—ACCESS ROAD
1/4" = 1'-0"



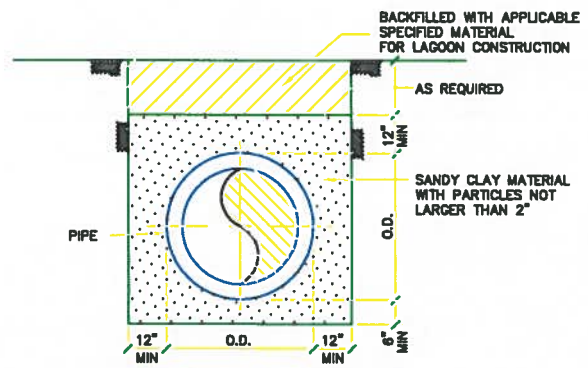
B/105 SECTION—TYP. PIPE INLET
NTS



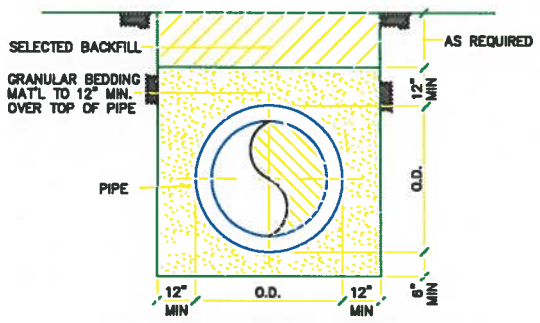
3/102 DETAIL—EXTERIOR BERM
SCALE: 1" = 10'



C/105 SECTION
1/8"=1'-0"



TYPICAL TRENCH DETAIL
PIPES INSTALLED WITHIN
LAGOON BERMS (EXCLUDING D.I. AIR PIPE)
N.T.S.



TYPICAL TRENCH DETAIL
PIPES INSTALLED OUTSIDE OF
LAGOON BERMS AND FOR D.I.
AIR PIPE THROUGHOUT
N.T.S.

Record drawing

Date.....19.....

Approved.....P.Eng

95,08,30	RECORD DRAWING	S.G.
94,09,07	ISSUED FOR CONSTRUCTION	D.J.L.
94,07,29	RE-ISSUED FOR TENDER - ADDENDUM No.2	J. deC.
94,07,18	ISSUED FOR TENDER	J. deC.
94,07,18	ISSUED FOR APPROVAL	J. deC.
DATE:	REVISION	APPROVED

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

STP— LAGOON CONSTRUCTION LAGOON SECTIONS AND DETAILS

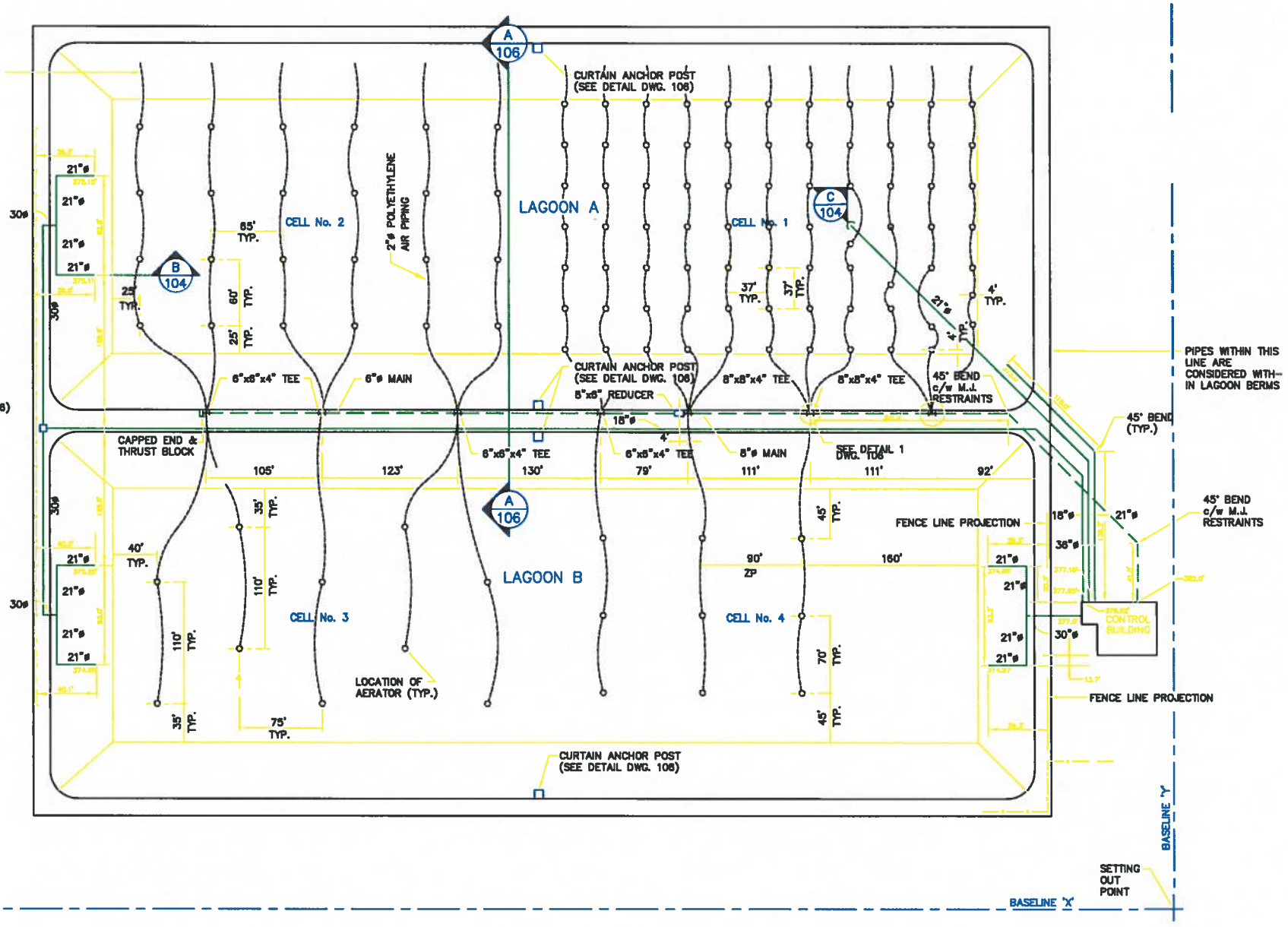
Drawn: MBH | Checked:
SCALE: 1" = 10' OR AS NOTED | DWG. No. 944101-104
DATE: 94.07.18

CBCL REF. 94322, DWG. No. 94322C04

NOTES: FOR AIR PIPES:
CSA B137.1 PE3408
POTABLE WATER MADE IN CANADA
XH9 30 206 GN KWH
SCLAIRPIPE 2" NPS SERIES 100 O.D. PIPE.

NORTH

NOTE: EXTENDED ALL AIRLINES IN LAGOON "A" TO 3'-0" BELOW NORMAL WATER LEVEL ON NORTH SIDE OF LAGOON AND TERMINATED WITH BUTT WELDED END CAP.



LEGEND:

- CONCRETE SEWAGE PIPING
- POLYETHYLENE AIR PIPING
- DUCTILE IRON AIR PIPING
- PIPE INVERT

Record drawing

Date.....19.....

Approved.....P.Eng

DATE	REVISION	APPROVED
95,08,29	RECORD DRAWING	S.G.
94,09,07	ISSUED FOR CONSTRUCTION	D.J.L.
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REGISTERED PROFESSIONAL ENGINEER — K. J. MURPHY — Pprovince of NOVA SCOTIA

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

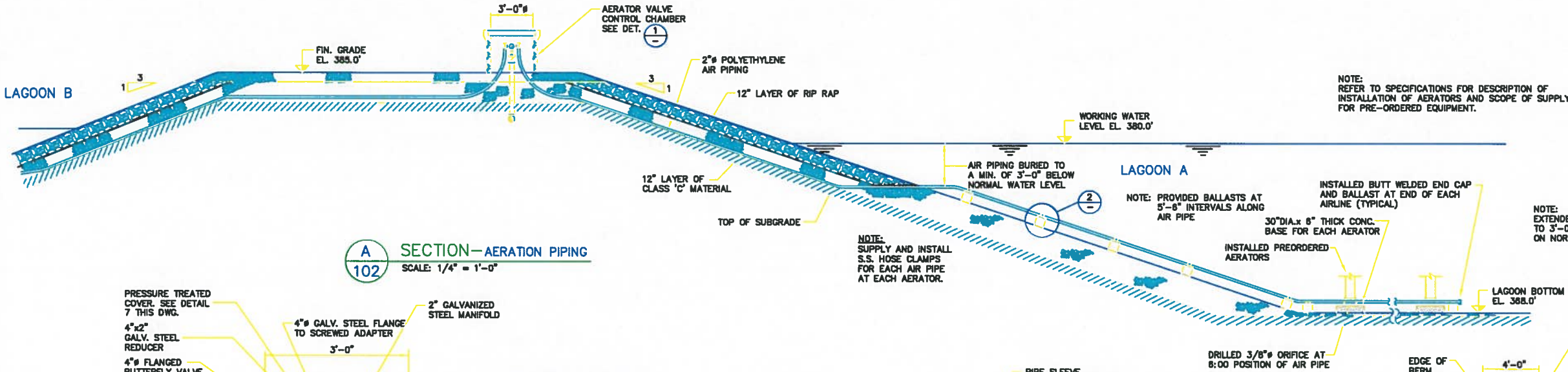
CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

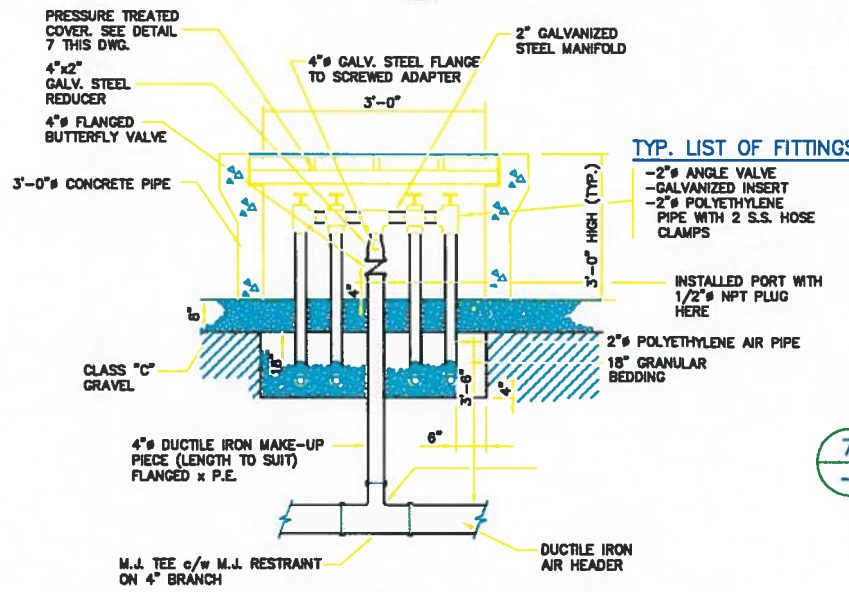
POLLUTION ABATEMENT PROJECT
STP– LAGOON CONSTRUCTION
SEWAGE LAGOON
PIPING ARRANGEMENT

DRAWN: MRH | SIGNED:
SCALE: 1" = 80' OR AS NOTED | DWG. No. 944101-105
DATE: 94,07,18

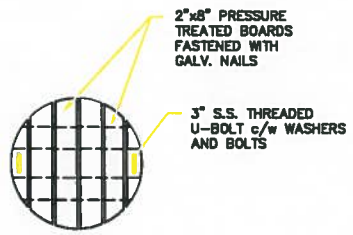
CBCL REF. 94522, DWG. NO. 944522105



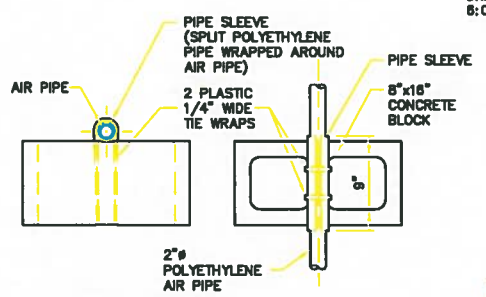
A/102 SECTION—AERATION PIPING
SCALE: 1/4" = 1'-0"



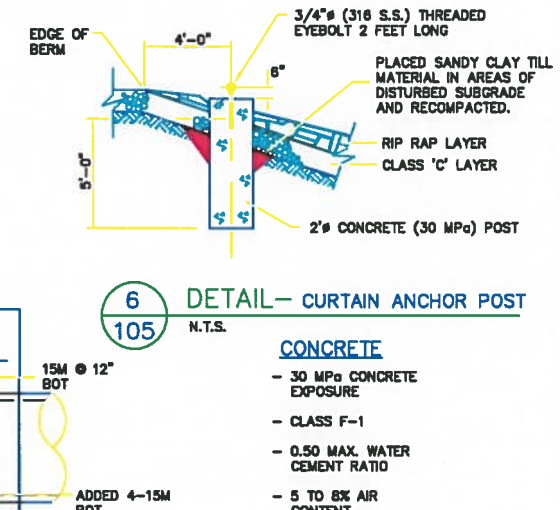
1/105 DETAIL—AERATOR VALVE CONTROL CHAMBER (TYP.)
N.T.S.



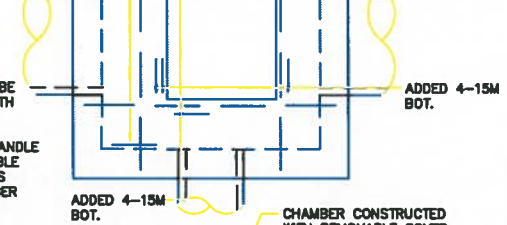
7/— DETAIL—COVER
N.T.S.



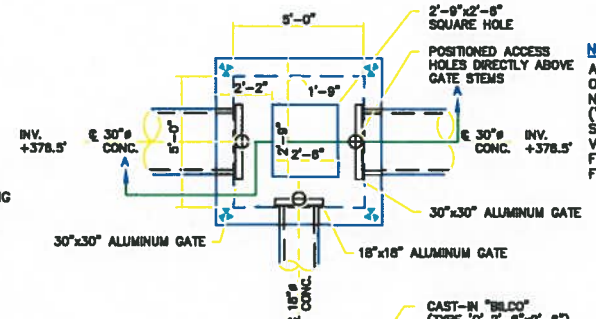
2/— DETAIL—AIR PIPE BALLAST
N.T.S.



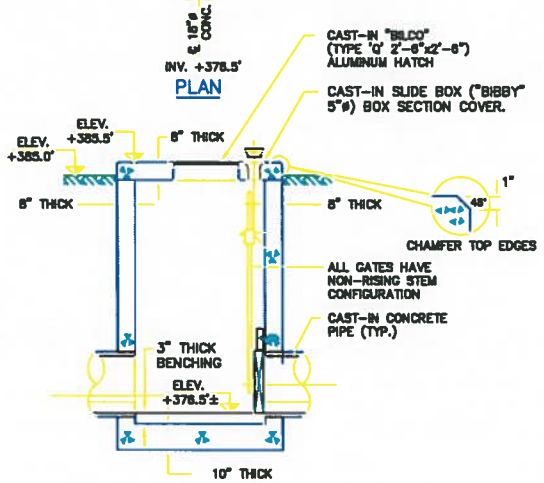
6/105 DETAIL— CURTAIN ANCHOR POST
N.T.S.



PLAN



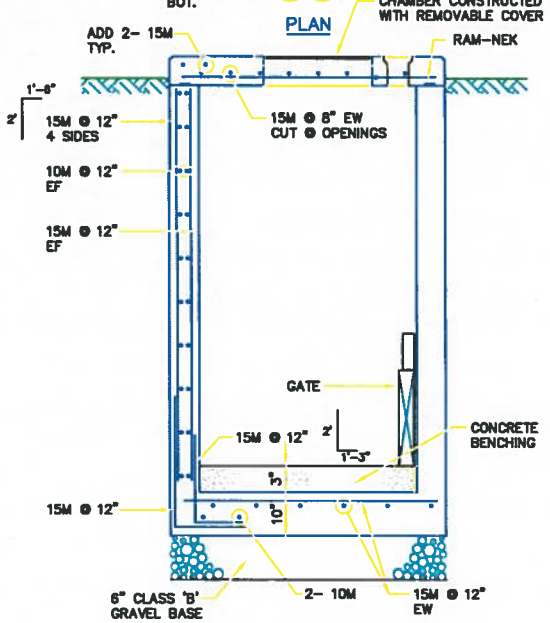
PLAN



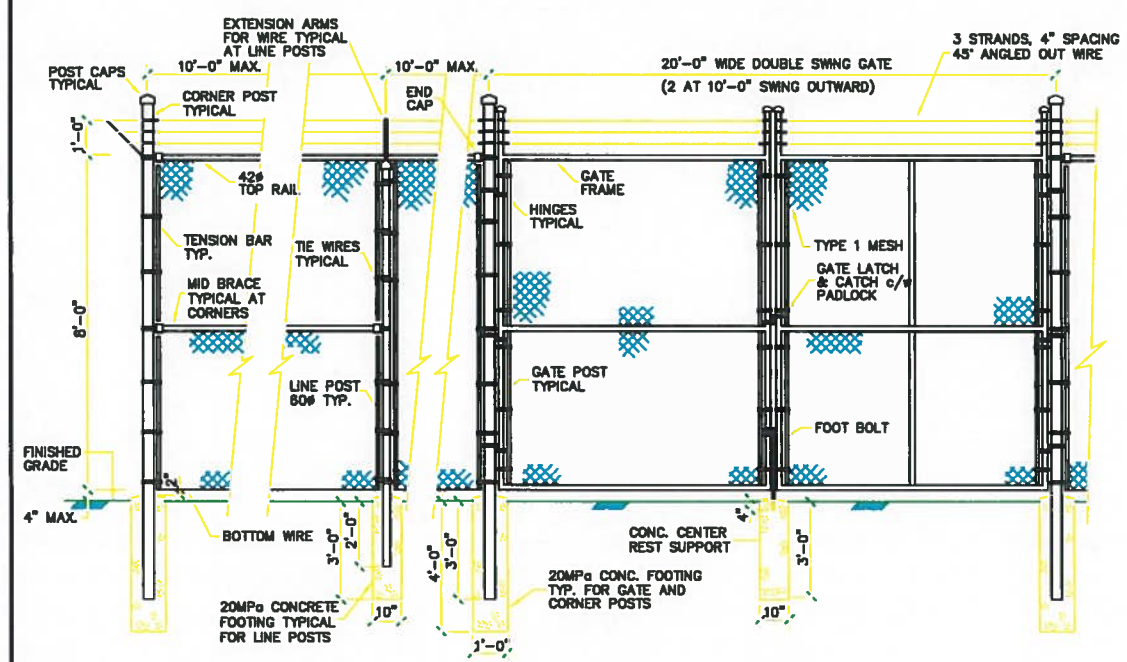
SECTION A-A

3/105 DETAIL—CONTROL STRUCTURE
N.T.S.

NOTE:
ALUMINUM GATES TO BE OPEN FRAME TYPE WITH NON-RISING STEM ("FONTAINE") SUPPLIED ONE TEE-HANDLE VALVE OPENER SUITABLE FOR OPERATING GATES FROM OUTSIDE CHAMBER



5/— DETAIL—CONTROL STRUCTURE REBAR
SCALE: 1" = 5'



4/102 DETAIL—CHAIN LINK FENCE
NTS

CONCRETE

- 30 MPa CONCRETE EXPOSURE
- CLASS F-1
- 0.50 MAX. WATER CEMENT RATIO
- 5 TO 8% AIR CONTENT

Record drawing

Date.....19.....

Approved.....P.Eng

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REGISTERED PROFESSIONAL ENGINEER — K. J. MURPHY — PROVINCE OF NOVA SCOTIA

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CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
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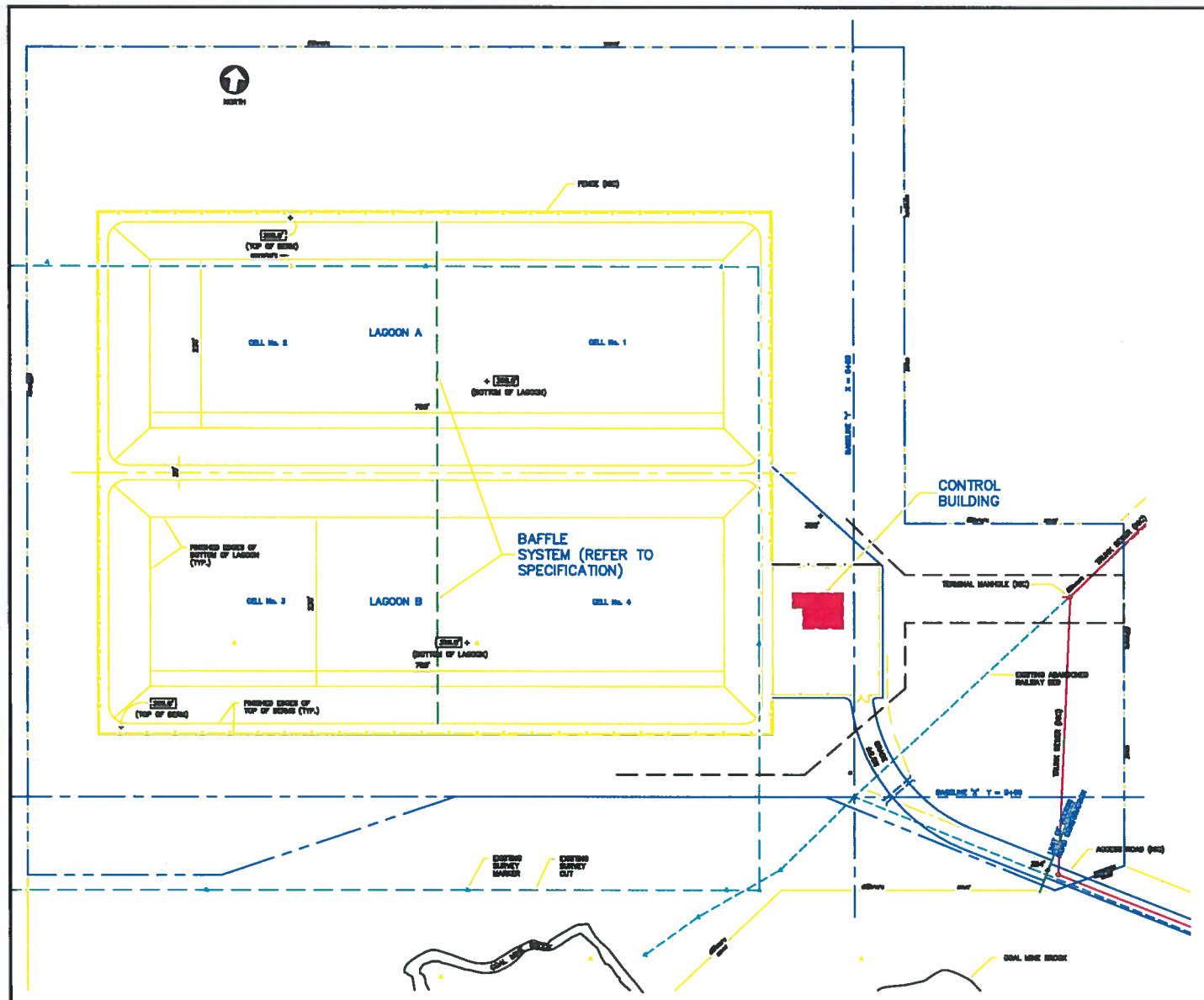
TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

STP— LAGOON CONSTRUCTION
MISCELLANEOUS DETAILS

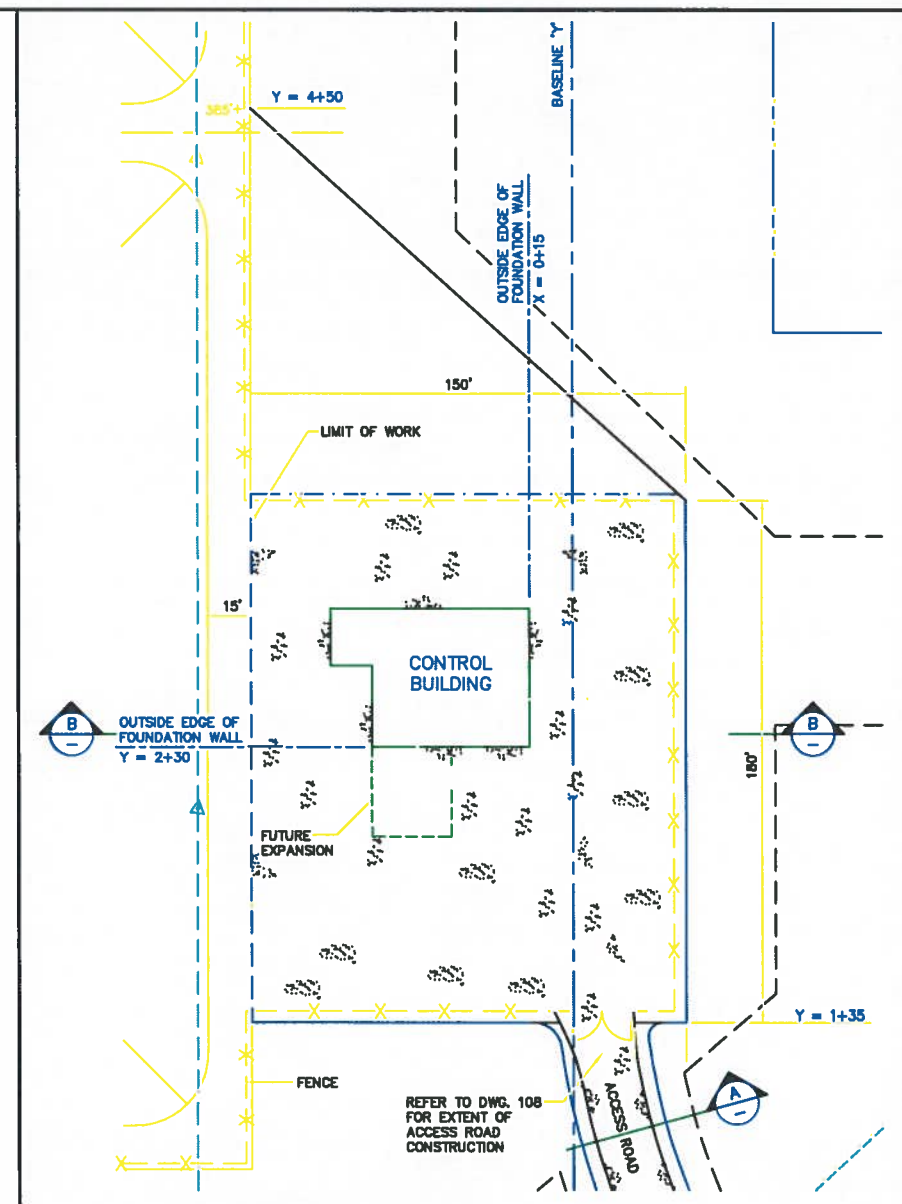
DRAWN: MRH	SIGNED:
SCALE: AS NOTED	DWG. No. 944101-106
DATE: 94,07,18	

CBCL REF. 944101, DWG. 944101106



SEWAGE TREATMENT PLANT SITE— EXISTING

SCALE: 1" = 100'



SITE PLAN— FINISH GRADES

SCALE: 1" = 30'

NOTES:

1. CONTROL BUILDING TOPSOIL AND SOD WAS REMOVED FROM THE CONTRACT PRIOR TO AWARD.

LEGEND:

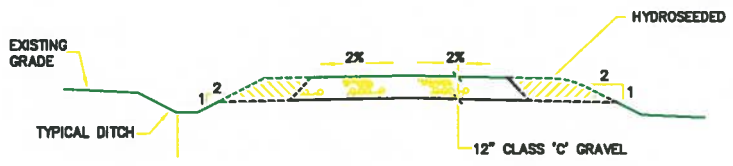
- FENCING (NIC)
- APPROX. LIMITS OF GRUBBING (NIC)
- (NIC) NOT IN CONTRACT
- AREA FINISHED WITH CLASS "C"

Record drawing

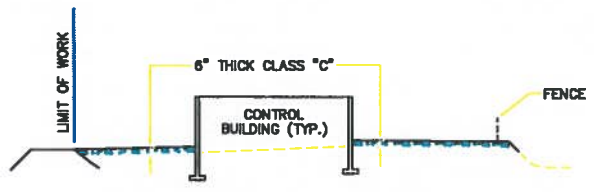
Date.....19.....

Approved.....P.Eng

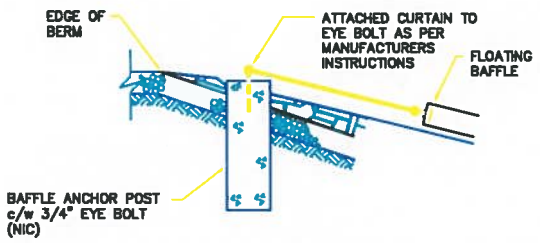
DATE	REVISION	APPROVED
30/08/95	RECORD DRAWING	S.G.
28/10/94	ISSUED FOR CONSTRUCTION	K.M.
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12/09/94	ISSUED FOR APPROVAL	J.deC.



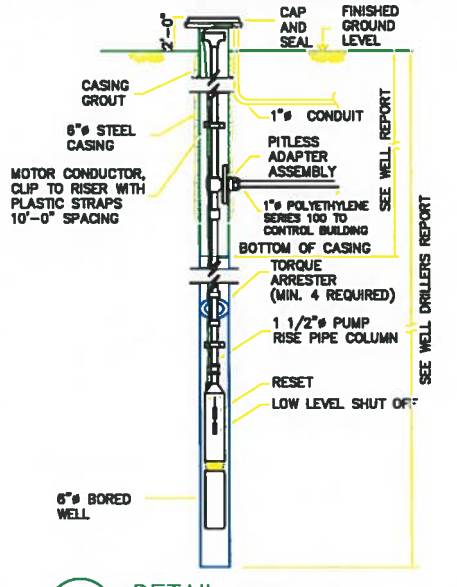
A — NTS SECTION— ACCESS ROAD



B — NTS SECTION— YARD (TYP.)



1 — N.T.S. DETAIL— BAFFLE ANCHOR ARRANGEMENT (TYP.)



2 / 108 — NTS DETAIL— WATER WELL

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TOWN OF SPRINGHILL

CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

STP—CONTROL BUILDING SITE LAYOUT

DRAWN: MRH | SIGNED:

SCALE: 1" = 100' OR AS NOTED | DWG. No. 944101—107

DATE: 94.09.20

CBCL REF. 94522, DWG. NO. 94522C07

NORTH

PIPE CONNECTIONS

PIPE & INVERT ELEVATIONS AT BUILDING		
PIPE	INVERT ELEV.	TYPE
MAINTENANCE BY-PASS	+378.02'	18"ø CONC.
LAGOON-A INLET	+377.85'	21"ø CONC.
HIGHFLOW OVERFLOW	+377.16	36"ø CONC.
AIR HEADER	+382.00'	8"ø D.I.
LAGOON-B DISCHARGE	+378.98'	30"ø CONC.

CELL No. 4

NOTE: CONTOURS SHOWN ON THIS DRAWING REPRESENT APPROX. SITE ELEVATIONS (GEODETIC) PRIOR TO CONSTRUCTION OF THE PRECEDING EARTHWORKS CONTRACT.

ORIGINAL LIMIT OF PIPEWORK Y=3+15
MAINTENANCE BYPASS
LAGOON-A INLET
HIGH FLOW OVERFLOW
Y=2+66.6
LAGOON-B DISCHARGE-30ø

18"ø
21"ø
36"ø
8"ø D.I. (NIC)
X = 0+80.33
X = 0+79.98
X = 0+71.33
X = 0+17
BASELINE 'Y' X = 0+00

TERMINAL MANHOLE c/w 4' LONG 36"ø CONC. STUB LENGTH AT INV. OUT ELEV. 386.60'

INFLUENT PIPING WORK (CONSTRUCTED UNDER CONTRACT No.2)
AIR HEADER
TRUNK SEWER (NIC)
36"ø INFLUENT SEWER
TYPICAL AREA GRUBBED (NIC)
CONTROL BUILDING
LIMIT OF PIPEWORK X=0+98
WATER WELL- DETAIL 2/107
WATER AND POWER SUPPLY, SEE DETAIL 2/107
EXISTING ABANDONED RAILWAY BED
REFER TO DWGS. 117 AND 118 FOR FILTER DRAIN DETAILS
ELECTRICAL AND COMMUNICATION WIRING - SEE ELECTRICAL DWG. 120 AND 121.
NEW UTILITY TERMINAL POLE
TRUNK SEWER (NIC)
22 1/2° BEND
30" CONC.
BASELINE 'X' Y = 0+00
REFER TO SECTION A/107 FOR ACCESS ROAD FINISHING DETAILS.
LIMIT OF ACCESS ROAD CONSTRUCTION
SETTING OUT POINT
ACCESS ROAD (NIC)
OUTFALL (CONSTRUCTED UNDER CONTRACT No.2)
EXISTING SURVEY CUT
30"ø CONC.
21"ø CONC.
COAL MINE BROOK

EXIST. GRADE
SELECTED BACKFILL MATERIAL
GRANULAR BEDDING MAT'L TO 12" MIN. OVER TOP OF PIPE
SEWER
AS REQUIRED
O.D.
12" MIN
O.D.
12" MIN
6" MIN

PLAN-YARD PIPING
1"=60'

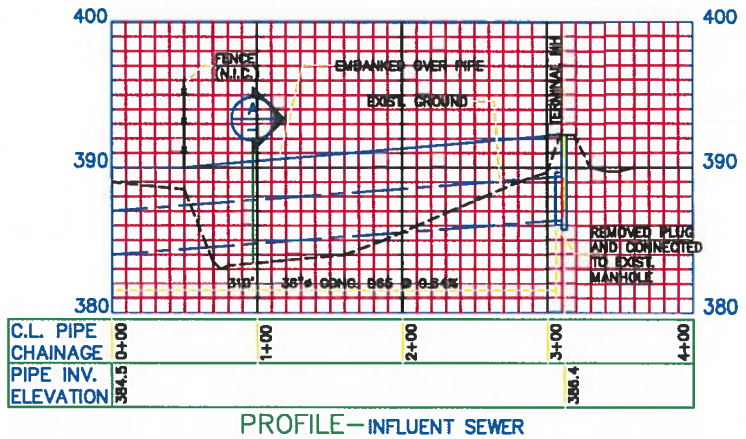
TRENCH DETAIL - ONE PIPE
N.T.S.

HYDROSEEDED FINISHED BERM AND AREA DISTURBED DURING CONSTRUCTION.
SELECT BACKFILL MATERIAL
2
1
PIPE
BEDDING MATERIAL AS SPECIFIED
12"
1
2

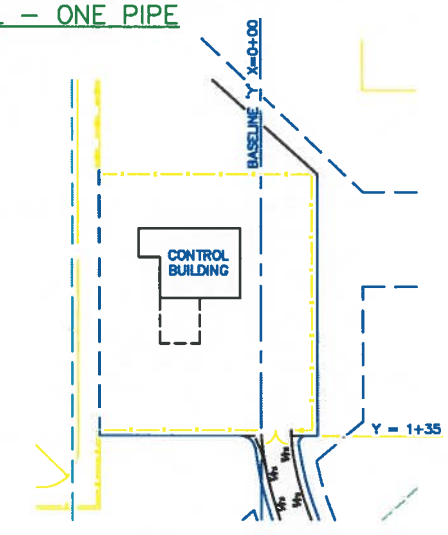
30"x30"x24" BRANCH TEE
INSTALLED 3'-0" LONG STUB LENGTH AND CONNECTED TO BUILDING UNDER THIS CONTRACT

A/- SECTION-INFLUENT SEWER AND OUTFALL WHERE EMBANKED
NTS

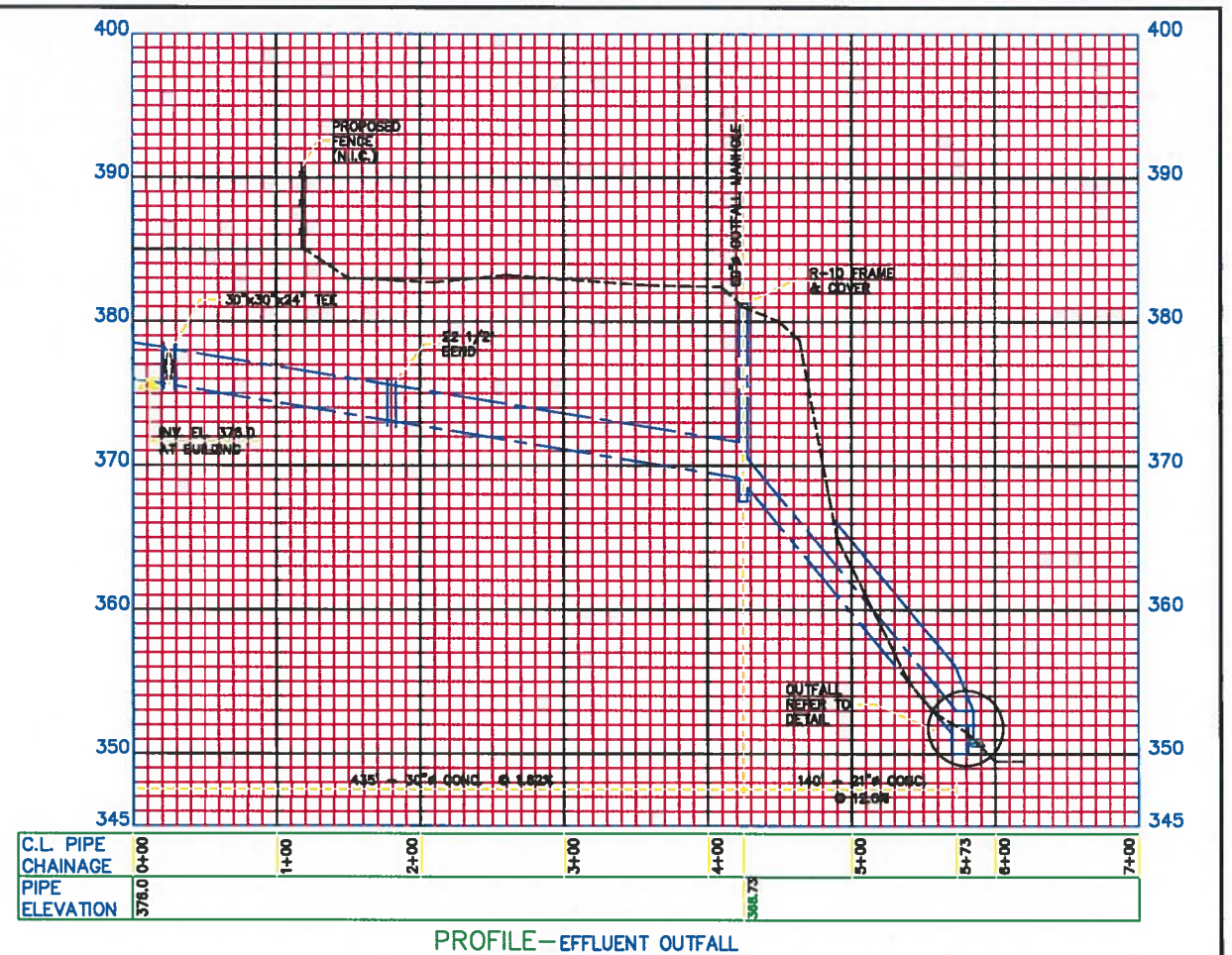
BRANCH TEE CONNECTION DETAIL-AT CHA. 0+25 OUTFALL PROFILE
NTS



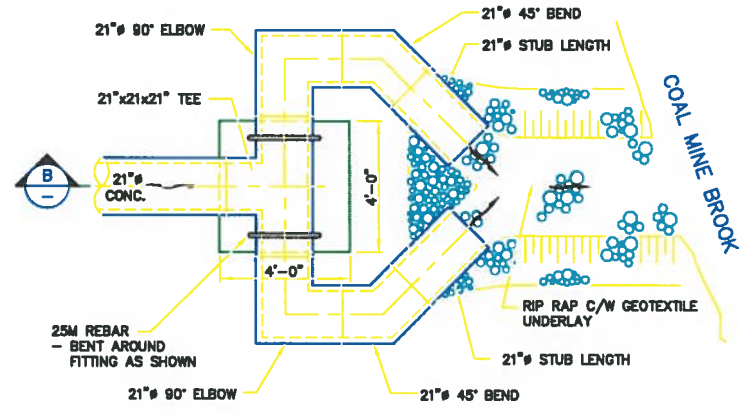
PROFILE-INFLUENT SEWER
HORIZ. 1"=60' VERT. 1"=6'



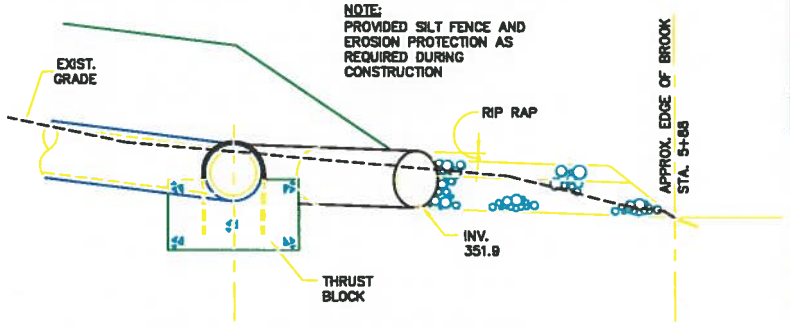
CONTROL BUILDING YARD AREA
SCALE: 1" = 60'



PROFILE-EFFLUENT OUTFALL
HORIZ. = 1"=60' VERT = 1"=6'



B/-
1/- DETAIL-OUTFALL AT BROOK-PLAN
N.T.S.



B/- SECTION-OUTFALL AT BROOK
N.T.S.

Record drawing

Date.....19.....

Approved.....P.Eng

30/06/95	RECORD DRAWING	S.G.
28/80/94	ISSUED FOR CONSTRUCTION	J.de'C.
18/10/94	REVISION No.1 - PROPOSED C.O. No.1	J.de'C.
20/09/94	ISSUED FOR TENDER	J.de'C.
12/09/94	ISSUED FOR APPROVAL	J.de'C.
DATE:	REVISION	APPROVED

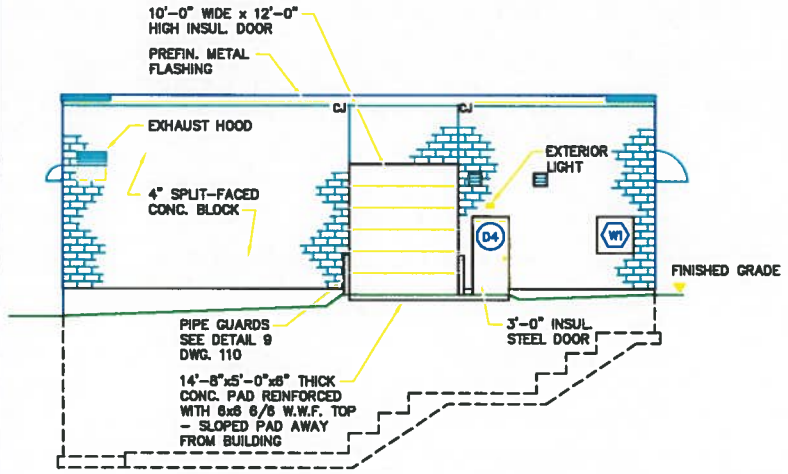
REGISTERED PROFESSIONAL ENGINEER - PROVINCE OF NOVA SCOTIA - DATE - K. J. MURPHY - 6822

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

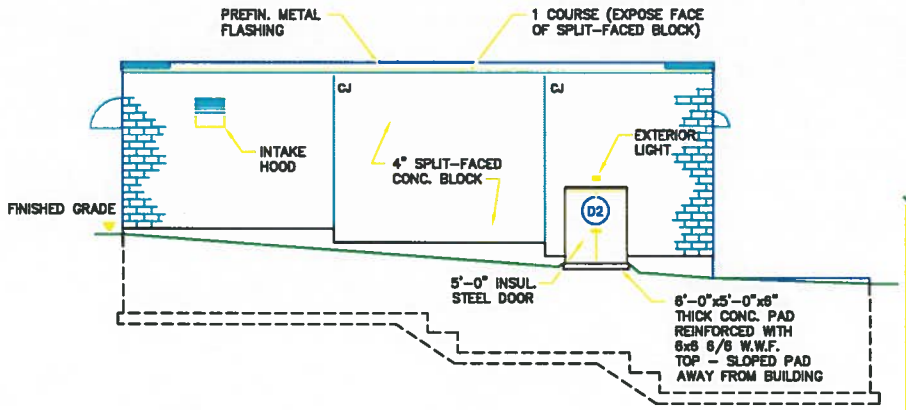
CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA
POLLUTION ABATEMENT PROJECT
STP-CONTROL BUILDING
YARD PIPING AND OUTFALL

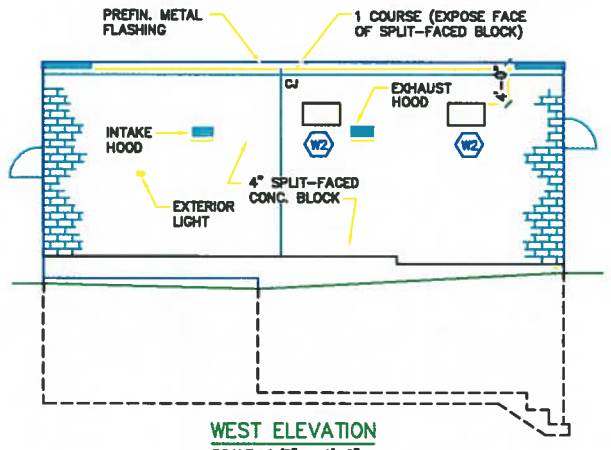
DRAWN: MRH | SIGNED:
SCALE: 1" = 80' OR AS NOTED | DWG. No. 944101-108
DATE: 94.09.20



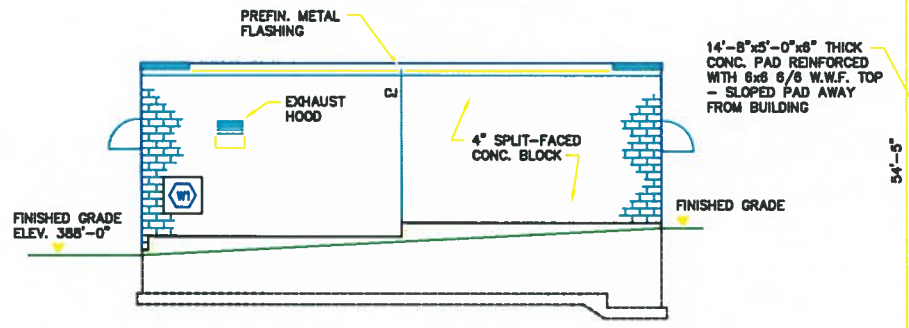
SOUTH ELEVATION
SCALE: 1/8" = 1'-0"



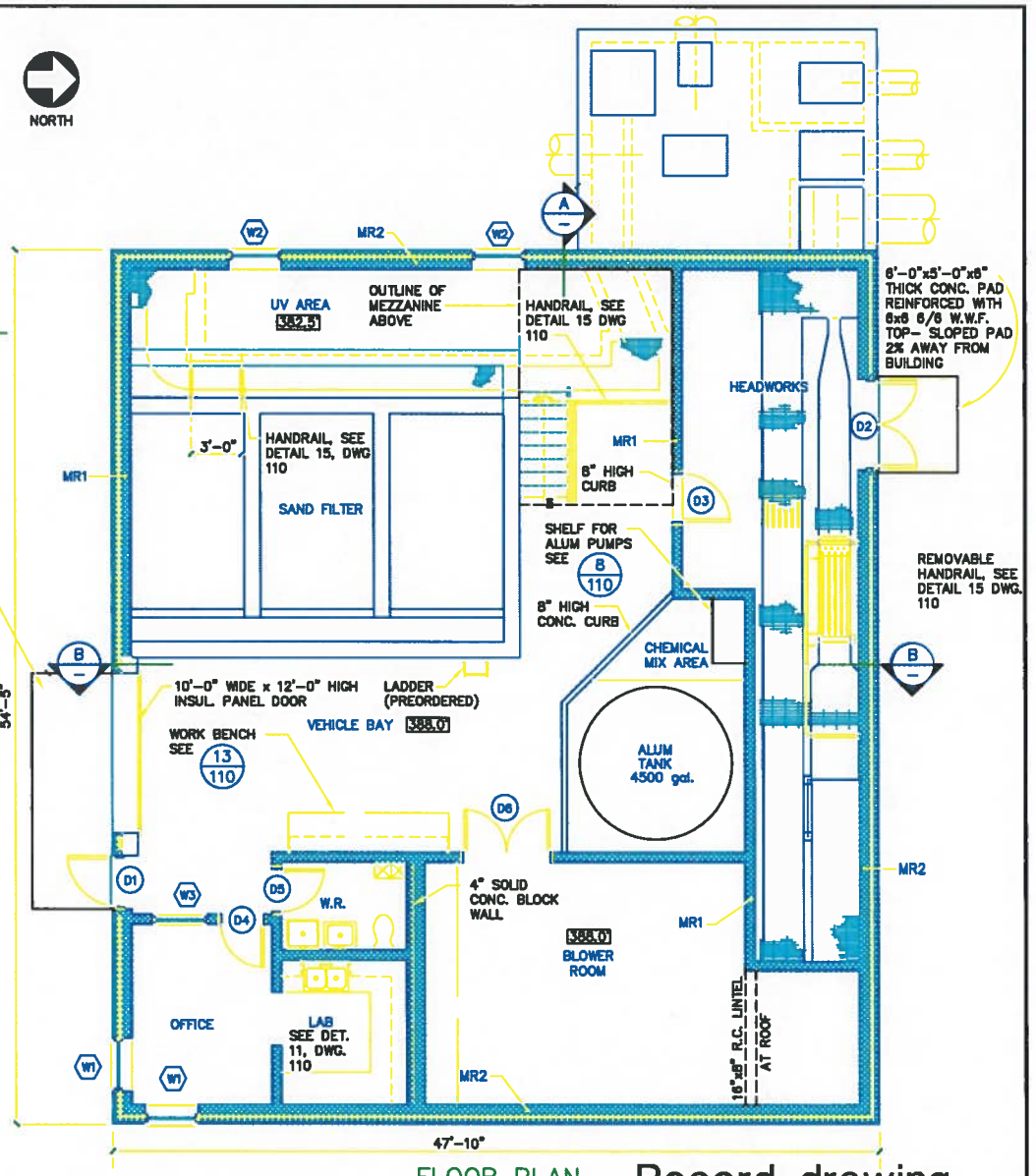
NORTH ELEVATION
SCALE: 1/8" = 1'-0"



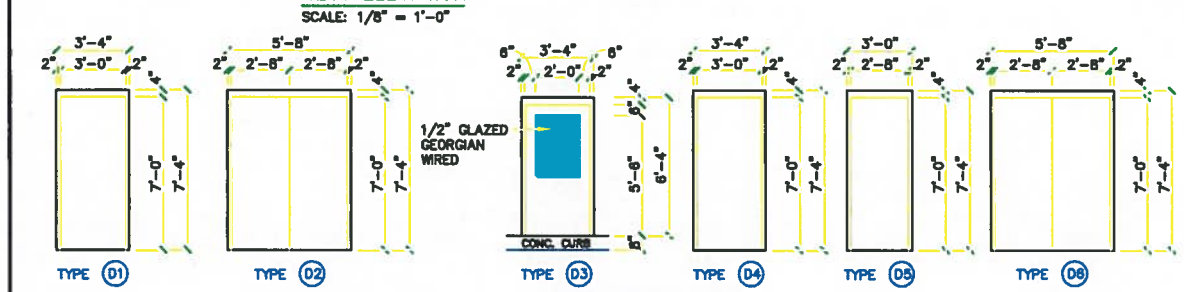
WEST ELEVATION
SCALE: 1/8" = 1'-0"

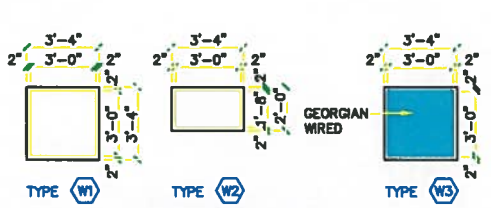


EAST ELEVATION
SCALE: 1/8" = 1'-0"



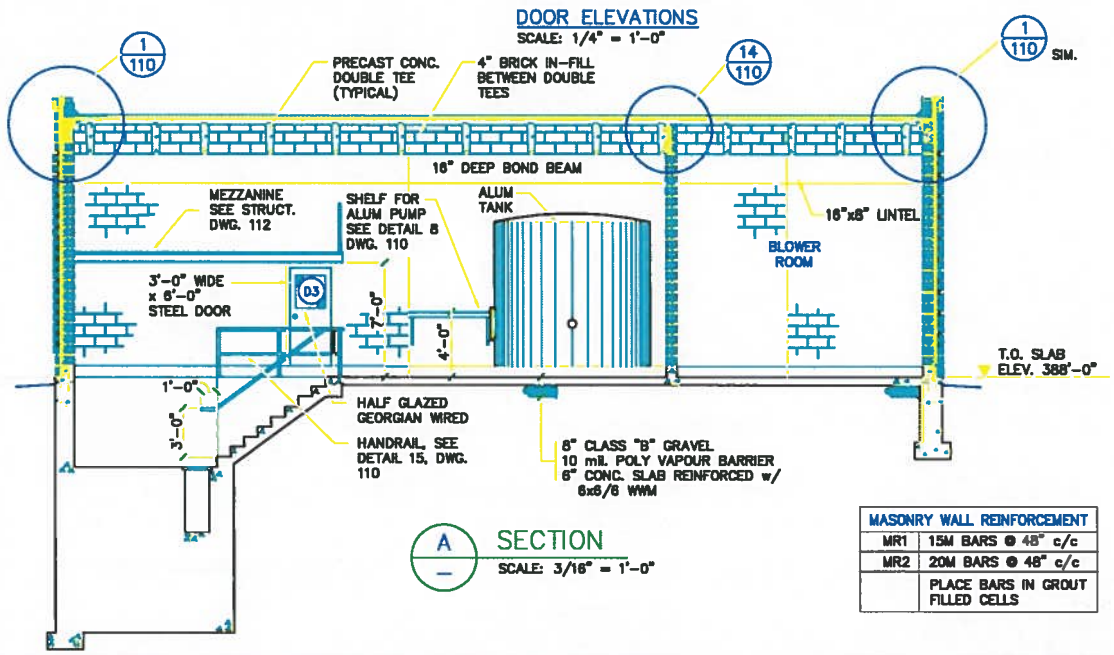
FLOOR PLAN
SCALE: 3/16" = 1'-0"





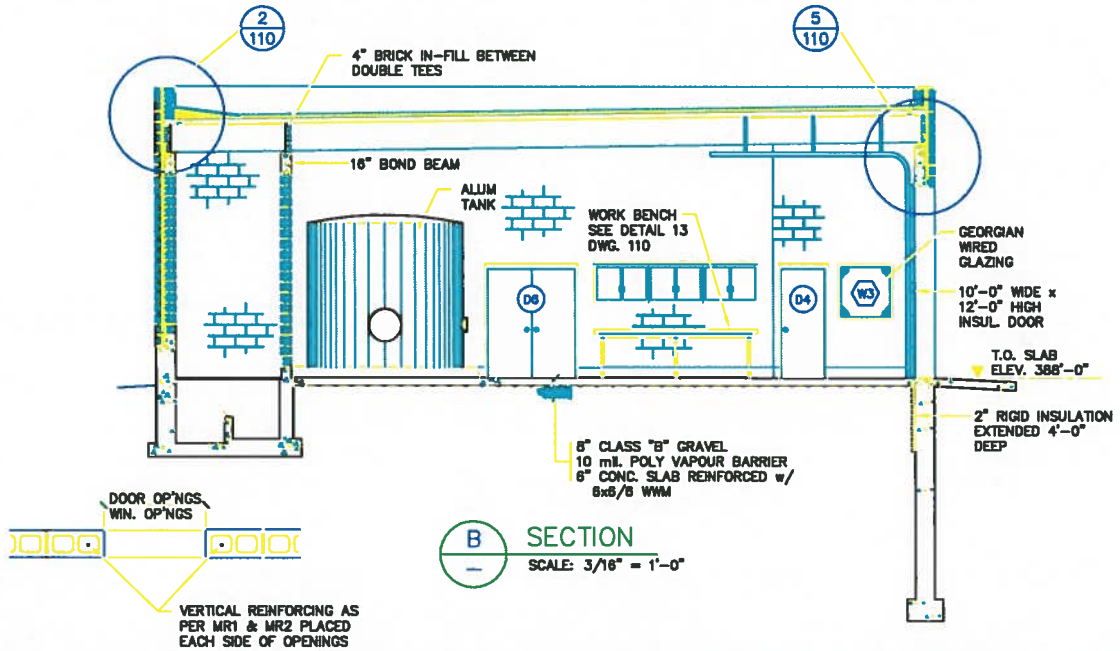
WINDOW ELEVATIONS
SCALE: 1/4" = 1'-0"

DOOR ELEVATIONS
SCALE: 1/4" = 1'-0"



A SECTION
SCALE: 3/16" = 1'-0"

MASONRY WALL REINFORCEMENT	
MR1	15M BARS @ 48" c/c
MR2	20M BARS @ 48" c/c
	PLACE BARS IN GROUT FILLED CELLS



B SECTION
SCALE: 3/16" = 1'-0"

Record drawing

Date.....19.....

Approved.....P.Eng

DATE:	REVISION	APPROVED
15/07/95	RECORD DRAWING	S.G.
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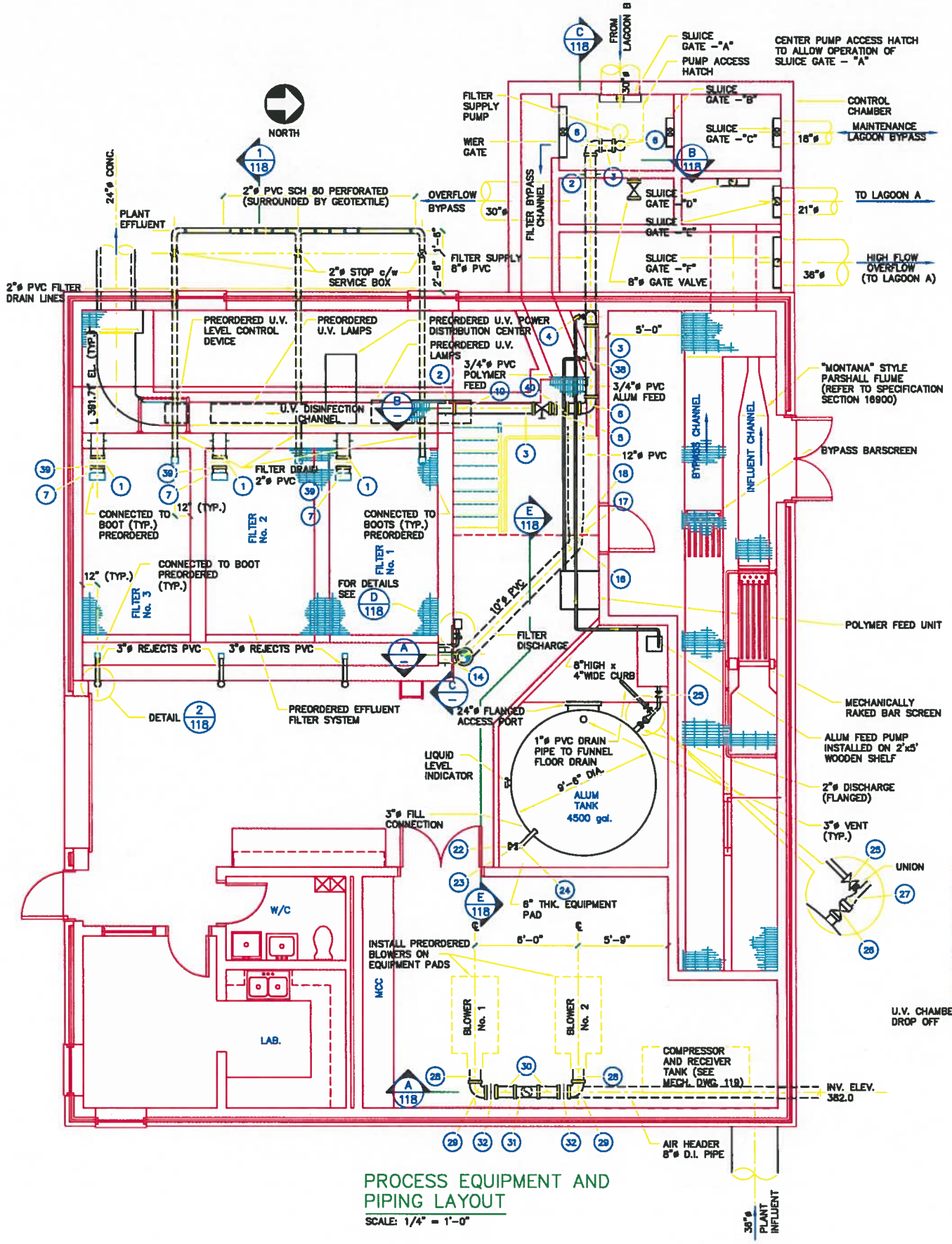
TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

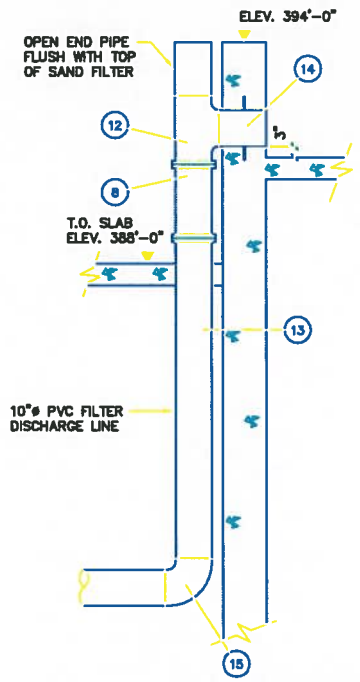
STP-CONTROL BUILDING
CONTROL BUILDING PLAN AND ELEVATIONS

ORIGINAL: MRH | SIGNED:
SCALE: AS NOTED | DWG. No. 944101-109
DATE: 94.08.30

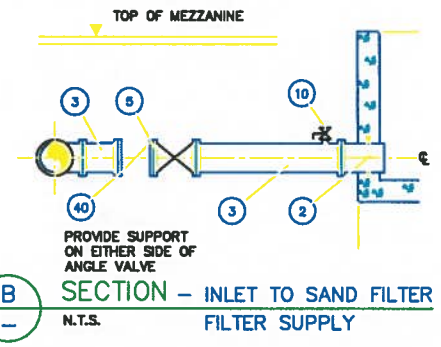
Drawing File: 9432BC09 Date: 9/14/1994 BC3 A/K



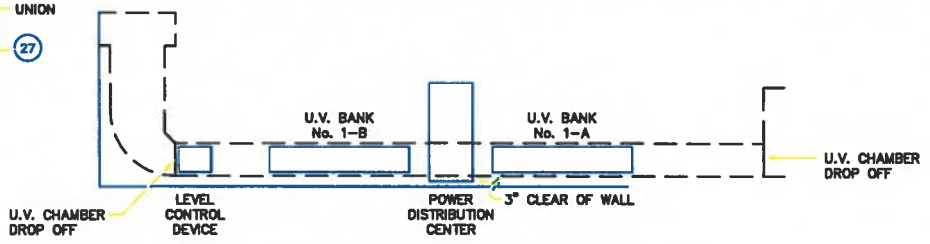
PROCESS EQUIPMENT AND PIPING LAYOUT
SCALE: 1/4" = 1'-0"



A — SECTION — DISCHARGE FROM SAND FILTER
N.T.S.



B — SECTION — INLET TO SAND FILTER FILTER SUPPLY
N.T.S.



PLAN — U.V. DISINFECTION AREA EQUIPMENT LAYOUT
SCALE: 1/4" = 1'-0"

LIST OF FITTINGS (SEE DWG. 118 ALSO)

No.	QTY.	DESCRIPTION
1	3	12"ø S.S. w/ WALL FLANGE – FLANGED ONE SIDE
2	2	8"ø PVC w/ WALL FLANGE – FLANGED ONE SIDE
3	–	8"ø – FLANGED
4	2	3/4" S.S. BALL VALVE
5	1	8" GATE VALVE
6	4	90° ELBOW – FLANGED
7	3	12"ø S.S. – FLANGED ONE END
8	–	10" FLANGED
9	1	8"ø 90° ELBOW
10	3	3/4" BALL VALVE – BRONZE
11	1	3/4" CHECK VALVE, S.S.
12	1	10"x10"x10" TEE – FLANGED ONE END – w/ SPOOL PIECE
13	1	10" FLANGED ONE END
14	1	10"ø w/ WALL FLANGE
15	1	10"ø 90° ELBOW
16	1	10"ø 45° ELBOW
17	–	10"ø SPOOL PIECE
18	1	10"x12" ECCENTRIC REDUCER (INCREASE ON PIPE OBVERT)
19	3	3"ø WALL FLANGE
20	3	3"ø 90° ELBOW
21	–	3"ø SPOOL PIECE
22	1	2" EVERTIGHT – PART 'F' ADAPTER (BRASS) c/w DUST CAP
23	1	3"ø GATE VALVE S.S.
24	2	3"ø 90° ELBOW – FLANGED ONE END
25	2	1" BALL VALVE S.S.
26	1	2" GATE VALVE S.S. FLANGED
27	1	2"x1" REDUCER – FLANGED ONE END
28	2	8"ø SPOOL PIECE D.I. FLANGED ONE SIDE
29	2	8"ø 90° ELBOW D.I. – FLANGED
30	3	8" SPOOL PIECE D.I. FLANGED
31	1	8"ø TEE D.I. FLANGED
32	2	8"ø WAFER BUTTERFLY VALVE – FLANGED
33	2	1"ø BALL VALVE – BRONZE
34	1	1" CHECK VALVE S.S.
35	1	3"ø 90° ELBOW
36	1	MULTIFUNCTION VALVE
37	1	1"ø ANGLE VALVE – BRONZE
38	2	POLYMER LINE INJECTOR (PREORDERED)
39	3	12" BUTTERFLY VALVE – WAFER STYLE (FILTER INLET)
40	1	8"ø CHECK VALVE

CONTROL CHAMBER GATE SCHEDULE

NAME	SIZE
WIER GATE	36"x36"
SLUICE GATE "A"	30"x30"
SLUICE GATE "B"	24"x24"
SLUICE GATE "C"	18"x18"
SLUICE GATE "D"	24"x24"
SLUICE GATE "E"	21"x21"
SLUICE GATE "F"	36"x36"

Record drawing

Date.....19.....

Approved.....P.Eng

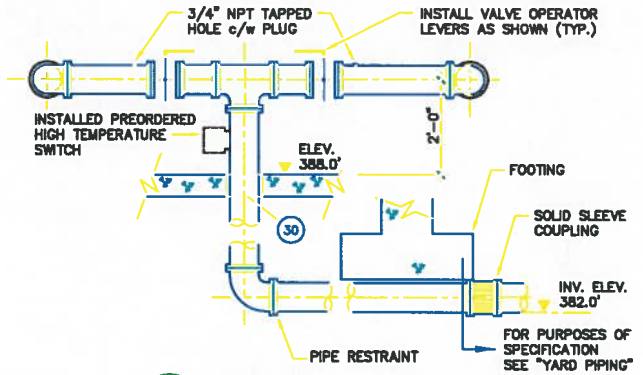
DATE:	REVISION	APPROVED
30/08/95	RECORD DRAWING	S.G.
29/10/94	ISSUED FOR CONSTRUCTION	K.M.
20/09/94	ISSUED FOR TENDER	J. deC.
12/09/94	ISSUED FOR APPROVAL	J. deC.

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

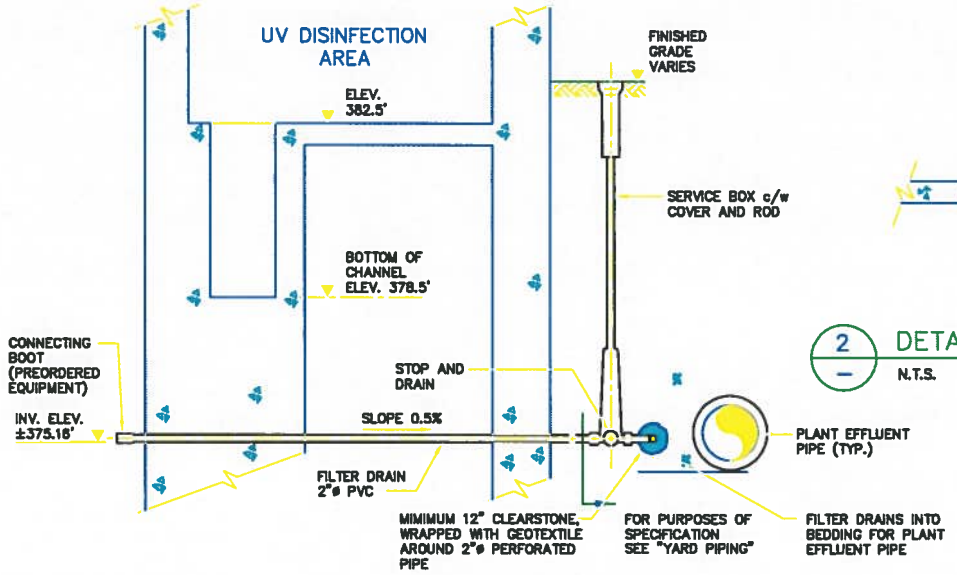
CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA
POLLUTION ABATEMENT PROJECT
STP–CONTROL BUILDING
PROCESS PIPING AND SECTIONS

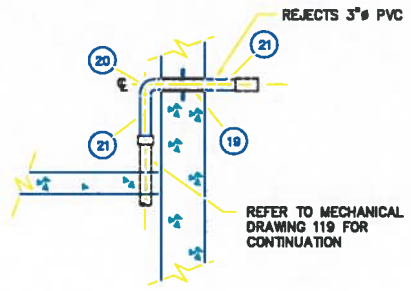
DRAWN: MRH | SIGNED:
SCALE: AS NOTED | DWG. No. 944101-117
DATE: 94.09.20



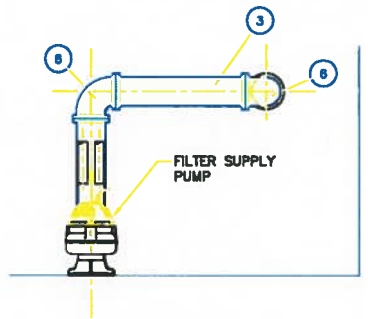
A/117 SECTION – BLOWER DISCHARGE
N.T.S.



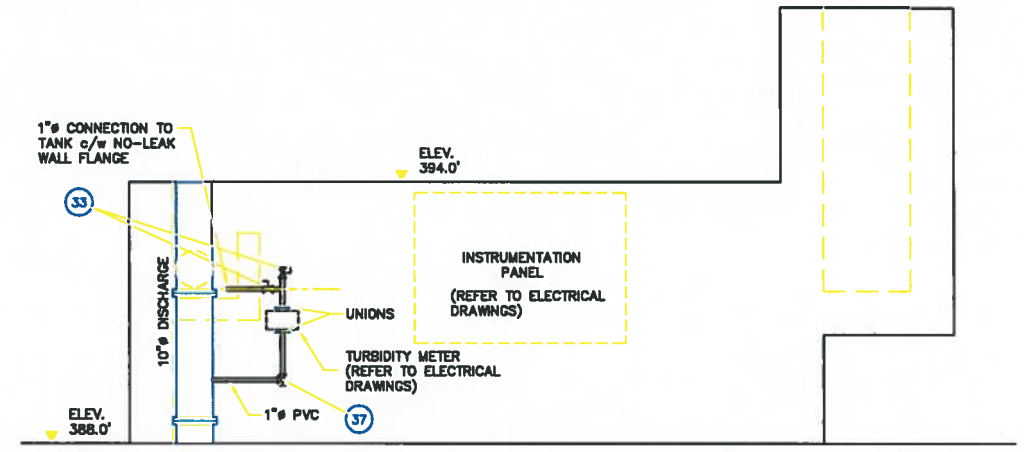
1/– DETAIL–FILTER DRAIN LINE (TYP.)
N.T.S.



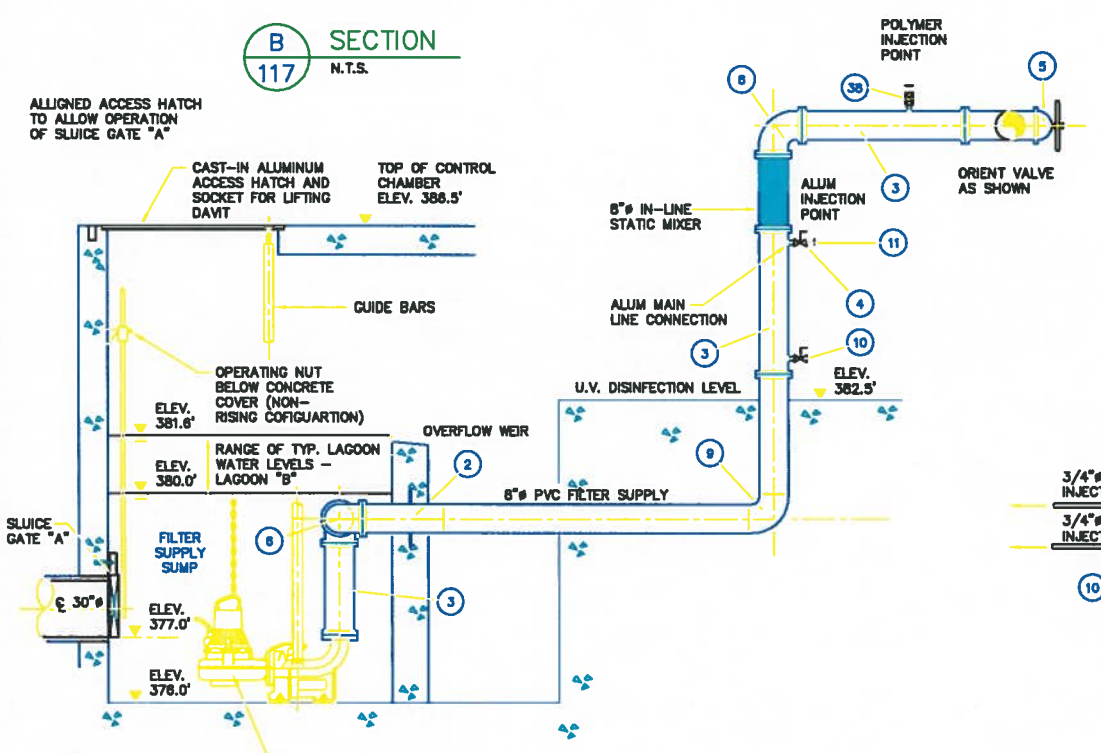
2/– DETAIL–TYPICAL CONNECTION (REJECTS FROM SAND FILTER)
N.T.S.



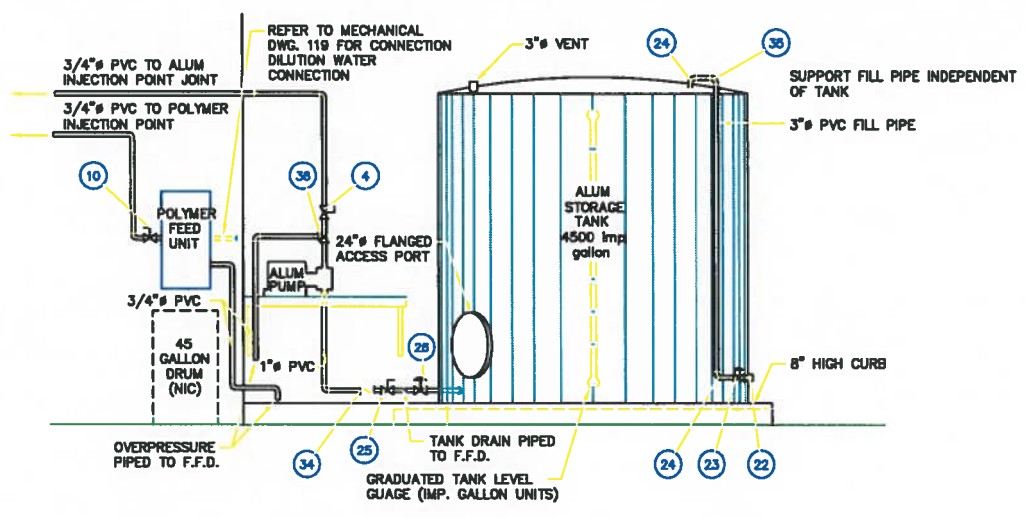
B/117 SECTION
N.T.S.



D/117 SECTION
N.T.S.



C/117 SECTION
N.T.S.



E/117 SECTION
N.T.S.

Record drawing

Date.....19.....

Approved.....P.Eng

30/06/95	RECORD DRAWING	S.G.
28/10/94	ISSUED FOR CONSTRUCTION	K.M.
20/09/94	ISSUED FOR TENDER	J. deC.
12/09/94	ISSUED FOR APPROVAL	J. deC.
DATE:	REVISION	APPROVED

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA
POLLUTION ABATEMENT PROJECT
STP–CONTROL BUILDING
PIPING DETAILS AND SECTIONS

DRAWN: MPH | SIGNED:
SCALE: N.T.S.
DATE: 94.09.20
DWG. No. 944101-118

Drawing File: D:\NOVA\944101\944101-118.dwg Date: 11/30/1995 08:53 AM

NORTH

E/F 2 C/W MOTORIZED B.D.D. & MOUNTING SLEEVE.

24"x 24" WEATHER HOOD

24"x 16" WEATHER HOOD

24"x 16" WEATHER HOOD

HB

3/4" COND. DRAIN

3/4" HOSE REEL AND HOSE.

INV. ELEV. OUT 385.5

HRV-2

1/2" DN. TO FILTER (TYP.) FILTER AND CONTROL PANEL BY OTHERS.

3" VENT UP THRU ROOF 45° OFFSET

12" HIGH, 14Ga. GALVANIZED STEEL BUMPER. ANCHOR TO WALL WITH TOP 24" A.F.F. (3 REQ'D.)

3" VENT UP

6" CAPPED LINE FOR FUTURE. INV. ELEV. 18" B.F.F.

6" H.D.

6" H.D.

6" H.D.

FIN. FLOOR ELEV. 388'-0"

1500 24"x 24"

C.O. & DROP

3" R.D.

3/4" C.W. TO POLYMER UNIT BACKFLOW PREVENTOR

18"x 18"

SAFETY EYE WASH

3" F.F.D.

ALUM TANK

3/4"

1 1/2"

1 1/2" VENT UP

3" F.F.D.

3" R.D.

3" @ 1 1/2 %

4" R.W.L. DN. INTO CHANNEL

1/4" MESH SCREEN

BRACKET FILTER & REDUCING VALVE 3'-0" ABOVE FLOOR

AIR DRYER

32" x 16" DN. TO 8" A.F.F. C/W 1" ACOUSTIC LINER & 1/4" MESH SCREEN AT OUTLET

32"x16" DUCT LINED WITH 1" ACOUSTIC INSULATION.

TRANSITION PIECE LINED WITH 1" ACOUSTIC INSULATION.

WALL MOUNT HOUSING FOR FAN LINED WITH 1" ACOUSTIC INSULATION.

DUPLEX AIR COMPRESSOR & 250 GAL RECEIVER

32"x 32" WEATHER HOOD

HRV-1

6"ø FLEX

WALL CAP WITH 1/4" MESH SCREEN (TYP.)

D.H.W. TANK PRESSURE TANK

DAMPER MOTOR

32" x 32" WEATHER HOOD

FOR CONTINUATION OF PIPING SEE DWG. 108

FLOOR PLAN
SCALE: 1/4" = 1'-0"

1/2" C.W. SUPPLY

WALL MTD. URINAL TANK 3 GAL. CAPACITY FOR USE IN MECH. RM.

1 1/4" DIA. HEADER C/W CAPPED END.

1 1/4"

3/8"

3/8"

FIN. FLOOR

TRAP PRIMING LINES TO FLOOR DRAINS RUN IN TYPE 'K' COPPER

5 DETAIL—TRAP PRIMER PIPING
NTS

3/8"ø DRILLED CONCRETE ANCHORS AT 14" O/C ALL 4 SIDES

CAULKED ALL AROUND

24"x 24" WEATHER HOOD

SECURITY SCREEN BIRD SCREEN

INLET GUARD

6" x 12" ACCESS PORT

MOTORIZED B.D.D.

3/8"ø DRILLED CONCRETE ANCHORS AT ALL 4 CORNERS.

T.O. SLAB ELEV. 388'-0"

B SECTION
SCALE: 1/4" = 1'-0"

3/8"ø DRILLED CONCRETE ANCHORS AT 14" O/C ALL 4 SIDES

CAULKED ALL AROUND

32"x 32" WEATHER HOOD

SECURITY SCREEN BIRD SCREEN

BLOWER ROOM

A.P.

6" x 12" ACCESS PORT

MOTORIZED B.D.D.

3/8"ø DRILLED CONCRETE ANCHORS AT ALL 4 CORNERS. (4 REQ'D.)

T.O. SLAB ELEV. 388'-0"

A SECTION
SCALE: 1/4" = 1'-0"

750 30"x 15"

3/8"ø DRILLED CONCRETE ANCHORS AT ALL 4 CORNERS. (4 REQ'D.)

CAULKED ALL AROUND

24"x 16" WEATHER HOOD

SECURITY SCREEN BIRD SCREEN

3/8"ø DRILLED CONCRETE ANCHORS AT 12" O/C MAX. ALL 4 SIDES (8 REQ'D.)

16"x 24"

HRV-2

24"x 24"

CAULK AIRTIGHT THRU WALL

18"x 18"

18"x 18"

3/4"x DRAIN LINE

MITRE BEND C/W TURNING VANES (TYPICAL)

C SECTION
SCALE: 1/4" = 1'-0"

PRESSURE SWITCH

3/4"

PRESSURE GAUGE

PRESSURE TANK

P.T. RELIEF VALVE

D.H.W. TANK

VACUUM BREAKER

3/4"ø R.P. BACKFLOW PREVENTER C/W BALL VALVES

HOSE END DRAIN COCK

3/4"

3/4"

DRAIN LINE TO SPILL ONTO FLOOR

1"ø TO SUBMERSIBLE WELL PUMP

3/4"

1/2"(TYP.)

3/4"

1/2"

1 DETAIL—DOMESTIC WATER PIPING SCHEMATIC
NTS

SHUT-OFF VALVE 1/2"

AIR FILTER PRV QUICK DISCONNECT

DIRT POCKET

30"

FINISH FLOOR

4 DETAIL—COMPRESSED AIR PIPING SCHEMATIC
NTS

3"ø DISCHARGE FROM SAND FILTER

SAND FILTER WALL

6" HUB DRAIN WITH 18" HIGH STANDPIPE C/W MECH. JOINT 4" A.F.F.

6"ø WASTE @ 1% SLOPE

3 DETAIL—SAND FILTER DRAIN PIPING CONNECTION
NTS

3" VENT UP THRU ROOF

1½" DRAIN CONNECTION FROM HRV-1

2 DETAIL—SANITARY WASTE PIPING SCHEMATIC
NTS

Record drawing

Date.....19.....

Approved.....P.Eng

30/09/85	RECORD DRAWING	S.G.
28/10/84	ISSUED FOR CONSTRUCTION	K.M.
20/09/84	ISSUED FOR TENDER	J.deC.
11/09/84	ISSUED FOR APPROVAL	J.deC.
DATE	REVISION	APPROVED

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

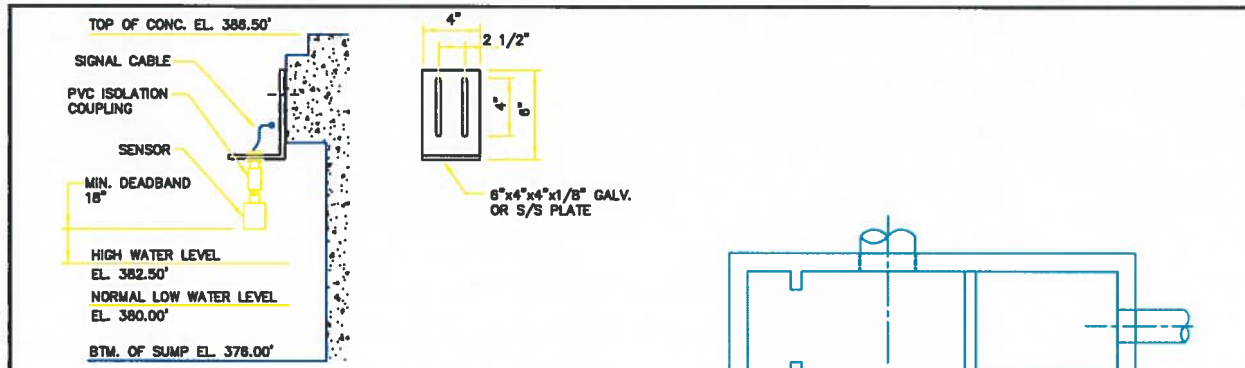
CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

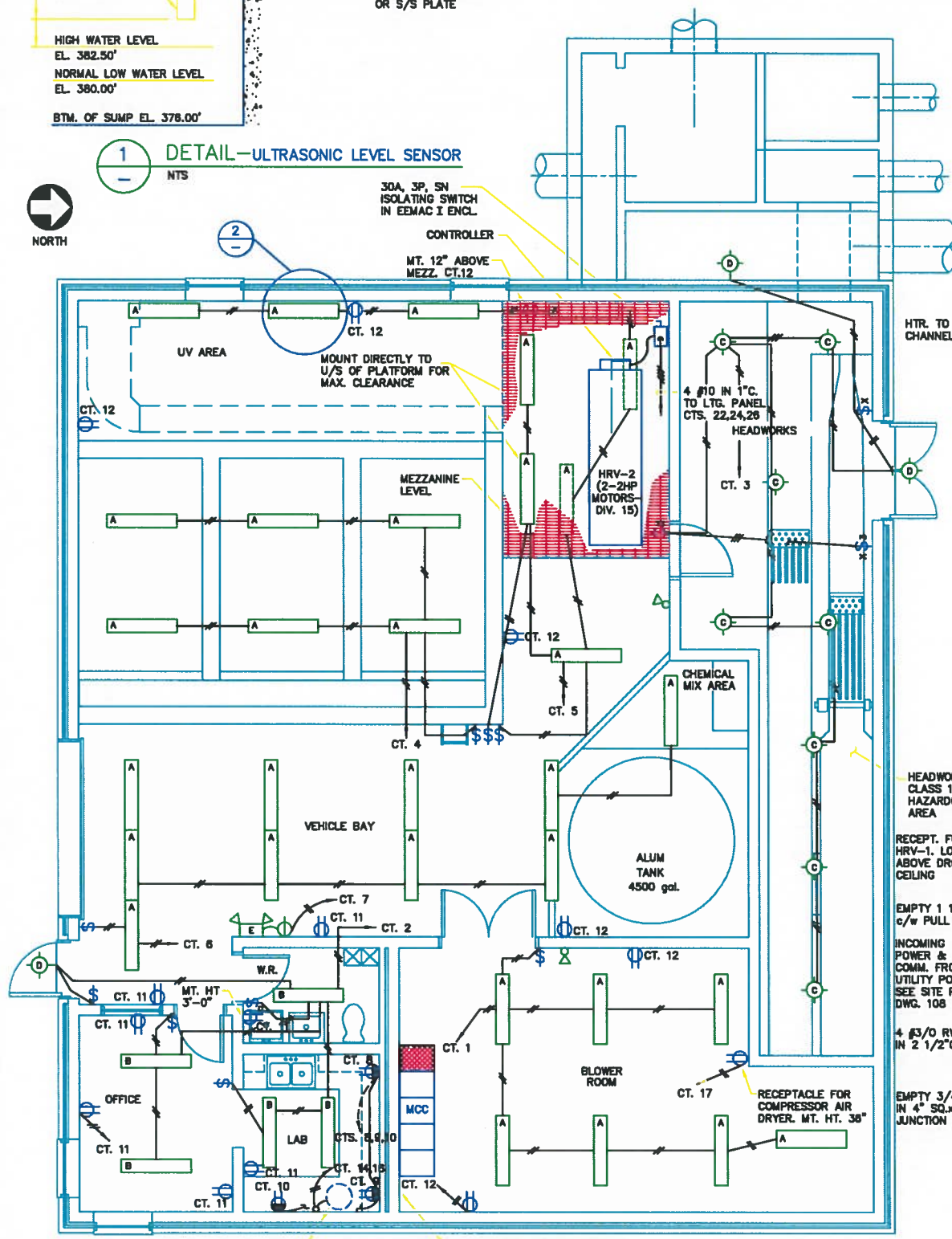
POLLUTION ABATEMENT PROJECT
STP—CONTROL BUILDING
MECHANICAL FLOOR PLAN, PIPING SCHEMATICS & DETAILS

DRAWN: DMM | SIGNED:
SCALE: AS NOTED | DWG. No. 944101-119
DATE: 84/9/20

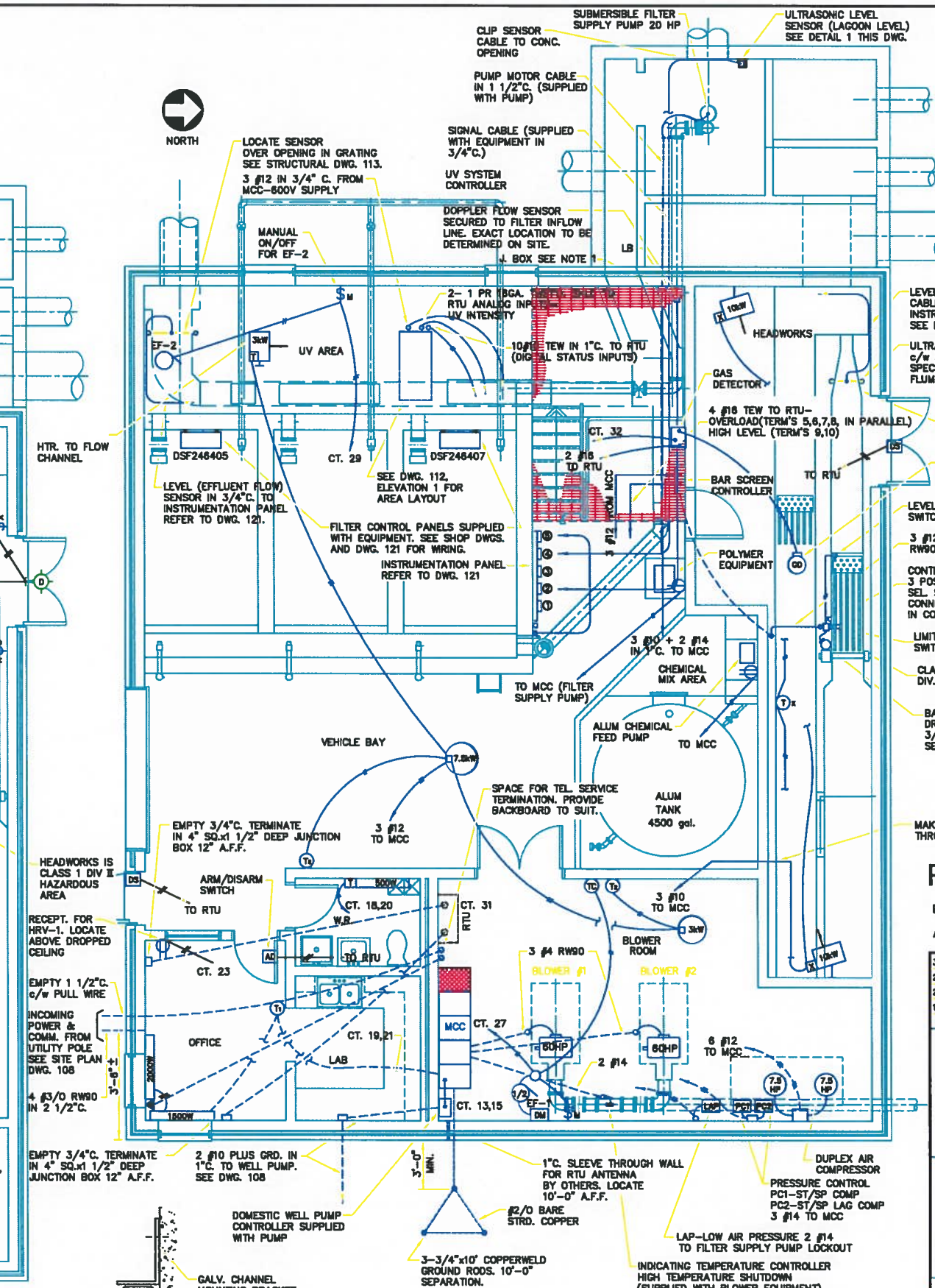
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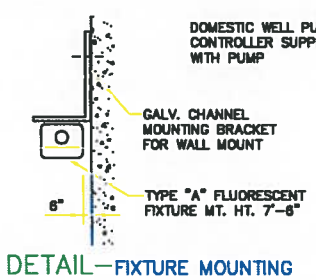


1 — DETAIL—ULTRASONIC LEVEL SENSOR
NTS



FLOOR PLAN—LIGHTING LAYOUT
SCALE: 1/4" = 1'-0"





2 — DETAIL—FIXTURE MOUNTING
NTS

FLOOR PLAN—POWER LAYOUT
SCALE: 1/4" = 1'-0"

NOTES:
1. 8"x8"x4" JUNCTION BOX c/w 6 PT. TERMINAL STRIP TO TERMINATE PUMP MOTOR CABLE.(POWER CONDUCTORS PLUS 2 FOR O/T/SEAL FAILURE DETECTION)
2. FOR LEGEND SEE DWG. 121.
3. LIMIT SWITCH, LEVEL SWITCH AND DRIVE MOTOR SUPPLIED WITH EQUIP. SEE MANUFACTURER'S SHOP DWGS.

Record drawing

Date.....19.....

Approved.....P.Eng

30/06/95	RECORD DRAWING	S.G.
28/10/94	ISSUED FOR CONSTRUCTION	K.M.
20/09/94	ISSUED FOR TENDER	J. deC
12/09/94	ISSUED FOR APPROVAL	J. deC
DATE:	REVISION	APPROVED

REGISTERED PROFESSIONAL ENGINEER — PROVINCE OF NOVA SCOTIA

ALDERNEY CONSULTANTS LIMITED
CONSULTING ENGINEERS
NOVA SCOTIA LAND SURVEYORS

CBCL Limited
Consulting Engineers

TOWN OF SPRINGHILL
CUMBERLAND COUNTY, NOVA SCOTIA

POLLUTION ABATEMENT PROJECT

STP—CONTROL BUILDING ELECTRICAL LAYOUT

DRAWN: J.D.L.	DESIGNED:
SCALE: AS NOTED	ORG. No.
DATE: 94/08/30	944101-120

Drawing File: G:\Jobs\944101\E120 Date: 6/22/1995 9:10 P.M.

SPRINGHILL S.T.P.
PROCESS FLOW SCHEMATIC

AERATED LAGOONS
4 CELLS OF EQUAL VOLUME
TOTAL WORKING VOLUME = 39,000,000 GAL.
MAX. WORKING VOLUME = 47,000,000 GAL.

MAX.	3090 GPM	
AVE.	820 GPM	

INFLUENT

MECHANICAL BAR SCREEN

GRIT CHAMBER

CELL 1 CELL 2 CELL 3 CELL 4

580 CFM 220 CFM 120 CFM 80 CFM

1000 CFM @ 9 Psi

BLOWER NO. 1

BLOWER NO. 2 (STANDBY)

COMPRESSOR NO. 1

COMPRESSOR NO. 2 (STANDBY)

AIR @ 80 Psi

MAX.	4,330,000 GPD	3010 GPM
MAX. HOURLY FLOW		6810 GPM
AVE.	1,080,000 GPD	750 GPM
AVE. (DRY)	940,000 GPD	650 GPM

PLANT BYPASS

MAX.	80 GPM	
AVE.	70 GPM	

MAX.	4,330,000 GPD	3010 GPM
AVE.	1,080,000 GPD	750 GPM

MAX.	750 GPM	
AVE.	650 GPM	

SAND FILTER

POLYMER

ALUM

FILTER SUPPLY PUMPS

NO. 1

NO. 2 (STANDBY)

UV DISINFECTION

MAX.	1580 GPM	
AVE.	650 GPM	

MAX.	1,200,000 GPD	830 GPM
AVE.	1,040,000 GPD	720 GPM

DISINFECTION BYPASS

PEAK SEASON BYPASS

NOTE: ALL VOLUMES EXPRESSED IN US-GALLONS OR NCFM.