Master Site Development Plan

Roe Gravel Pit

SE 12-27-27 W4M (Title # 891 070 572)

BURNCO Rock Products Ltd.

October 2022 v5

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1.0 Introduction

BURNCO Rock Products Ltd. (BURNCO) is a family-owned Alberta based company that has been in operation since 1912. Today, BURNCO is a fourth-generation construction materials company with over sixty locations in Alberta, British Columbia, Saskatchewan, Colorado, and Texas. BURNCO produces high quality aggregates, paving asphalt, and ready-mix concrete.

BURNCO takes great pride in its sites and works every day to ensure they are having the least possible impact on neighbors and the community while continuing to supply the aggregates needed for local projects.

Sites currently operated in Rocky View County include:

- Irricana Gravel Pit 304 hectares (751 acres)
- Burma Gravel Pit 194 hectares (480 acres)
- Springbank Gravel Pit 246 hectares (608 acres)
- Indus Gravel Pit 553 hectares (1,368 acres)
- West Cochrane Gravel Pit 61 hectares (151 acres)

These sites have been successfully operated for many years. In that time, BURNCO has learned effective strategies for impact assessment and control. This includes a commitment to meaningful noise, dust, and traffic control measures. These measures include screening berms, enclosed equipment, road upgrades, and a willingness to engage with neighbors and stakeholders. BURNCO has had great success with such measures and holds all projects to a high standard of performance.

1.1 Roe Gravel Pit

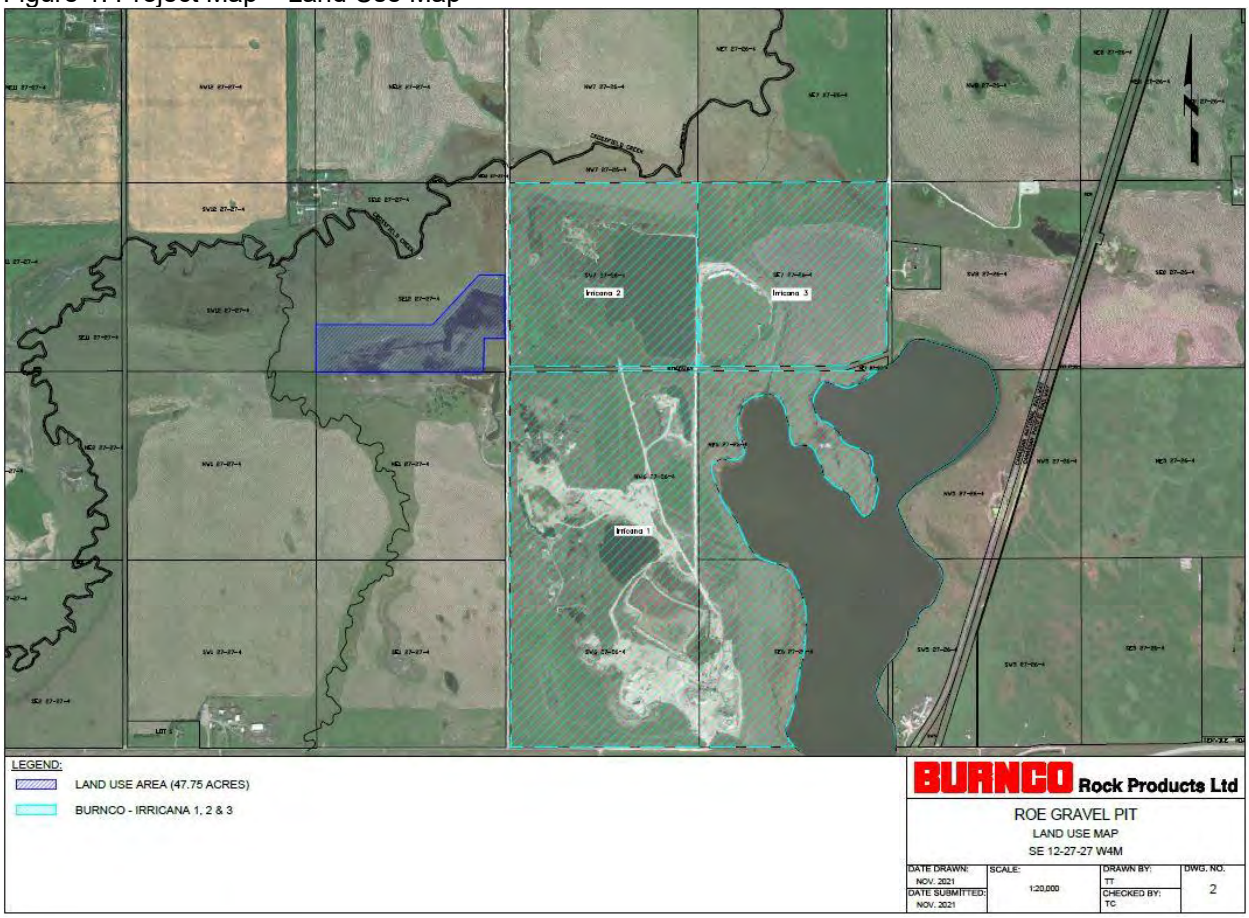
BURNCO currently operates a complex of gravel pits located southwest of the Town of Irricana, Alberta. Irricana 1 is located in SEC 06-27-26 W4M. Irricana 2 (Luft) is located in SW 7-27-26 W4M. Irricana 3 (Poffenroth) is located in SE 7-27-26 W4M. Combined, this site is 304 hectares (751 acres) in size. While Irricana 2 and Irricana 3 are depleted and reclaimed, Irricana 1 contains an estimated 2,100,000 tonnes of aggregates and is selling roughly 400,000 tonnes of material annually. Operations include earthmoving, aggregate crushing, aggregate washing, and loading trucks. BURNCO's Irricana site has been operating since the 1980's and with reserves depleting, a supplemental source of material is required for the continued operation of the site.

BURNCO is proposing to increase the volume of available material by assuming operation of the Roe Gravel pit which is located in the SE 12-27-27 W4M. The size of this location is 19.32 hectares (47.75 acres) and will serve to supply BURNCO's existing Irricana 1 Gravel Pit with an estimated 1,200,000 tonnes of aggregate through the expansion of permitted reserves. The site is expected to operate for 5 to 10 years. The site is currently permitted as a Rocky View County gravel pit and has an Alberta Environment & Parks (AEP) Registration # 00015044-01-00.

The project would include the following parcel:

- Proposed: SE 12-27-27 W4M (Title # 891 070 572)

Figure 1: Project Map – Land Use Map



Aggregate from this site will be used to supply local projects in Rocky View County and in the Town of Irricana. Washing capacity at the existing site allows BURNCO to supply premium aggregates to its network of asphalt and concrete plants in the Greater Calgary Area.

This document provides a summary of the development, operation, and closure plans for this project. It is BURNCO's belief that by following the Project Activities Plan for the proposed development, that BURNCO's Roe Gravel Pit can operate in a socially and environmentally responsible manner for many years to come.

1.2 Location and Ownership

The lands are located in Rocky View County and are southwest of the Town of Irricana. The total proposed area is 19.32 hectares (47.75 acres). The property is privately held and BURNCO has entered into a lease agreement with the owner for gravel mining

Table 1: Land Ownership and Occupancy

Location Municipal Address or 1/4-Sec-Twp-Rge-Mer	Registered Owners Name, Address and Phone Number	Occupants Name, Address and Phone Number
SE 12-27-27 W4M (Title # 891 070 572)	Hazel George 270 141 Township Road 272 Rocky View County, Alberta T4A 2V3 (403) 935-4883	Current Gravel Pit Tenant: Rocky View County Farming: Hazel George 270 141 Township Road 272 Rocky View County, Alberta T4A 2V3 (403) 935-4883

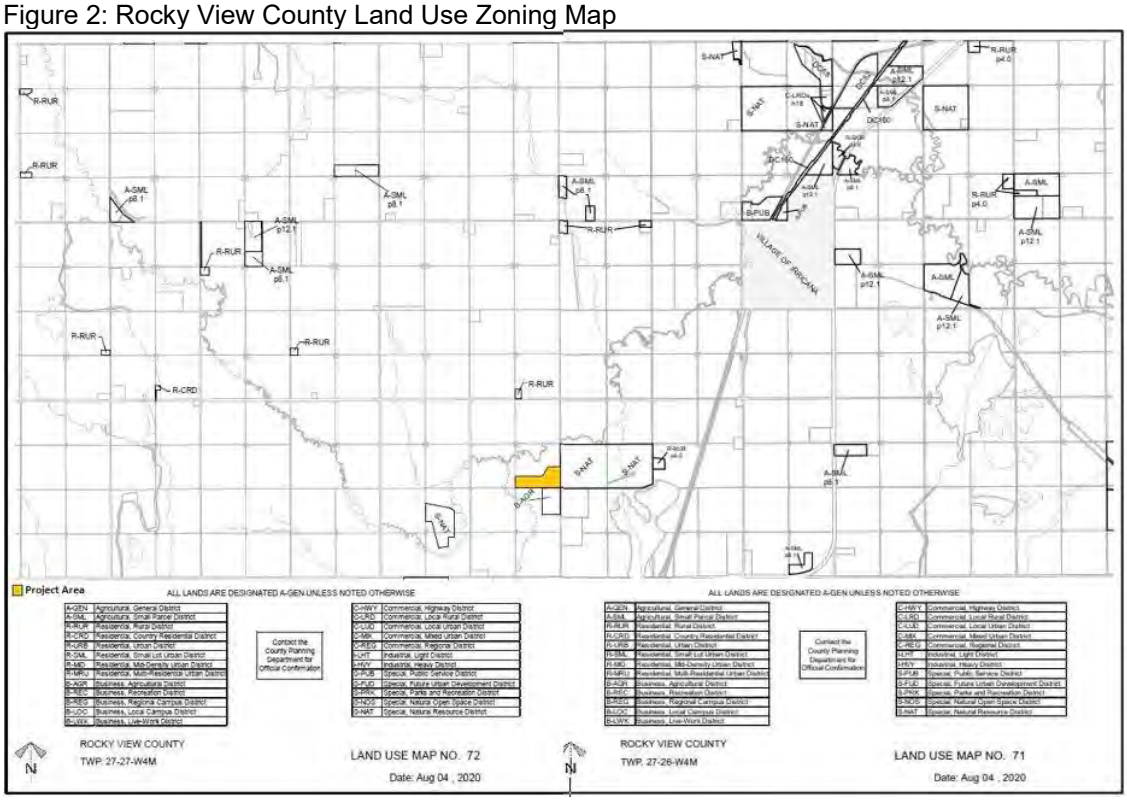
1.3 Current Land Use

The land in the proposed area is registered as A-GEN (Agricultural – General District). Currently, there is a gravel pit operated by Rocky View County. With surface materials depleted, and with no ability to recover additional materials, the site had been undergoing reclamation. BURNCO's intention is to now assume operation of this site and seek permitting for the recovery of the gravel reserves located within the water table. While these materials were not suitable for regular gravel production, they will be acceptable as feedstock for BURNCO's nearby wash plant.

1.4 Adjacent Lands

Lands to the east of the project are zoned as Special, Natural Resource District (S-NAT) and contain active and reclaimed gravel pits, which were operated by BURNCO. The reclaimed properties are owned by Rocky Ridge Farms and Murray Poffenroth, while the operation gravel pit lands are owned by BURNSWEST Properties Ltd and leased to BURNCO. The property to the south is owned by Rocky Ridge Farms and is currently zoned as Business, Agricultural District (B-AGR). This property has an unreclaimed gravel pit located on it. The properties to the north and west are primarily farmland, which support both cultivated and pasture operations. There is also a gravel pit to the southwest, which is known as the Senger Pit. It is operated by AECON Transportation West Ltd.

Figure 2: Rocky View County Land Use Zoning Map



2.0 Site Analysis

In support of the Project, Millennium EMS Solutions Ltd. (MEMS) was retained to complete an Environmental Screening Report (ESR) for the Project. A complete copy of the ESR can be found in Appendix 3. The purpose of this report was to evaluate the biophysical resources at the site. An overview of the results can be found in Sections 2.1 – 2.5:

2.1 Soil

According to the Agricultural Region of Alberta Soil Inventory Database (AGRASID) the landscape model for the Site is described as having rego humic gleysol on fine textured (C, SiC) materials (not till) over medium textured (L, CL) till (BZC). Soils are coarser textured than the dominant or co-dominant soils and Solonetzic soils. The Site resides in a valley with floodplain, low relief landform with slopes ranging from 1-5% on the floodplain and up to 15% on the side slopes.

The average topsoil and subsoil thicknesses within the Site is 10 cm and 11 cm, respectively
(BURNCO, 2022)

2.2 Geology

The surficial deposits are the sediments above the bedrock surface and include sand and gravel pockets. The Site has pre-glacial fluvial deposits that are approximately 5 to 10 m in depth that overly the Lacombe Member of the Paskapoo Formation (Hydrogeological Consultants Ltd, 2002). Geological maps of the area indicate the Site belongs in the Palogene (± Neogene) Paskapoo Formation that consist of recessively weather, grey to greenish-grey mudstone and siltstone with subordinate (although generally exposed pale),

thick- to thin-bedded, commonly cross-stratified sandstone, minor conglomerate, mollusc coquina, and coal; nonmarine (Prior et al., 2013).

2.3 Vegetation and Wildlife

The Foothills Fescue Natural Subregion is characterized by Creeping juniper, Parry oatgrass, bluebunch fescue, and June grass (dry, steep slopes). Addition of mountain rough fescue with increased soil moisture.

The Alberta Conservation Information Management System (ACIMS) has a database of vascular and non-vascular plants and invertebrate species of special conservation concern. A search of the database on September 8, 2022, showed no elements of concern, protected areas, nor crown reservations in the section 12-27-27 W4M (AEP 2018); however, it should be noted that information can be incomplete, and species of special concern may exist in the Site limits. The search results are included in Appendix B.

The Site was previously permitted as a RVC gravel pit. During that time, the Site's sand and gravel material lying above the water table was removed by RVC. Prior to resource removal the Site was stripped of vegetation as part of the operational plan. Based on the lack of rare vegetation species, it is anticipated that there will be no negative impacts to the Site or the surrounding areas.

The Site is monitored for any prohibited and/or Noxious weeds. If any weeds are identified during the inspection, they are removed and destroyed as per the Weed Control Act.

No Prohibited or Noxious weeds are currently onsite.

A search of the Fish and Wildlife Internet Mapping Tool (FWIMT) was completed to determine any records for wildlife, specifically for critical wildlife habitat, species at risk, and migratory birds. Based on this information, the records of wildlife species within a 2 km radius of the Site are listed below in Table 4).

Table 4 (of MEMS report): Critical Wildlife

Common Name	***Scientific Name***	***Alberta Ranking 2020***	***SARA Schedule 1 Listing***
Burrowing Owl	*Athene cunicularia*	*Threatened*	*Endangered*
Great Blue Heron	*Ardea herodias*	*Sensitive*	*Special Concern*
Brooke Stickleback	*Culaea inconstans*	*NA*	*NA*
Fathead Minnow	*Pimephales promelas*	*Secure*	*NA*

If initial stripping is to be done between April to September, then a wildlife sweep will be conducted for the Burrowing Owl.

2.4 Wetlands and Water Bodies

Through a review of the Alberta Merged Wetlands Inventory Map and field assessment there are confirmed no wetlands identified within the boundaries of the Site. A tributary of Crossfield Creek is a minimum of 120 m west of the Site boundary. Crossfield Creek is a minimum of 260 m to the north of the Site boundary. Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

The Site was previously permitted as a RVC gravel pit. During that time, the Site's sand and gravel material lying above the water table was removed by RVC. Prior to resource removal the Site was stripped of vegetation as part of the operational plan. Based on the confirmation of no wetlands being identified, it is anticipated that there will be no negative impacts to the Site or from the Site to watercourses in the area.

2.5 Environmental Screening Report Conclusion

It is MEMS' understanding that the Site's aggregate will be mined from within the groundwater table based on previous site testing and then transported to BURNCO's adjacent Irricana Pit for processing (crushing, washing, etc.).

Based on the lack of findings to support the potential for negative impacts to the Site and the surrounding area as it relates to rare vegetation, air quality, surface drainage, soils, wildlife, wetlands and groundwater, combined with the recommendation of nest sweeping for Burrowing Owls, a Biophysical Impact Assessment is not recommended at this time.

Policy #1
A Biophysical Impact Assessment (BIA) is not required to be submitted unless deemed necessary by Alberta Environment and Parks, and in accordance with the approved Environmental Screening Report (ESR).

2.6 Resource

The site has recently been tested by auger drill to determine the depth, extent, and quality of aggregate. Ten test holes/pits were logged across the site for use in assessing topsoil, subsoil, overburden, and gravel depths. The site contains an estimated 1,200,000 tonnes of aggregate.

- SE 12-27-27 W4M (Title # 891 070 572)
    - Topsoil: 10 cm Subsoil: 11 cm
    - Overburden (OB): 0.15 m Gravel: 5.1 m

2.7 Stormwater

In support of the Project, Millennium EMS Solutions Ltd. (MEMS) was retained to complete a Stormwater Management Plan (SMP) for the Project. A complete copy of the SMP plan can be found in Appendix 4. An overview of the results is as follows:

The Site area is relatively flat with no permanent water features such as mapped water bodies, rivers, creeks, intermittent drainage, or wetlands. The only two water features are relic water ponds from previous gravel mining and are currently used as dugouts for livestock. The drainage slope within the Site drains north and east based on the Contour Topographic figures (Appendix A).

The primary drainage destination is to Crossfield Creek to the north side of the Site, and the drainage ditch located to the east of the Site running along Range Road 270.

2.8 Groundwater

In support of the Project, Millennium EMS Solutions Ltd. (MEMS) was retained to complete a Desktop Groundwater Assessment and Field Verified Groundwater Well Survey (DGA) for the Project. A complete copy of the DGA plan can be found in Appendix 5. The objectives of this evaluation were to describe the hydrology and groundwater resources within the Project area and to evaluate the potential effects on groundwater that may be caused by the Project. An overview of the results is as follows:

Information from the Alberta Environment and Parks (AEP) Water Well Database indicate that there are five water wells located within a 1.6 km radius of the Site. Of the five water well records, three were for water wells for domestic purposes, one agricultural and one for monitoring. These records are summarized in Table 2 in Section 4.2 below.

There was sufficient information to determine that the George Water Well (WW) (Well ID #1305228) is completed in a bedrock aquifer. The information available for the Luft WW (Well ID #251329) indicates the water well is likely completed in a bedrock aquifer while there is insufficient information to determine the completion interval of Well ID #251403. The record for Well ID #161222, also owned by Hazel George, was confirmed that it doesn't exist.

The AEP Authorization Viewer database indicates that there are four authorized groundwater approvals which are provided in Table 1 below.

Table 1 (of MEMS report) AEP Authorization Viewer

Approval Number	Approval Holder	Location	Use
73598-00-00	GEORGE, HAZEL M.	SE 12-027-27 W4	Domestic
156397-00-00	Rocky Ridge Farms Ltd.	SW 01-027-27 W4	N/A
29252-00-01	BURNCO Rock Products Ltd.	SW 06-027-26 W4M	Industrial - Washing
157385-00-00	BURNCO Rock Products Ltd.	SW 07-027-26 W4M	End Pit Lake

Through a review of the Alberta Merged Wetlands Inventory Map and field assessment there are no confirmed wetlands identified within the boundaries of the Site. The Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

In order to conduct the current investigation, background data was collected from (but not limited to) the following sources in order to assess the local and regional geologic and hydrogeological setting in relation to the Site.

- AEP Water Well Information Database (AEP, 2022) – Groundwater records were obtained from the database and used to help prepare geological and hydrogeological interpretations and the field verified well survey.
- AEP Authorization Viewer/Database – A list of licensed, registered, and authorized groundwater diversions under the Water Act was obtained from AEP on September 10, 2022 to help identify other nearby groundwater users.
- Alberta Geological Survey (AGS) – Regional geological and hydrogeological reports and maps.
- Test data provided by BURNCO.

Using all water well records available in the AEP Water Well Information Database as a starting point, MEMS conducted a field-verified water well survey within 1.6 km of the Site on September 2, 2022. When contact was made with a landowner, an attempt was made to confirm the data available from the AEP Water Well Information Database. This included measuring the water level in the water well if it were practical, obtain coordinates for water wells using a GPS unit, and obtain any other information regarding the well that the landowner was prepared to provide. If a water well was identified that was not apart of the AEP Water Well Information Database, then as much information as possible was obtained for the water well and it was added to the list of wells within the study area.

3.0 Development / Operating Plan

3.1 Overview

The Roe Gravel Pit will serve as a satellite pit for BURNCO's Irricana 1 gravel pit in SEC 06-27-26 W4M There will be no material processing at the Roe Gravel Pit. Materials will be excavated and then hauled to BURNCO's adjacent site. Major activities at the Roe Gravel Pit will include:

- earthworks
- loading and scaling

Earthworks

To extract the gravel (pit-run), topsoil and subsoil must be salvaged to expose the gravel beneath. This work is accomplished with heavy machinery such as scrapers, track hoes, articulating trucks, bulldozers, graders. This process is expected to continue as required through all phases of the proposed project.

Policy #2
Before commencing operations, BURNCO will secure a Development Permit for each mining phase of the development.

Policy #3
If initial stripping occurs between April 1st and September 30th, a wildlife sweep will be conducted for the Burrowing Owl.

Loading and Scaling

Once aggregate materials have been removed from the ground water table, the final step is to load these materials into trucks for transport to BURNCO's Irricana 1 Site. This work is accomplished with a loader. While the aggregate materials are being loaded, they will be also be scaled using a loader scale. Trucks will then be weighed at a portable commercial truck scale and portable scale house that are located on BURNCO's existing Irricana 1 site at SEC 06-27-27 W4M. This process is expected to continue as required through all phases of the proposed project.

It is expected that ~200,000 tonnes of aggregate material will be removed annually from the site and transported to BURNCO's existing Irricana 1 site. This annual volume will be dependent on market conditions and will not affect the volumes being sold annually from Irricana 1 site.

Aggregate from this site will be used to supply local projects in Rocky View County and in the Town of Irricana. Washing capacity at the existing site allows BURNCO to supply premium aggregates to its network of asphalt and concrete plants in the Greater Calgary Area.

Policy #4
Upon successful MSDP adoption and re-designation of the project area, BURNCO will assume the Registration from AEP under the Code of Practice for Pits from Rocky View County.

3.2 Hours of Operation

BURNCO's existing Irricana 1 gravel pit is currently operated Monday through Sunday, with no restrictions on operations.

For the proposed satellite site, BURNCO is proposing the following operating hours.

- Hours for Operating:
  - 7:00 am to 7:00 pm; Monday through Saturday
  - No activities on Sundays or Statutory Holidays

- Hours for Hauling:
  - 7:00 am to 7:00 pm Monday through Saturday
  - No activities on Sundays or Statutory Holidays

Policy #5
BURNCO will follow the hours of operation as determined by Rocky View County as part of the Development Permit process.

3.3 Development Phasing

As there is an existing operation in SEC 06-27-27 W4M, the majority of infrastructure necessary for the operation of a satellite gravel pit on these lands is already in place. This includes items such as a scale, water licenses to source water, and screening berms. A designated haul route along Ranged Road 270 will be required to facilitate the operation of this site. The key development strategies associated with that phasing plan are as follows:

Policy #6
BURNCO will follow the development phasing plan as illustrated in the MSDP.

Policy #7
BURNCO will limit the maximum disturbance area to 40 acres at any single time.

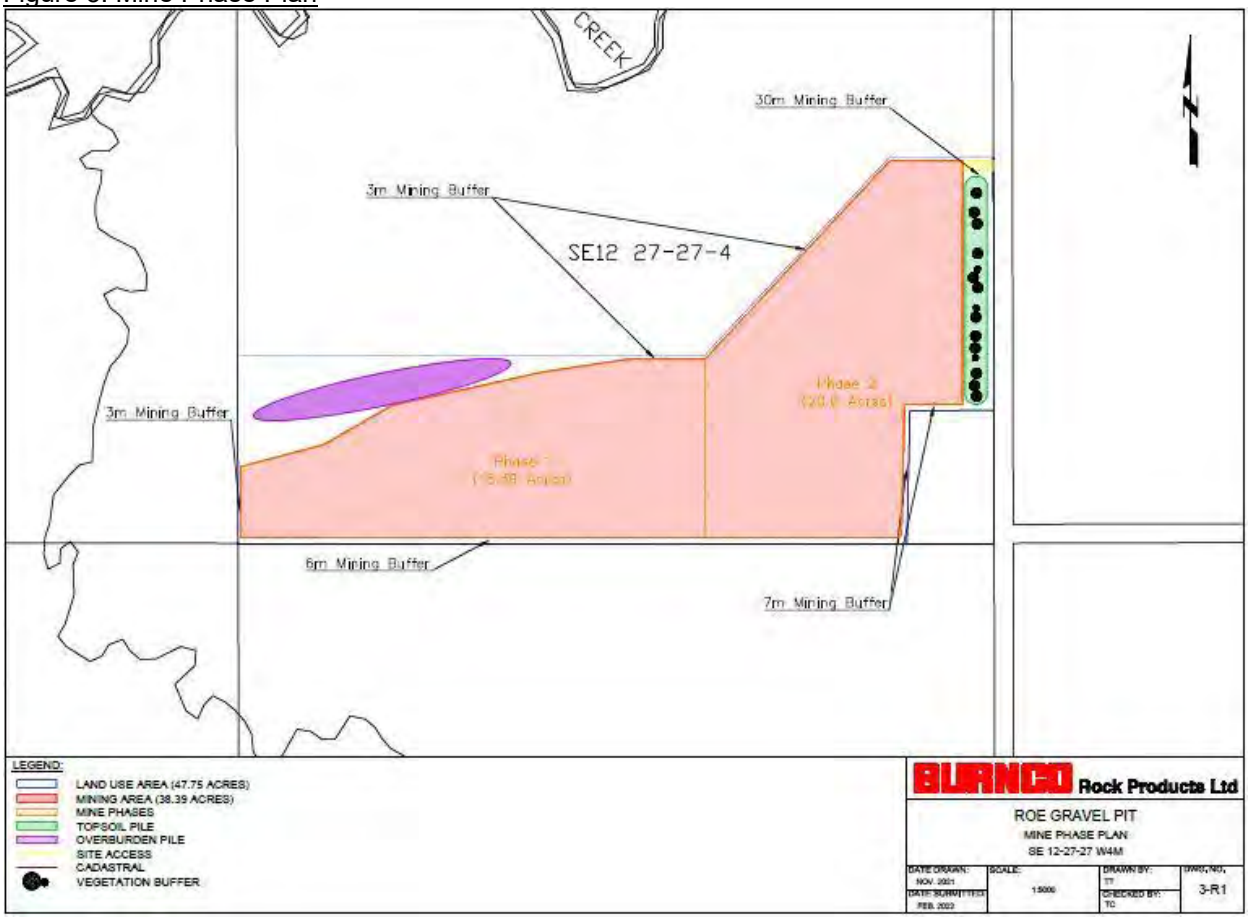
Phase 1:

- Screening berm to the east of the development will be constructed from soil stripped from mining phase 1,
- The screening berm will provide impact mitigation for traffic and provide security for the operation,
- Screening berm to the north of the project will be constructed from overburden stripped from mining phase 1,
- Haul route to BURNCO's existing site via Range Road 270 and Township Road 270.

Phase 2:

- Screening berm to the north of the project will be further enhanced from soil stripped from mining phase 2,
- Grading of phase 1 slopes will be done by utilizing overburden stripped from mining phase 2,
- Haul route to remain unchanged (Range Road 270 to Township Road 270,
- Once aggregate extraction from mining phase 2 is complete, grading of the phase 2 slopes will be done by utilizing overburden and topsoil from the north screening berm,
- The screening berm along Range Road 270 will be left in place.

Figure 3: Mine Phase Plan

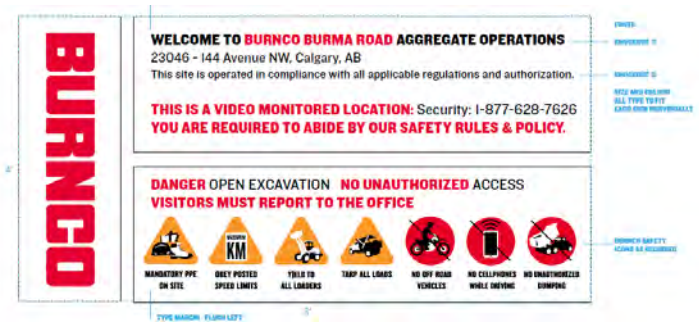


3.4 Site Securement, Signage, Buffers

Project lands will be secured on all property boundaries with farm fencing. All access points to the project lands such as farm approaches will be gated.

Upon issuance of a development permit for these lands, “Danger No Trespassing” signs will be posted every 200 meters along all property boundaries to inform the general public about the presence of open excavations and provide basic site information.

The primary access point to the project will have lockable steel gates comprised of two 16-foot gates hung on large steel corner posts. Signage will also be provided to identify the site and provide key information. Signs will be 4 feet by 8 feet and mounted on one or both sides of the approach.



There will be a minimum three-meter buffer to adjacent property boundaries and a minimum thirty-meter buffer to road allowances.

Policy #8
BURNCO will install site signage. This will include perimeter signage to discourage trespassing as well as entrance signage as necessary to identify the site and provide key information to the public.

Policy #9
Site signage shall include a 24-hour phone number for neighbors to call in the event of questions or concerns.

3.5 Noise Assessment and Control

BURNCO intends to minimize the noise of the operation through the following measures:

- The loader back-up alarm systems will be maintained at the minimum dBA levels allowable under Alberta Occupational Health and Safety guidelines. When the equipment is operating during darkness, the noise alarm system is turned off and a strobe light warning system is turned on as an alternative to the warning sounds,
- Access roads will be graded and regularly maintained to reduce traffic noise,
- Use of engine retarder brakes will not be allowed when trucks are in the operational area,
- Strategically place product piles to shield the neighboring areas from the operating equipment,
- Construction of screening berms in strategic locations as detailed in Section 3.3.

In support of the Project, ACI Acoustical Consultants Inc. (ACI) was retained to complete a Noise Quality Impact Memo for the Project. A complete copy of the ACI memo can be found in Appendix 6. The purpose of this memo was to assess the noise contributions and operations associated with the Project and to determine if there would be a significant change in the noise climate of the area surrounding the Project. An overview of the results is as follows:

> *The Project is located at SE 12-27-27-W4M in Rocky View County as indicated in Figure 1. This places the Project approximately 5 km southwest of Irricana, Alberta. The land uses surrounding the Project include the existing BURNCO Irricana Gravel Pit to the east, pasture fields to the north and west and cultivated fields to the south. In addition to the Irricana Pit, Range Road 270 is directly east of the Project which is a previous haul route for historic gravel pits in the area.*
>
> *Excluding the landowner of the of the Project, the nearest occupied residence is 1,600 m southwest of the southern boundary of the Project.*
>
> *Topographically the land in the area is relatively flat with no significant hills or berms. In areas where there are no facilities the vegetation is composed primarily of field grasses. Periodically, there are sparse trees and bushes within the area. Given this and the relative distance to the nearest residence, the vegetative sound absorption is considered moderate.*
>
> *The Project will be divided into two (2) mining phases, as indicated in Figure 2. This site will be operated as a feeder site for the existing BURNCO Irricana Pit and thus, there will not be any processing/washing/crushing onsite. There will be two types of operational activities. One includes the earthworks that are required to establish, maintain and reclaim the site. The second includes mining, loading, and hauling activities.*
>
> *Based on the relative distance to the nearest impact residential receptor and the operational activities of the Project, it is not anticipated that the Project will have a significant impact on the noise climate of the residents to the southwest. Therefore, a full noise impact assessment is not required at this time.*

Additionally, permanent noise monitoring is not recommended for this site. Instead, it is recommended that noise monitoring be conducted on a case-by-case basis. This is consistent with BURNCO's Environmental Monitoring & Complaint Resolution plan.

BURNCO is also committed to monitoring the site as necessary to ensure noise does not become an adverse effect for the area. As required, BURNCO will utilize enhanced mitigation measures.

Such enhanced mitigations include:

- Additional noise control,
- Reducing site activities during periods of excessive noise,

With these options in place, BURNCO is confident that noise will not become a nuisance as a result of this development.

Policy #10
BURNCO will follow the noise control measures detailed in the MSDP. In addition, noise impacts will be managed in accordance with the submitted Noise Quality Impact Memo.

3.6 Air Quality Assessment and Control

BURNCO has implemented the following measures to reduce dust generated from the operations:

- Maintaining and cleaning equipment regularly.
- Operations to be focused on minimizing "double handling" soil materials.
- Reducing speeds on roadways - a strict maximum speed limit of 30km/hr speed limit will be enforced on site to reduce road dust.
- Watering down traffic lanes during dry periods with the use of a water truck pre-loaded with water from BURNCO's Irricana Pit, frequency to be adjusted as needed.
- If watering down traffic lanes is insufficient, the following stepped approach of increased measures will be implemented:
- Increasing the frequency of watering down traffic lanes; and
  using chloride additives, crushed limestones or a proven manufactured product spread along the road in addition to watering.
- Reduce wind erosion from stockpiles by contouring of topsoil and overburden stockpiles at the 3H:1V and leaving the top of the piles in a flat-topped oval shape to maximize stability.
- The topsoil and overburden stockpiles are to be seeded immediately following development.
- Monitoring of stockpiled soils and reclaimed areas will be conducted to ensure mitigative measures are effective.
- Reclamation will be completed progressively upon exhaustion of the aggregate resource within a mining phase or at such a time where the aggregate resource is no longer required.
- Reducing site activities during periods of poor air quality.

In support of the Project, Millennium EMS Solutions Ltd. (MEMS) was retained to complete an Air Quality Impact Memo for the Project. A complete copy of the MEMS memo can be found in

Appendix 7. The purpose of this memo was to identify the potential effects and changes to ambient air quality due to the Project. An overview of the results is as follows:

> *Based on the operational activities of the Project and on previous dispersion modelling assessments of similar projects, it is not anticipated that the Project will have a significant impact on regional air quality. The main project influence will be site generated dust, but BURNCO expects the potential impacts to be mitigated by the industrial best practices described above.*
>
> *It is also anticipated that air quality impacts from the Project will decrease rapidly with increasing distance from the Project. Therefore, further air quality impact assessment is not required at this time. Additionally, permanent air quality monitoring is not recommended for this site. Instead, it is recommended that air quality monitoring be conducted on a case-by-case basis, which is consistent with BURNCO's Environmental Monitoring & Complaint Resolution plan. BURNCO has also committed to the implementation of permanent air quality monitoring if its case-by-case monitoring indicates that is it necessary.*

BURNCO is also committed to monitoring the site as necessary to ensure air quality for the area is not adversely affected. As required to meet Alberta Ambient Air Quality Objectives, BURNCO will utilize enhanced mitigation measures.

Such enhanced mitigations include:

- Additional dust control (sprinklers, more frequent water truck use, and dust suppressants),
- Reducing site activities during periods of poor air quality,
- Additional vegetation planting around receptors.

With these enhanced mitigation options in place, BURNCO is confident that this development can be successfully operated to ensure compliance with Alberta ambient air quality objectives.

Policy #11
BURNCO will follow the dust control measures detailed in the MSDP. In addition, air quality impacts will be managed in accordance with the submitted Air Quality Impact Memo.

Policy #12
Operations at the pit will be compliant with the Alberta Ambient Air Quality Objectives (AAAQO).

3.7 Environmental Monitoring & Complaint Resolution

Not including the landowner of the proposed development, the nearest occupied residence is 1,600m from the property. Both BURNCO's Irricana pits and Aecon's Senger pit are much closer to nearest occupied residence. As such, no permanent monitoring stations for either noise, dust, or other emissions are envisioned for the site at this time. Instead, monitoring will be conducted on an as-required basis.

At all times, the following protocol shall be employed in the case of noise or dust complaints received by BURNCO from nearby residents:

- BURNCO will investigate the complaint,
- BURNCO will make reasonable steps to address the complaint if it is determined that the site is the source of the complaint,
- In all instances, BURNCO will respond to the complainant within 24 hrs. This response will include the results of BURNCO's investigation, and any actions taken. This response will be provided in writing.

If BURNCO's case-by-case monitoring indicates that permanent air quality monitoring is required, BURNCO will implement a permanent monitoring program.

Policy #13
BURNCO will follow the complaint response protocol provided in the MSDP related to noise and dust complaints. As detailed, permanent emissions monitoring will be considered if warranted.

3.8 Annual Reporting Requirements

BURNCO will submit an Annual Report to Rocky View County, which will include all pertinent operation details, no later than six months after each operating year. The following information will be included:

- A current site plan showing extraction activity,
- Reclamation Activities,
- Methods BURNCO has employed to address any complaints/incidents from adjacent properties and/or the Community.
- Annual water quality testing results from Hazel George's water well (Well ID 1305228).

Policy #14
BURNCO will provide an Annual Report to Rocky View County in accordance with Development Permit requirements.

3.9 Stormwater

As discussed in Section 2.2, Millennium EMS Solutions Ltd. (MEMS) was retained to complete a Stormwater Management Plan (SMP) for the Project. A complete copy of the MEMS memo can be found in Appendix 4. The following is the conclusion from the report:

> *Operations at the Site will not divert, block, or impound the natural surface drainage around the active pit. Topsoil and organic materials will continue to be salvaged in new work areas and placed in stockpiles away from surface water drainage paths. All surface water within the pit area will be directed towards and confined within the excavation created by the mining of sand and gravel from the Site. Run-off and groundwater seepages to the low point in the pit will allow for infiltration through the gravel layer.*
>
> *The pit edges will be constructed with a 5m horizontal to 1m vertical slope (5H:1V) one metre above and one metre below the water table. The remaining slope will be made to a 3m horizontal to 1m vertical slope (3H:1V). There will be a berm constructed 3m horizontal to 1m vertical between Range Road 270 and the closest edges to the Site, to create vegetation buffers.*
>
> *Surface water management from rain precipitation will be conducted through diversion around the Site and back into the natural drainage of the land. Temporary drainage structures such as swales and ditches will help to convey water around the Site and away from the newly reclaimed areas. Precipitation in the undisturbed areas of the Site will be allowed to flow unimpeded.*
>
> *Surface water within the Site will be directed to the lowest spot of the excavation to infiltrate down or to the reclaimed End Pit Lake.*
>
> *The stormwater management system will be operated in accordance with the Stormwater Management Guidelines (Alberta Government, 1999) standards. During construction activities, and until vegetation can be established, temporary Best Management Practices (BMPs) will be utilized to minimize the effects of sediment erosion and to manage storm water.*
>
> *The stripping of topsoil and overburden will produce stockpiles on the Site. During the Phase 1 mining phase, topsoil and subsoil will be stockpiled along the eastern edge of the site to create a berm that will remain after reclamation. Overburden will be progressively stripped and stockpiled along the north edge of the Phase 1 mining phase. Vegetation cover will be required for stockpiles to prevent water quality or wind erosion/dust issues. Operations personnel will inspect erosion and sediment control (ESC) devices after heavy rainfalls of 25 mm or more within a 24-hour duration.*
>
> *The Site will be mining aggregate from within the water table and is not expected to require maintenance for removing stormwater or maintenance, including sediment removal, during their operational life.*

Policy #15
BURNCO will ensure that stormwater from the active mining area is collected and not discharged from site. Stormwater will be managed in accordance with the submitted Stormwater Management Plan.

Policy #16
BURNCO will submit an updated Stormwater Management Plan as part of its Development Permit application, for each mining phase of the project.

3.10 Groundwater Assessment and Security

3.10.1 Groundwater Assessment

As discussed in Section 2.8, Millennium EMS Solutions Ltd. (MEMS) was retained to complete a Desktop Groundwater Assessment and Field Verified Groundwater Well Survey (DGA). The objectives for this assessment were to describe the hydrogeology and groundwater resources within the Project Area and to evaluate the potential effects on groundwater that may be caused by the proposed gravel pit. The following is the conclusion from the report:

> *Surficial materials underlying the Site consist of topsoil and subsoil with an average thickness of 0.13 m and 0.14 m respectively. Overburden of fine sand was present in two boreholes. The sand and gravel deposits range from 3.5 m to 8.0 m in thickness. This information is based on the test data provided by BURNCO.*
>
> *Based on the recorded lithology for GIC Well ID #1305228, the top of the bedrock in the vicinity of the Site is at approximately 9.8 m bgs (AWWID, 2022).*
>
> *The groundwater at the Site has been determined to be approximately 934.6 metres above sea level (masl) which is approximately 1.4 m below original ground surface (BURNCO, 2022).*
>
> *Groundwater flow direction could not be interpreted due to insufficient data; however, it is anticipated to follow the local topography, which slopes to the north and north-west (Figure 5).*
>
> *Water well records for nearby water wells provide the pumping rate and water levels during the pumping tests conducted in order to develop the water wells after drilling and completion. The pumping rates for these development tests range between 60.0 L/min and 77.3 L/min for Well ID #1305228 and Well ID #1305873 respectively.*
>
> *The AEP Water Well Information Database includes five water well records within 1.6 km of the Site. Of the five water well records, three were for domestic purposes, one for agricultural and on for monitoring. These five records are summarized in Table 2 below including if the field verified activity was able to occur.*
>
> *MEMS personnel conducted a field-verified water well survey within 1.6 km of the Site on September 2, 2022. The purpose of the field verified water well survey was to locate as many water wells in the field survey area as practical and where possible, to update the information available for the water wells.*

Table 2 (of MEMS report) Water Well List						
Well ID	***Owner***	***Location***	***Depth (m)***	***GPS Location***	***Use***	***Field-Verified***
1305228	*GEORGE, HAZEL M.*	*SE 12-027-27 W4*	*41.8*	*51.2920503 - 113.6735586*	*Domestic*	*Yes*
251329	*LUFT, R*	*SW 01-027-27 W4*	*48.8*	*51.2720936 - 113.6778465*	*Agricultural*	*Yes*
251403	*LUFT, R*	*SW 01-027-27 W4M*	*61.0*	*51.2720498 - 113.6815275*	*Domestic*	*Yes*
161222	*GEORGE, HAZEL M.*	*SE 12-027-27 W4*	*24.4*	*-*	*Domestic*	*No*
N/A	*BURNCO Rock Products Ltd.*	*SE 06-027-26 W4M*		*51.2708256 - 113.6486761*	*Monitoring*	*Yes*

The Well ID #1305228 is utilized by two residences. The drilling report indicates it was drilled to a total depth of 41.8 m bgl and completed from 38.1 to 41.5 m bgl in a sandstone aquifer within the bedrock.

As per the landowner Hazel George, Well ID #161222 does not exist.

The estimated depth of the gravel deposit ranges from 3.5 m to 8.0 m below ground surface. Based on the cross-sections, the groundwater table was approximately 934.6 masl and approximately 1.4 m below original ground surface.

Of the three existing water wells within 1.6 km of the Site, it appears that all three are completed in bedrock aquifers. Lithology and completion depth information for Well ID #1305228 indicate this water well is completed in a bedrock aquifer. Although completion depth information is not available for Well ID #251329 the lithology that is available indicates the water well is likely completed in a bedrock aquifer. For Well ID #251403, there is no lithology or depth information for the water well, but the available chemical analysis indicates the groundwater is of a sodium-bicarbonate-sulfate type quality, typical of groundwater from bedrock aquifers in Alberta. Water wells completed in bedrock aquifers have completion intervals that would be below the base of overlying sands and gravels in the surficial deposits. Well ID #1305228 (Hazel George) is the nearest well to the Site and it is completed in the bedrock. The landowner has consented to the gravel pit and the reclamation of an EPL.

The nearest point to a water body is a tributary of the Crossfield Creek that is a minimum of 120 m west of the Site boundary. Crossfield Creek is a minimum of 260 m to the

north of the Site boundary. The Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

The development plan includes bailing the aggregate to surface and not the dewatering of the aggregate deposit in order to mine. This will reduce any potential impacts to water well users in the area. The potential impacts from the Site's mining operations include the following:

- Increased total suspended solids within the groundwater.
- Increased surface water infiltration to the unconfined sand and gravel aquifer due to the removal of the surficial material.
- Risk of a spill from fuel and chemicals required for the heavy equipment necessary for the mining operation.

The nearest well belongs to the landowner, Hazel George. The water well is completed in the bedrock of the Paskapoo Formation, below the depth of any sand and gravel deposits and, as a result, is not expected to be adversely affected by activities at the Site. The well is located on the opposite side of the Crossfield Creek.

3.10.2 Groundwater Conclusions

The groundwater elevation within the Site is approximately 934.6 masl and approximately 1.4 m below original ground surface. The aggregate deposit is in an unconfined aquifer within the surficial deposits. The Site is in a glacial meltwater channel and within a valley associated to Crossfield Creek.

Five water wells were listed during the desktop assessment and four were located during the field-verified survey with the fifth well confirmed that it doesn't exist. Other than one monitoring well for the Irricana Pit, the three water wells within 1.6 km of the Site appear to be completed in the upper bedrock. As a result, the three water wells are not expected to be adversely affected by operations at the Site. Based on this understanding, and BURNCO's commitment to monitor the nearby landowner's well (Hazel George water well ID #1305228 [domestic use]), no additional permanent groundwater monitoring is recommended at this time.

The commitments from BURNCO to the water well users within 1.6 km that have been negatively impacted from the mining operations are to:

- If a landowner's water well is without water a temporary alternate water supply will be provided within 24-hours.
- A third-party consultant will be contracted within 14-days to investigate the cause.
- If it is deemed that BURNCO's mining operation is partially responsible for the decrease in water supply, a permanent alternate water supply will be installed.

The nearest water body is the Crossfield Creek and its tributary and due to its distance from the Site, no adverse affects related to the Site operations are expected.

It is anticipated that there will be a low risk of a negative impact to the local water well users or surface water body due to the nature of the aggregate deposit and the fact that no dewatering activities are to occur.

3.10.3 Groundwater Security

The removal of aggregate from below the water table and the construction of an end pit lake will require a Water Act approval and license. BURNCO will secure all necessary authorizations prior to proceeding with this development.

Should any nearby water well users indicate to BURNCO that they believe their water supply has been negatively impacted due to the gravel mining operation, BURNCO will do the following:

- Provide a temporary alternate water supply within 24 hours if a resident is without water,
- Hire an outside consultant within 14 days to determine the cause of the problem,
- Provide a permanent alternate water supply if the problem is at least partially due to BURNCO's mining operation.

Policy #17
BURNCO will secure a Water Act Approval to excavate aggregate from an unconfined groundwater aquifer prior to any site activity.

Policy #18
BURNCO will secure a Water Act License for the construction of an end pit lake.

Policy #19
Groundwater will be managed and monitored in accordance with the submitted Desktop Groundwater Assessment and Field Verified Groundwater Well Survey.

Policy #20
BURNCO will follow the complaint protocol provided in the MSDP related to groundwater security.

3.11 Traffic Impact Assessment and Control

BURNCO expects to utilizing Range Road 270 to Township Road 270 to access BURNCO's existing Irricana site. This access will be utilized for all activities of the development. This includes Phases 1 and 2, which can be found in Appendix 2: Drawing No. 3.

3.11.1 Traffic Impact Assessment

A Traffic Impact Assessment (TIA) was completed by Watt Consulting Group (Watt) on behalf of BURNCO Rock Products Ltd. This TIA was utilized to determine the adequacy of the road surface and if any road or intersection upgrades are required. A complete copy of the Watt TIA can be found in Appendix 8. The TIA determined that both the road surface and intersections were sufficient, and no upgrades are required to support the development. An overview of the results is as follows:

> *The Roe Pit development will supply material to the nearby Irricana site 2.8 km away and is expected to operate for a period of 5-10 years. Two annual hauling scenarios were reviewed; the review determined the following:*
>
> - Under Scenario 1, the site will generate 30 trips per hour (or 360 trips daily) over an approximate 1-month period. The existing Range Road 270 and Township Road 270 (east of Range Road 271) road surface is adequate to accommodate

the expected post development volumes and therefore no road upgrades are recommended.

- Under Scenario 2, the site will generate 10 trips per hour (or 120 trips daily) over an approximate 6-month period. The existing roads are adequate to accommodate the post development volumes under Scenario 2; no road upgrades are recommended.
- It is noted that the subject site is accessed via Range Road 270, which is classified as a low volume gravel road and as per Policy 14.22 of the County Plan roadways providing access to businesses should be paved. However, as the volumes along Range Road 270 are below the 500 trips per day threshold further roadway improvements are not required to support the development.

Both Scenario 1 and Scenario 2 can be utilized as the hauling scenario for the Roe Pit development. No additional improvements are needed to support either scenario, based on the County's servicing standards.

Policy #21
BURNCO will enter into a Road Use Agreement at the time of future Development Permit approval, for the maintenance of the proposed haul route along Range Road 270 and to ensure compliance with the County Service Standards. BURNCO will not upgrade Range Road 270, or any part of the haul road to a paved standard.

3.11.2 Haul Safety

All drivers are required to follow the BURNCO trucking policy to ensure BURNCO safety standards as well as the public's expectations are met. Drivers must always practice responsible driving habits and maintain a good driving record. As with all BURNCO operations, company employees and independent truckers involved in the hauling of aggregate must meet three criteria:

- Safety – only the highest standard of safety is appropriate to safeguard the public, the driver's peers and the driver,
- Legality – all federal, provincial and municipal laws and regulations must be followed as well as BURNCO's own regulations,
- Efficiency – the least time-consuming, safe and legal haul route must be taken.

Each spring, independent truckers wishing to work for BURNCO must register themselves and their vehicles by providing, among other things, proof of proper insurance, registration, vehicle safety inspection, and coverage by the Workers Compensation Board.

Policy #22
BURNCO will follow the protocol provided in the MSDP related to haul safety.

3.11.3 Haul Monitoring

BURNCO participates in the Alberta Sand and Gravel Association (ASGA) truck registry program to help monitor trucks. The registry works in the following manner:

- The truck registry requires all gravel truck operators to display a four-digit number, and the phone number 1-866-901-ASGA (2742),
- If someone feels the truck is not operating in a safe and courteous manner, they can phone the complaint line and register a complaint,

- All complaints received via this number are documented and relayed to the producer (i.e. BURNCO) the truck is registered with.

The producer then follows up on the complaint to ensure it is resolved. With the truck registry, BURNCO is informed of any problems that are occurring on the haul route and can resolve them promptly.

Policy #23
BURNCO will follow the protocol provided in the MSDP related to haul monitoring.

3.12 Hazardous Waste Plan

All fuel storage sites will be constructed in a manner that follows the *Guidelines for Secondary Containment for Above Ground Storage Tanks*, Alberta Environmental Protection, May 1997, and comply with Part 4 of the *Alberta Fire Code 2006* for tank registrations. A bermed imperviously lined area, or other form of secondary containment, will surround fuel tanks with a minimum 110% holding capacity of the largest tank's capacity.

Any spills within or beyond the bermed area of the above ground storage tanks will be controlled immediately using various techniques including diking and containing. Any spills will be collected using sorbent pads and vacuum trucks.

Materials such as oil, lubricants, glycols, etc. that are stored on-site will be labeled according to the Workplace Hazardous Materials Information System (WHIMIS) regulations and will be suitably contained. No waste material will be imported into the pit. All waste material generated from pit operations will be collected and stored in approved containers. This waste material will then be hauled on a regular basis to an approved landfill for proper disposal. Burial of waste will be prohibited during all phases of the operation. Portable sanitary facilities will be located on site. All sanitary waste will be hauled to an approved waste management treatment facility.

Policy #24
BURNCO will follow the hazardous waste plan in the MSDP.

3.13 Erosion and Sediment Control

In support of the Project, Millennium EMS Solutions Ltd. (MEMS) was retained to complete an Erosion and Sediment Control Plan (ESCP) for the Project. A complete copy of the ESCP plan can be found in Appendix 9. An overview of the results is as follows:

> *The Project area slopes northwest from a topographic high on the southern edge of the proposed Pit area, sloping into the natural drainage of Crossfield Creek to the west and north of the Pit. It is assumed that all reclamation done to the previous site has maintained the natural drainage of the site.*
>
> *The intent in developing this ESCP is to prevent sedimentation of the soil resource from the Pit*
> *activities into adjacent lands and especially into the adjacent permanent or ephemeral watercourses/wetlands namely Crossfield Creek located within the same quarter section and adjacent quarter section to the west. The topsoil stockpile will be stored along the eastern edge of the lease and will also function as a screening barrier to traffic along*

Range Road 270. This stockpile/berm will be planted with both agronomic and tree species to control erosion as well as to enhance the visual barrier to the site.

As part of the ongoing maintenance procedures on the Pit, BURNCO will commit to conducting erosion and sediment control (ESC) inspections of the site annually. Additional inspections will be conducted after heavy or prolonged precipitation events (≥ 12 mm of rainfall over 24 hours). During winter months, ESC inspections will be conducted only after a heavy snowmelt.

The inspections will be completed to assess the performance of the control measures and to identify any additional measures required to accommodate the anticipated and observed conditions on-site. Permanent controls will include the following:

- Stormwater will be controlled to ensure minimal release from the site such that stormwater does not create any adverse effect;
- Disturbance areas will be minimized as much as possible;
- Clear delineation of disturbance areas to minimize disturbance of vegetation and soils; and
- ESC measures to prevent mobilization of sediment from stripped areas to adjacent drainage channels or beyond the limits of the work area.

Regular monitoring during the construction process is required to ensure regulatory compliance, oversee implementation of works in accordance with design plans, minimize site disturbances, and limit seepage into work areas. Construction equipment or adverse weather conditions can damage BMP installations. Majority of BMPs only perform correctly with regular maintenance. All erosion and sediment control measures will be continually monitored. An inspection and report will be conducted annually and after a heavy or prolonged rainfall event or snowmelt.

Maintenance must be carried out in a timely and diligent manner, ideally within 48 hours of discovering any damaged installation. Erosion and sediment control inspection reports will be made available to all government regulators on request. In addition, all other regulatory approvals will be kept onsite during construction. If there is a temporary work stoppage, inspection and maintenance of erosion and sediment control measures must continue.

It is anticipated that following the listed BMPs for erosion and sediment control will be sufficient to mitigate potential ESC problems on-site. BURNCO is committed to annual spring monitoring of all ESC installations, including additional monitoring after heavy or significant precipitation events and snowmelt, to ensure all controls are in proper working order.

Policy #25
BURNCO will manage the erosion and sediment control measures in accordance with the submitted Erosion and Sediment Control Plan.

Policy #26
BURNCO will submit an updated Erosion and Sediment Control Plan as part of its Development Permit application, for each mining phase of the project.

4.0 Reclamation Plan

BURNCO always strives to promptly reclaim their operations back to an equivalent land capability and to re-establish a similar grade and drainage patterns that existed prior to disturbance. The site will be predominantly reclaimed back to agricultural use as shown in the reclamation drawings provided in Appendix 2.

In addition, Millennium EMS Solutions Ltd. was retained to develop a landscaping and reclamation plan for the site. A complete copy of the MEMS plan can be found in Appendix 10. The purpose of this plan was to clearly define what the reclaimed site conditions would include.

Policy #27
BURNCO will submit a reclamation plan with each development permit application.

Policy #27
Reclamation will be completed in accordance with Part 5 of the Code of Practice for pits which sets requirements regarding the conservation of soil and subsoil and the characteristics of reclamation.

Policy #29
BURNCO will reclaim areas progressively and in accordance with the reclamation contours and cross-sections in the MSDP.

4.1 Landscaping and Closure

As described in the Section 3.3, the site will be developed based on milestones related to the progress of the mining areas. Construction of the screening berms will also be built in phases and will be done so in accordance with the following:

Phase 1:

- Screening berm to the east of the proposed development will be developed using stripped topsoil and subsoils,
- Vegetation planting on this section of berm will be completed after the berm has been constructed,
- Overburden will be utilized to develop an additional screening berm to the north of the proposed development.

Phase 2:

- Screening berm to the north of the project will be further enhanced from soil stripped from mining phase 2,
- Grading of phase 1 slopes will be done by utilizing overburden stripped from mining phase 2,
- Once aggregate extraction from mining phase 2 is complete, grading of the phase 2 slopes will be done by utilizing overburden and topsoil from the north screening berm,
- The screening berm along Range Road 270 will be left in place.

The topsoil and subsoil berm that has been vegetated along Rand Road 270 will be left as permanent feature on the property.

Policy #30
BURNCO will complete the landscaping and site screening in accordance with the submitted Landscaping Plan.

Policy #31
BURNCO will submit an updated Landscaping Plan as part of its Development Permit application, for each mining phase of the project.

As described in Section 3.3 and 3.11, the screening berm built between the proposed development and Township Road 270 will be left as a permanent reclamation feature. This screening berm will have mature landscaping at the time of final reclamation. The contouring associated with this permanent feature is shown on the reclamation plan in Appendix 2: Drawing No. 6.

4.2 Soil Salvage

All topsoil and subsoil on site will be salvaged and used in the final reclamation. Topsoil and subsoil salvage will not occur under wet, frozen, adverse field conditions or high wind velocities that will result in mixing, loss, compaction or degradation of soil.

Topsoil and subsoil will be salvaged a minimum of three meters ahead of pit faces to prevent topsoil spilling or sloughing in the open excavation. Topsoil and subsoil will be directly placed into areas of reclamation. The topsoil will be placed in a berm on the east boundary as a permanent feature that will remain after final reclamation. The screening berms will be trimmed and graded around the base to prevent surface water and wind erosion.

Policy #32
BURNCO will ensure proper soil salvage and will follow the protocols provided in the MSDP related to soil salvage.

4.3 Subgrade

Placement of fill and rough grading will follow the contour plan shown in Appendix 2: Drawing No. 6. Once subgrades are established, areas will be ripped and cross ripped to a depth of 0.3 meters to ensure decompaction of the subgrade. Ripping can help improve soil conditions by breaking up the surface of the overburden, increasing infiltration of surface water, and creating a better root zone.

Policy #33
BURNCO will follow all requirements in the Code of Practice for Pits (Section 5.2.5), which indicates that reclaimed sloping will be no steeper than 3:1. BURNCO will also follow Alberta Occupational Health and Safety requirements.

4.4 Soils Placement

The average thickness of topsoil and subsoil obtained from exploratory testing done by BURNCO was 0.10 m and 0.11 m, respectively. Only once final grade is achieved, trimming is complete and the soil is decompacted, the soils will be replaced uniformly over the disturbed area, commencing with subsoils. Salvaged subsoil will be replaced evenly over the overburden.
Topsoil and subsoil replacement will occur after contouring is complete and subsidence is no longer a concern. Replaced topsoil will be protected from water and wind erosion by leaving some surface roughness and establishing appropriate erosion control measures.

Topsoil and subsoil replacement should only be done in dry conditions and the targeted replacement depth shall be 0.08 m and 0.09 m, respectively, throughout the Site.

4.5 Vegetation

The most critical component in reclamation is soil organic matter, due to its importance for increasing water holding capacity, contributing to the nutrient pool, initiating the formation of soil structure, and acting as a substrate for a wide array of soil organisms (Haigh, 2000; Munshower, 1994; and Palmer, 1992). The most effective approach to increasing organic matter is the establishment of a productive vegetation cover. This will also help to improve soil infiltration capacity and reduce soil erosion (Naeth et al., 1991).

Copies of the Seed Analysis Certificates (required for all graded seed under the Canada Seeds Act) for all components in the seed mix shall be supplied to AEP for review prior to the application of any seed. Seed mixes should be developed based on adjacent plant communities.

Topsoil and subsoil piles will be seeded to establish vegetation and reduce the potential for erosion. Short-term stabilization could also include fiber mulch, straw shredding/crimping and or compost/manure.

Once topsoil has been evenly placed, the reclaimed areas will be re-vegetated to pasture using drill seeding at a rate no less than 22 kg/hectare. Grass seed mixture will be 30% wheatgrass, 40% smooth brome, 30% Kentucky bluegrass. Once seeding is complete, a program of cutting and fertilizing will take place as necessary to ensure the pasture becomes established (BURNCO 2022).

Policy #34
BURNCO will control weeds during operations and reclamation. These efforts will be compliant with the Weed Control Act and the Rocky View County Land Use Bylaw.

4.6 Inactive Pit Conservation & Reclamation Techniques

At all time, the pit will be clearly identified by signs that indicate danger and discourage trespassing. Slopes around structures and equipment will be stabilized and sloped no steeper than 3:1. During periods of inactivity of over six months, pit faces will be sloped no steeper than 2:1. Stockpiles will be vegetated, and the weeds will be sprayed and mowed. The site will be monitored to ensure soil reclamation material is stable, weeds are controlled, and the site is secure.

Once the above items have been completed, the site will be monitored on a monthly basis to ensure soil reclamation material is stable, weeds are controlled, and the site is secure.

Policy #35
BURNCO will follow the protocols provided in the MSDP related to inactive pit conservation and reclamation.

4.7 Proposed Surface Water Bodies

There will be one permanent water body in the final reclamation plan. The water body is planned to be 32.22 acres in size (See Appendix 2 Drawing No. 7 - Reclamation Plan). The shoreline will be constructed with a 5:1 slope above the average water level to one meter below the water table and will have a 3:1 slope at depths greater than one meter below the water level. This water body will provide water for livestock and will promote habitat for wildlife. A Water Act application will be submitted to AEP for the development of a permanent water body.

5.0 Conclusion

The BURNCO Irricana Pit has been in successful operation since the late 1980s. BURNCO would like to continue operating at this location and is seeking to permit this satellite site, which will allow for the continued operation of BURNCO's Irricana pit.

This project presents a great opportunity for Rocky View County and the people of Alberta in continuing to meet the growing demand for aggregates. These aggregates are critical in building our communities and maintaining our quality of life.

BURNCO is committed to the highest level of care and compliance in all our developments. It is BURNCO's belief that by following the Project Activities Plan for the lands associated with the proposed development, that BURNCO's Roe Pit can operate in a socially and environmentally responsible manner.

Appendix 1: MSDP Policy Summary

Policy #1
A Biophysical Impact Assessment (BIA) is not required to be submitted unless deemed necessary by Alberta Environment and Parks (AEP), and in accordance with the approved Environmental Screening Report (ESR).

Policy #2
Before commencing operations, BURNCO will secure a Development Permit for each mining phase of the development.

Policy #3
If initial stripping occurs between April 1st and September 30th, a wildlife sweep will be conducted for the Burrowing Owl.

Policy #4
Upon successful MSDP adoption and re-designation of the project area, BURNCO will assume the Registration from AEP under the Code of Practice for Pits from Rocky View County.

Policy #5
BURNCO will follow the hours of operation as determined by Rocky View County as part of the Development Permit process.

Policy #6
BURNCO will follow the development phasing plan as illustrated in the MSDP.

Policy #7
BURNCO will limit the maximum disturbance area to 40 acres at any single time.

Policy #8
BURNCO will install site signage. This will include perimeter signage to discourage trespassing as well as entrance signage as necessary to identify the site and provide key information to the public.

Policy #9
Site signage shall include a 24-hour phone number for neighbors to call in the event of questions or concerns.

Policy #10
BURNCO will follow the noise control measures detailed in the MSDP. In addition, noise impacts will be managed in accordance with the submitted Noise Quality Impact Memo.

Policy #11
BURNCO will follow the dust control measures detailed in the MSDP. In addition, air quality impacts will be managed in accordance with the submitted Air Quality Impact Memo.

Policy #12
Operations at the pit will be compliant with the Alberta Ambient Air Quality Objectives (AAAQO).

Policy #13
BURNCO will follow the complaint response protocol provided in the MSDP related to noise and dust complaints. As detailed, permanent emissions monitoring will be considered if warranted.

Policy #14
BURNCO will provide an Annual Report to Rocky View County in accordance with Development Permit requirements.

Policy #15
BURNCO will ensure that stormwater from the active mining area is collected and not discharged from site. Stormwater will be managed in accordance with the submitted Stormwater Management Plan.

Policy #16
BURNCO will submit an updated Stormwater Management Plan as part of its Development Permit application, for each mining phase of the project.

Policy #17
BURNCO will secure a Water Act Approval to excavate aggregate from an unconfined groundwater aquifer prior to any site activity.

Policy #18
BURNCO will secure a Water Act License for the construction of an end pit lake.

Policy #19
Groundwater will be managed and monitored in accordance with the submitted Desktop Groundwater Assessment and Field Verified Groundwater Well Survey.

Policy #20
BURNCO will follow the complaint protocol provided in the MSDP related to groundwater security.

Policy #21
BURNCO will enter into a Road Use Agreement at the time of future Development Permit approval, for the maintenance of the proposed haul route along Range Road 270 and to ensure compliance with the County Service Standards. BURNCO will not upgrade Range Road 270, or any part of the haul road to a paved standard.

Policy #22
BURNCO will follow the protocol provided in the MSDP related to haul safety.

Policy #23
BURNCO will follow the protocol provided in the MSDP related to haul monitoring.

Policy #24
BURNCO will follow the hazardous waste plan in the MSDP.

Policy #25
BURNCO will manage the erosion and sediment control measures in accordance with the submitted Erosion and Sediment Control Plan.

Policy #26
BURNCO will submit an updated Erosion and Sediment Control Plan as part of its Development Permit application, for each mining phase of the project.

Policy #27
BURNCO will submit a reclamation plan with each development permit application.

Policy #28
Reclamation will be completed in accordance with Part 5 of the Code of Practice for pits which sets requirements regarding the conservation of soil and subsoil and the characteristics of reclamation.

Policy #29
BURNCO will reclaim areas progressively and in accordance with the reclamation contours and cross-sections in the MSDP.

Policy #30
BURNCO will complete the landscaping and site screening in accordance with the submitted Landscaping Plan.

Policy #31
BURNCO will submit an updated Landscaping Plan as part of its Development Permit application, for each mining phase of the project.

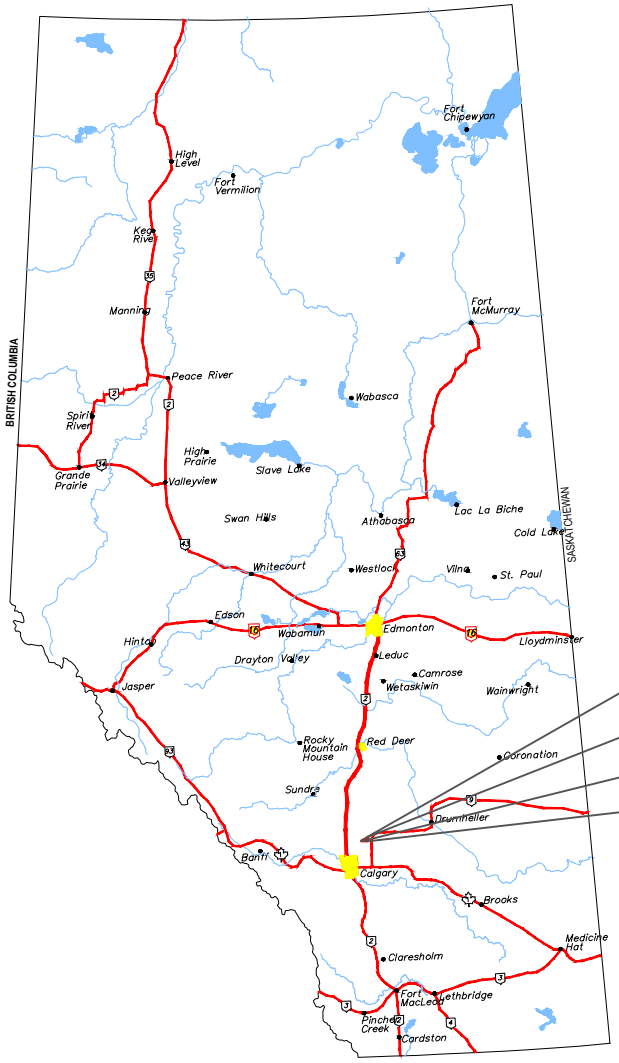
Policy #32
BURNCO will ensure proper soil salvage and will follow the protocols provided in the MSDP related to soil salvage.

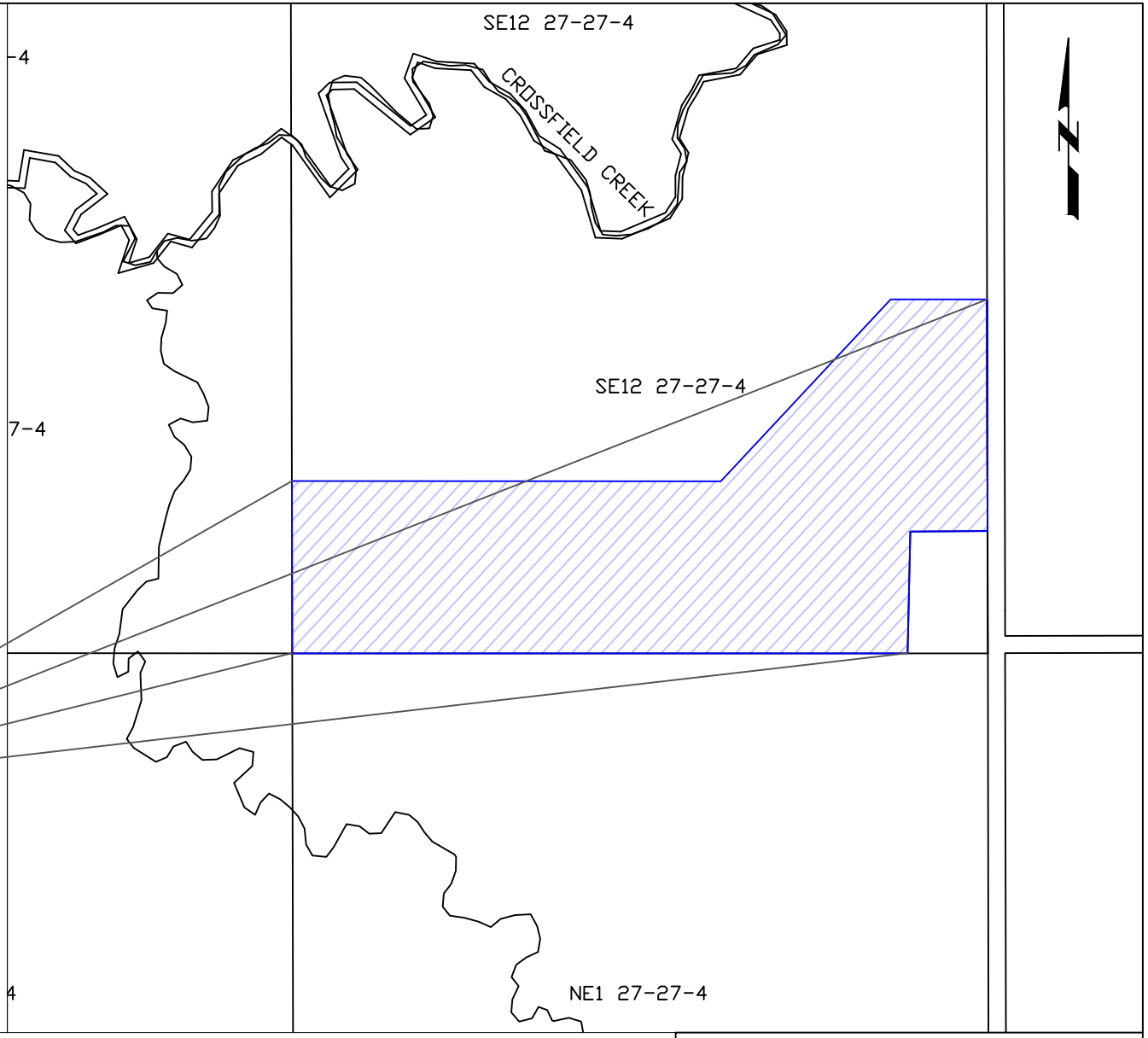
Policy #33
BURNCO will follow all requirements in the Code of Practice for Pits (Section 5.2.5), which indicates that reclaimed sloping will be no steeper than 3:1. BURNCO will also follow Alberta Occupational Health and Safety requirements.

Policy #34
BURNCO will control weeds during operations and reclamation. These efforts will be compliant with the Weed Control Act and the Rocky View County Land Use Bylaw.

Policy #35
BURNCO will follow the protocols provided in the MSDP related to inactive pit conservation and reclamation.

Appendix 2: Drawings





LEGEND:

LAND USE AREA (47.75 ACRES)

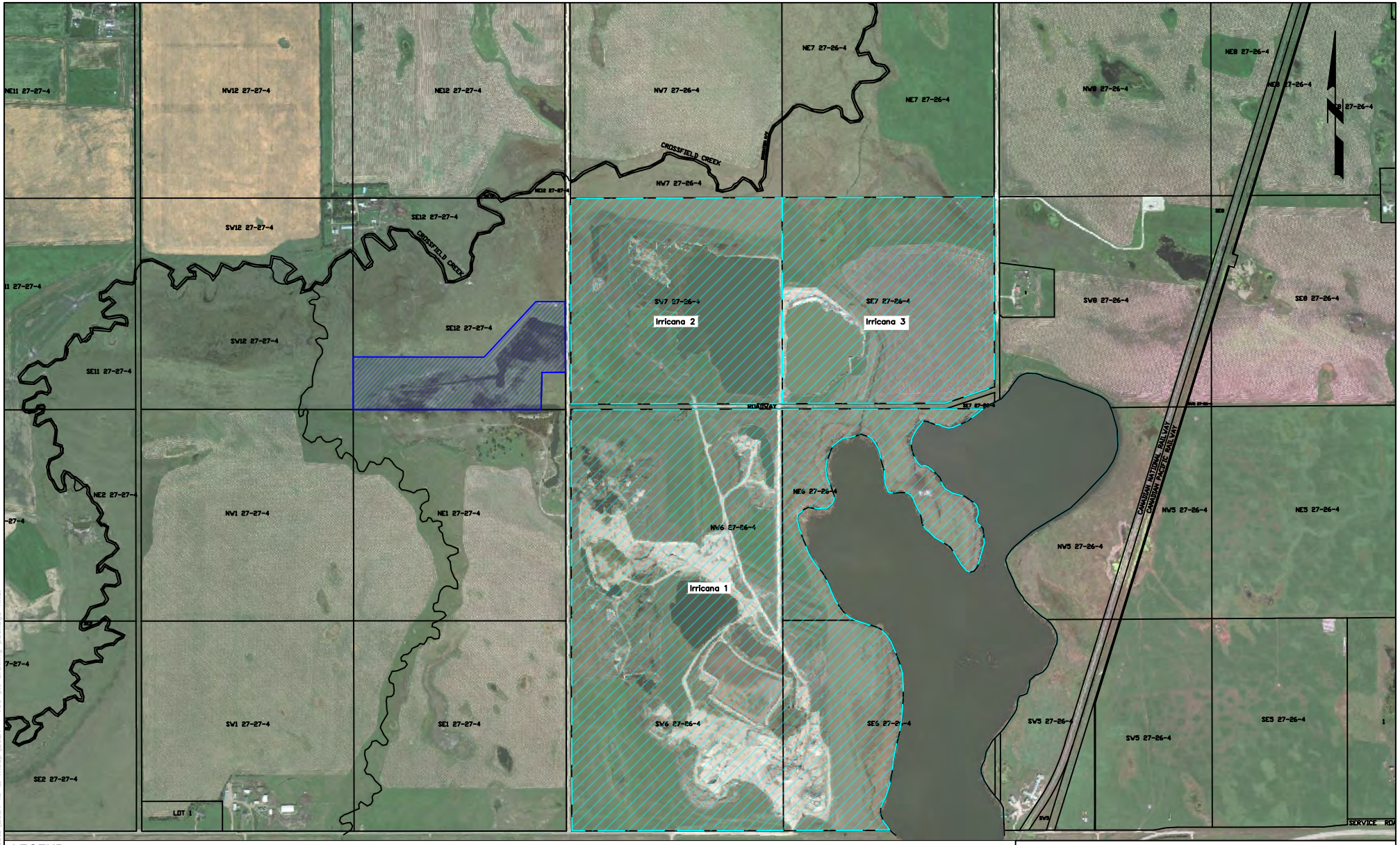
BURNCO Rock Products Ltd

ROE GRAVEL PIT

LOCATION MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	NTS	TT	1
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	



LEGEND:

LAND USE AREA (47.75 ACRES)

BURNCO - IRRICANA 1, 2 & 3

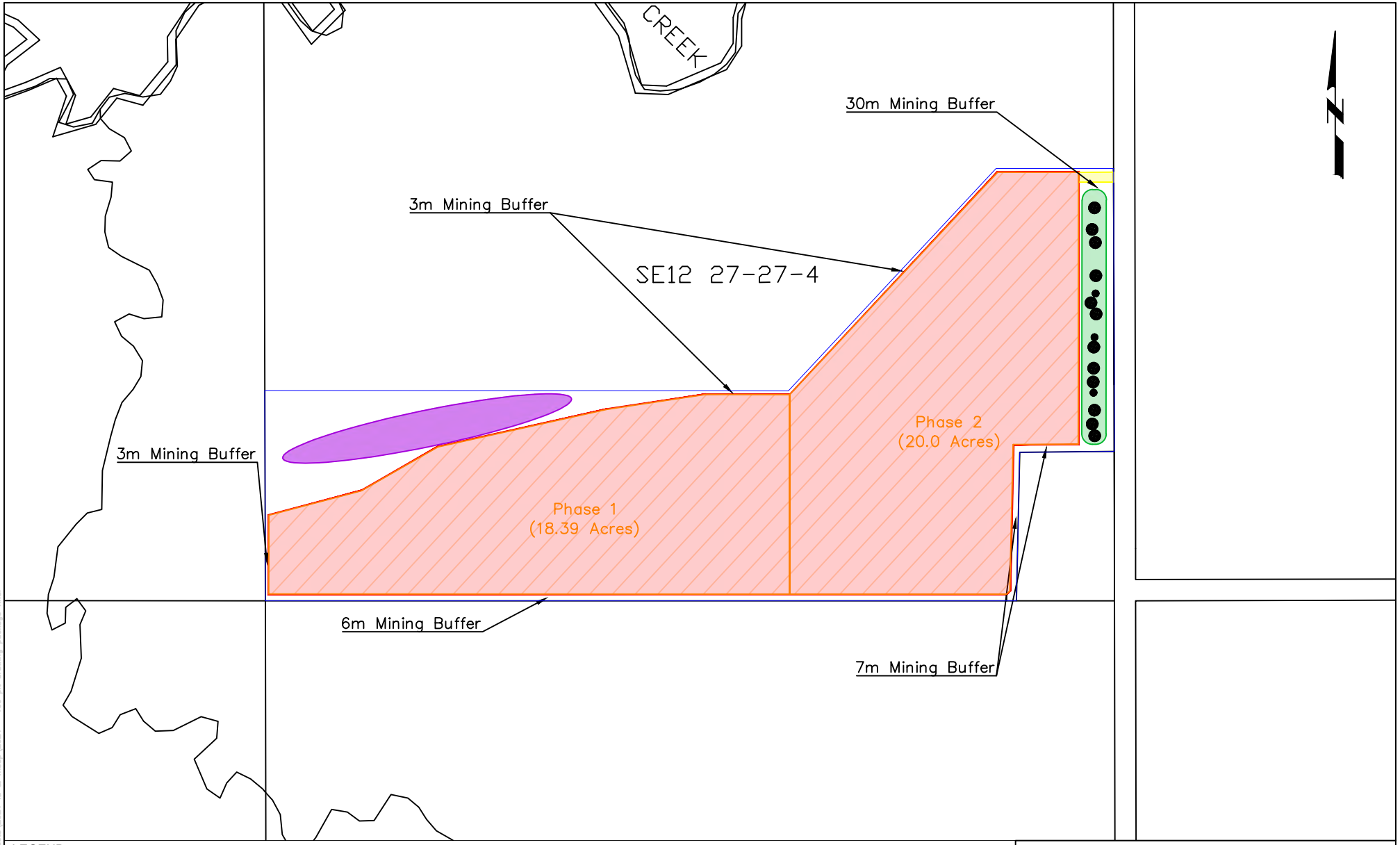
BURNCO Rock Products Ltd

ROE GRAVEL PIT

LAND USE MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:20,000	TT	2
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- MINE PHASES
- TOPSOIL PILE
- OVERBURDEN PILE
- SITE ACCESS
- CADASTRAL
- VEGETATION BUFFER

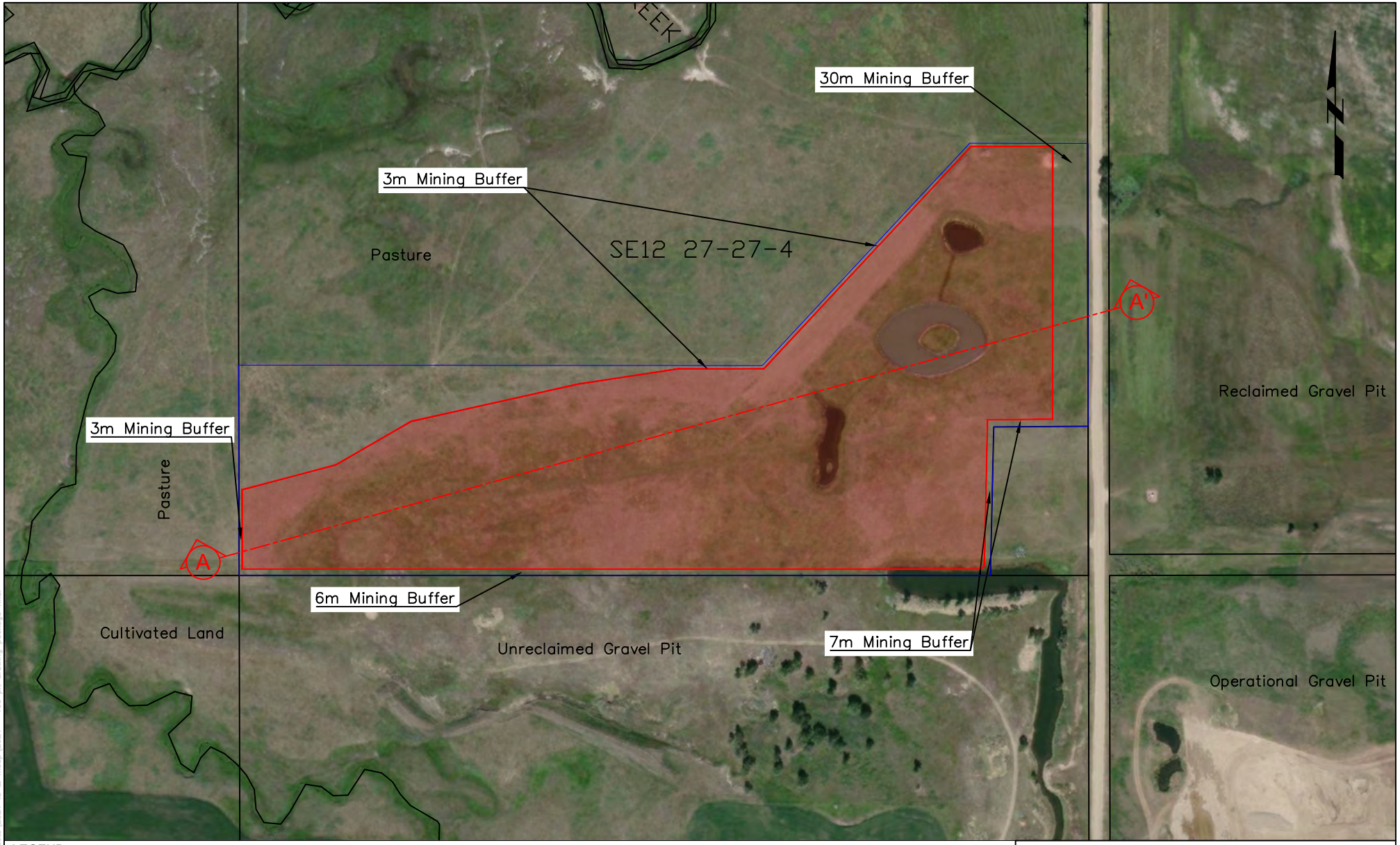
BURNCO Rock Products Ltd

ROE GRAVEL PIT

MINE PHASE PLAN

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	3-R1
DATE SUBMITTED: FEB. 2022		CHECKED BY: TC	



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

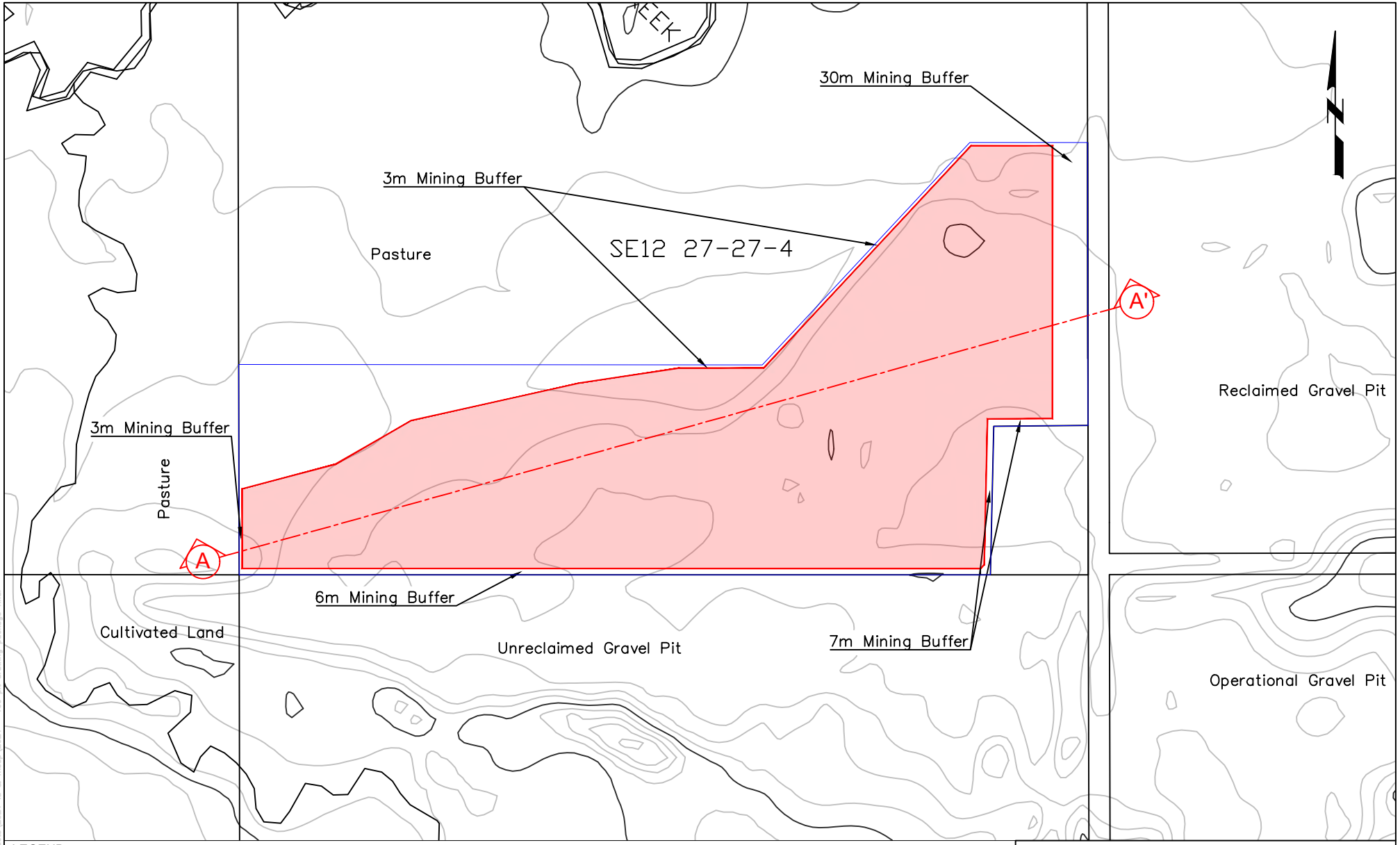
BURNCO Rock Products Ltd

ROE GRAVEL PIT

SITE MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	4
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

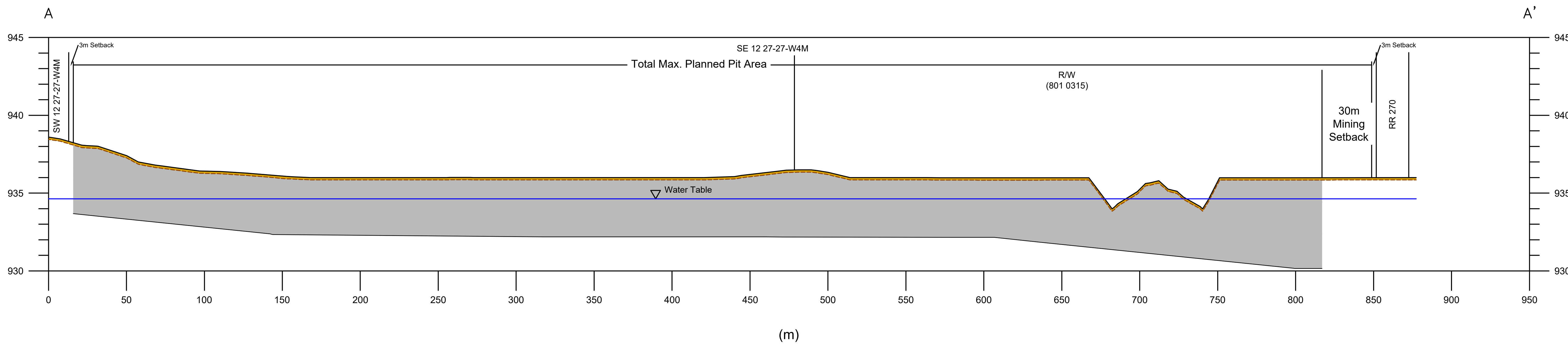
ROE GRAVEL PIT

SITE EXISTING CONTOURS MAP

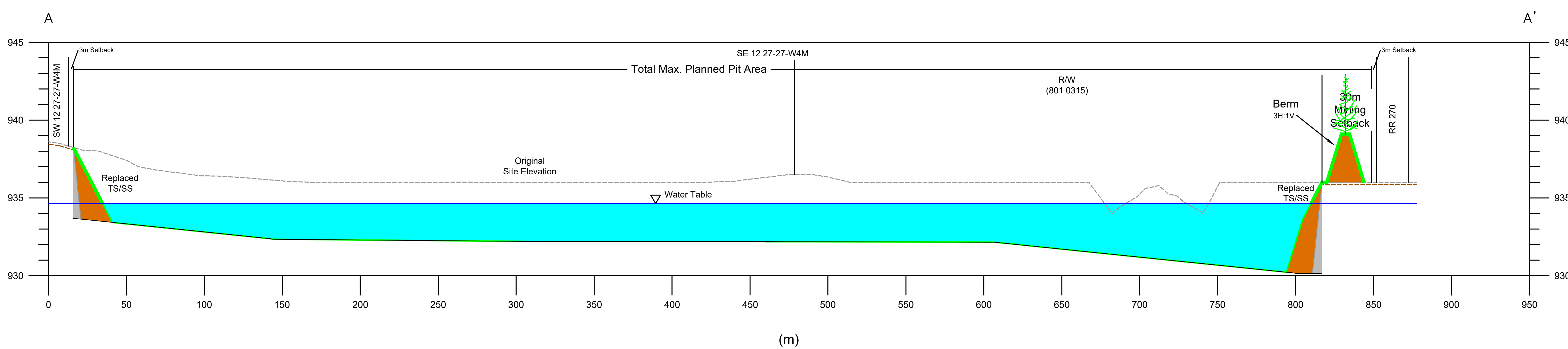
SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	5
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	

(A) EXISTING SITE CONDITIONS



(A) RECLAIMED SITE CONDITIONS



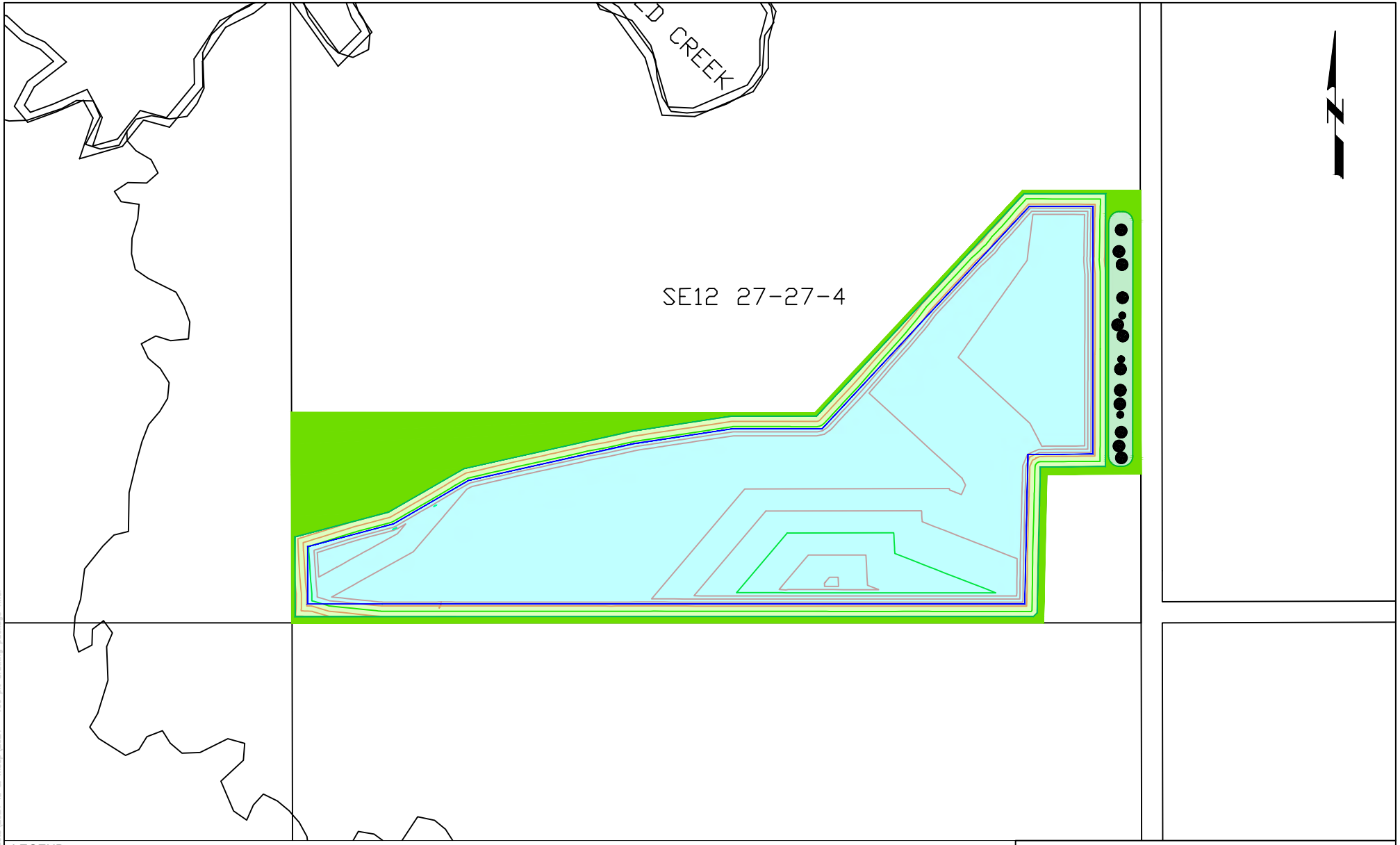
NOTES:

- Gravel will be mined at 1H:1V.
- Lake shore will be backfilled and reclaimed to 5H:1V 1 meter below the water table and then it will be graded to 3H:1V for the rest of the depth of the lake.
- Topsoil and subsoil will be replaced at ±10cm and ±11cm respectively.

BURNCO Rock Products Ltd

ROE GRAVEL PIT
CROSS SECTION A-A'
SE 12-27-27 W4M

DATE DRAWN: DEC. 2021	SCALE: 1:2500	DRAWN BY: ML	DWG. NO. 6
DATE SUBMITTED: DEC. 2021		CHECKED BY: TT	



LEGEND:

- END PIT LAKE (32.22 ACRES)
- LAKE SHORE (12 METER HORIZONTAL DISTANCE)
- 1M CONTOURS
- 5M CONTOURS
- CADASTRAL
- LANDSCAPE BERM
- PASTURE
- VEGETATION BUFFER

BURNCO Rock Products Ltd

ROE GRAVEL PIT

RECLAMATION PLAN

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
DEC. 2021	1:5000	ML	7
DATE SUBMITTED: DEC. 2021		CHECKED BY: TC	

Appendix 3: Environmental Screening Report

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www.mems.ca

Environmental Screening Report
Roe Gravel Pit
SE 12-27-27 W4M (Title # 891 070 572)

Prepared for:
BURNCO Rock Products Ltd.

Prepared by:
Millennium EMS Solutions Ltd.
#148, 2257 Premier Way
Sherwood Park, Alberta
T8H 2M8

September 2022
File#: 22-00690-00

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1.0 INTRODUCTION

BURNCO Rock Products Ltd. (BURNCO) retained Millennium EMS Solutions Ltd. (MEMS) to complete an Environmental Screening Report for the Roe Gravel Pit located within SE 12-27-27 W4M (herein referred to as "the Site"). The following report details current environmental compliance conditions are per Rocky View County (RVC) requirements for a Development Permit.

2.0 SITE BACKGROUND

The Site is the located approximately 5 km southwest of the town of Irricana, Alberta and 18 km east of Airdrie, Alberta. BURNCO has the following three adjoining gravel pits to the east and southeast:

- Irricana 1 is located in SEC 06-27-26 W4M,
- Irricana 2 (Luft) is located in SW 07-27-26W4M; and
- Irricana 3 (Poffenroth) is located in SE 07-27-26 W4M.

Combined, these sites represent a total of 304 hectares (751 acres) in size. Irricana 2 and Irricana 3 are now depleted and reclaimed while Irricana 1 contains an estimated 2,100,000 tonnes of aggregates and is selling roughly 400,000 tonnes of material annually.

The proposed Site is located in the SE 12-27-27 W4M is 19.32ha (47.75 ac). The Site will serve to supply BURNCO's existing Irricana 1 Gravel Pit with an estimated 1,200,000 tonnes of aggregate through the expansion of permitted reserves. The Site is expected to have a lifespan of 5 to 10 years. The Site was permitted as a RVC gravel pit and had an Alberta Environment & Parks (AEP) Registration # 00015044-01-00 under the *Environmental Protection and Enhancement Act* (EPEA). The approval is currently expired and renewable. During the time the Site was registered to RVC, the Site's sand and gravel material lying above the water table was removed by RVC.

3.0 GEOLOGY

The surficial deposits are the sediments above the bedrock surface and include sand and gravel pockets. The Site has pre-glacial fluvial deposits that are approximately 5 to 10 m in depth that overly the Lacombe Member of the Paskapoo Formation (Hydrogeological Consultants Ltd, 2002). Geological maps of the area indicate the Site belongs in the Palogene (± Neogene) Paskapoo Formation that consist of recessively weather, grey to greenish-grey mudstone and siltstone with subordinate (although generally exposed pale), thick- to thin-bedded, commonly cross-stratified sandstone, minor conglomerate, mollusc coquina, and coal; nonmarine (Prior *et al*., 2013).

4.0 GROUNDWATER AND FIELD VERIFIED WATER WELL SURVEY

Based on previous Site testing, it has been determined that 100% of the remaining gravel deposit lies within the groundwater table. Excavation of sand and gravel located below the water table will be accomplished by bailing. This will involve an excavator dredging up sand and gravel from the applicable excavation area on Site (BURNCO 2022). These materials will then be transported by truck to a BURNCO's existing site listed above, Irricana 1.

A *Water Act* application will be submitted to AEP by BURNCO for the disturbance of an aquifer. This disturbance is related to the excavation of sand and gravel from an unconfined groundwater aquifer (BURNCO 2022).

See Appendix C for information regarding the locations, types and depths drilled for nearby groundwater wells in the area. Table 1 lists the five water wells within 1.6 km of the Site; four of which were field verified and the fifth, water well ID# 161222, being confirmed by the landowner (Hazel George) that it does not exist.

Table 1 Water Well List

Well ID	Owner	Location	Depth (m)	GPS Location	Use	Field-Verified
1305228	GEORGE, HAZEL M.	SE 12-027-27 W4	41.8	51.2920503 -113.6735586	Domestic	Yes
251329	LUFT, R	SW 01-027-27 W4	48.8	51.2720936 -113.6778465	Agricultural	Yes
251403	LUFT, R	SW 01-027-27 W4M	61.0	51.2720498 -113.6815275	Domestic	Yes
161222	GEORGE, HAZEL M.	SE 12-027-27 W4	24.4	-	Domestic	No
N/A	BURNCO Rock Products Ltd.	SW 12-027-27 W4M		51.2708256 -113.6486761	Monitoring	Yes

The estimated depth of the gravel deposit ranges from 3.5 m to 8.0 m below ground surface. Based on the cross-sections, the groundwater table was approximately 934.6 masl and approximately 1.4 m below original ground surface.

Of the three existing water wells within 1.6 km of the Site, it appears that all three are completed in bedrock aquifers. Lithology and completion depth information for Well ID #1305228 indicate this water well is completed in a bedrock aquifer. Although completion depth information is not

available for Well ID #251329 the lithology that is available indicates the water well is likely completed in a bedrock aquifer. For Well ID #251403, there is no lithology or depth information for the water well, but the available chemical analysis indicates the groundwater is of a sodium-bicarbonate-sulfate type quality, typical of groundwater from bedrock aquifers in Alberta. Water wells completed in bedrock aquifers have completion intervals that would be below the base of overlying sands and gravels in the surficial deposits. Well ID #1305228 (Hazel George) is the nearest well to the Site and it is completed in the bedrock. The landowner has consented to the gravel pit and the reclamation of an EPL.

The groundwater elevation within the Site is approximately 934.6 masl and approximately 1.4 m below original ground surface. The aggregate deposit is in an unconfined aquifer within the surficial deposits. The Site is in a glacial meltwater channel and within a valley associated to Crossfield Creek.

Five water wells were listed during the desktop assessment and four were located during the field-verified survey with the fifth well confirmed that it doesn't exist. Other than one monitoring well for the Irricana Pit, the three water wells within 1.6 km of the Site appear to be completed in the upper bedrock. As a result, the three water wells are not expected to be adversely affected by operations at the Site. Based on this understanding, and BURNCO's commitment to monitor the nearby landowner's well (Hazel George water well ID #1305228 [domestic use]), no additional permanent groundwater monitoring is recommended at this time.

The commitments from BURNCO to the water well users within 1.6 km that have been negatively impacted from the mining operations are to:

- If a landowner's water well is without water a temporary alternate water supply will be provided within 24-hours.
- A third-party consultant will be contracted within 14-days to investigate the cause.
- If it is deemed that BURNCO's mining operation is partially responsible for the decrease in water supply, a permanent alternate water supply will be installed.

The nearest water body is the Crossfield Creek and its tributary and due to its distance from the Site, no adverse affects related to the Site operations are expected.

It is anticipated that there will be a low risk of a negative impact to the local water well users or surface water body due to the nature of the aggregate deposit and the fact that no dewatering activities are to occur.

5.0 LAND TOPOGRAPHY AND USE

5.1 Agricultural Land Use

The Canada Land Inventory Information for Agricultural capacities state the land is mixed between two different SubSets. The NE corner of the Site states to contains soils that have moderately severe limitations that restrict the range of crops or require special conservation practices. The remainder of the Site contains soils that have no significant limitations in use for crops. The following Agriculture classification of the zones are listed in Table 2 below:

Table 2 Agricultural Land Use

SubSet A	SubSet B	SubClass	Reference
Agricultural SubSet A – Class 3 – 100%: Soils in this class have moderately severe limitations that restrict the range of crops or require special conservation practices	**None**	**SubClass W** - Excess Water	AGRISID 2022
Agricultural SubSet A – Class 1 – 90%: Soils in this class have no significant limitations in use for crops	**Agriculture SubSet B – Class 5 – 10%**: Soils in this class have very severe limitations that restrict their capability in producing perennial forage crops, and improvement practices are feasible	SubClass T - Topography	

5.2 Land Use Zoning and Management

The Site is located on private land, that are leased to BURNCO, within the RVC Land Use Framework. Land use in the region is mainly agricultural, oil and gas, and aggregate.

The properties to the north and west are owned by Hazel George and are used for agricultural pastureland (RCV 2022).

Lands to the east of the Site are zoned as Special, Natural Resource District (S-NAT) and contain active and reclaimed gravel pits, which were operated by BURNCO. The reclaimed properties are owned by Rocky Ridge Farms and Murray Poffenroth, while the operation gravel pit lands are owned by BURNSWEST Properties Ltd and leased to BURNCO (RVC 2022).

The property to the south is owned by Rocky Ridge Farms and is currently zoned as Business, Agricultural District (B-AGR). Additionally, this property has a gravel pit that has not been reclaimed (RVC 2022).

A gravel pit to the southwest (Senger Pit) is operated by AECON Transportation West Ltd. (BURNCO 2022).

5.3 Natural Subregion

Table 3 contains the regional characteristics as they relate to the Site.

Table 3 Regional Characteristics

		Reference
Natural Subregion	Foothills Fescue	Abadata 2022
Topography	Undulating plains (north and east) and rolling to hummocky uplands (south and west) with altitudes between 800 m to 1,500 m.	NRC (2006)
Soil Type	Dominantly Orthic Black Chernozems with some occurrences of Dark Brown Chernozems. Humic Gleysols are associated with wetlands.	
Vegetation	Creeping juniper, Parry oatgrass, bluebunch fescue, and June grass (dry, steep slopes). Addition of mountain rough fescue with increased soil moisture.	
Surficial Geology	Dominantly medium textured, moderately calcareous glacial till.	
Major Land Use	Principal land use is agriculture (cultivation and grazing on native prairie). Significant oil and gas exploration and development in the foothills. Recreation is also popular within the south.	
Water Bodies	Water only occupies 1% of the subregion, primarily in the form of the Waterton, Oldman, Bow, and St. Mary Rivers, and the St. Mary Reservoir. Wetlands comprise 3% of the subregion.	

5.4 Oil, Gas and Utility Activities

There is one active wellsite (License 0241344) owned by Ember Resources Inc. (Ember) located in SE-13-06-27 W4M (Surface 01-12-27-27 W4M). It borders along the southeast corner of the Site. A pipeline (License AB00057357-342), owned by Ember, extends from the wellsite to the east to another wellsite in 4-07-27-26 W4M. (Abacus 2022).

5.5 Waterwells and Water Licensees

A review of the Alberta Water Well Information Database was conducted September 2022 and identified five (5) Water Wells within a radius of approximately 1.6 KM of the Site. The water well ID# 161222 does not exist as per Hazel George during the field assessment.

It is anticipated that there will be no negative impacts to the site or water well users in the area.

6.0 NOISE AND AIR QUALITY

The Site is currently seeded to grass and contains sporadic woody vegetation. Due to the relatively flat land with no significant slope, the vegetative sound absorption is considered moderate (ACI 2022).

The closest occupied residence, excluding the landowner, is 1,600 m southwest of the southern boundary of the Site. Based on the relative distance to the nearest residential receptor and the operational activities of the Site, it is not anticipated that the Site will have a significant impact on the noise climate of the residents to the southwest. A full noise impact assessment and permanent noise monitoring was deemed unnecessary at this time (ACI 2022).

The most common contributors to fine dust particulate for mining operations are on-site traffic, material handling and crushing, wind erosion of conveyance systems, disturbed areas and unprotected stockpiles.

It is MEMS' understanding that the Site's aggregate will be mined from within the groundwater table, which will result in natural dust emission mitigation. The aggregate will then be transported offsite to BURNCO's adjacent Irricana 1 Pit for processing (crushing, washing, *etc.*). Therefore, the Site's only two contributors to particulate emissions are on-site traffic on unpaved roads and wind erosion of disturbed areas and unprotected stockpiles.

Through the use of industry best practices for erosion and dust control/mitigation, MEMS is confident that the proposed operation will result in the minimal generation of dust emissions. To effectively control and mitigate the impacts of dust, the following dust control measures are recommended:

- Maintaining and cleaning equipment regularly.
- Operations to be focused on minimizing "double handling" soil materials.
- Reducing speeds on roadways - a strict maximum speed limit of 30km/hr speed limit will be enforced on site to reduce road dust.
- Watering down traffic lanes during dry periods with the use of a water truck pre-loaded with water from BURNCO's Irricana Pit, frequency to be adjusted as needed.

- If watering down traffic lanes is insufficient, the following stepped approach of increased measures will be implemented:
  - Increasing the frequency of watering down traffic lanes; and
  - using chloride additives, crushed limestones or a proven manufactured product spread along the road in addition to watering.
- Reduce wind erosion from stockpiles by contouring of topsoil and overburden stockpiles at the 3H:1V and leaving the top of the piles in a flat-topped oval shape to maximize stability.
- The topsoil and overburden stockpiles are to be seeded immediately following development.
- Monitoring of stockpiled soils and reclaimed areas will be conducted to ensure mitigative measures are effective.
- Reclamation will be completed progressively upon exhaustion of the aggregate resource within a mining phase or at such a time where the aggregate resource is no longer required.
- Reducing site activities during periods of poor air quality.

Based on the operational activities of the Project and on previous dispersion modelling assessments of similar projects, it is not anticipated that the Project will have a significant impact on regional air quality as a whole. The main project influence will be Site generated dust, but BURNCO expects the potential impacts to be mitigated by the industrial best practices described above.

It is also anticipated that air quality impacts from the Project will decrease rapidly with increasing distance from the Project. Therefore, further air quality assessment is not required at this time. Additionally, permanent air quality monitoring is not recommended for this site. Instead, it is recommended that air quality monitoring be conducted on a case-by-case basis, which is consistent with BURNCO's Environmental Monitoring & Complaint Resolution plan. BURNCO has also committed to the implementation of permanent air quality monitoring if its case-by-case monitoring indicates that is it necessary.

7.0 SOILS

According to the Agricultural Region of Alberta Soil Inventory Database (AGRASID) the landscape model for the Site is described as having rego humic gleysol on fine textured (C, SiC) materials (not till) over medium textured (L, CL) till (BZC). Soils are coarser textured than the dominant or co-dominant soils and Solonetzic soils. The Site resides in a valley with floodplain, low relief landform with slopes ranging from 1-5% on the floodplain and up to 15% on the side slopes.

The average topsoil and subsoil thicknesses within the Site is 10 cm and 11 cm, respectively (BURNCO, 2022)

8.0 SURFACE DRAINAGE

The landscape drains to the north and into Crossfield Creek. Off-site surface water will be diverted around the perimeter of the Site and back into the natural drainage of the land. This will help to not inundate the Site and to maintain original drainage patterns as much as possible.

Temporary drainage structures such as swales and ditches will help to convey water around the Site and away from stockpiles and newly reclaimed areas. Precipitation in the undisturbed areas of the Site will be allowed to flow unimpeded. Surface water within the Site will flow to lower areas within the pit and allowed to percolate through the aggregate layer or to the proposed End Pit Lake after reclamation.

9.0 VEGETATION AND RARE PLANT SPECIES

The Foothills Fescue Natural Subregion is characterized by Creeping juniper, Parry oatgrass, bluebunch fescue, and June grass (dry, steep slopes). Addition of mountain rough fescue with increased soil moisture.

The Alberta Conservation Information Management System (ACIMS) has a database of vascular and non-vascular plants and invertebrate species of special conservation concern. A search of the ACIMS database on September 8, 2022, showed no elements of concern, protected areas, nor crown reservations in the section 12-27-27 W4M (AEP 2018); however, it should be noted that information can be incomplete, and species of special concern may exist in the Site limits. The search results are included in Appendix B.

The Site was previously permitted as a RVC gravel pit. During that time, the Site's sand and gravel material lying above the water table was removed by RVC. Prior to resource removal the Site was stripped of vegetation as part of the operational plan. Based on the lack of rare vegetation species, it is anticipated that there will be no negative impacts to the Site or the surrounding areas.

10.0 WEED CONTROL

The Site is monitored for any prohibited and/or Noxious weeds. If any weeds are identified during the inspection, they are removed and destroyed as per the *Weed Control Act*.

No Prohibited or Noxious weeds are currently onsite.

11.0 WETLANDS AND WATER BODIES

Through a review of the Alberta Merged Wetlands Inventory Map and field assessment there are confirmed no wetlands identified within the boundaries of the Site. A tributary of Crossfield Creek is a minimum of 120 m west of the Site boundary. Crossfield Creek is a minimum of 260 m to the north

of the Site boundary. Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

The Site was previously permitted as a RVC gravel pit. During that time, the Site's sand and gravel material lying above the water table was removed by RVC. Prior to resource removal the Site was stripped of vegetation as part of the operational plan. Based on the confirmation of no wetlands being identified, it is anticipated that there will be no negative impacts to the Site or from the Site to watercourses in the area.

12.0 WILDLIFE

A search of the Fish and Wildlife Internet Mapping Tool (FWIMT) was completed to determine any records for wildlife, specifically for critical wildlife habitat, species at risk, and migratory birds. Based on this information, the records of wildlife species within a 2 km radius of the Site are listed below in Table 4, Appendix A).

Table 4 Critical Wildlife

Common Name	Scientific Name	Alberta Ranking 2020	SARA Schedule 1 Listing
Burrowing Owl	*Athene cunicularia*	Threatened	Endangered
Great Blue Heron	*Ardea herodias*	Sensitive	Special Concern
Brooke Stickleback	*Culaea inconstans*	NA	NA
Fathead Minnow	*Pimephales promelas*	Secure	NA

If initial stripping is to be done between April to September, then a wildlife sweep will be conducted for the Burrowing Owl.

13.0 CONCLUSION

It is MEMS' understanding that the Site's aggregate will be mined from within the groundwater table based on previous site testing and then transported to BURNCO's adjacent Irricana Pit for processing (crushing, washing, *etc.*).

Based on the lack of findings to support the potential for negative impacts to the Site and the surrounding area as it relates to rare vegetation, air quality, surface drainage, soils, wildlife, wetlands and groundwater, combined with the recommendation of nest sweeping for Burrowing Owls, a biophysical impact assessment is not recommended at this time.

14.0 LIMITATIONS OF LIABILITY AND CLOSURE

This report has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this report. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions or misinterpretations by others.

While preparing this report, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this report. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This report has been prepared for the sole and exclusive use of BURNCO who may rely on this report for specific application to this project site. Any other use, or any use of this report by any other party, including any individuals or organisations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this report. If third parties choose to use this report in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion, reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this report, including any individuals or organizations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, will be required to return an executed copy of MEMS Third-Party Reliance Agreement (Appendix F).

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

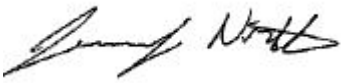
Yours truly,

Millennium EMS Solutions Ltd.

Prepared by:

Kristopher Lyseng, B.Sc.
Environmental Scientist

Reviewed by:



Jennifer North, C.E.T.
Senior Environmental Technologist

15.0 REFERENCES

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the Industrial and Commercial Land Use Section, Land Management Branch, Alberta Sustainable Resource Development, Government of Alberta, Edmonton, AB.

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Prior, G.J., Hathway, B., Glombick, P.M., Pană, D.I., Banks, C.J., Hay, D.C., Schneider, C.L., Grobe, M., Elgr, R. and Weiss, J.A. (2013). Bedrock geology of Alberta. Alberta Energy Regulator, AER/AGS Map 600, scale 1:1 000 000.

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APPENDIX A: FISH AND WILDLIFE INTERNET MAPPING TOOL (FWIMT)

Fish and Wildlife Internet Mapping Tool (FWIMT)

(source database: Fish and Wildlife Management Information System (FWMIS))

Species Summary Report

Report Date: 08-Sep-2022 15:39

Species present within the current extent

Fish Inventory	Wildlife Inventory	Stocked Inventory
BROOK STICKLEBACK	BURROWING OWL	No Species Found in Search Extent
FATHEAD MINNOW	GREAT BLUE HERON	

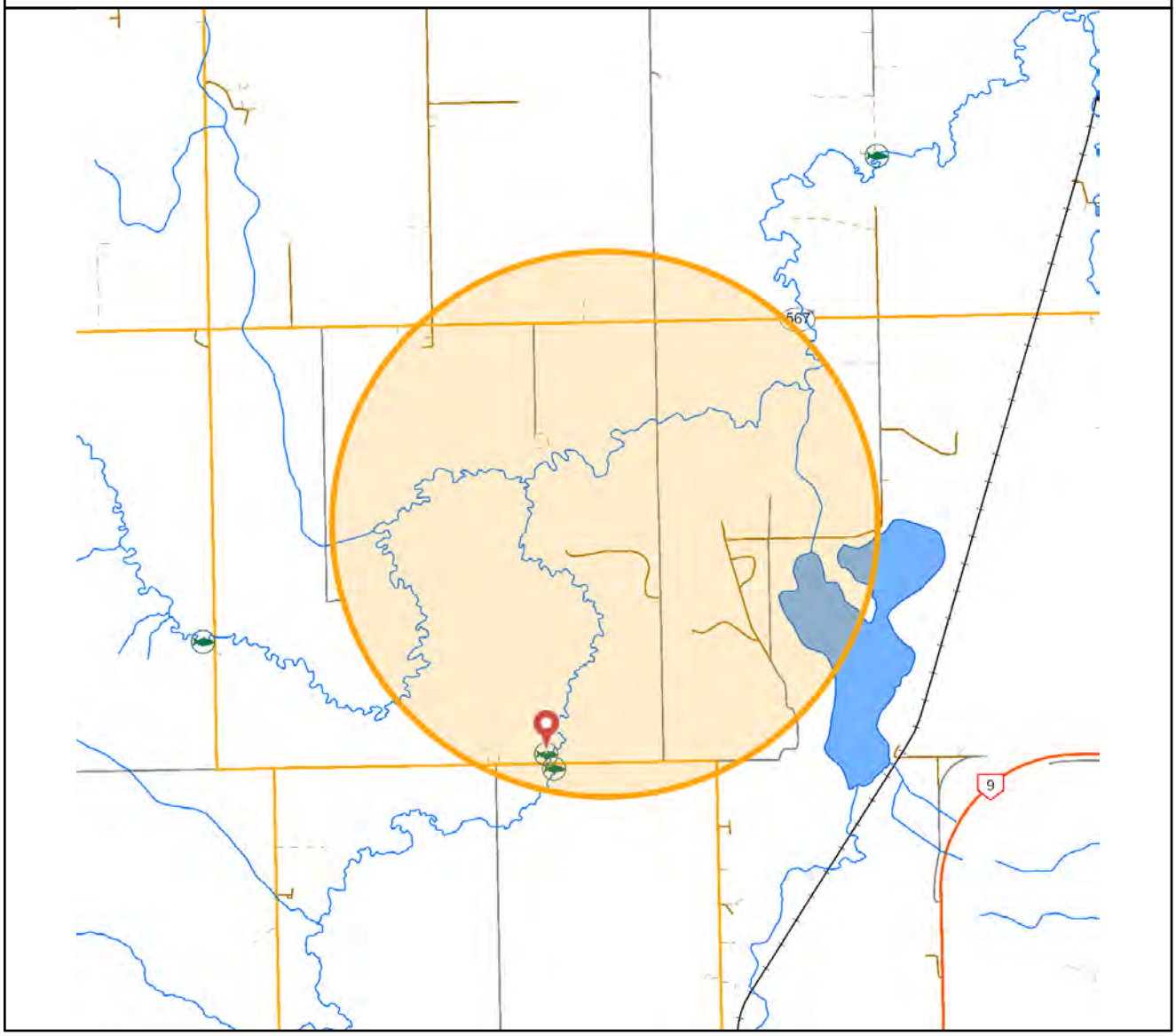
Buffer Extent

Centroid (X,Y)	Projection	Centroid (Qtr Sec Twp Rng Mer)	Radius or Dimensions
592893, 5680241	10-TM AEP Forest	SE 12 27 27 4	2 kilometers

Contact Information

For contact information, please visit:
https://www.alberta.ca/fisheries-and-wildlife-management-contacts.aspx

08-Sep-2022 15:39 **Map Results**



APPENDIX B: ALBERTA CONSERVATION INFORMATION MANAGEMENT SYSTEM (ACIMS)

Date: 1/9/2022
Requestor: Consultant
Reason for Request: Environmental Reporting
SEC: 12 **TWP:** 027 **RGE:** 27 **MER:** 4

Alberta Parks

Non-sensitive EOs (updated: June 2022)

M_RR_TTT_SS	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Non-sensitive EOs Found: Next Steps - See FAQ

Sensitive EOs (updated: June 2022)

M-RR-TTT	EO_ID	ECODE	S_RANK	SNAME	SCOMNAME	LAST_OBS_D

No Sensitive EOs Found: Next Steps - See FAQ

APPENDIX C: WATER WELLS

Alberta Water Well Information Database Map

Projection
Web Mercator (Auxillary Sphere)
Datum
WGS 84
Date
8/26/2022, 3:46:38 PM

Legend
- Groundwater Drilling Report
- Baseline Water Well Report

http://groundwater.alberta.ca/WaterWells/d/

Reconnaissance Report

View in Metric

Export to Excel

Groundwater Wells

Please click the water Well ID to generate the Water Well Drilling Report.

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (ft)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (ft)	TEST RATE (igpm)	SC_DIA (in)
161222	SE	12	27	27	4	UNKNOWN DRILLER		80.00	Chemistry	Domestic				GEORGE, HAZEL M.			0.00
251329	SW	1	27	27	4	GERRITSEN, PETER WATER WELL DRILLING	1966-03-01	160.00	New Well	Unknown		12		LUFT, R			5.56
251403	6	12	27	27	4	UNKNOWN DRILLER	1969-06-09	200.00	Well Inventory	Domestic	1			BUSSEY, J	15.00		0.00
1305228	SW	12	27	27	4	GERRITSEN DRILLING	2008-08-15	137.00	New Well	Domestic		9	22	GEORGE, HAZEL	53.48	13.20	6.00

Baseline Water Well Tests

Please click the water Test ID to generate the Baseline Water Well Test Report.

Test ID	GIC Well ID	LSD	QTR	SEC	TWP	RGE	M	Resource Company	Testing Date	Water Quality	Pump Test	Gas	Isotopes
1078690			SE	1	27	27	4	Encana Corporation	2006-08-28	Yes	Yes	-	-
1079474			SW	12	27	27	4	Encana Corporation	2007-01-26	Yes	Yes	Yes	Yes
1201343			SW	12	27	27	4	Encana Corporation	2008-11-06	Yes	Yes	Yes	Yes

APPENDIX D: AGRICULTURAL REGION OF ALBERTA SOIL INVENTORY DATABASE (AGRASID)

Report on Soil Polygon: 11377

Variable	Value
POLY_ID	11377
Map Unit Name	ZDL1/DL
Landform	DL - disturbed land
LSRS Rating (Spring Grains)	NR(10)

Landscape Model Descriptions:
Miscellaneous undifferentiated mineral soils (ZUN).
The polygon may include soils that are not strongly contrasting from the dominant or co-dominant soils (1).
Disturbed land (urban, open pit mines, gravel pits) (DL).

Image:
No image.

Landform Model:
No landform model.

Landform Profile:
No landform profile.

Report on Soil Polygon: 11311

Variable	Value
POLY_ID	11311
Map Unit Name	BZC15/SC1l
Landform	SC1l - valley with flooplain - low relief
LSRS Rating (Spring Grains)	2HM(8) - 3M(2)

Landscape Model Descriptions:
Rego Humic Gleysol on fine textured (C, SiC) materials (not till) over medium textured (L, CL) till (BZC).
The polygon includes soils that are coarser textured than the dominant or co-dominant soils and Solonetzic soils (15).
Valley with floodplain, low relief landform with slopes ranging from 1-5% on the floodplain and up to 15% on the side slopes (SC1l).

Image:
No image.

Landform Model:
No landform model.

Landform Profile:
No landform profile.

APPENDIX E: OIL AND GAS FACILITIES

AbaData AER Well Report

WELL ID	LICENSE #	LICENSE DATE	WELL NAME	LICENSEE	SURFACE LOCATION	LICENSE STATUS	SPUD DATE	FINAL DRILL DATE	WELL STATUS	ABANDON DATE
100 / 13-06-027-26 W4 / 0	0241344	Aug 25, 2000	EMBER ENTICE 13-6-27-26	EMBER RESOURCES INC.	01-12-027-27W4M	Amended	Aug 26, 2000	Sep 13, 2000	CBMOT FLOW	
100 / 03-12-027-27 W4 / 0	0386962	Dec 5, 2007	EMBER ENTICE 3-12-27-27	EMBER RESOURCES INC.	12-12-027-27W4M	Amended	Jan 5, 2008	Jan 6, 2008	CBMCLS FLOW	
100 / 12-12-027-27 W4 / 2	0386976	Dec 5, 2007	EMBER ENTICE 12-12-27-27	EMBER RESOURCES INC.	12-12-027-27W4M	Amended	Jan 7, 2008	Jan 7, 2008	CBMOT FLOW	
100 / 15-12-027-27 W4 / 0	0387081	Dec 6, 2007	EMBER ENTICE 15-12-27-27	EMBER RESOURCES INC.	09-12-027-27W4M	Amended	Jan 4, 2008	Jan 4, 2008	CBMCLS FLOW	
100 / 16-12-027-27 W4 / 0	0386970	Dec 5, 2007	EMBER ENTICE 16-12-27-27	EMBER RESOURCES INC.	16-12-027-27W4M	Amended	Jan 2, 2008	Jan 3, 2008	CBMCLS FLOW	
100 / 01-13-027-27 W4 / 0	0229264	Nov 25, 1999	PCP PCR 1B IRRICANA 1-13-27-27	OVINTIV CANADA ULC	16-12-027-27W4M	RecCertified	Dec 6, 1999	Dec 20, 1999	ABD	

Government Well Data Current to: August 08, 2022

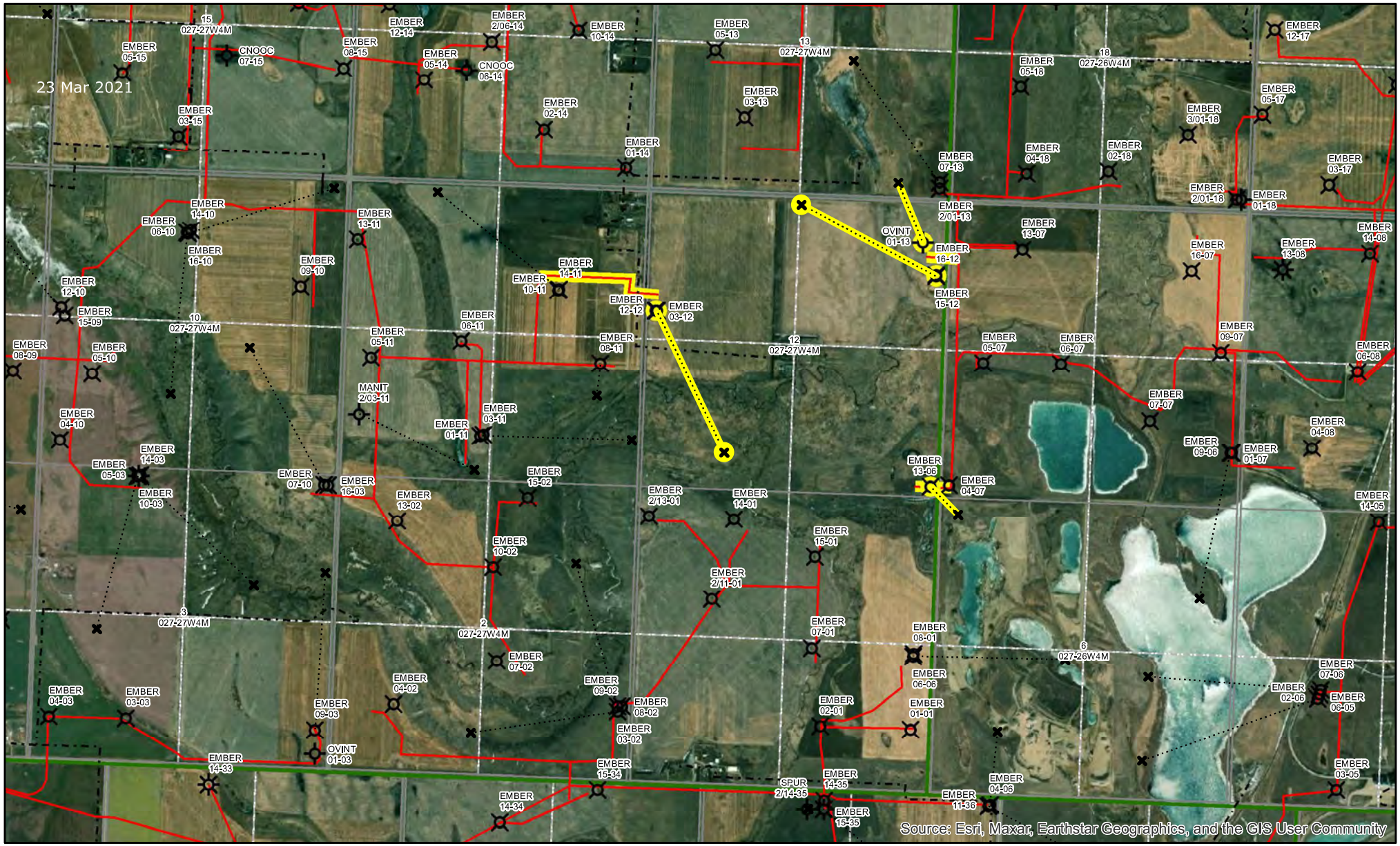
SURFACE LATITUDE	SURFACE LONGITUDE	DOWNHOLE LATITUDE	DOWNHOLE LONGITUDE	H2S (%)
51.285654	-113.662433	51.284321	-113.660198	
51.293771	-113.684290	51.286965	-113.678632	
51.293771	-113.684404	51.293771	-113.684404	
51.295973	-113.662614	51.299225	-113.673296	
51.296045	-113.662614	51.296045	-113.662614	
51.297591	-113.663714	51.300474	-113.665799	0.000

AbaData Pipeline Report

LICENSE / LINE #	PROV	COMPANY NAME	LICENSE DATE	FROM LOCATION	TO LOCATION	LGTH (kms)	STS	SUB	H2S (mol/ kmol)	OD (mm)	WT (mm)	MAT	TYPE	GRD	MOP (kpa)	JNT	INTL COAT	STRESS LEVEL (%)
57357 - 342	AB	EMBER RESOURCES INC.	Feb 11, 2009	1-12-27-27W4 WE	4-7-27-26W4 PL	0.1	O	NG	0	141.3	19.35	P	3408	7.3	1750	B	U	50
57357 - 343	AB	EMBER RESOURCES INC.	Feb 11, 2009	12-12-27-27W4 WE	10-11-27-27W4 PL	0.63	O	NG	0	141.3	19.35	P	3408	7.3	1750	B	U	50
57357 - 344	AB	EMBER RESOURCES INC.	Feb 11, 2009	16-12-27-27W4 WE	13-7-27-26W4 PL	0.14	O	NG	0	141.3	19.35	P	3608	7.3	1750	B	U	50

ENV	FIELD
	ENTICE
	ENTICE
	ENTICE

Oil and Gas: Wells and Pipelines 12-27-27-W4M



Wednesday, September 7, 2022

1:28,455

0 330 660 1,320 m

AbaData

APPENDIX F: MILLENNIUM EMS SOLUTIONS LTD. THIRD PARTY RELIANCE AGREEMENT

MILLENNIUM
EMS Solutions Ltd.

#148, 2257 Premier Way
Sherwood Park, AB T8H 2M8
tel: 780.496.9048
fax: 780.496.9049

Suite 202, 701 64 Avenue SE
Calgary, AB T2H 2C3
tel: 403.592.6180
fax: 403.283.2647

#102, 11312 98 Avenue
Grande Prairie, AB T8V 8H4
tel: 780.357.5500
fax: 780.357.5501

Suite 218, 852 Fort Street
Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO ENVIRONMENTAL SCREENING REPORT

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Environmental Screening Report" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: _____
MEMS Representative
Title
Date

Agreed to this ____ day of •, _____.
[THIRD PARTY]

By: _____
Name:
Title
Date

Appendix 4: Stormwater Management Plan

MILLENNIUM
EMS Solutions Ltd.

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fax: 780.357.5501

Suite 218, 852 Fort Street
Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

Stormwater Management Plan
Roe Gravel Pit
SE 12-27-27 W4M (Title # 891 070 572)

Prepared for:
BURNCO Rock Products Ltd.

Prepared by:
Millennium EMS Solutions Ltd.
#148, 2257 Premier Way
Sherwood Park, Alberta
T8H 2M8

September 2022
22-00690-00

Table of Contents

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List of Appendices

1.0 INTRODUCTION

BURNCO Rock Products Ltd. (BURNCO) retained Millennium EMS Solutions Ltd. (MEMS) to complete a Stormwater Management Plan for the Roe Gravel Pit located within SE 12-27-27 W4M (herein referred to as "the Site"). It is crucial that surface drainage control be used in both the operation and reclamation phases of the project. Surface drainage control helps to eliminate soil erosion, soil loss, and sedimentation from overland and channel flow through active. Additionally, it helps to control flooding and ponding that may occur. It is also vital during the operating and reclamation phases that the Site does not impede, divert, or impound the natural surface or subsurface drainage.

The following details the surface drainage control for of the operating and reclamation phases of the Site.

1.1 Site Background

The Site is the located approximately 5 km southwest of the town of Irricana, Alberta and 18 km east of Airdrie, Alberta. BURNCO has the following three adjoining gravel pits to the east and southeast:

- Irricana 1 is located in SEC 06-27-26 W4M,
- Irricana 2 (Luft) is located in SW 07-27-26W4M; and
- Irricana 3 (Poffenroth) is located in SE 07-27-26 W4M.

Combined, these sites represent a total of 304 hectares (751 acres) in size. Irricana 2 and Irricana 3 are now depleted and reclaimed while Irricana 1 contains an estimated 2,100,000 tonnes of aggregates and is selling roughly 400,000 tonnes of material annually.

The proposed Site is located in the SE 12-27-27 W4M and is 19.32 hectares (47.75 acres) in size. The Site will serve to supply BURNCO's existing Irricana 1 gravel pit with an estimated 1,200,000 tonnes of aggregate through the expansion of permitted reserves. The Site is expected to have a lifespan of 5 to 10 years. The Site was permitted as a Rocky View County (RVC) gravel pit and had an Alberta Environment & Parks (AEP) Registration # 00015044-01-00 under the *Environmental Protection and Enhancement Act* (EPEA). The approval is currently expired and renewable.

2.0 DISCUSSION

2.1 Existing Drainage

The Site area is relatively flat with no permanent water features such as mapped water bodies, rivers, creeks, intermittent drainage, or wetlands. The only two water features are relic water ponds from

previous gravel mining and are currently used as dugouts for livestock. The drainage slope within the Site drains north and east based on the Contour Topographic figures (Appendix A).

The primary drainage destination is to Crossfield Creek to the north side of the Site, and the drainage ditch located to the east of the Site running along Range Road 270.

2.2 Surface Water

Operations at the Site will not divert, block, or impound the natural surface drainage around the active pit. Topsoil and organic materials will continue to be salvaged in new work areas and placed in stockpiles away from surface water drainage paths. All surface water within the pit area will be directed towards and confined within the excavation created by the mining of sand and gravel from the Site. Run-off and groundwater seepages to the low point in the pit will allow for infiltration through the gravel layer.

The pit edges will be constructed with a 5m horizontal to 1m vertical slope (5H:1V) one metre above and one metre below the water table. The remaining slope will be made to a 3m horizontal to 1m vertical slope (3H:1V). There will be a berm constructed 3m horizontal to 1m vertical between Range Road 270 and the closest edges to the Site, to create vegetation buffers.

2.3 Diversion

Surface water management from rain precipitation will be conducted through diversion around the Site and back into the natural drainage of the land. Temporary drainage structures such as swales and ditches will help to convey water around the Site and away from the newly reclaimed areas. Precipitation in the undisturbed areas of the Site will be allowed to flow unimpeded.

Surface water within the Site will be directed to the lowest spot of the excavation to infiltrate down or to the reclaimed End Pit Lake.

2.4 Drainage Best Management Practices

The stormwater management system will be operated in accordance with the Stormwater Management Guidelines (Alberta Government, 1999) standards. During construction activities, and until vegetation can be established, temporary Best Management Practices (BMPs) will be utilized to minimize the effects of sediment erosion and to manage storm water.

The stripping of topsoil and overburden will produce stockpiles on the Site. During the Phase 1 mining phase, topsoil and subsoil will be stockpiled along the eastern edge of the site to create a berm that will remain after reclamation. Overburden will be progressively stripped and stockpiled along the north edge of the Phase 1 mining phase. Vegetation cover will be required for stockpiles to

prevent water quality or wind erosion/dust issues. Operations personnel will inspect erosion and sediment control (ESC) devices after heavy rainfalls of 25 mm or more within a 24-hour duration.

The Site will be mining aggregate from within the water table and is not expected to require maintenance for removing stormwater or maintenance, including sediment removal, during their operational life.

3.0 CLOSURE

This report has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this report. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions or misinterpretations by others.

While preparing this report, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this report. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This report has been prepared for the sole and exclusive use of BURNCO who may rely on this report for specific application to this project site. Any other use, or any use of this report by any other party, including any individuals or organisations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this report. If third parties choose to use this report in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion, reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this report, including any individuals or organizations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy

Act, will be required to return an executed copy of MEMS Third Party Reliance Agreement in Appendix B.

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

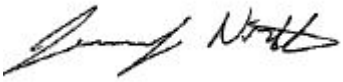
Yours truly,

Millennium EMS Solutions Ltd.

Prepared by:

Kristopher Lyseng B.Sc.
Environmental Scientist

Reviewed by:



Jennifer North, C.E.T.
Senior Environmental Technologist

4.0 REFERENCES

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Government of Alberta, 1999. Stormwater Management Guidelines for the province of Alberta. Stormwater Management Guidelines. Current as of January 1999

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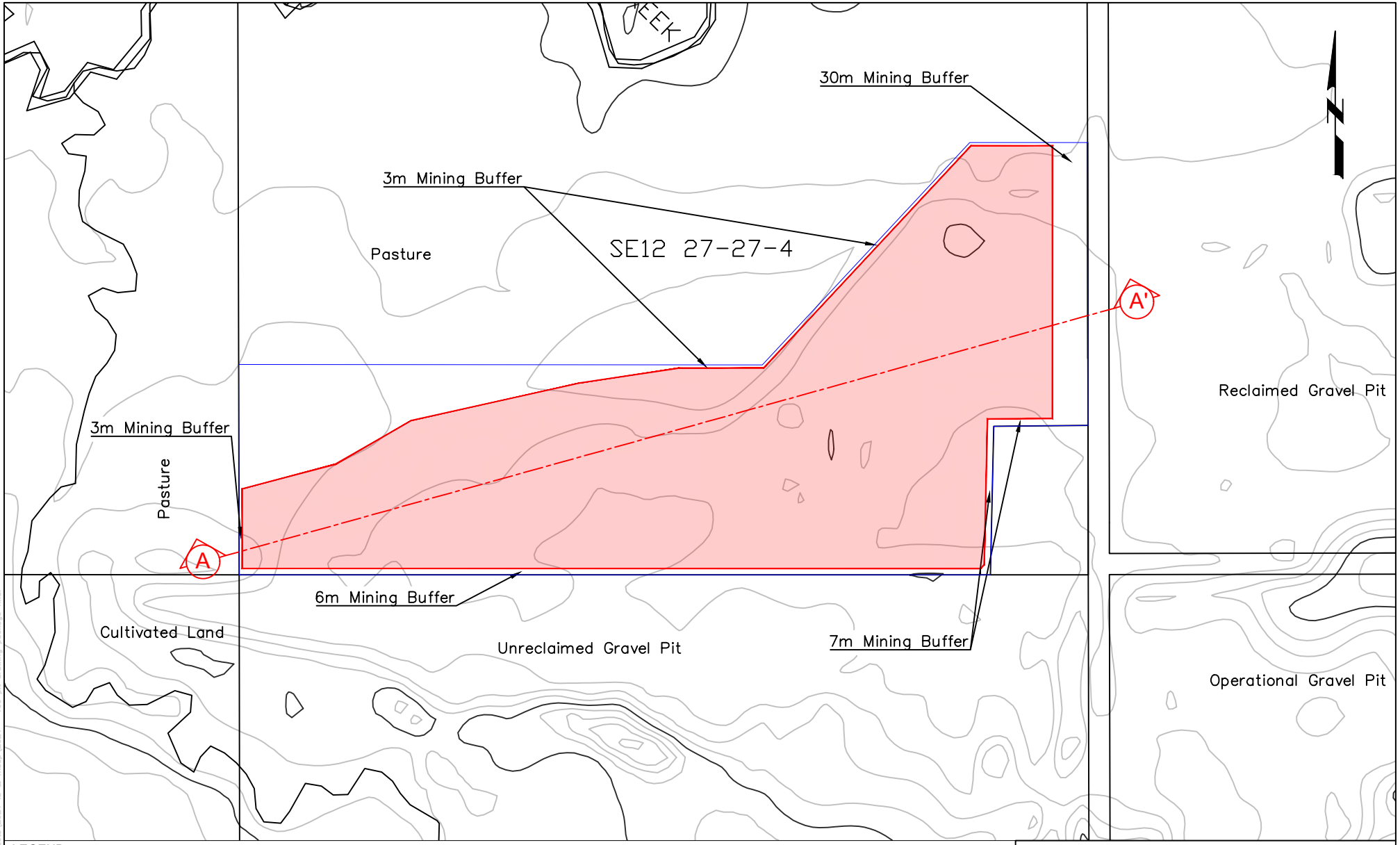
APPENDIX A: CONTOUR MAPS



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

ROE GRAVEL PIT

SITE EXISTING CONTOURS MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	5
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	

APPENDIX B: MILLENNIUM EMS SOLUTIONS LTD. THIRD PARTY RELIANCE AGREEMENT

MILLENNIUM
EMS Solutions Ltd.

#148, 2257 Premier Way
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Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO STORMWATER MANAGEMENT PLAN

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Stormwater Management Plan" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: _____
MEMS Representative
Title
Date

Agreed to this ____ day of •, _____.
[THIRD PARTY]

By: _____
Name:
Title
Date

Appendix 5: Desktop Groundwater Assessment and Field Verified Groundwater Well Survey

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EMS Solutions Ltd.

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www.mems.ca

Roe Pit
Desktop Groundwater Assessment and Field Verified Groundwater Well Survey
SE 12-027-27 W4M

Prepared for:
BURNCO Rock Products Ltd.

Prepared by:
Millennium EMS Solutions Ltd.
#148, 2257 Premier Way
Sherwood Park, Alberta
T8H 2M8

September 2022
File 22-00690-00

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1.0 INTRODUCTION

Millennium EMS Solutions Ltd. (MEMS) was retained by BURNCO Rock Products Ltd. (BURNCO) to complete a desktop groundwater assessment and field verified groundwater well survey for the Roe Gravel Pit, located within SE 12-027-27 W4M (herein referred to as "the Site"), which is approximately 18 kilometres (km) east of Airdrie, AB with Rocky View County (RVC). The Site is adjacent to another operating BURNCO pit, the Irricana 1 Pit, and has been operated by RVC in the past. The Site will be operating under the *Environmental Protection and Enhancement Act* (EPEA) Approval No. 00015044-01-00 (AEP, 1996).

1.1 Scope of Work

The scope of work is to support municipal approvals for the Site. This included a search of available datasets, a field-verified water well survey within 1.6 km of the Site and an assessment on the potential groundwater users in the area.

2.0 BACKGROUND

2.1 Proposed Development

BURNCO is proposing to continue the development of the Site and deplete the aggregate deposit within the groundwater. The Site will be 19.32 hectares (ha) (47.75 acres) in total and provide an estimated 1,200,000 tonnes of aggregate. The aggregate will be bailed to surface and transported to BURNCO's adjacent Irricana 1 gravel pit in section 06-027-27 W4M for processing (washing and crushing).

2.2 Regional Hydrogeology

The dominant soils in the area consist of the Balzac soil series, a rego humic gleysol developed on fine textured silty clay and sandy clay. These are commonly found in a depression or a valley topography (AGRASID, 2022).

The Site is underlain by Quaternary deposits and Cretaceous bedrock. Quaternary deposits consist predominantly of glacial till deposits with layers of sand and/or gravel while the upper bedrock consists of shale from the Paskapoo Formation.

The Quaternary deposits in the vicinity of the Site are composed of fluvial deposits associated with a meltwater channel. The deposits consist of gravel, sand, silt and clay, as well as local till up to 20 metres in thickness (Shetsen, 1987).

The Quaternary deposits contain aquifers to aquitards based on the amount of sand and gravel present and the overall hydraulic conductivity of the unit at a given location. As a result, the

expected yield of the units vary greatly, from less than 10 m³/day to over 100 m³/day (HCL, 2002) and are characterised as being patchy since yield is correlated to the presence of sand and gravel. In general groundwater in the surficial deposits is of the calcium-magnesium-bicarbonate-type with total dissolved solids (TDS) exceeding 200 mg/L (HCL, 2002).

The underlying Paskapoo Formation in the vicinity of the Site is approximately 190 m in thickness (Borneuf, 1977) and comprised of interbedded hard to soft mudstone, siltstone, and sandstone, with subordinate limestone, coal, pebble conglomerate and bentonite (Glass, 1997). The groundwater yield from wells installed within the upper bedrock in the vicinity of the site range from 10 to 75 m³/day. The TDS in these bedrock aquifers exceed 1,100 mg/L with chloride concentrations less than 50 mg/L and a total hardness of less than 100 mg/L (HCL, 2002).

2.3 Local Groundwater Users

Information from the Alberta Environment and Parks (AEP) Water Well Database indicate that there are five water wells located within a 1.6 km radius of the Site. Of the five water well records, three were for water wells for domestic purposes, one agricultural and one for monitoring. These records are summarized in Table 2 in Section 4.2 below.

There was sufficient information to determine that the George Water Well (WW) (Well ID #1305228) is completed in a bedrock aquifer. The information available for the Luft WW (Well ID #251329) indicates the water well is likely completed in a bedrock aquifer while there is insufficient information to determine the completion interval of Well ID #251403. The record for Well ID #161222, also owned by Hazel George, was confirmed that it doesn't exist.

2.4 AEP Authorization Viewer Database

The AEP Authorization Viewer database indicates that there are four authorized groundwater approvals which are provided in Table 1 below.

Table 1 AEP Authorization Viewer

Approval Number	Approval Holder	Location	Use
73598-00-00	GEORGE, HAZEL M.	SE 12-027-27 W4	Domestic
156397-00-00	Rocky Ridge Farms Ltd.	SW 01-027-27 W4	N/A
29252-00-01	BURNCO Rock Products Ltd.	SW 06-027-26 W4M	Industrial - Washing
157385-00-00	BURNCO Rock Products Ltd.	SW 07-027-26 W4M	End Pit Lake

2.5 Water Bodies within 1.6 km

Through a review of the Alberta Merged Wetlands Inventory Map and field assessment there are no confirmed wetlands identified within the boundaries of the Site. The Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

2.6 BURNCO Commitments to the Landowner

During discussions and agreements with the landowner, BURNCO will complete a pumping test of Hazel George's well (Well ID #1305228) to determine its hydrogeological properties of the aquifer, such as the long-term sustainable yield and the efficiency of the water well. BURNCO has also committed to conducting annual chemical analyses on the groundwater from the water well that includes routine potability (major anions and cations), and dissolved metals on this well.

Should any negative impacts from the Site's operations be observed for any water well user, BURNCO has committed to a complaint protocol. This includes the following measures:

- If a landowner's water well is without water, a temporary alternate water supply will be provided within 24-hours.
- A third-party consultant will be contracted within 14-days to investigate the cause.
- If it is deemed that BURNCO's mining operation is partially responsible for the decrease in water supply, a permanent alternate water supply will be installed.

3.0 METHODOLOGY

3.1 Background Data Collection

In order to conduct the current investigation, background data was collected from (but not limited to) the following sources in order to assess the local and regional geologic and hydrogeological setting in relation to the Site.

- AEP Water Well Information Database (AEP, 2022) – Groundwater records were obtained from the database and used to help prepare geological and hydrogeological interpretations and the field verified well survey.
- AEP Authorization Viewer/Database – A list of licensed, registered, and authorized groundwater diversions under the *Water Act* was obtained from AEP on September 10, 2022 to help identify other nearby groundwater users.
- Alberta Geological Survey (AGS) – Regional geological and hydrogeological reports and maps.
- Test data provided by BURNCO.

3.2 Field-Verified Water Well Survey

Using all water well records available in the AEP Water Well Information Database as a starting point, MEMS conducted a field-verified water well survey within 1.6 km of the Site on September 2, 2022. When contact was made with a landowner, an attempt was made to confirm the data available from the AEP Water Well Information Database. This included measuring the water level in the water well if it were practical, obtain coordinates for water wells using a GPS unit, and obtain any other information regarding the well that the landowner was prepared to provide. If a water well was identified that was not apart of the AEP Water Well Information Database, then as much information as possible was obtained for the water well and it was added to the list of wells within the study area.

4.0 RESULTS

4.1 Site Geology and Hydrogeology

4.1.1 Geology

Surficial materials underlying the Site consist of topsoil and subsoil with an average thickness of 0.13 m and 0.14 m respectively. Overburden of fine sand was present in two boreholes. The sand and gravel deposits range from 3.5 m to 8.0 m in thickness. This information is based on the test data provided by BURNCO.

Based on the recorded lithology for GIC Well ID #1305228, the top of the bedrock in the vicinity of the Site is at approximately 9.8 m bgs (AWWID, 2022).

4.1.2 Hydrogeology

The groundwater at the Site has been determined to be approximately 934.6 metres above sea level (masl) which is approximately 1.4 m below original ground surface (BURNCO, 2022).

Groundwater flow direction could not be interpreted due to insufficient data; however, it is anticipated to follow the local topography, which slopes to the north and north-west (Figure 5).

Water well records for nearby water wells provide the pumping rate and water levels during the pumping tests conducted in order to develop the water wells after drilling and completion. The pumping rates for these development tests range between 60.0 L/min and 77.3 L/min for Well ID #1305228 and Well ID #1305873 respectively.

4.2 Field-Verified Water Well Survey

The AEP Water Well Information Database includes five water well records within 1.6 km of the Site. Of the five water well records, three were for domestic purposes, one for agricultural and on for monitoring. These five records are summarized in Table 2 below including if the field verified activity was able to occur.

MEMS personnel conducted a field-verified water well survey within 1.6 km of the Site on September 2, 2022. The purpose of the field verified water well survey was to locate as many water wells in the field survey area as practical and where possible, to update the information available for the water wells.

Table 2 Water Well List

Well ID	Owner	Location	Depth (m)	GPS Location	Use	Field-Verified
1305228	GEORGE, HAZEL M.	SE 12-027-27 W4	41.8	51.2920503 -113.6735586	Domestic	Yes
251329	LUFT, R	SW 01-027-27 W4	48.8	51.2720936 -113.6778465	Agricultural	Yes
251403	LUFT, R	SW 01-027-27 W4M	61.0	51.2720498 -113.6815275	Domestic	Yes
161222	GEORGE, HAZEL M.	SE 12-027-27 W4	24.4	-	Domestic	No
N/A	BURNCO Rock Products Ltd.	SE 06-027-26 W4M		51.2708256 -113.6486761	Monitoring	Yes

The Well ID #1305228 is utilized by two residences. The drilling report indicates it was drilled to a total depth of 41.8 m bgl and completed from 38.1 to 41.5 m bgl in a sandstone aquifer within the bedrock.

As per the landowner Hazel George, Well ID #161222 does not exist.

5.0 DISCUSSION

The estimated depth of the gravel deposit ranges from 3.5 m to 8.0 m below ground surface. Based on the cross-sections, the groundwater table was approximately 934.6 masl and approximately 1.4 m below original ground surface.

Of the three existing water wells within 1.6 km of the Site, it appears that all three are completed in bedrock aquifers. Lithology and completion depth information for Well ID #1305228 indicate this water well is completed in a bedrock aquifer. Although completion depth information is not available for Well ID #251329 the lithology that is available indicates the water well is likely completed in a bedrock aquifer. For Well ID #251403, there is no lithology or depth information for the water well, but the available chemical analysis indicates the groundwater is of a sodium-bicarbonate-sulfate type quality, typical of groundwater from bedrock aquifers in Alberta. Water wells completed in bedrock aquifers have completion intervals that would be below the base of overlying sands and gravels in the surficial deposits. Well ID #1305228 (Hazel George) is the nearest well to the Site and it is completed in the bedrock. The landowner has consented to the gravel pit and the reclamation of an EPL.

The nearest point to a water body is a tributary of the Crossfield Creek that is a minimum of 120 m west of the Site boundary. Crossfield Creek is a minimum of 260 m to the north of the Site boundary. The Crossfield Creek is not a classed water course, as per the Code of Practice for Watercourse Crossings (AEP, 2012).

5.1 Potential Impacts to Water Well users within 1.6 km

The development plan includes bailing the aggregate to surface and not the dewatering of the aggregate deposit in order to mine. This will reduce any potential impacts to water well users in the area. The potential impacts from the Site's mining operations include the following:

- Increased total suspended solids within the groundwater.
- Increased surface water infiltration to the unconfined sand and gravel aquifer due to the removal of the surficial material.
- Risk of a spill from fuel and chemicals required for the heavy equipment necessary for the mining operation.

The nearest well belongs to the landowner, Hazel George. The water well is completed in the bedrock of the Paskapoo Formation, below the depth of any sand and gravel deposits and, as a result, is not expected to be adversely affected by activities at the Site. The well is located on the opposite side of the Crossfield Creek.

6.0 CONCLUSIONS

The groundwater elevation within the Site is approximately 934.6 masl and approximately 1.4 m below original ground surface. The aggregate deposit is in an unconfined aquifer within the surficial deposits. The Site is in a glacial meltwater channel and within a valley associated to Crossfield Creek.

Five water wells were listed during the desktop assessment and four were located during the field-verified survey with the fifth well confirmed that it doesn't exist. Other than one monitoring well for the Irricana Pit, the three water wells within 1.6 km of the Site appear to be completed in the upper bedrock. As a result, the three water wells are not expected to be adversely affected by operations at the Site. Based on this understanding, and BURNCO's commitment to monitor the nearby landowner's well (Hazel George water well ID #1305228 [domestic use]), no additional permanent groundwater monitoring is recommended at this time.

The commitments from BURNCO to the water well users within 1.6 km that have been negatively impacted from the mining operations are to:

- If a landowner's water well is without water a temporary alternate water supply will be provided within 24-hours.
- A third-party consultant will be contracted within 14-days to investigate the cause.
- If it is deemed that BURNCO's mining operation is partially responsible for the decrease in water supply, a permanent alternate water supply will be installed.

The nearest water body is the Crossfield Creek and its tributary and due to its distance from the Site, no adverse affects related to the Site operations are expected.

It is anticipated that there will be a low risk of a negative impact to the local water well users or surface water body due to the nature of the aggregate deposit and the fact that no dewatering activities are to occur.

7.0 RECOMMENDATIONS

The following measure may be used to decrease the risk of a negative impact to groundwater users in the vicinity:

- Spill response kits will be kept on-site, and employees will be adequately trained.
- Any releases will be reported according to the Guide to Release Reporting: Alberta *Environmental Protection and Enhancement Act* (Alberta's Queen's Printer, 2005).
- Hazardous materials will be located in a designated storage area, away from high traffic areas, or drainage ditches and areas that area exposed to high winds or rains. Excessive amounts of hazardous materials will not be stored at the site. All hazardous material containers must be labeled clearly as per Workplace Hazardous Material Information System (WHMIS) standards and have all Material Safety Data Sheets (MSDS) available on-site. Hazardous materials storage should be fenced and locked.

- Equipment will be fueled in a designated area with a fuel truck. Appropriate firefighting equipment will be located at the fueling area. The fueling area will be located within the staging area away from the drainage ditches, and at least 100 m away from any water body. As a contingency, containment equipment should be placed underneath the equipment being fueled. A spill response kit will be available at the fueling area.
- Portable toilets with holding tanks may be provided for collecting, storing and disposing of human waste.
- Hazardous materials storage will be located at a minimum of 100 m from any watercourse or water body.
- Potential spillage from the fuelling process could migrate and contaminate the soil or groundwater. Proper measures will be taken to mitigate the risk.

8.0 LIMITATIONS OF LIABILITY

This report has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this report. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions or misinterpretations by others.

While preparing this report, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this report. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This report has been prepared for the sole and exclusive use of BURNCO who may rely on this report for specific application to this project site. Any other use, or any use of this report by any other party, including any individuals or organisations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this report. If third parties choose to use this report in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion,

reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this report, including any individuals or organizations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, will be required to return an executed copy of MEMS' Third-Party Reliance Agreement in Appendix D.

9.0 CLOSURE

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

Regards,

Millennium EMS Solutions Ltd.

Prepared by:

Jennifer North, C.E.T.
Senior Environmental Technologist

Reviewed by:

PROFESSIONAL GEOLOGIST ALBERTA
JASON T. SANDERS

2022-09-21

Jason Sanders, P.Geol.
Senior Hydrogeologist

PERMIT TO PRACTICE
MILLENNIUM EMS SOLUTIONS LTD
RM SIGNATURE
RM APEGA ID #: 58088
DATE: 2022-09-21
PERMIT NUMBER: P007002
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)

Validated by:
Jason Sanders, P.Geol.
Senior Hydrogeologist

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APPENDIX A: WATER WELL USERS DATABASE RESULTS

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 161222
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1991/05/01

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GEORGE, HAZEL M.	RR 2, AIRDRIE				T4B 2A4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.288741 Longitude -113.667631
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Not Applicable

Type of Work
Chemistry

Proposed Well Use
Domestic

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description

Yield Test Summary

Measurement in Metric

Recommended Pump Rate L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
24.38 m			

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	24.38

Surface Casing (if applicable)

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Bottom at : 0.00 m

Well Casing/Liner

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Top at : 0.00 m
Bottom at : 0.00 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)

Perforated by

Annular Seal

Placed from 0.00 m to 0.00 m
Amount

Other Seals

Type	At (m)

Screen Type

Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack

Type
Grain Size
Amount 0.00

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
UNKNOWN DRILLER

Copy of Well report provided to owner
Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 161222
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 1991/05/01

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GEORGE, HAZEL M.	RR 2, AIRDRIE				T4B 2A4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SE	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.288741 Longitude -113.667631
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate L/min
Recommended Pump Intake Depth (From TOC) m
Pump Installed
Depth m
Type
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Remedial Action Taken
Submitted to ESRD

Sample Collected for Potability
Submitted to ESRD

Additional Comments on Well

Yield Test

Taken From Ground Level Measurement in Metric

Test Date	Start Time	Static Water Level
		m

Method of Water Removal

Type
Removal Rate L/min
Depth Withdrawn From m

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
UNKNOWN DRILLER

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 251403
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BUSSEY, J	P.O. BOX 126 IRRICANA				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	6	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.290549 Longitude -113.676284
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Unknown

Proposed Well Use
Domestic

Type of Work
Well Inventory

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 0.00 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
1969/06/09		4.57

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
60.96 m			1969/06/09

Borehole

Diameter (cm)	From (m)	To (m)
0.00	0.00	60.96

Surface Casing (if applicable)

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Bottom at : 0.00 m

Well Casing/Liner

Size OD : 0.00 cm
Wall Thickness : 0.000 cm
Top at : 0.00 m
Bottom at : 0.00 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)

Perforated by

Annular Seal

Placed from 0.00 m to 0.00 m
Amount

Other Seals

Type	At (m)

Screen Type

Size OD : 0.00 cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack

Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
UNKNOWN DRILLER

Copy of Well report provided to owner
Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 251403
GoA Well Tag No.
Drilling Company Well ID
Date Report Received

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
BUSSEY, J	P.O. BOX 126 IRRICANA				

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	6	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.290549 Longitude -113.676284
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 0.00 L/min
Recommended Pump Intake Depth (From TOC) 0.00 m
Pump Installed
Depth m
Type
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Well Disinfected Upon Completion
Geophysical Log Taken
Remedial Action Taken
Submitted to ESRD
Sample Collected for Potability
Submitted to ESRD Yes
Additional Comments on Well

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
1969/06/09	12:00 AM	4.57 m

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)

Method of Water Removal

Type
Removal Rate L/min
Depth Withdrawn From 0.00 m

If water removal period was < 2 hours, explain why

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
UNKNOWN NA DRILLER

Certification No
1

Company Name
UNKNOWN DRILLER

Copy of Well report provided to owner

Date approval holder signed

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 1305228
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2008/10/31

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GEORGE, HAZEL	BOX 2 SITE 2 RR 2	AIRDRIE	ALBERTA	CA	T4B 2A4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.288800 Longitude -113.679000
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Rotary

Proposed Well Use
Domestic

Type of Work
New Well

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
7.01		Tan Sandy Clay
8.23		Light Brown Sand
9.75		Tan Till & Clay
29.26		Blue Soft Clay & Sand
33.83		Blue Clay
36.88		Blue Hard Clay
38.40		Blue Shale
41.45		Blue Sandstone
41.76		Dark Blue Shale

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 60.01 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2008/08/22	60.01	16.30

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
41.76 m	41.76 m	2008/08/15	2008/08/15

Borehole

Diameter (cm)	From (m)	To (m)
20.02	0.00	37.49
13.02	37.49	41.76

Surface Casing (if applicable)
Plastic
Size OD : 15.24 cm
Wall Thickness : 0.965 cm
Bottom at : 37.49 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.602 cm
Top at : 35.66 m
Bottom at : 41.76 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
38.10	41.45	0.475		7.62

Perforated by Saw

Annular Seal Bentonite Chips/Tablets
Placed from 0.00 m to 37.49 m
Amount

Other Seals

Type	At (m)

Screen Type
Size OD : cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings Bottom Fittings

Pack
Type Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
CHRIS GERRITSEN

Certification No
4385Q

Company Name
GERRITSEN DRILLING

Copy of Well report provided to owner
Yes

Date approval holder signed
2008/09/10

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 1305228
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2008/10/31

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
GEORGE, HAZEL	BOX 2 SITE 2 RR 2	AIRDRIE	ALBERTA	CA	T4B 2A4

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	SW	12	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.288800 Longitude -113.679000
How Location Obtained
Not Verified

Elevation m
How Elevation Obtained
Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level 55.88 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate 60.01 L/min
Recommended Pump Intake Depth (From TOC) 41.00 m
Pump Installed Depth m
Type Make H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS) Depth m
Gas Depth m
Remedial Action Taken
Well Disinfected Upon Completion
Geophysical Log Taken
Submitted to ESRD

Sample Collected for Potability Submitted to ESRD

Additional Comments on Well
LITH: 0'-23' ALSO SOFT.32'-96' ALSO LAYERS.

Yield Test

Taken From Ground Level
Depth to water level

Measurement in Metric

Test Date	Start Time	Static Water Level
2008/08/22	7:12 AM	16.30 m

Method of Water Removal
Type Pump
Removal Rate 60.01 L/min
Depth Withdrawn From 41.00 m

If water removal period was < 2 hours, explain why
MEASUREMENTS TAKEN FROM TOP OF CASING.

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
16.30	0:00	17.18
16.33	2:00	17.01
16.33	4:00	16.91
16.38	6:00	16.86
16.53	8:00	16.81
16.60	10:00	16.78
16.66	12:00	16.75
16.70	14:00	16.73
16.73	16:00	16.71
16.76	20:00	16.67
16.81	24:00	16.65
16.86	30:00	16.62
16.90	34:00	16.61
16.93	40:00	16.59
16.97	50:00	16.57
17.01	60:00	16.55
17.05	74:00	16.53
17.09	90:00	16.51
17.12	104:00	16.50
17.16	120:00	16.49
17.18	132:00	16.48
	4150:00	16.40

Water Diverted for Drilling

Water Source	Amount Taken	Diversion Date & Time
	L	

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
CHRIS GERRITSEN

Certification No
4385Q

Company Name
GERRITSEN DRILLING

Copy of Well report provided to owner
Yes

Date approval holder signed
2008/09/10

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GOWN ID

GIC Well ID 1305873
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2022/01/04

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
SENGER, MACKENZIE		IRRICANA	ALBERTA	CANADA	

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	8	11	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.290121 Longitude -113.689165
How Location Obtained
Map

Elevation m
How Elevation Obtained
Not Obtained

Drilling Information

Method of Drilling
Combination

Proposed Well Use
Domestic & Stock

Type of Work
New Well

Formation Log

Measurement in Metric

Depth from ground level (m)	Water Bearing	Lithology Description
0.61		Topsoil
1.22		Tan Clay
10.06		Brown Clay & Rocks
33.53		Gray Clay
35.05		Light Blue Shale
35.36		Blue Shale
37.49		Gray Medium Grained Sandstone

Yield Test Summary

Measurement in Metric

Recommended Pump Rate 68.19 L/min

Test Date	Water Removal Rate (L/min)	Static Water Level (m)
2021/09/27	77.28	11.52

Well Completion

Measurement in Metric

Total Depth Drilled	Finished Well Depth	Start Date	End Date
37.49 m	37.49 m	2021/09/24	2021/09/24

Borehole

Diameter (cm)	From (m)	To (m)
19.81	0.00	33.83
15.24	33.83	35.05
13.21	35.05	37.49

Surface Casing (if applicable)
Plastic
Size OD : 15.24 cm
Wall Thickness : 0.965 cm
Bottom at : 35.05 m

Well Casing/Liner
Plastic
Size OD : 11.43 cm
Wall Thickness : 0.602 cm
Top at : 34.14 m
Bottom at : 37.49 m

Perforations

From (m)	To (m)	Diameter or Slot Width (cm)	Slot Length (cm)	Hole or Slot Interval(cm)
35.05	37.49	0.559	10.16	15.24

Perforated by Saw

Annular Seal Bentonite Slurry
Placed from 0.00 m to 35.05 m
Amount 120.00 Gallons

Other Seals

Type	At (m)
Driven	33.83

Screen Type
Size OD : cm

From (m)	To (m)	Slot Size (cm)

Attachment
Top Fittings
Bottom Fittings

Pack
Type
Grain Size
Amount

Contractor Certification

Name of Journeyman responsible for drilling/construction of well
MICHAEL PHILLIPS

Certification No
136572A

Company Name
GERRITSEN DRILLING

Copy of Well report provided to owner
Yes

Date approval holder signed
2021/09/29

Water Well Drilling Report

View in Imperial | Export to Excel

The driller supplies the data contained in this report. The Province disclaims responsibility for its accuracy. The information on this report will be retained in a public database.

GIC Well ID 1305873
GoA Well Tag No.
Drilling Company Well ID
Date Report Received 2022/01/04

GOWN ID

Well Identification and Location

Measurement in Metric

Owner Name	Address	Town	Province	Country	Postal Code
SENGER, MACKENZIE		IRRICANA	ALBERTA	CANADA	

Location	1/4 or LSD	SEC	TWP	RGE	W of MER	Lot	Block	Plan	Additional Description
	8	11	27	27	4				

Measured from Boundary of
m from
m from

GPS Coordinates in Decimal Degrees (NAD 83)
Latitude 51.290121 Longitude -113.689165
How Location Obtained: Map

Elevation m
How Elevation Obtained: Not Obtained

Additional Information

Measurement in Metric

Distance From Top of Casing to Ground Level: 45.72 cm
Is Artesian Flow
Rate L/min
Is Flow Control Installed
Describe

Recommended Pump Rate: 68.19 L/min
Recommended Pump Intake Depth (From TOC): 33.53 m
Pump Installed
Depth m
Type
Make
H.P.
Model (Output Rating)

Did you Encounter Saline Water (>4000 ppm TDS)
Depth m
Gas
Depth m
Well Disinfected Upon Completion: Yes
Geophysical Log Taken
Remedial Action Taken
Submitted to ESRD

Sample Collected for Potability: Yes
Submitted to ESRD

Additional Comments on Well

Yield Test

Taken From Top of Casing
Depth to water level

Measurement in Metric

Test Date: 2021/09/27
Start Time: 11:00 AM
Static Water Level: 11.52 m

Method of Water Removal
Type: Pump
Removal Rate: 77.28 L/min
Depth Withdrawn From: 33.53 m

If water removal period was < 2 hours, explain why

Pumping (m)	Elapsed Time Minutes:Sec	Recovery (m)
11.52	0:00	15.30
12.72	2:00	14.07
13.07	4:00	13.82
13.22	6:00	13.69
13.35	8:00	13.60
13.43	10:00	13.51
13.51	12:00	13.44
13.59	14:00	13.37
13.66	16:00	13.32
13.78	20:00	13.22
13.89	24:00	13.14
13.99	30:00	13.03
14.21	40:00	12.89
14.35	50:00	12.67
14.55	60:00	12.59
14.83	80:00	12.43
15.07	100:00	12.34
15.30	120:00	12.25

Water Diverted for Drilling

Water Source	Amount Taken		Diversion Date & Time
COUNTY OF WHEATLAND	9092.18	L	2021/09/20 1:00 PM

Contractor Certification

Name of Journeyman responsible for drilling/construction of well: MICHAEL PHILLIPS
Certification No: 136572A
Company Name: GERRITSEN DRILLING
Copy of Well report provided to owner: Yes
Date approval holder signed: 2021/09/29

Alberta Water Well Information Database Map

Projection
Web Mercator (Auxillary Sphere)
Datum
WGS 84
Date
8/26/2022, 3:46:38 PM

Legend
- Groundwater Drilling Report
- Baseline Water Well Report

http://groundwater.alberta.ca/WaterWells/d/

Alberta

Reconnaissance Report

View in Metric

Export to Excel

Groundwater Wells

Please click the water Well ID to generate the Water Well Drilling Report.

GIC Well ID	LSD	SEC	TWP	RGE	M	DRILLING COMPANY	DATE COMPLETED	DEPTH (ft)	TYPE OF WORK	USE	CHM	LT	PT	WELL OWNER	STATIC LEVEL (ft)	TEST RATE (igpm)	SC_DIA (in)
161222	SE	12	27	27	4	UNKNOWN DRILLER		80.00	Chemistry	Domestic				GEORGE, HAZEL M.			0.00
251329	SW	1	27	27	4	GERRITSEN, PETER WATER WELL DRILLING	1966-03-01	160.00	New Well	Unknown		12		LUFT, R			5.56
251403	6	12	27	27	4	UNKNOWN DRILLER	1969-06-09	200.00	Well Inventory	Domestic	1			BUSSEY, J	15.00		0.00
1305228	SW	12	27	27	4	GERRITSEN DRILLING	2008-08-15	137.00	New Well	Domestic		9	22	GEORGE, HAZEL	53.48	13.20	6.00

Baseline Water Well Tests

Please click the water Test ID to generate the Baseline Water Well Test Report.

Test ID	GIC Well ID	LSD	QTR	SEC	TWP	RGE	M	Resource Company	Testing Date	Water Quality	Pump Test	Gas	Isotopes
1078690			SE	1	27	27	4	Encana Corporation	2006-08-28	Yes	Yes	-	-
1079474			SW	12	27	27	4	Encana Corporation	2007-01-26	Yes	Yes	Yes	Yes
1201343			SW	12	27	27	4	Encana Corporation	2008-11-06	Yes	Yes	Yes	Yes

APPENDIX B: FIELD VERIFIED WATER WELL SURVEY RESULTS

MILLENNIUM
EMS Solutions Ltd.

Water Source Survey Questionnaire

Owner/Lessee:	BURNCO Rock Products Ltd.	**Well ID:**	N/A
Date:	02-Sep-22	**Legal Location:**	6-12-27-27 W4M
Phone Number:		**GPS Coordinates of Well:**	51.2708256
Company Name:			-113.6486761

Water Source:
Type: wells/springs/dugouts/others: Well
Status: producing/standby/observation/abandoned/active/other: Observation

Well Depth: N/A

Depth to top of aquifer and amount of available head: **N/A**

Well Completion Details: Completion Interval (open hold/perforated/screened)
Top: N/A **Bottom:** N/A

Purpose of use:
Household/livestock/industrial/other: **Monitoring**

Has it ever run dry? Yes/No N/A

Distance and location of proposed water diversion or drainage site:

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049

Additional Comments from Landowner/Occupant:

Follow-up Action:

Field Parameters:

Sample ID	Sampling Location	Date & Time	EC (mS/cm)	pH	TDS (ppt)	Temp (°C)	Water Quality (color, smell, sediment, etc)

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049
Email: info@mems.ca / www.mems.ca

MILLENNIUM
EMS Solutions Ltd.

Water Source Survey Questionnaire

Owner/Lessee:	Hazel George	**Well ID:**	161222
Date:	02-Sep-22	**Legal Location:**	SE-12-27-27 W4M
Phone Number:		**GPS Coordinates of Well:**	51.2920503
Company Name:			-113.6735586

Water Source:
Type: wells/springs/dugouts/others: Well
Status: producing/standby/observation/abandoned/active/other: Active

Well Depth:
24.38 m

Depth to top of aquifer and amount of available head: N/A

Well Completion Details: Completion Interval (open hold/perforated/screened)
Top: N/A **Bottom:** N/A

Purpose of use:
Household/livestock/industrial/other: Domestic

Has it ever run dry? Yes/No No

Distance and location of proposed water diversion or drainage site:
500 m

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049

Additional Comments from Landowner/Occupant:

Follow-up Action:

Field Parameters:

Sample ID	Sampling Location	Date & Time	EC (mS/cm)	pH	TDS (ppt)	Temp (°C)	Water Quality (color, smell, sediment, etc)

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049
Email: info@mems.ca / www.mems.ca

MILLENNIUM
EMS Solutions Ltd.

Water Source Survey Questionnaire

Owner/Lessee:	R. Luft	**Well ID:**	251403
Date:	02-Sep-22	**Legal Location:**	SW 01-27-27 W4M
Phone Number:		**GPS Coordinates of Well:**	51.2720498
Company Name:			-113.6815275

Water Source:
Type: wells/springs/dugouts/others: Well
Status: producing/standby/observation/abandoned/active/other: Active

Well Depth: 48.77 m

Depth to top of aquifer and amount of available head: N/A

Well Completion Details: Completion Interval (open hold/perforated/screened)
Top: N/A **Bottom:** N/A

Purpose of use:
Household/livestock/industrial/other: Domestic

Has it ever run dry? Yes/No No

Distance and location of proposed water diversion or drainage site:

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049

Additional Comments from Landowner/Occupant:

Follow-up Action:

Field Parameters:

Sample ID	Sampling Location	Date & Time	EC (mS/cm)	pH	TDS (ppt)	Temp (°C)	Water Quality (color, smell, sediment, etc)

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049
Email: info@mems.ca / www.mems.ca

MILLENNIUM
EMS Solutions Ltd.

Water Source Survey Questionnaire

Owner/Lessee:	R. Luft	**Well ID:**	N/A
Date:	02-Sep-22	**Legal Location:**	SW 01-27-27 W4M
Phone Number:		**GPS Coordinates of Well:**	51.2720936
Company Name:			-113.6778465

Water Source:
Type: wells/springs/dugouts/others: Well
Status: producing/standby/observation/abandoned/active/other: Active

Well Depth: 48.77 m

Depth to top of aquifer and amount of available head: **N/A**

Well Completion Details: Completion Interval (open hold/perforated/screened)
Top: N/A **Bottom:** N/A

Purpose of use:
Household/livestock/industrial/other: **Livestock**

Has it ever run dry? Yes/No No

Distance and location of proposed water diversion or drainage site: 1.4 km

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049

Additional Comments from Landowner/Occupant:

Follow-up Action:

Field Parameters:

Sample ID	Sampling Location	Date & Time	EC (mS/cm)	pH	TDS (ppt)	Temp (°C)	Water Quality (color, smell, sediment, etc)

2257 Premier Way, Sherwood Park, AB Canada T8H 2M8 Tel: 780-496-9048 Fax: 780-496-9049
Email: info@mems.ca / www.mems.ca

APPENDIX C: MILLENNIUM EMS SOLUTIONS LTD. THIRD-PARTY RELIANCE AGREEMENT

MILLENNIUM
EMS Solutions Ltd.

#148, 2257 Premier Way
Sherwood Park, AB T8H 2M8
tel: 780.496.9048
fax: 780.496.9049

Suite 202, 701 64 Avenue SE
Calgary, AB T2H 2C3
tel: 403.592.6180
fax: 403.283.2647

#102, 11312 98 Avenue
Grande Prairie, AB T8V 8H4
tel: 780.357.5500
fax: 780.357.5501

Suite 218, 852 Fort Street
Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO DESKTOP GROUNDWATER ASSESSMENT AND FIELD VERIFIED GROUNDWATER WELL SURVEY

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Desktop Groundwater Assessment and Field Verified Groundwater Well Survey" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: ______________________________

MEMS Representative
Title
Date

Agreed to this ____ day of •, ______.
[THIRD PARTY]

By: ______________________________

Name:
Title
Date

Appendix 6: Noise Impact Quality Memo

acoustical consultants inc

aci Acoustical Consultants Inc.
5031 – 210 Street
Edmonton, Alberta, Canada T6M 0A8
Phone: (780) 499-1591
www.aciacoustical.com

INTRODUCTION

aci Acoustical Consultants Inc., of Edmonton, was retained by BURNCO Rock Products Ltd. (BURNCO) of Calgary, AB to conduct an acoustical review of the Roe Gravel Pit (the Project) in Rocky View County, Alberta. The purpose of the work was to assess the noise contributions and operations associated with the Project to determine if there would be a significant change in the noise climate of the area surrounding the Project.

DESCRIPTION

The Project is located at SE 12-27-27-W4M in Rocky View County as indicated in Figure 1. This places the Project approximately 5 km southwest of Irricana, Alberta. The land uses surrounding the Project include the existing BURNCO Irricana Gravel Pit to the east, pasture fields to the north and west and cultivated fields to the south. In addition to the Irricana Pit, Range Road 270 is directly east of the Project which is a previous haul route for historic gravel pits in the area.

Excluding the landowner of the of the Project, the nearest occupied residence is 1,600 m southwest of the southern boundary of the Project.

Topographically the land in the area is relatively flat with no significant hills or berms. In areas where there are no facilities the vegetation is composed primarily of field grasses. Periodically, there are sparse trees and bushes within the area. Given this and the relative distance to the nearest residence, the vegetative sound absorption is considered moderate.

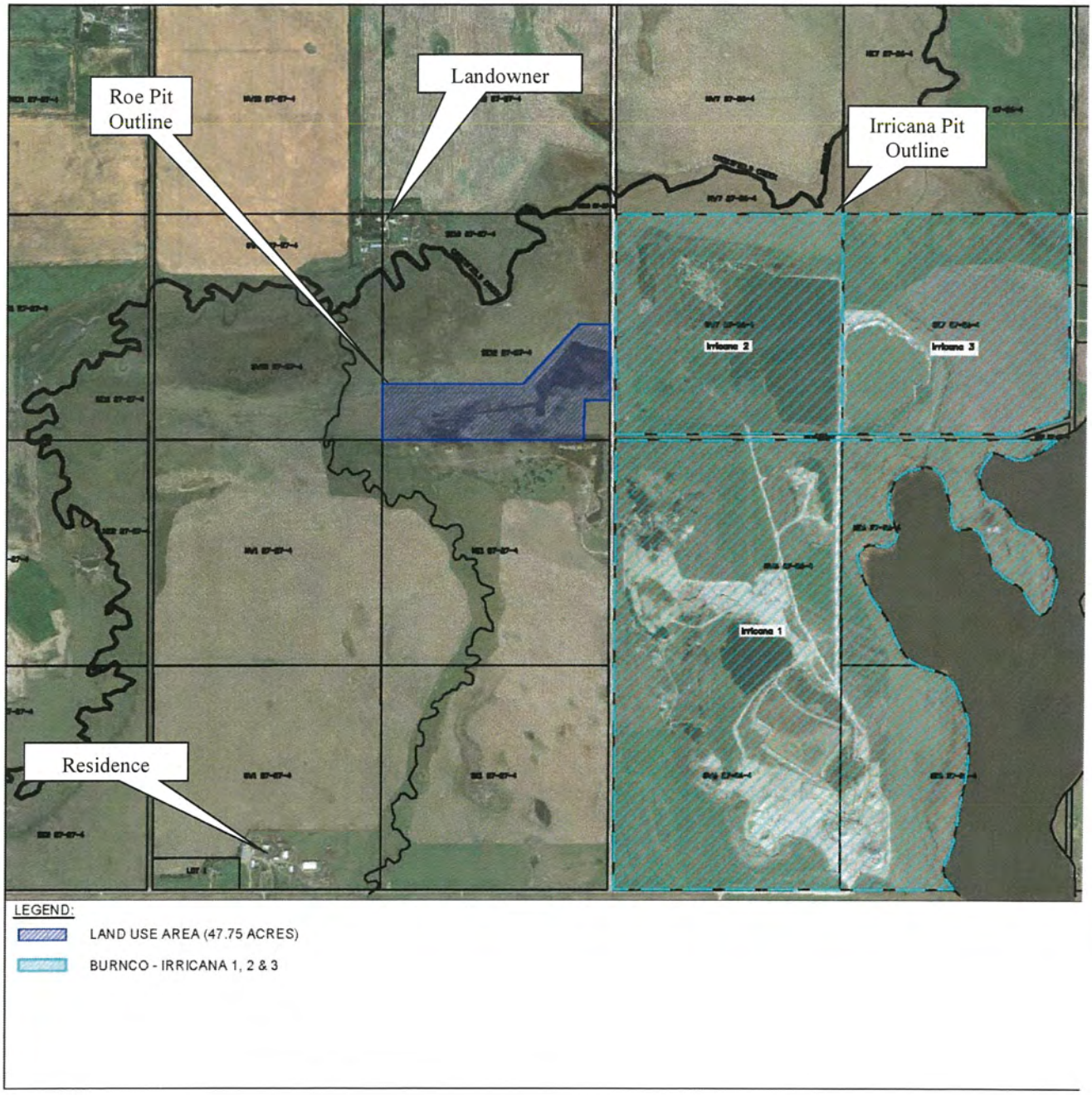

Figure 1. Study Area

Operational Description

The Project will be divided into two (2) mining phases, as indicated in Figure 2. This site will be operated as a feeder site for the existing BURNCO Irricana Pit and thus, there will not be any processing/washing/crushing onsite. There will be two types of operational activities. One includes the earthworks that are required to establish, maintain and reclaim the site. The second includes mining, loading, and hauling activities.

Potential equipment associated with each activity can be found below:

1) Earthworks
    a. One (1) – Backhoe Loader
    b. Two (2) – Rock/Haul Trucks
2) Mining and Hauling
    a. One (1) – Backhoe Loader
    b. One (1) - Loader
    c. Two (2) – Rock/Haul Trucks

It should be noted that these two types of activities will be occurring independently.

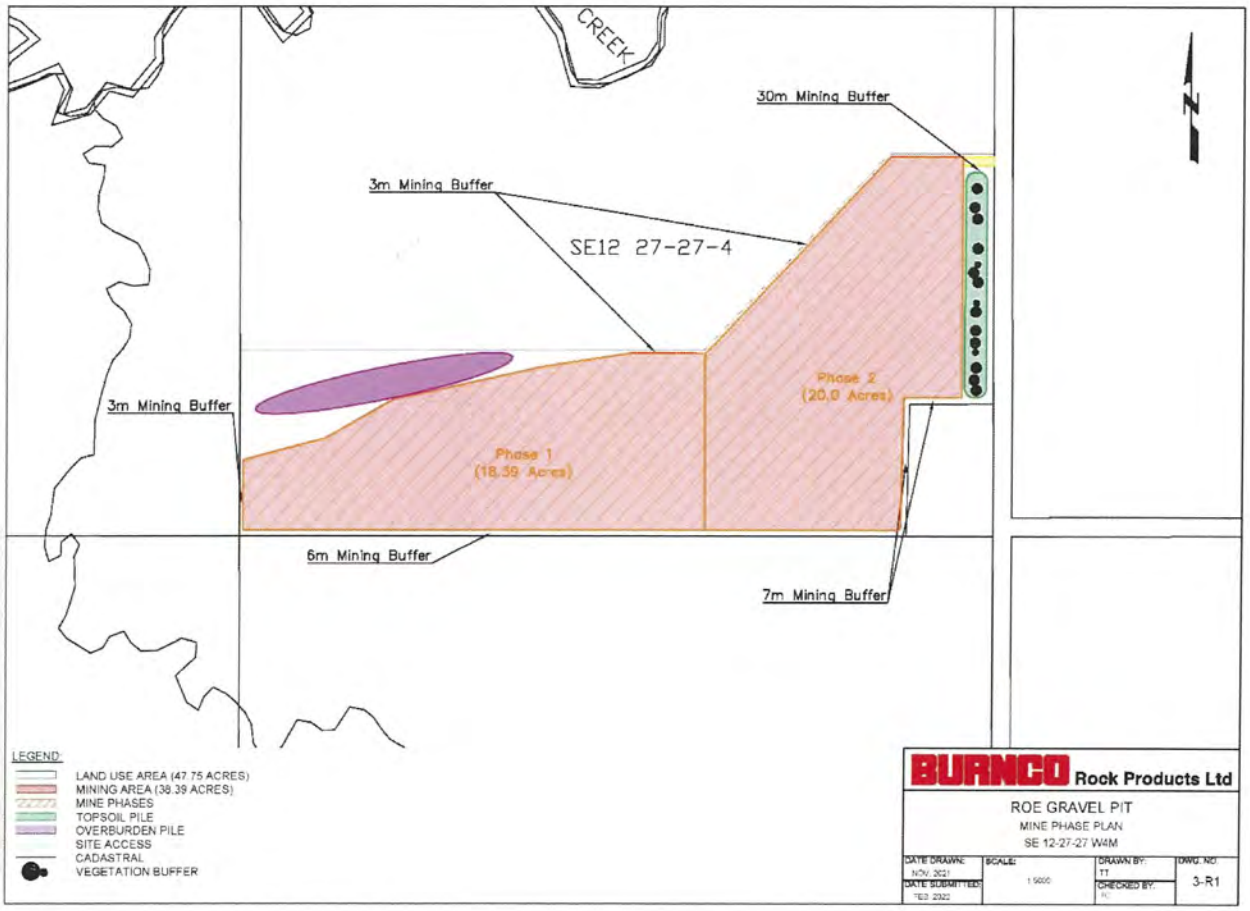

Figure 2. Mining Plan

Acoustical Recommendations

Based on the relative distance to the nearest impact residential receptor and the operational activities of the Project, it is not anticipated that the Project will have a significant impact on the noise climate of the residents to the southwest. Therefore, a full noise impact assessment is not required at this time.

Additionally, permanent noise monitoring is not recommended for this site. Instead, it is recommended that noise monitoring be conducted on a case-by-case basis. This is consistent with BURNCO's Environmental Monitoring & Complaint Resolution plan.

Conclusion

We trust the information provided is sufficient; if there are further questions, please contact us.

aci Acoustical Consultants Inc.,
Per

Patrick Froment, B.Sc., B.Ed., P.L.(Eng.)
Principal Partner

Member ID :196923

9/09/2022

PERMIT TO PRACTICE
ACI ACOUSTICAL CONSULTANTS INC.
Signature
Date 09/09/2022
PERMIT NUMBER: P 7735
The Association of Professional Engineers, Geologists and Geophysicists of Alberta

Appendix 7: Air Quality Impact Memo

EXTERNAL MEMO

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Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

To: Thomas Tyler **Company: BURNCO Rock Products**

cc: Jennifer North (MEMS)

From: Yan Wong **Company: Millennium EMS Solutions Ltd.**

Date: September 21, 2022 **Reference Number: 22-00690-00**

Re: Air Quality Memo – Roe Gravel Pit

☐ **Urgent** ☒ **For Review** ☐ **Please Comment**
☐ **Please Reply** ☐ **Please Recycle**

Millennium EMS Solutions Ltd. (MEMS) at the request of BURNCO Rock Products Ltd. (BURNCO), has prepared this memo to address the potential for site generated dust and the mitigation strategies that will be implemented at the Roe Gravel Pit (the Site).

The most common contributors to fine dust particulate for mining operations are on-site traffic, material handling and crushing, wind erosion of conveyance systems, disturbed areas and unprotected stockpiles.

It is MEMS' understanding that the Site's aggregate will be mined from within the groundwater table, which will result in natural dust emission mitigation. The aggregate will then be transported offsite to BURNCO's adjacent Irricana Pit for processing (crushing, washing, *etc.*). Therefore, the Site's only two contributors to particulate emissions are on-site traffic on unpaved roads and wind erosion of disturbed areas and unprotected stockpiles.

Through the use of industry best practices for erosion and dust control/mitigation, MEMS is confident that the proposed operation will result in the minimal generation of dust emissions. To effectively control and mitigate the impacts of dust, the following dust control measures are recommended:

- Maintaining and cleaning equipment regularly.
- Operations to be focused on minimizing "double handling" soil materials.
- Reducing speeds on roadways - a strict maximum speed limit of 30km/hr speed limit will be enforced on site to reduce road dust.
- Watering down traffic lanes during dry periods with the use of a water truck pre-loaded with water from BURNCO's Irricana Pit, frequency to be adjusted as needed.
- If watering down traffic lanes is insufficient, the following stepped approach of increased measures will be implemented:
  - Increasing the frequency of watering down traffic lanes; and
  - using chloride additives, crushed limestones or a proven manufactured product spread along the road in addition to watering.
- Reduce wind erosion from stockpiles by contouring of topsoil and overburden stockpiles at the 3H:1V and leaving the top of the piles in a flat-topped oval shape to maximize stability.
- The topsoil and overburden stockpiles are to be seeded immediately following development.
- Monitoring of stockpiled soils and reclaimed areas will be conducted to ensure mitigative measures are effective.
- Reclamation will be completed progressively upon exhaustion of the aggregate resource within a mining phase or at such a time where the aggregate resource is no longer required.
- Reducing site activities during periods of poor air quality.

Based on the operational activities of the Project and on previous dispersion modelling assessments of similar projects, it is not anticipated that the Project will have a significant impact on regional air quality as a whole. The main project influence will be dust but BURNCO expects the potential impacts to be mitigated by the industrial best practices described above.

It is also anticipated that air quality impacts from the Project will decrease rapidly with increasing distance from the Project. Therefore, further air quality assessment is not required at this time. Additionally, permanent air quality monitoring is not recommended for this site. Instead, it is recommended that air quality monitoring be conducted on a case-by-case basis, which is consistent with BURNCO's Environmental Monitoring & Complaint Resolution plan. BURNCO has also committed to the implementation of permanent air quality monitoring if its case-by-case monitoring indicates that is it necessary.

We thank you for the opportunity to be of assistance. Should you have any questions, please contact the undersigned at 780.235.7186.

This memo has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this memo. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this memo as a result of omissions or misinterpretations by others.

While preparing this memo, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this memo. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This memo has been prepared for the sole and exclusive use of BURNCO who may rely on this memo for specific application to this project site. Any other use, or any use of this memo by any other party, including any individuals or organisations who may obtain access to this memo through applications under the Freedom of Information and Protection of Privacy Act, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this memo. If third parties choose to use this memo in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion, reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this memo, including any individuals or organizations who may obtain access to this memo through applications under the Freedom of Information and Protection of Privacy Act, will be required to return an executed copy of MEMS' Third Party Reliance Agreement in Appendix A.

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

Yours truly,

Millennium EMS Solutions Ltd.

Prepared by:

Yan Wong, Ph.D., P.Eng.
Discipline Lead, Air Sciences

Attachments:

Appendix A Millennium EMS Solutions Ltd. Third Party Reliance Agreement

APPENDIX A: MILLENNIUM EMS SOLUTIONS LTD. THIRD PARTY RELIANCE AGREEMENT

MILLENNIUM
EMS Solutions Ltd.

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Grande Prairie, AB T8V 8H4
tel: 780.357.5500
fax: 780.357.5501

Suite 218, 852 Fort Street
Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO AIR QUALITY MEMO

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Air Quality Memo" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: _____
MEMS Representative
Title
Date

Agreed to this ____ day of •, _____.
[THIRD PARTY]

By: _____
Name:
Title
Date

Appendix 8: Traffic Impact Assessment

WATT CALGARY
1300 – 736 6th Ave SW
Calgary, AB T2P 3T7
403-273-9001

MEMORANDUM

Date:	September 15, 2022
To:	Thomas Tyler, Burnco Rock Products
Cc:	Tanner Vollema, WATT Consulting Group
From:	Brendan Stevenson, WATT Consulting Group
Our File No:	4023.T01
Subject:	Roe Pit Transportation Impact Assessment

1.0 INTRODUCTION

WATT Consulting Group (WATT) was retained by Burnco Rock Products to conduct a Transportation Impact Assessment of a proposed gravel pit located at SE 12-27-27-W4M near Irricana in Rocky View County (County). Access to the proposed gravel pit will be provided off of Range Road 270. The pit is intended to supply gravel to the existing Irricana 1 gravel pit on Township Road 270. See **Figure 1** for site location.

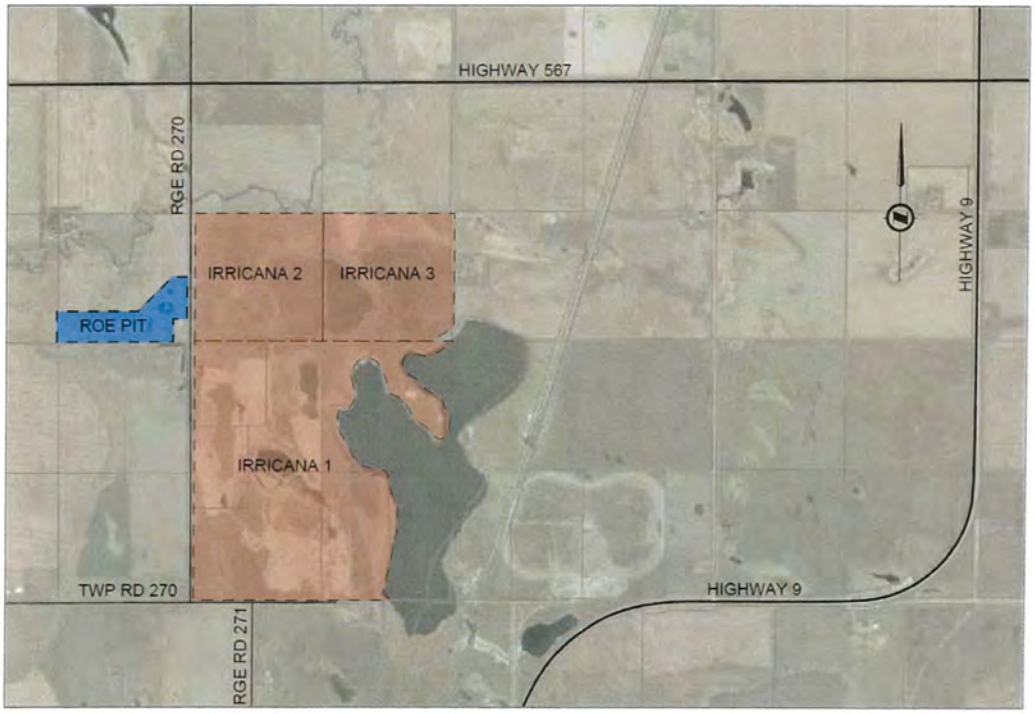

Figure 1: Site Context

2.0 EXISTING CONDITIONS

2.1 Existing Road Network

The TIA identified two roads that will be impacted by the proposed development. A detailed description of these roads is provided below:

- **Range Road 270** is a rural gravel road that is 8 m in width and travels north-south from Highway 567 north of the site to Township Road 270 to the south.

- **Township Road 270** is a rural collector road that runs east-west from Airdrie in the west to just east of Range Road 271 at the entrance to the Irricana 1 site. West of Range Road 271, Township Road 270 is a two-lane paved road 8 m in width; east of Range Road 271, Township Road 270 is a local gravel road that serves as an access road for the Irricana site. Township Road 270 has a posted speed limit of 80 km/h.

There are two existing intersections which may be impacted by the proposed development: Range Road 270 / Township Road 270 and Range Road 271 / Township Road 270. Both intersections are rural three-legged 'T' intersections with low volumes; operational analysis of the intersections was not conducted.

2.2 Existing Volumes

The existing volumes on the study roads are based on PM peak hour volumes obtained from the Rocky View County Visum model maintained by WATT. The volumes are summarized in **Table 1**.

Table 1: Existing Volumes

Road	PM Peak Hour Volumes (vph)	Daily Volumes (AADT)
Range Road 270	9	90
Township Road 270 (west of RR271)	11	110
Township Road 270 (east of RR271)	13	130

3.0 PROPOSED DEVELOPMENT

The Roe Pit site is a 47.75-acre site located roughly 5 km southwest of Irricana, on Range Road 270. The Roe Pit was previously used by the County as a gravel pit. The developer intends to use the Roe Pit site as a feeder site for the existing Irricana 1 gravel pit, using haul trucks to transport raw material from the Roe Pit to the Irricana 1 site. No external truck traffic to the Roe Pit will occur, and no change to the existing external traffic to the Irricana site is expected to occur as a result of the addition of the Roe Pit. The developer estimates that the Roe Pit site will operate for 5 to 10 years before depletion.

3.1 Haul Route

The haul route between the Roe Pit and Irricana 1 sites will be via Range Road 270 and Township Road 270. The route is roughly 2.8 km in length and is primarily on a gravel surface except for the 400 m section of Township Road 270 between Range Road 270 and Range Road 271. The haul route is shown in **Figure 2**.

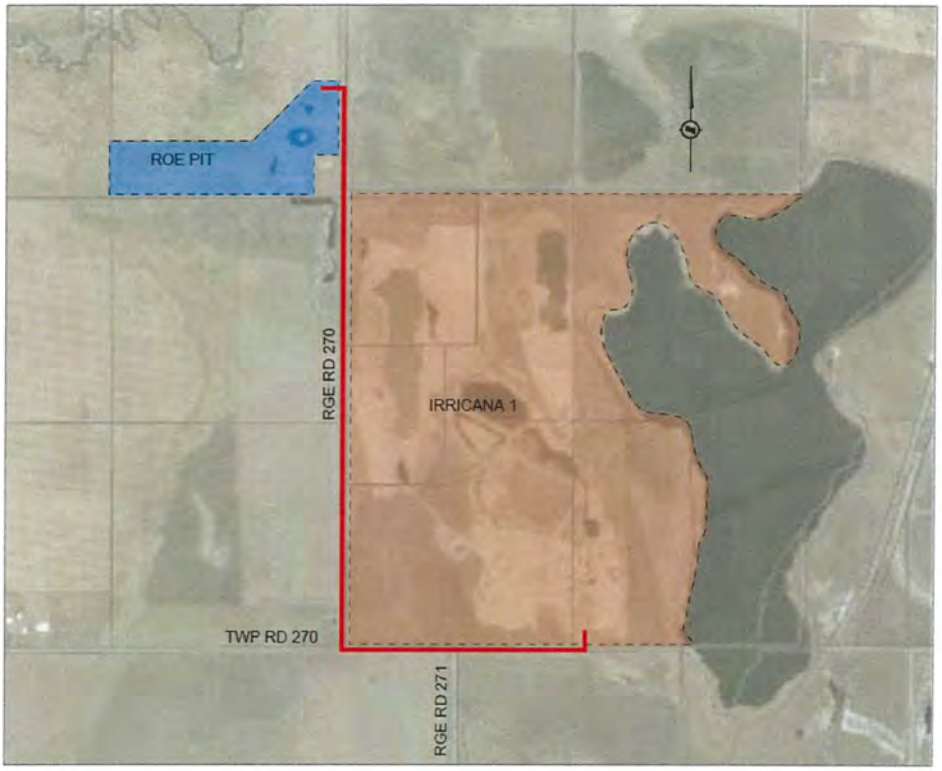

Figure 2: Haul Truck Route

3.2 Trip Generation

The Roe Pit is expected to produce approximately 200,000 tonnes of aggregate annually to be transported to Irricana 1. Each truck is expected to make two trips within an hour (one each direction). Two hauling scenarios have been proposed for delivery of the material:

- Scenario 1 is short-term mass haul, transporting the entire annual amount in approximately 1 month each year. This would require 15 trucks per hour (30 trips) at 12 hours per day.

- Scenario 2 involves hauling material as required to keep supplying the Irricana site's requirements. Material would be transported over a maximum of 6 months each year and would require an estimated 5 trucks per hour (10 trips) at 12 hours per day. This 6-month timeline will allow for any shutdowns that occur with the crusher such as breakdowns, screen replacements, and labour issues.

Both scenarios were examined to determine the impact on the road network. The trip generation for each scenario is summarized below in **Table 2**.

Table 2: Hauling Scenario Trip Generation Summary

Scenario	Haul Trucks (per hour)	Hourly Trips	Daily Trips	Duration (annually)
Scenario 1	15	30	360	~1 month
Scenario 2	5	10	120	~6 months*

*Refer to Section 3.2 for more information on the duration

3.3 Post Development Volumes

The post development volumes for the study roads were determined by adding the generated trips to the existing volumes. The post development volumes for each scenario are summarized in **Table 3**.

Table 3: Post Development Volumes

Road	Scenario 1		Scenario 2	
	PM Peak	AADT	PM Peak	AADT
Range Road 270	39	390	19	190
Township Road 270 (west of RR271)	41	410	21	210
Township Road 270 (east of RR271)	43	430	23	230

4.0 ROAD CLASSIFICATION REVIEW

A road classification review of the study roads was conducted to determine whether road upgrades are required to handle the existing traffic as well as the post development traffic under both hauling scenarios. The road classifications are based the specifications provided in Table 400-F of the RVC *County Servicing Standards (2013)*.

4.1 Existing Road Classification

The existing road classifications were determined based on the daily volumes, road width, and road surface type (shown in **Table 4**). Based on these factors, Range Road 270 is a Regional Moderate Volume (RMV) road, while Township Road 270 is a Regional Transitional Paved (RMVP) road west of Range Road 271 and a Regional Moderate Volumes east of Range Road 271.

Table 4: Existing Road Classification

Road	AADT	Road Width	Road Surface	Classification
Range Road 270	90	8m	Gravel	Regional Moderate Volume (RMV)
Township Road 270 (west of RR271)	110	8m	Paved (2-lane)	Regional Transitional Paved (RMVP)
Township Road 270 (east of RR271)	130	8m	Gravel	Regional Moderate Volume (RMV)

4.2 Post Development Classification

The review determined the appropriate classification for the study roads under post development conditions based on the post development volumes for each scenario and using the specification in the *County Servicing Specifications*. As the study roads are rural roads, the Municipal Grid Road specifications were considered applicable; these specifications are summarized in **Table 5**. The classification review results are summarized in **Table 6**.

Table 5: Municipal Grid Roads Specification (from Table 400-F of RVC *County Servicing Specifications 2013*)

Road Classification	Daily Volumes (AADT)	Surface Type	Road Width
Regional Low Volume (RLV)	<200	Gravel	7.0m
Regional Moderate Volumes (RMV)	<500	Gravel	8.0m
Regional Transitional Paved (RMVP)	200-1000	Paved	8.0m
Regional Collector (RC)	501-2500	Paved	9.0m
Regional Arterial (RA)	>2500	Paved	10.0m

Table 6: Post Development Road Classifications

Road	Scenario 1		Scenario 2	
	AADT	Classification	AADT	Classification
Range Road 270	390	Regional Moderate Volume (RMV)	190	Regional Moderate Volume (RMV)
Township Road 270 (west of RR271)	410	Regional Transitional Paved (RMVP)	210	Regional Transitional Paved (RMVP)
Township Road 270 (east of RR271)	430	Regional Moderate Volume (RMV)	230	Regional Moderate Volume (RMV)

Under both Scenario 1 and Scenario 2, the existing roads are appropriate for the volumes of traffic. No road upgrades are recommended under both Scenario 1 and Scenario 2 as the expected daily volumes are below the 500 trips per day threshold for paving the roadway as per the RVC Servicing Standards.

5.0 CONCLUSION

The Roe Pit development will supply material to the nearby Irricana site 2.8 km away and is expected to operate for a period of 5-10 years. Two annual hauling scenarios were reviewed; the review determined the following:

- Under Scenario 1, the site will generate 30 trips per hour (or 360 trips daily) over an approximate 1-month period. The existing Range Road 270 and Township Road 270 (east of Range Road 271) road surface is adequate to accommodate the expected post development volumes and therefore no road upgrades are recommended.

- Under Scenario 2, the site will generate 10 trips per hour (or 120 trips daily) over an approximate 6-month period. The existing roads are adequate to accommodate the post development volumes under Scenario 2; no road upgrades are recommended.

- It is noted that the subject site is accessed via Range Road 270, which is classified as a low volume gravel road and as per Policy 14.22 of the County Plan roadways providing access to businesses should be paved. However, as the volumes along Range Road 270 are below the 500 trips per day threshold further roadway improvements are not required to support the development.

5.1 Recommendations

Both Scenario 1 and Scenario 2 can be utilized as the hauling scenario for the Roe Pit development. No additional improvements are needed to support either scenario, based on the County's servicing standards.

Sincerely,
WATT Consulting Group

Brendan Stevenson, *P.Eng., PTOE, PMP*
Regional Lead, Transportation

C 587-432-3282
E bstevenson@wattconsultinggroup.com

#WEAREWATT

PROFESSIONAL ENGINEER ALBERTA
BRENDAN STEVENSON
ID#: 251987
2022-09-15

PERMIT TO PRACTICE
WATT CONSULTING GROUP LTD.
Signature
Date September 15, 2022
PERMIT NUMBER: P 3818
The Association of Professional Engineers and Geoscientists of Alberta

Appendix 9: Erosion and Sediment Control Plan

MILLENNIUM
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toll free: 888.722.2563
www.mems.ca

Erosion and Sediment Control Plan
BURNCO Roe Gravel Pit
SE 12-27-27 W4M

Prepared for:
BURNCO Rock Products Ltd.

Prepared by:
Millennium EMS Solutions Ltd.
#148, 2257 Premier Way
Sherwood Park, Alberta
T8H 2M8

September 2022
Project # 22-00690

Table of Contents

Page

List of Appendices

1.0 INTRODUCTION

As part of the Approval process, BURNCO Rock Products Ltd. (BURNCO) retained Millennium EMS Solutions Ltd. (MEMS) to develop an Erosion and Sediment Control Plan (ESCP) for the Roe Gravel Pit (The Pit) located within SE 12-27-27 W4M. This ESCP will help to conserve and maintain the soil resources on site during all phases of the project. BURNCO is proposing to assume the operation of the Pit and has entered into an agreement with the landowner to utilize the site for further aggregate extraction.

The original pit, which was operated by Rocky View County, has exhausted the surface reserves of gravel and had been in the process of being reclaimed. BURNCO is seeking permitting to expand and utilize the aggregate material currently within the water table as this material will work as feedstock for BURNCO's existing gravel pit located nearby.

It is crucial that surface drainage control be used in both the operation and reclamation phases of the project. Surface drainage control helps to eliminate soil erosion, soil loss, and sedimentation from overland and channel flow through active. Additionally, it helps to control flooding and ponding that may occur. It is also vital during the operating and reclamation phases that the Pit do not impede, divert, or impound the natural surface or subsurface drainage.

1.1 Site Background

The Site is the located approximately 5 km southwest of the town of Irricana, Alberta and 18 km east of Airdrie, Alberta. BURNCO has the following three adjoining gravel pits to the east and southeast:

- Irricana 1 is located in SEC 06-27-26 W4M,
- Irricana 2 (Luft) is located in SW 07-27-26W4M; and
- Irricana 3 (Poffenroth) is located in SE 07-27-26 W4M.

Combined, these sites represent a total of 304 hectares (751 acres) in size. Irricana 2 and Irricana 3 are now depleted and reclaimed while Irricana 1 contains an estimated 2,100,000 tonnes of aggregates and is selling roughly 400,000 tonnes of material annually.

The proposed Site is located in the SE 12-27-27 W4M and is 19.32 hectares (47.75 acres) in size. The Site will serve to supply BURNCO's existing Irricana 1 gravel pit with an estimated 1,200,000 tonnes of aggregate through the expansion of permitted reserves. The Site is expected to have a lifespan of 5 to 10 years. The Site was permitted as a Rocky View County (RVC) gravel pit and had an Alberta Environment & Parks (AEP) Registration # 00015044-01-00 under the *Environmental Protection and Enhancement Act* (EPEA). The approval is currently expired and renewable.

Surface water flows north, Crossfield Creek is located immediately to the west, northwest and north of Site. Crossfield Creek in turn flows for approximately 3 km before joining with an unnamed pond to the east of Site. A single Water Well is located within 1000m of the Site, and it is in SE 12-27-27 W4M (Well # 161222).

1.2 Soil Description

A desktop assessment was completed by MEMS to determine background soil information. Information sources used to determine soil properties and classification of the soil series in the Pit area included the AGRASID online soil viewer (Alberta Soil Information Center 2019), the existing Soil Survey of the Municipal District of Rocky View No. 44, Alberta (Turchenek and Fawcett, 1994), and the Alberta Soil Names File (Alberta Soil Information Center, 2016).

Soils within the Pit area have been previously mapped as Rego Humic Gleysols that have developed on moderately fine-textured glaciolacustrine and till deposits (Alberta Soil Information Center 2019). These soils are mapped as belonging to the Balzac (BZC) soil series. Given the large scale at which these provincial surveys are completed, it is understandable that a proportion of mapped polygons may not be representative of the local conditions. As gravel deposits are indicative of glaciofluvial deposits rather than glaciolacustrine or till deposits, it is assumed that the overlying soil type should be derived from the same parent materials. As such, a different soil series is being applied to the Pit site area to account for the differences in the soil profiles that would be likely found on the site.

The Bow Valley soils (BOV) series is classified as Orthic and Rego Black Chernozems that are very gravelly and very coarse (Loamy Sand – Sand, and >50% gravel) soils that have developed on glaciofluvial and fluvial deposits. These soils are non saline and strongly calcareous. The deposits on which Bow Valley soils have developed are potential gravel sources (Turchenek and Fawcett 1994). It should be noted that the soils on the site have undergone some degree of reclamation, the condition of the reclaimed soils are unknown at this time.

Wind and water erosion ratings for the mapped soils are presented in Soil Survey of the Municipal District of Rocky View No. 44, Alberta (Turchenek and Fawcett, 1994). The ratings for erosion wind were determined using a rating system in which soil texture, soil moisture regime, and map unit composition were used to estimate the erosion risk. Soils with a high fraction of either clay or sand are the most erosive and the BOV series is considered extremely susceptible to wind erosion given the sandy textures.

The water erosion risk for soil map units in the M.D. of Rocky View was calculated using a modified Universal Soil Loss Equation (USLE) in which the conservation practices and cover management factors were left out the equation. This was done in order to determine the maximum potential soil loss which may occur for uncovered and unprotected soils. BOV soils units were rated ranging from

negligible to moderate for water erosion which equates to approximately 1-22 tonnes/ha/yr of potential soil loss.

1.3 Surface Conditions

The Pit is located within Soil Correlation Area (SCA) 6: Thin Black Soil Zone of South-Central Alberta. The Project is located within the Fescue Grassland Ecoregion and Foothills Fescue Natural Subregion where agronomic crops are dominant. Vegetation communities in the surrounding area are primarily non-native hay crop, tame pasture and non-native species, however, the Pit is located in an existing gravel pit where the extent of previous reclamation is unknown. Lands to the east of the project are zoned as Special, Natural Resource District (S-NAT) and contain active and reclaimed gravel pits, which were operated by BURNCO. The reclaimed properties are owned by Rocky Ridge Farms and Murray Poffenroth, while the operation gravel pit lands are owned by BURNSWEST Properties Ltd and leased to BURNCO. The property to the south is owned by Rocky Ridge Farms and is currently zoned as Business, Agricultural District (B-AGR). This property has an unreclaimed gravel pit located on it. The properties to the north and west are primarily farm land, which support both cultivated and pasture operations. There is also a gravel pit to the southwest, which is known as the Senger Pit. It is operated by AECON Transportation West Ltd.

1.4 Drainage Patterns

The Project area slopes northwest from a topographic high on the southern edge of the proposed Pit area, sloping into the natural drainage of Crossfield Creek to the west and north of the Pit. It is assumed that all reclamation done to the previous site has maintained the natural drainage of the site.

2.0 EROSION AND SEDIMENT CONTROL MEASURES

The intent in developing this ESCP is to prevent sedimentation of the soil resource from the Pit activities into adjacent lands and especially into the adjacent permanent or ephemeral watercourses/wetlands namely Crossfield Creek located within the same quarter section and adjacent quarter section to the west. The topsoil stockpile will be stored along the eastern edge of the lease and will also function as a screening barrier to traffic along Range Road 270. This stockpile/berm will be planted with both agronomic and tree species to control erosion as well as to enhance the visual barrier to the site.

As part of the ongoing maintenance procedures on the Pit, BURNCO will commit to conducting erosion and sediment control (ESC) inspections of the site annually. Additional inspections will be conducted after heavy or prolonged precipitation events (≥ 12 mm of rainfall over 24 hours). During winter months, ESC inspections will be conducted only after a heavy snowmelt. The inspections will be completed to assess the performance of the control measures and to identify any additional

measures required to accommodate the anticipated and observed conditions on-site. Permanent controls will include the following:

- Stormwater will be controlled to ensure minimal release from the site such that stormwater does not create any adverse effect;
- Disturbance areas will be minimized as much as possible;
- Clear delineation of disturbance areas to minimize disturbance of vegetation and soils; and
- ESC measures to prevent mobilization of sediment from stripped areas to adjacent drainage channels or beyond the limits of the work area.

The development of the topsoil stockpile/screening berm along the eastern edge of the lease will be seeded with both grasses and trees to establish vegetation and reduce the potential for erosion. Short-term stabilization could also include fiber mulch, straw shredding/crimping and or compost/manure. The overburden pile will also require temporary vegetation or other measures to reduce the severity of erosion on the stockpile.

As applicable, ESC measures may include:

- Sediment fence barriers;
- Fiber rolls / Wattles;
- Slope texturing / Track walking;
- Rolled erosion control products;
- Synthetic permeable ditch barriers, and
- Rock check dams.

2.1 Stormwater Management During Operations

2.1.1 Surface Water

As per the Stormwater Management Plan prepared for the Pit, it is intended that operations at the Pit will not divert, block, or impound the natural surface drainage around the Pit. Topsoil and organic materials will continue to be salvaged in new work areas and placed in stockpiles away from surface water drainage paths. All surface water within the pit area will be directed towards and confined within the excavation created by the mining of sand and gravel from this site. Run-off and groundwater seepages to the low point in the pit will allow for infiltration through the gravel layer.

The pit edges will be constructed with a 5m horizontal to 1m vertical slope (5H:1V) one metre above and one metre below the water table. The remaining slope will be made to a 3m horizontal to 1 m

vertical slope (3H:1V). There will be a berm constructed 3m horizontal to 1m vertical slope between Range Road 270 and the closest edges to the pit, to create vegetation buffers.

Surface drainage control is important in both the operation and reclamation phases to minimize erosion, soil loss, and sedimentation resulting from overland and channel flow through the active or reclaimed areas, and to control flooding or ponding. Natural drainage patterns will be maintained outside of the borrow pit area. The surface drainage within the pit area will be directed to the lowest elevation within the Pit, which will become the end-pit lake.

2.1.2 Diversion

Surface waters from precipitation events will mainly be diverted around the gravel pit area and back into the natural drainage of the land. Temporary drainage structures such as swales and ditches will help to convey water around the site and away from the operating area and newly reclaimed areas. Precipitation in the undisturbed areas of the Pit will be allowed to flow unimpeded. Surface water within the Pit will be directed to the lowest spot of the excavation to infiltrate down or to the End Pit Lake.

2.2 Temporary Erosion and Sediment Control Measures

Temporary ESC measures may be necessary during construction and operation of the Pit, and will be installed as required. In post-construction, when areas are suitably stabilized, temporary sediment control measures will be removed. Temporary measures may include but are not limited to:

- Silt fences. Properly installed silt fence will be utilized where required and will be installed as per manufacturer's recommendations. Slope of areas draining to fence should generally be no steeper than 2H:1V. For slopes steeper than 2H:1V, consider alternative soil stabilization BMPs. For slopes adjacent to water bodies, use additional soil stabilization BMPs. Improperly installed fences will be removed and re-installed. All silt fences will be repaired as soon as damaged and sediment build-up removed when it reaches half of fence height. All silt fencing will be removed once upslope areas have been vegetated or upon project completion.
- Sediment Traps. A temporary basin with a controlled release structure, formed by excavating or constructing an earthen embankment across a waterway or low drainage area. Locate trap inlets to maximize travel distance to the trap outlet. Generally, a trap length equal to three times the trap width provides adequate travel distance. Use rock or vegetation to protect the trap outlets against erosion.
- Temporary erosion control (hydro-mulch/tackifier) to provide temporary cover (*e.g.,* hydromulch / tackifier) on bare soil in disturbed areas.

- Run-on control (diversion ditch) along southern boundary to intercept drainage from upslope areas.
- Temporary erosion control (rolled erosion control product) in diversion and conveyance ditches to prevent erosion and reduce potential for downslope sedimentation.
- Good housekeeping (gravel access road) to reduce mud tracking onto adjacent paved roadways.
- Dust control applications, namely calcium chloride used on internal haul routes and potentially other gravel surfaces that accommodate common vehicle movements and traffic during operations.

2.3 Stockpile Stabilization

Stripped materials during the development of the Pit will be placed into two stockpiles: topsoil, and overburden. Before excavation, silt fence should be installed along the north boundary, downslope of these proposed overburden area, to address and mitigate the potential for sediment transfer to adjacent areas.

Once overburden areas are in place, hydro-mulch/tackifier, erosion control blankets or mulch may be applied in these areas to provide temporary stabilization until final reclamation occurs. Before stabilization, watering of the stockpile may be necessary to suppress dust. For the topsoil stockpile, a screening berm will be built along the entire east boundary. It will be vegetated, including a row of trees planted along the top of the berm.

2.4 Best Management Practices

2.4.1 Before Construction

Prior to any site disturbance, the potential for erosion can be greatly reduced by good planning and adopting construction processes that proactively work to reduce the area, type and duration of the disturbance. The following planning strategies can be implemented:

- Minimize work during undesirable weather conditions season (wet, windy, *etc.*);
- Install required BMPs before construction starts;
- Suspend work if weather conditions are unfavorable (heavy rain, strong wind);
- Minimize the length of time between bare ground exposure and the installation of soil stabilization and sediment control measures;
- Clearly stake out work area with flagging tape to minimize disturbance;
- Locate all laydown areas on flat terrain. If necessary, install containment measures (*e.g.,* ,sediment logs, containment berms) around these areas;

- Install perimeter ESC measures (*e.g.,* silt fence) before earthworks and placement of overburden starts;
- Stabilized access point into site to reduce potential of dirt/mud tracking onto adjacent roadways, and
- Schedule BMP maintenance and inspection.

2.4.2 During Construction

Areas of a development that do not require stripping and grading should not be cleared and graded, or these activities should be restricted. These include stream buffers, wetlands, springs, and environmental areas. The purpose of this BMP is to minimize the amount of bare soil exposed to erosive factors; reduce the velocity of storm water runoff; reduce erosion, sediment transport, and tracking; provide an area for runoff to permeate the soil; provide buffers, screens, and aesthetics values; provide biofiltration (capture/process of pollutants); and provide fully-developed habitat for wildlife. It is the most inexpensive form of erosion control. The following planning strategies can be implemented:

- Minimize needless soil stripping and grading;
- Preserve and use existing drainage systems;
- Minimize disturbance to banks and wetland riparian zone;
- No removal or disturbance of bank vegetation outside the site of the activity;
- Topsoil stabilization:
  - Disturbed soils are highly susceptible to soil erosion and should be stabilized immediately. To provide soil stabilization, it is important to establish cover over the topsoil with high erosion potential (*e.g.,* steep slopes, fresh topsoil piles, natural drainage *etc.*) within a short period of time of the soils being exposed. Cover such as grass, mulch, erosion control blankets, hydroseeding, and plastic sheeting can be used to achieve this. Non-degradable fabrics must generally be removed when permanent stabilization measures are ready to be installed. To protect topsoil from wind erosion water spraying can also be utilized. Do not use excessive amounts of water that may cause soils to be saturated and create other problems such as excess runoff, mud/dirt tracking, or icing in winter months
- Install outlet velocity dissipation devices:
  - Outlet velocity dissipation devices may be placed at the outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, sediment traps, desilting basins, conduits or channels. They are placed at conveyance outlets to prevent scour and reduce the velocity and/or energy of storm water flows and discharges. Most effective when sized properly based on expected flow volumes and velocities.

- Install additional ESC measures, such as silt fences, as needed, to ensure onsite runoff is dealt with and not leading to offsite sedimentation:
  - Silt fences allow sediment to settle from runoff before water leaves the construction site. Use silt fence between the edge of construction disturbance and a critical resource such as wetlands or watercourses to prevent siltation. They are not intended for use in streams, channels, or anywhere flow is concentrated.
- Provide enough watering or other approved dust control measures (*e.g.*, calcium chloride) to minimize dust on haul roads, stockpiles and any other loose soil onsite, especially during dry windy conditions; and
- Complete an erosion and sediment control inspection and report monthly and after a significant or prolonged rainfall event, strong wind or snowmelt. A significant rainfall event is typically defined as greater than 12 mm of rainfall during a 24-hour period.

2.4.3 Post Construction

For post-construction activities, the following planning strategies can be implemented:

- Restore/reclaim all disturbed areas as soon as practical and where possible.
- Re-use salvageable subsoil for backfill and remove all other excavated material
- To minimize slope erosion, apply topsoil and regionally approved native grass seed mix.
- Remove and dispose all temporary sediment control measures when no longer needed.
- Remove all unused materials from site and dispose construction debris at an approved waste transfer facility.

2.4.4 General Mitigation Measures

- Ensure all vehicles and equipment brought onsite are clean and in good working order free of contamination or leaks.
- Conduct cleaning, fueling and servicing of all equipment at least 100 m away from any watercourses, wetlands or environmentally sensitive areas. Any on-site fuel storage should be contained within a lined berm to contain any potential spills.
- Stop aggregate excavation work during heavy rains/snowfall or extremely windy conditions.
- Ensure all reportable spills or releases are reported to the Alberta 24 Hour Spill Reporting Line: 1.800.222.6514.
- Keep a copy of the ESC Plan and all regulatory approvals onsite during construction activity.

2.5 Monitoring

Regular monitoring during the construction process is required to ensure regulatory compliance, oversee implementation of works in accordance with design plans, minimize site disturbances, and limit seepage into work areas. Construction equipment or adverse weather conditions can damage BMP installations. Majority of BMPs only perform correctly with regular maintenance. All erosion and sediment control measures will be continually monitored. An inspection and report will be conducted annually and after a heavy or prolonged rainfall event or snowmelt.

Maintenance must be carried out in a timely and diligent manner, ideally within 48 hours of discovering any damaged installation. Erosion and sediment control inspection reports will be made available to all government regulators on request. In addition, all other regulatory approvals will be kept onsite during construction. If there is a temporary work stoppage, inspection and maintenance of erosion and sediment control measures must continue.

2.6 Conclusion

It is anticipated that following the listed BMPs for erosion and sediment control will be sufficient to mitigate potential ESC problems on-site. BURNCO is committed to annual spring monitoring of all ESC installations, including additional monitoring after heavy or significant precipitation events and snowmelt, to ensure all controls are in proper working order.

3.0 CLOSURE

This report has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this report. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions or misinterpretations by others.

While preparing this report, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this report. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This report has been prepared for the sole and exclusive use of BURNCO who may rely on this report for specific application to this project site. Any other use, or any use of this report by any other party,

including any individuals or organisations who may obtain access to this report through applications under the *Freedom of Information and Protection of Privacy Act*, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this report. If third parties choose to use this report in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion, reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this report, including any individuals or organizations who may obtain access to this report through applications under the *Freedom of Information and Protection of Privacy Act*, will be required to return an executed copy of MEMS' Third Party Reliance Agreement in Appendix B.

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

Yours truly,

Millennium EMS Solutions Ltd.

Prepared by: :

Steven Clark, B.Sc., P.Ag
Senior Environmental Scientist

Reviewed by:

Vadim Lyzhin, Ph.D., P.Ag
Senior Soil Scientist

4.0 REFERENCES

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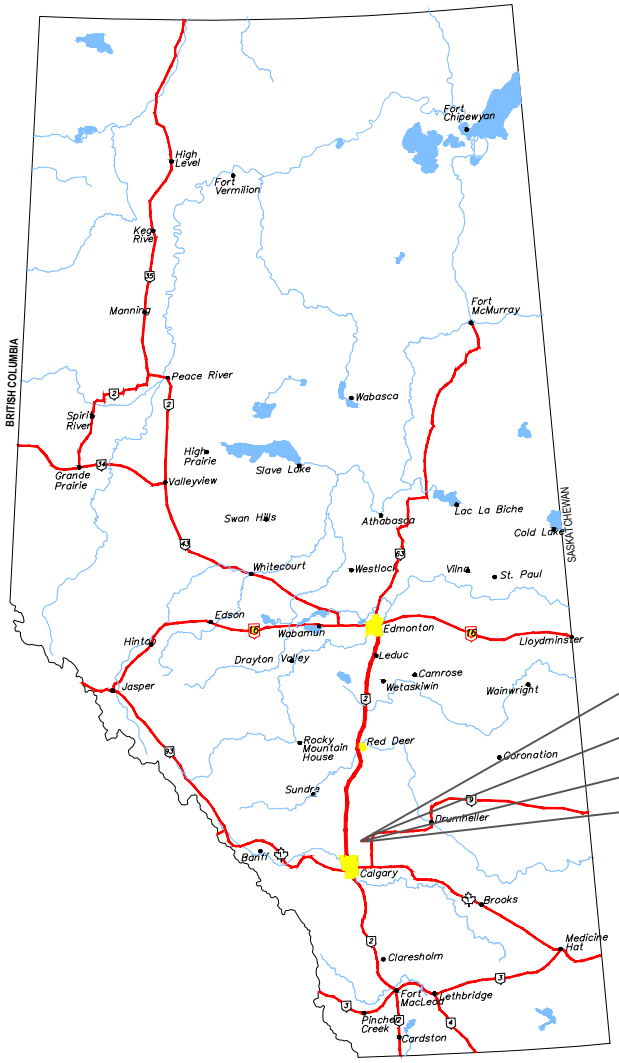
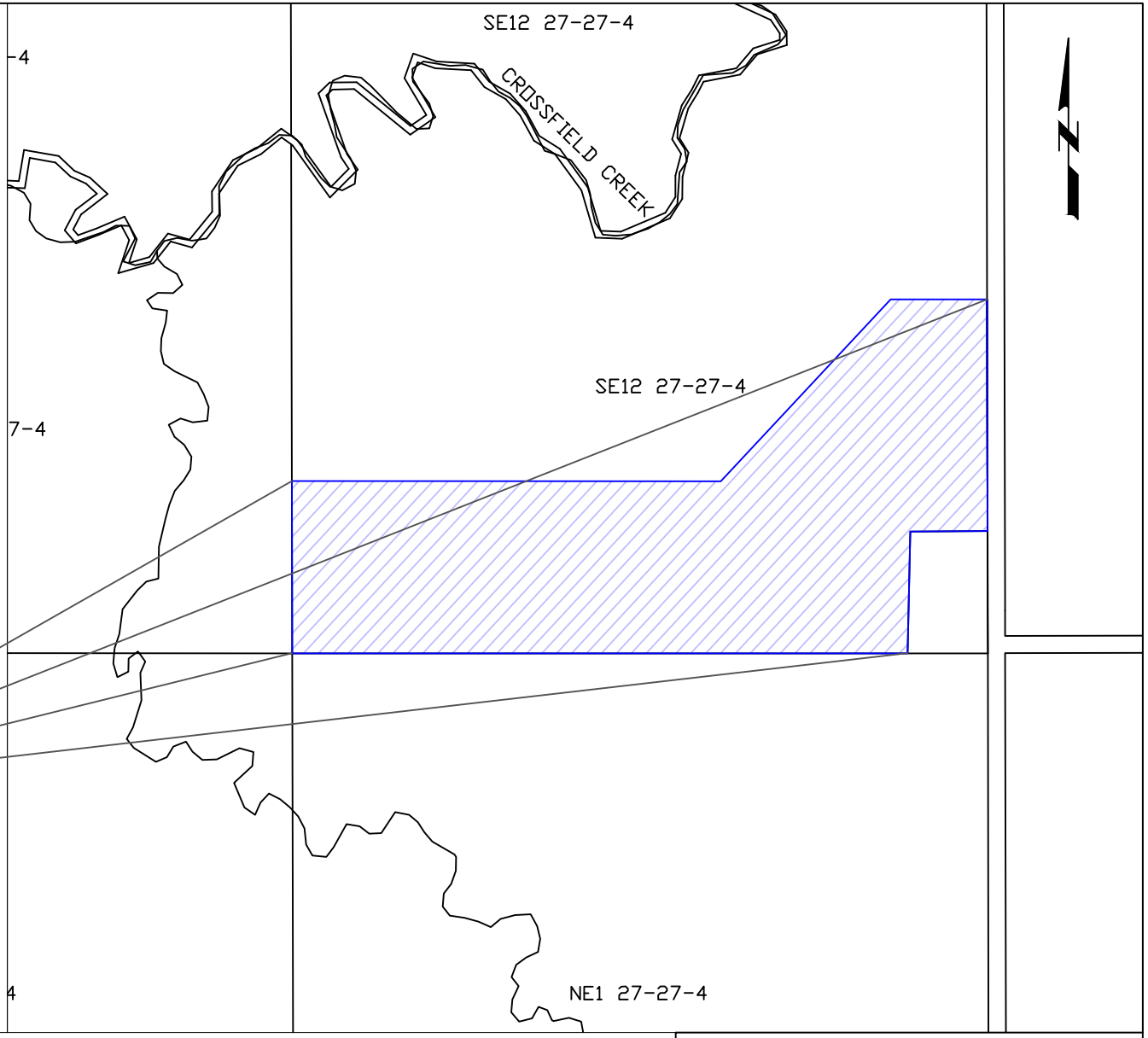
APPENDIX A: FIGURES





LEGEND:

LAND USE AREA (47.75 ACRES)

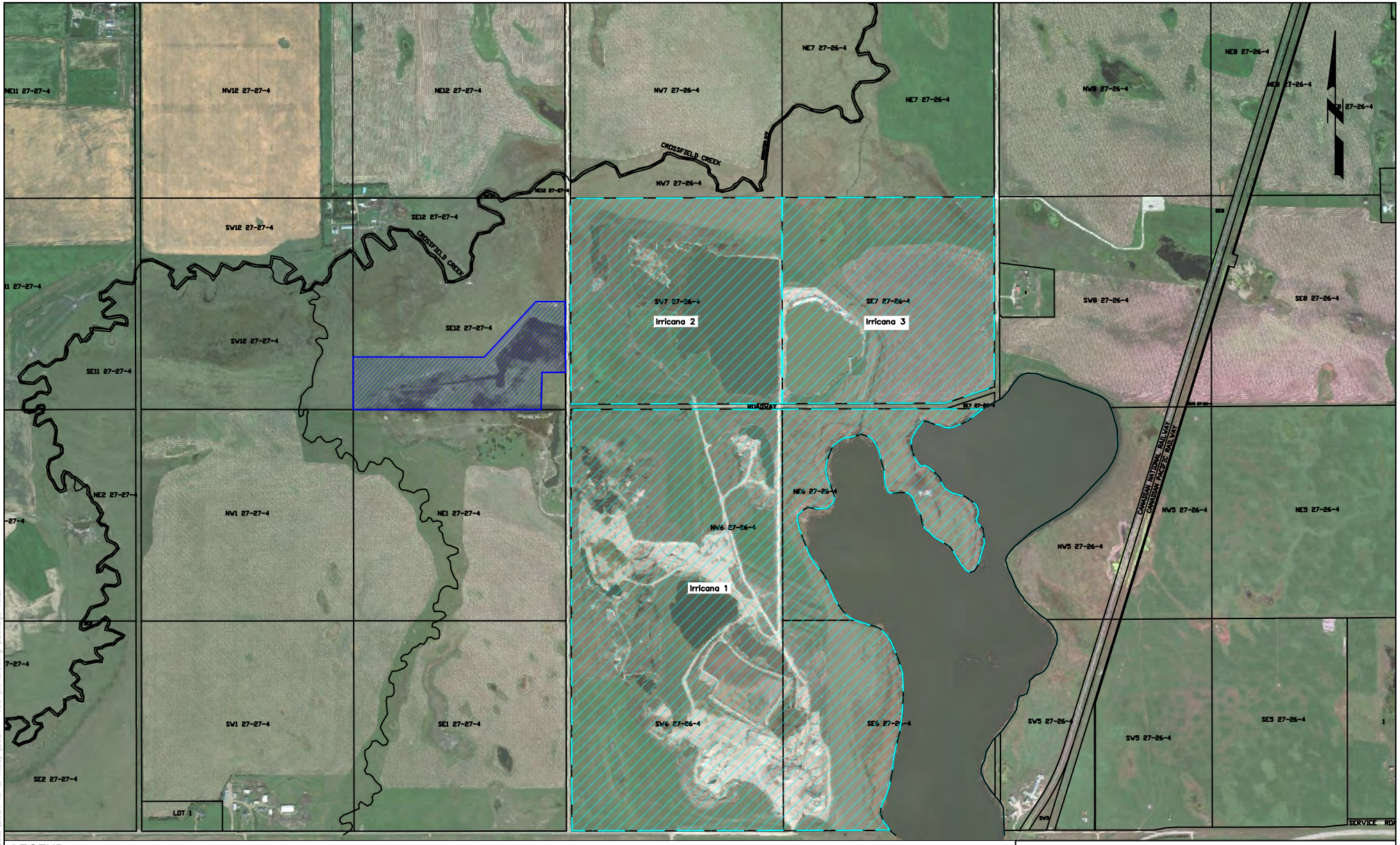
BURNCO Rock Products Ltd

ROE GRAVEL PIT

LOCATION MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	NTS	TT	1
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	



LEGEND:

LAND USE AREA (47.75 ACRES)

BURNCO - IRRICANA 1, 2 & 3

BURNCO Rock Products Ltd

ROE GRAVEL PIT

LAND USE MAP

SE 12-27-27 W4M

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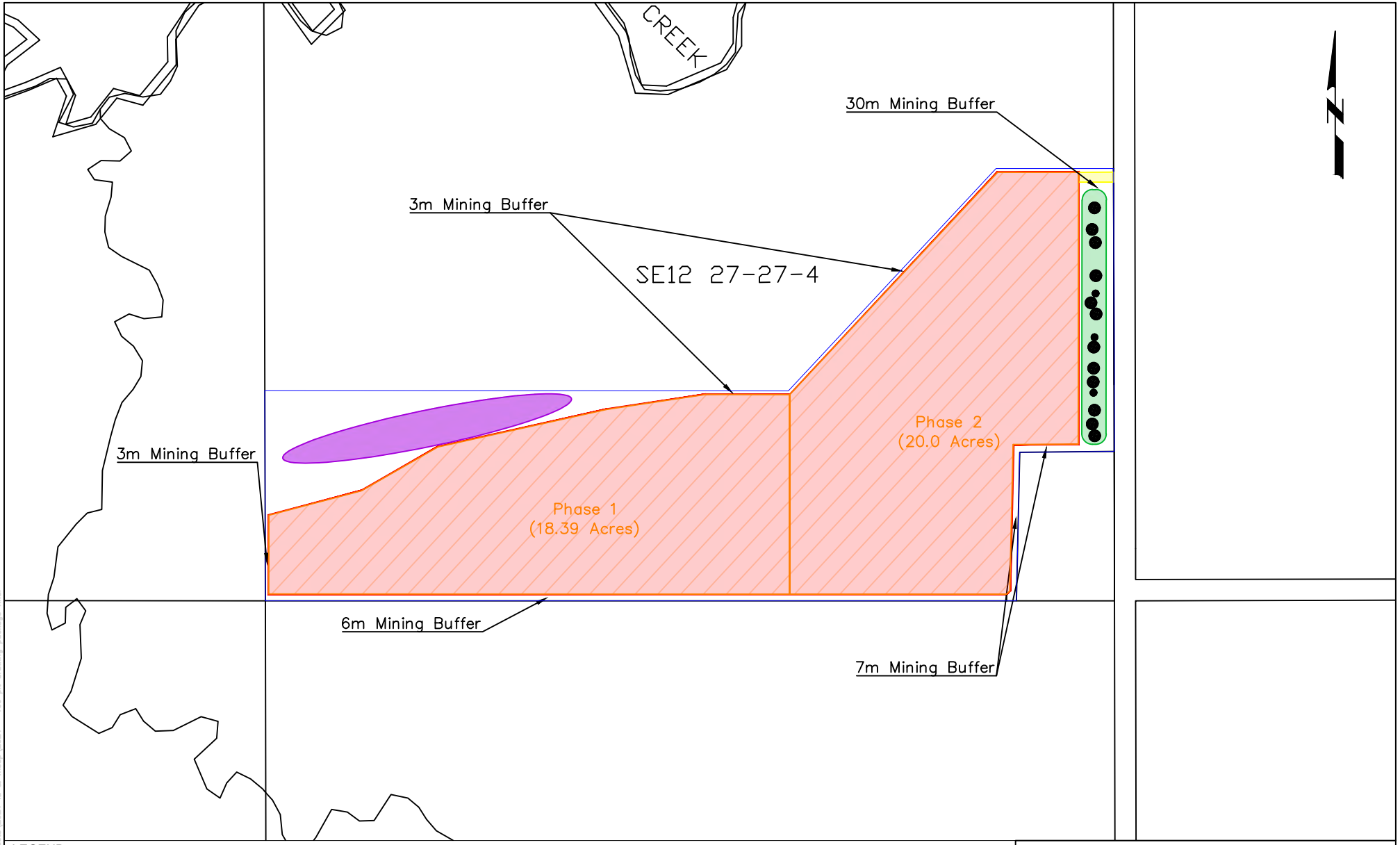
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- MINE PHASES
- TOPSOIL PILE
- OVERBURDEN PILE
- SITE ACCESS
- CADASTRAL
- VEGETATION BUFFER

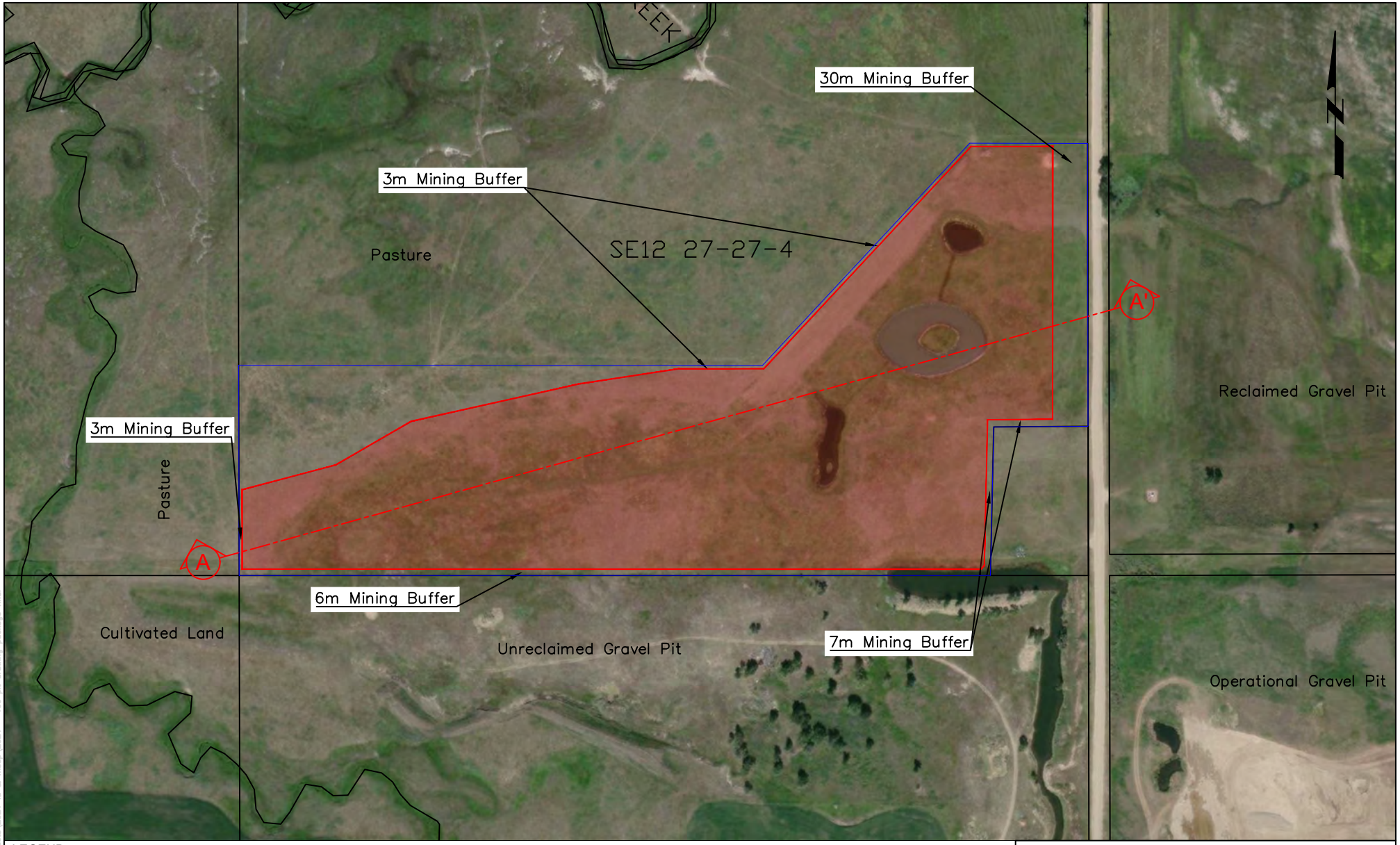
BURNCO Rock Products Ltd

ROE GRAVEL PIT

MINE PHASE PLAN

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	3-R1
DATE SUBMITTED: FEB. 2022		CHECKED BY: TC	



LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

ROE GRAVEL PIT

SITE MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
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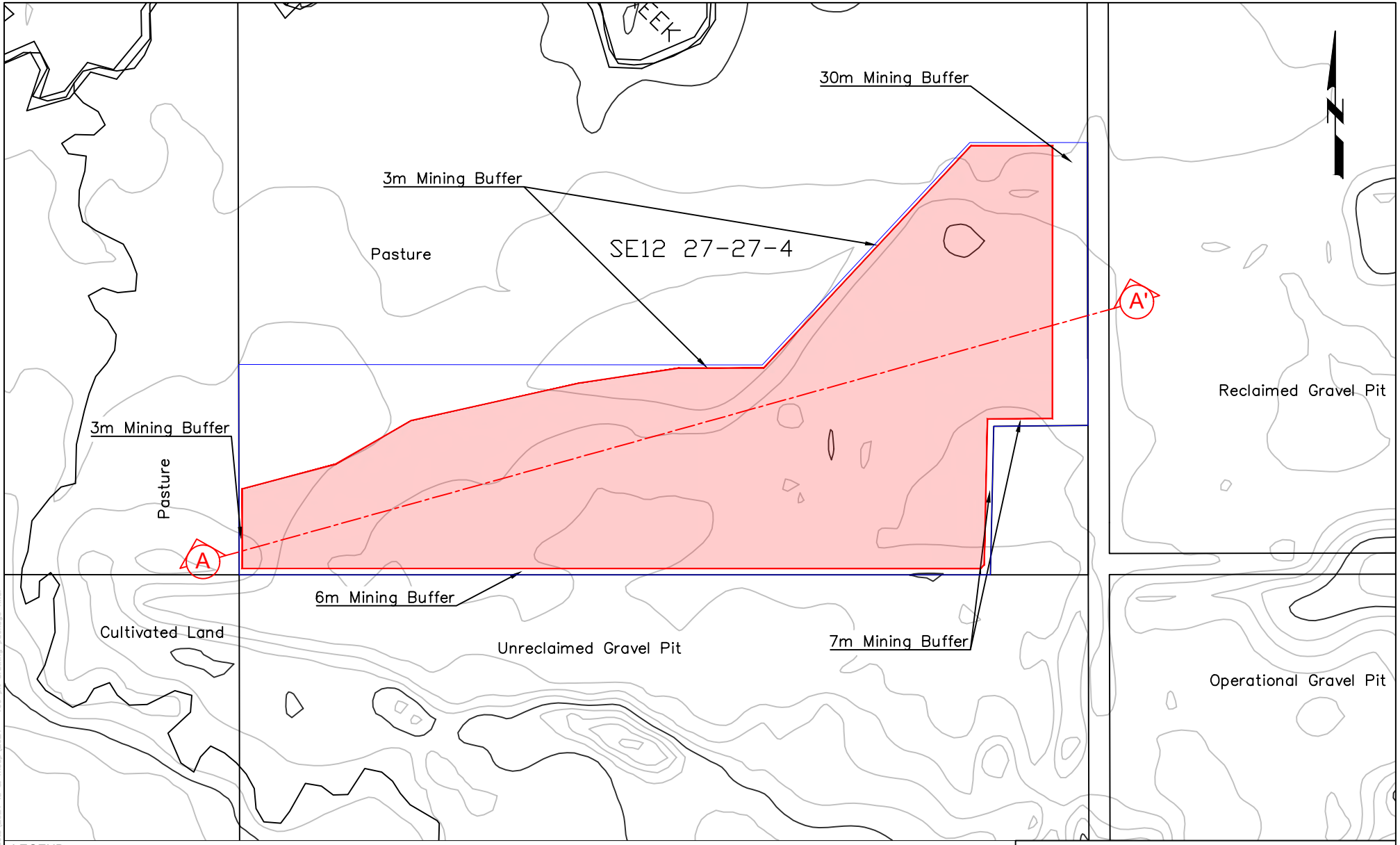


LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

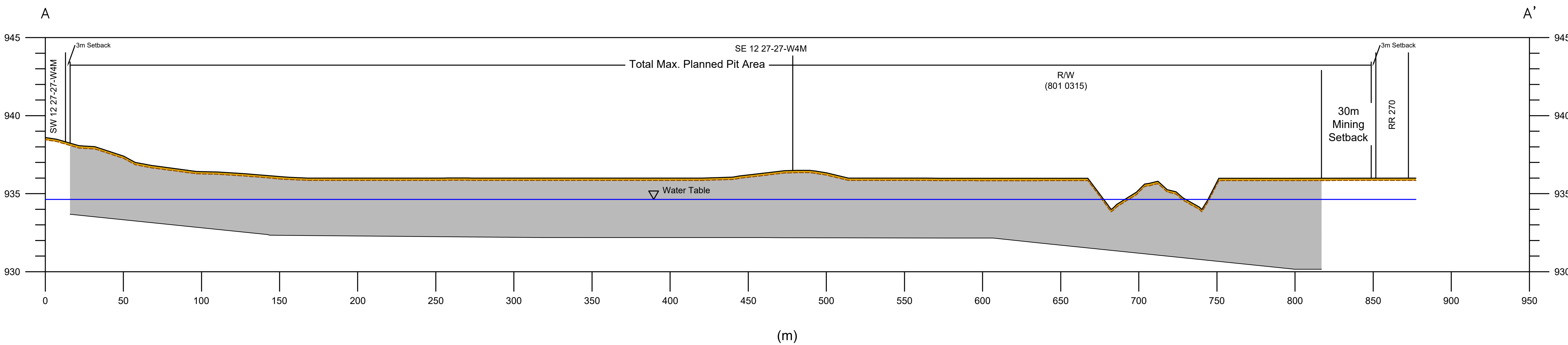
ROE GRAVEL PIT

SITE EXISTING CONTOURS MAP

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
NOV. 2021	1:5000	TT	5
DATE SUBMITTED: NOV. 2021		CHECKED BY: TC	

A EXISTING SITE CONDITIONS



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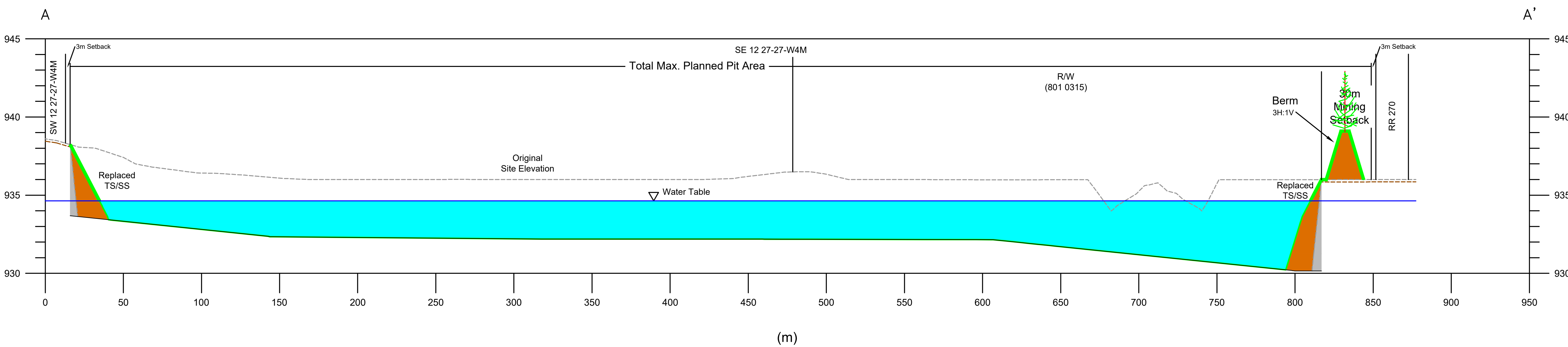

NOTES:

- Gravel will be mined at 1H:1V.
- Lake shore will be backfilled and reclaimed to 5H:1V 1 meter below the water table and then it will be graded to 3H:1V for the rest of the depth of the lake.
- Topsoil and subsoil will be replaced at ±10cm and ±11cm respectively.

BURNCO Rock Products Ltd

ROE GRAVEL PIT
CROSS SECTION A-A'
SE 12-27-27 W4M

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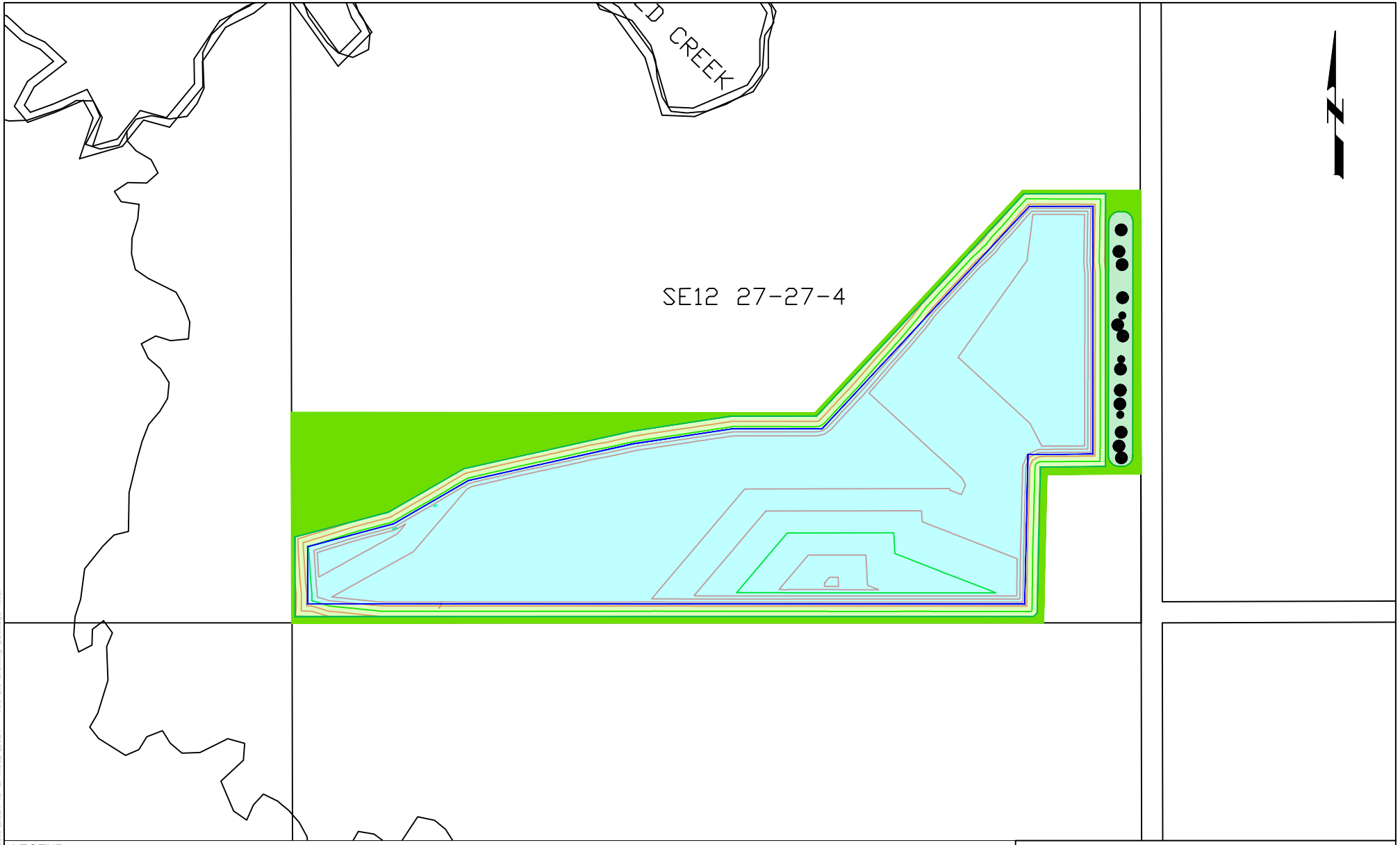
DATE SUBMITTED: DEC. 2021		CHECKED BY: TT	



LEGEND:

- END PIT LAKE (32.22 ACRES)
- LAKE SHORE (12 METER HORIZONTAL DISTANCE)
- 1M CONTOURS
- 5M CONTOURS
- CADASTRAL
- LANDSCAPE BERM
- PASTURE
- VEGETATION BUFFER

BURNCO Rock Products Ltd

ROE GRAVEL PIT

RECLAMATION PLAN

SE 12-27-27 W4M

DATE DRAWN:	SCALE:	DRAWN BY:	DWG. NO.
DEC. 2021	1:5000	ML	7
DATE SUBMITTED: DEC. 2021		CHECKED BY: TC	

APPENDIX B: MILLENNIUM EMS SOLUTIONS LTD. THIRD PARTY RELIANCE AGREEMENT

MILLENNIUM
EMS Solutions Ltd.

#148, 2257 Premier Way
Sherwood Park, AB T8H 2M8
tel: 780.496.9048
fax: 780.496.9049

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Calgary, AB T2H 2C3
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fax: 403.283.2647

#102, 11312 98 Avenue
Grande Prairie, AB T8V 8H4
tel: 780.357.5500
fax: 780.357.5501

Suite 218, 852 Fort Street
Victoria, BC V8W 1H8

#105, 116 Research Drive
Saskatoon, SK S7N 3R3
tel: 306.518.2442

toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO EROSION AND SEDIMENT CONTROL PLAN

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Erosion and Sediment Control Plan" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: _____
MEMS Representative
Title
Date

Agreed to this ____ day of •, _____.
[THIRD PARTY]

By: _____
Name:
Title
Date

Appendix 10: Landscaping Plan

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Landscaping Plan
Roe Gravel Pit
SE 12-27-27 W4M (Title # 891 070 572)

Prepared for:
BURNCO Rock Products Ltd.

Prepared by:
Millennium EMS Solutions Ltd.
#148, 2257 Premier Way
Sherwood Park, Alberta
T8H 2M8

September 2022
22-00690-00

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1.0 INTRODUCTION

BURNCO Rock Products Ltd. (BURNCO) retained Millennium EMS Solutions Ltd. (MEMS) to complete a Landscaping Plan for the Roe Gravel Pit located within SE 12-27-27 W4M (herein referred to as "the Site"). The following Landscape Plan is based on the Rocky View County (RVC) requirements.

2.0 SITE BACKGROUND

The Site is located near existing gravel pits located southwest of the town of Irricana, Alberta. Irricana 1 is located in SEC 06-27-26 W4M, Irricana 2 (Luft) is located in SW 7-27-26W4M, and Irricana 3 (Poffenroth) is located in SE 7-27-26 W4M. Combined, these sites represent a total of 304 hectares (751 acres) in size. Irricana 2 and Irricana 3 are now depleted and reclaimed while Irricana 1 contains an estimated 2,100,000 tonnes of aggregates and is selling roughly 400,000 tonnes of material annually.

The proposed Site is located in the SE 12-27-27 W4M and is 19.32 hectares (47.75 acres) in size. The Site will serve to supply BURNCO's existing Irricana 1 gravel pit with an estimated 1,200,000 tonnes of aggregate through the expansion of permitted reserves. The Site is expected to have a lifespan of 5 to 10 years. The Site is currently permitted as a RVC gravel pit and has an Alberta Environment & Parks (AEP) Registration # 00015044-01-00.

3.0 SITE DETAILS

Table 1 outlines the characteristics of the Site.

Table 1 Site Characteristics

		Reference
Adjacent land use	Agricultural, Natural Resources District (contain active and reclaimed gravel pits), Business-Agricultural	Aerial imagery – AbaData (2022) BURNCO 2022
Site vegetation	Site to be incorporated back into landowner's agricultural field and to be seeded (>22 kg/acre) to: • 30% wheatgrass • 40% smooth brome • 30% Kentucky bluegrass.	BURNCO 2022
Topography	On-site: Relatively flat and level Off-site: Gradual slope to the north	Topographic contours AbaData (2022)

Table 1 Site Characteristics		
		Reference
Mapped soil types and parent geological materials	Dominant Soil Type: Rego Humic Gleysol (C,SiC) that is over medium textured (L,CL) till (BZC). The soils are coarser textured than the dominant or co-dominant soils and solonetzic soils. Valley with floodplain, low relief landforms with slopes that range from 1-5%.	Alberta Soil Information Viewer (2022)

4.0 RECLAMATION

The objective of reclamation, defined by the Alberta EPEA Conservation and Reclamation Regulation (AR 115/93), is to return areas disturbed for industrial development to equivalent land capability. Equivalent land capability is defined in the Regulation as "the ability of the land to support various land uses after conservation and reclamation is similar to the ability that existed prior to an activity being conducted on the land, but that the individual land uses will not necessarily be identical" (*Environmental Protection and Enhancement Act 1993*). Reclamation objectives include achieving terrain, drainage, and soil characteristics similar to pre-disturbance conditions to achieve equivalent land capability. It is anticipated that reclaimed land will support the landowner's need as an end pit lake and pasture land.

4.1 Reclamation Plan Design

The final reclamation plan is an End Pit Lake with an approximate size of 13.04 ha (32.22 acres) and pasture land for the remainder of the Site.

Refer to Appendix A for BURNCO's Reclamation Figure and Reclamation Cross-sections.

4.1.1 Materials Handling

Topsoil and subsoil will be stripped to create a screening berm to the east of the development. Overburden and aggregate material will be extracted, where the overburden will be used to create a screening berm to the north of the mining area.

In most cases, overburden will be used for grading and re-contouring for the End Pit Lake. Progressive reclamation will be conducted throughout the mining operation where topsoil and subsoil are placed into areas of reclamation. The soil surface directly beneath the topsoil and subsoil will be ripped for decompaction of the soil to prevent any rooting restrictions, lumps will be broken up, and any ridges and depressions leveled prior to topsoil and subsoil replacement. BURNCO will

make every effort to minimize machine traffic on replaced topsoil and subsoil and not work when it is wet.

4.1.2 Buffers/Mining Setbacks and Slopes

The mining/excavation limits established below must be observed to ensure adequate overburden to create the reclaimed slope of 3H:1V. The lake shore will be backfilled and reclaimed to 5H:1V one (1) meter below the water table and then it will be graded to 3H:1V for the rest of the depth of the lake.

The excavation limit incorporates a 30 m property line buffer on the east edge of the excavation and Range Road 270. The screening berm between the excavation's east edge and Range Road 270 will have a 3H:1V slope. The established buffers will also maintain the integrity of the boundaries.

During periods of inactivity of over six months, pit faces will be sloped no steeper than 2H:1V.

4.2 Topsoil and Subsoil Salvage

All topsoil and subsoil on site will be salvaged and used in the final reclamation. Topsoil and subsoil salvage will not occur under wet, frozen, adverse field conditions or high wind velocities that will result in mixing, loss, compaction or degradation of soil.

Topsoil and subsoil will be salvaged a minimum of three meters ahead of pit faces to prevent topsoil spilling or sloughing in the open excavation. Topsoil and subsoil will be directly placed into areas of reclamation. The topsoil will be placed in a berm on the east boundary as a permanent feature that will remain after final reclamation.

The screening berms will be trimmed and graded around the base to prevent surface water and wind erosion.

4.3 Grading

Overburden from Phase 2 of the project will be directly placed into the Phase 1 mining area, to create the final sloping for the end pit lake.

4.4 Preparation of Compacted Soil Areas

To eliminate compaction, the access road and perimeter of the End Pit Lake shall be ripped 0.3 mbgs, respectively.

4.4.1 Topsoil and Subsoil Replacement

The average thickness of topsoil and subsoil obtained from exploratory testing done by BURNCO was 0.10 m and 0.11 m, respectively. Only once final grade is achieved, trimming is complete and the soil

is decompacted, the soils will be replaced uniformly over the disturbed area, commencing with subsoils. Salvaged subsoil will be replaced evenly over the overburden. Topsoil and subsoil replacement will occur after contouring is complete and subsidence is no longer a concern. Replaced topsoil will be protected from water and wind erosion by leaving some surface roughness and establishing appropriate erosion control measures.

Topsoil and subsoil replacement should only be done in dry conditions and the targeted replacement depth shall be 0.08 m and 0.09 m, respectively, throughout the Site.

4.5 Revegetation Plan

The most critical component in reclamation is soil organic matter, due to its importance for increasing water holding capacity, contributing to the nutrient pool, initiating the formation of soil structure, and acting as a substrate for a wide array of soil organisms (Haigh, 2000; Munshower, 1994; and Palmer, 1992). The most effective approach to increasing organic matter is the establishment of a productive vegetation cover. This will also help to improve soil infiltration capacity and reduce soil erosion (Naeth *et al*., 1991).

Copies of the Seed Analysis Certificates (required for all graded seed under the Canada *Seeds Act*) for all components in the seed mix shall be supplied to AEP for review prior to the application of any seed. Seed mixes should be developed based on adjacent plant communities.

4.5.1 Seeding

Topsoil and subsoil piles will be seeded to establish vegetation and reduce the potential for erosion. Short-term stabilization could also include fiber mulch, straw shredding/crimping and or compost/manure,

Once topsoil has been evenly placed, the reclaimed areas will be re-vegetated to pasture using drill seeding at a rate no less than 22 kg/hectare. Grass seed mixture will be 30% wheatgrass, 40% smooth brome, 30% Kentucky bluegrass. Once seeding is complete, a program of cutting and fertilizing will take place as necessary to ensure the pasture becomes established (BURNCO 2022).

4.6 Surface Water

There will be one permanent water body which is planned to be 13.04 ha (32.22 acres) in size (See Appendix A Drawing No. 7 - Reclamation Plan). The shoreline will be constructed with a 5H:1V slope above the average water level to one meter below the water table and will have a 3H:1V slope at depths greater than one meter below the water level.

This water body will provide water for livestock and will promote habitat for wildlife. A *Water Act* application will be submitted to AEP for the development of a permanent water body.

The landscape drains to the north and into Crossfield Creek and east to an unnamed tributary. Off-site surface water will be diverted around the perimeter of the Site and back into the natural drainage of the land. This will help to not inundate the Site and to maintain original drainage patterns as much as possible.

Temporary drainage structures such as swales and ditches will help to convey water around the Site and away from stockpiles and newly reclaimed areas. Precipitation in the undisturbed areas of the Site will be allowed to flow unimpeded.

4.7 Weed Management (During Operations and After Closure)

The Site will be monitored for any prohibited and/or Noxious weeds. If any weeds are identified during the inspection, they will be removed and destroyed as per the *Weed Control Act* (AEP 2008,).

4.7.1 Inactive Pit

If the Site is to remain inactive for more than two years due to market supply or aggregate depletion in an area of the Pit, the following inactive pit plan will include:

- Sloping of the pit face to a maximum of 3H:1V;
- Removing all equipment from the site;
- Signs with "Open Pit" will be placed in highly visible areas;
- Site drainage to be maintained within the pit boundaries;
- Stockpiles will be seeded to protect against erosion and loss; and
- Monitoring and removing any weeds annually.

5.0 CLOSURE

This report has been prepared for BURNCO in accordance with the agreed scope of work, based on data and information provided by BURNCO except as noted in this report. MEMS's work is predicated on the fact that all data contained in third party reports and information provided by others is accurate and reflective of site conditions. MEMS does not accept responsibility for any deficiency, misstatements or inaccuracies contained in this report as a result of omissions or misinterpretations by others.

While preparing this report, MEMS may use or incorporate MEMS's proprietary algorithms, methods, compilations, processes, designs, formulas, and/or techniques, and may also employ advanced technologies for simulation, information modeling, generative design, and the development of project

documentation (the "Technical Tools"). The Technical Tools may be further used to create data sets and result in simulations or models (collectively, the "Datasets") that may be included in this report. Both the Technical Tools and the Datasets are by-products of MEMS's internal processes and shall belong solely to MEMS. No unauthorized use of the Technical Tools or Datasets is permitted.

This report has been prepared for the sole and exclusive use of BURNCO who may rely on this report for specific application to this project site. Any other use, or any use of this report by any other party, including any individuals or organisations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, is prohibited without the express written consent of BURNCO and MEMS. MEMS accepts no responsibility for foreseeable or unforeseeable damages, or direct or indirect damages, if any, suffered by any third party as a result of decisions made or actions taken based on the unauthorized use of this report. If third parties choose to use this report in an unauthorized manner, such third parties are also choosing to indemnify MEMS and its officers, employees, agents, successors and assigns from any and all claims, damages, or liability of any kind (including but not limited to delay of project commencement or completion, reduction of property value, and/or fear of, or actual, exposure to or release of toxic or hazardous substances) in regard to such use.

Third parties that wish to use this report, including any individuals or organizations who may obtain access to this report through applications under the Freedom of Information and Protection of Privacy Act, will be required to return an executed copy of MEMS' Third Party Reliance Agreement in Appendix B.

We thank you for the opportunity to be of assistance to BURNCO. Should you have any questions, please contact Jenn North at 780.235.7186.

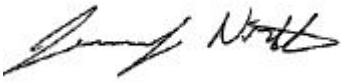
Yours truly,

Millennium EMS Solutions Ltd.

Prepared by:

Kristopher Lyseng B.Sc.
Environmental Scientist

Reviewed by:



Jennifer North, C.E.T.
Senior Environmental Technologist

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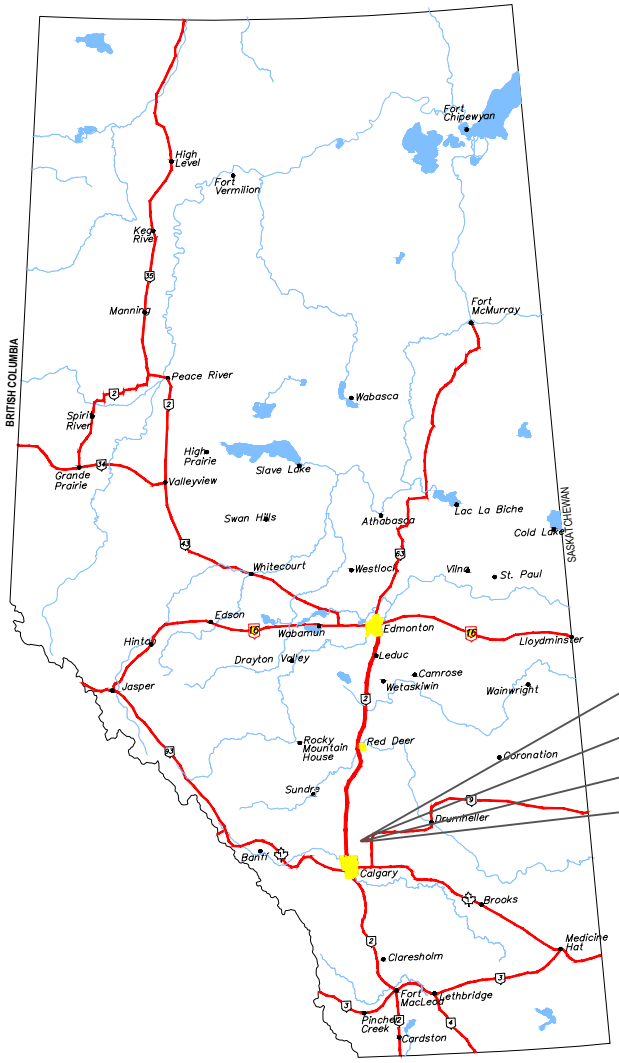
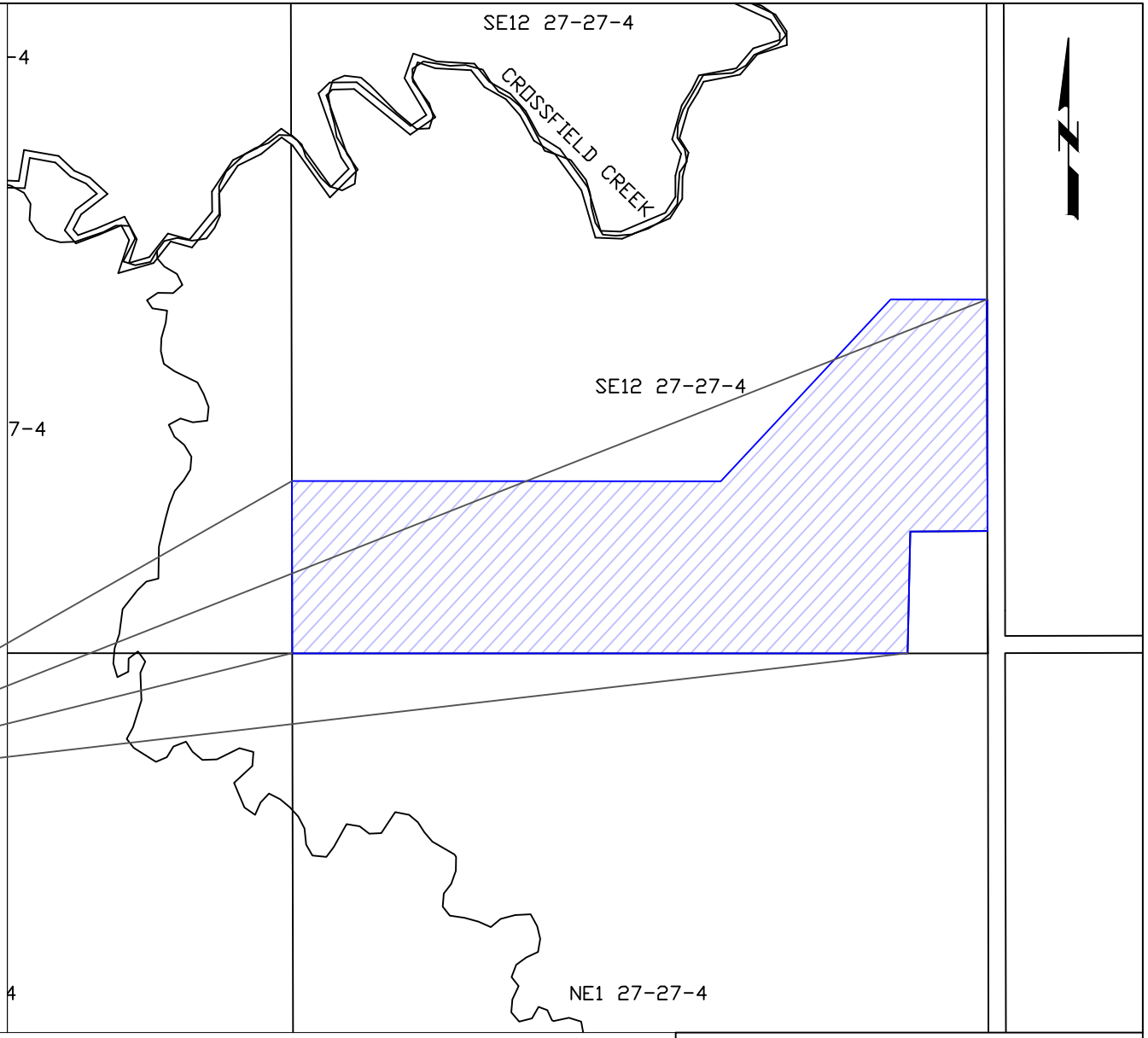
APPENDIX A: BURNCO RECLAMATION FIGURES





LEGEND:

LAND USE AREA (47.75 ACRES)

BURNCO Rock Products Ltd

ROE GRAVEL PIT

LOCATION MAP

SE 12-27-27 W4M

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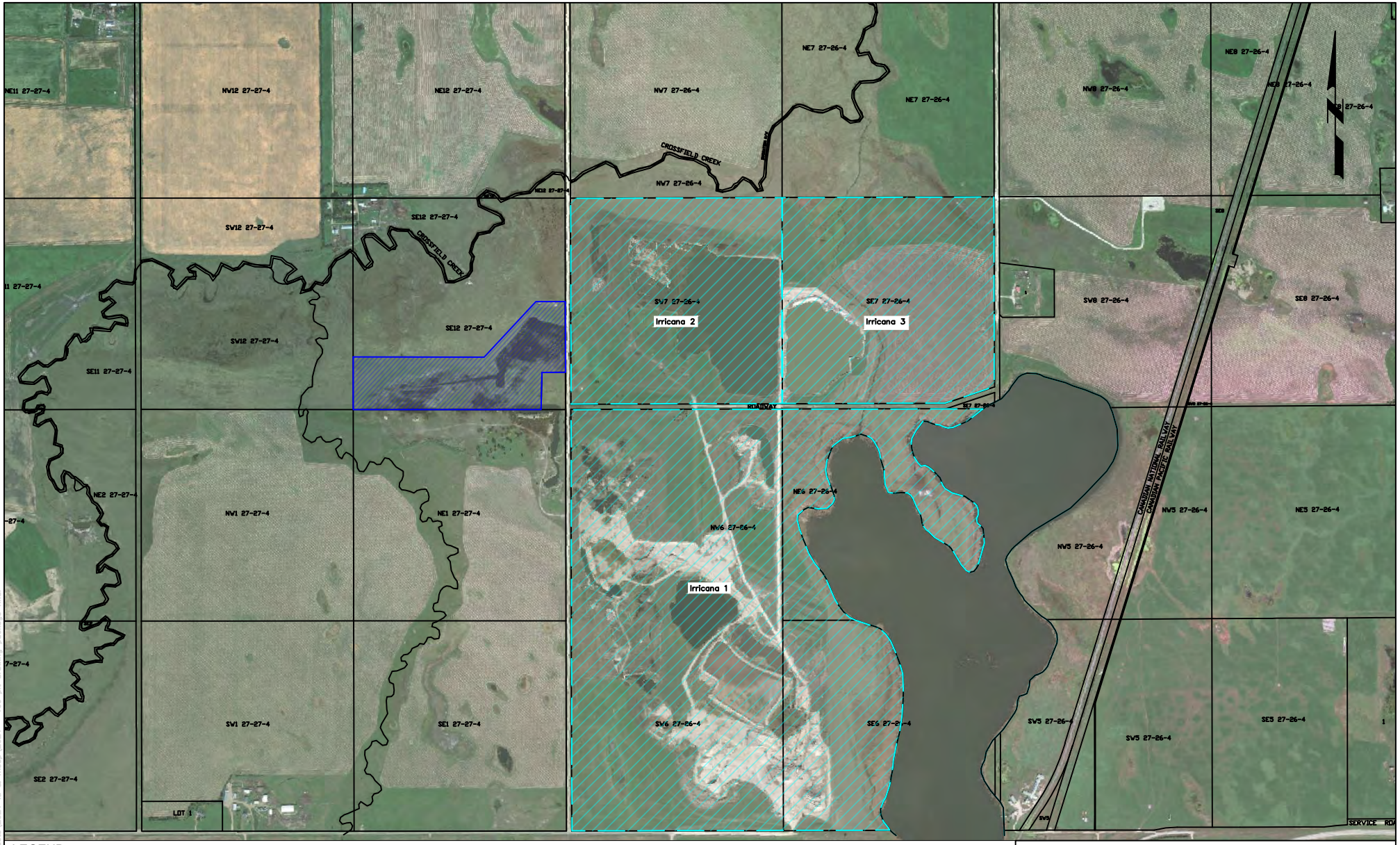

LEGEND:

LAND USE AREA (47.75 ACRES)

BURNCO - IRRICANA 1, 2 & 3

BURNCO Rock Products Ltd

ROE GRAVEL PIT

LAND USE MAP

SE 12-27-27 W4M

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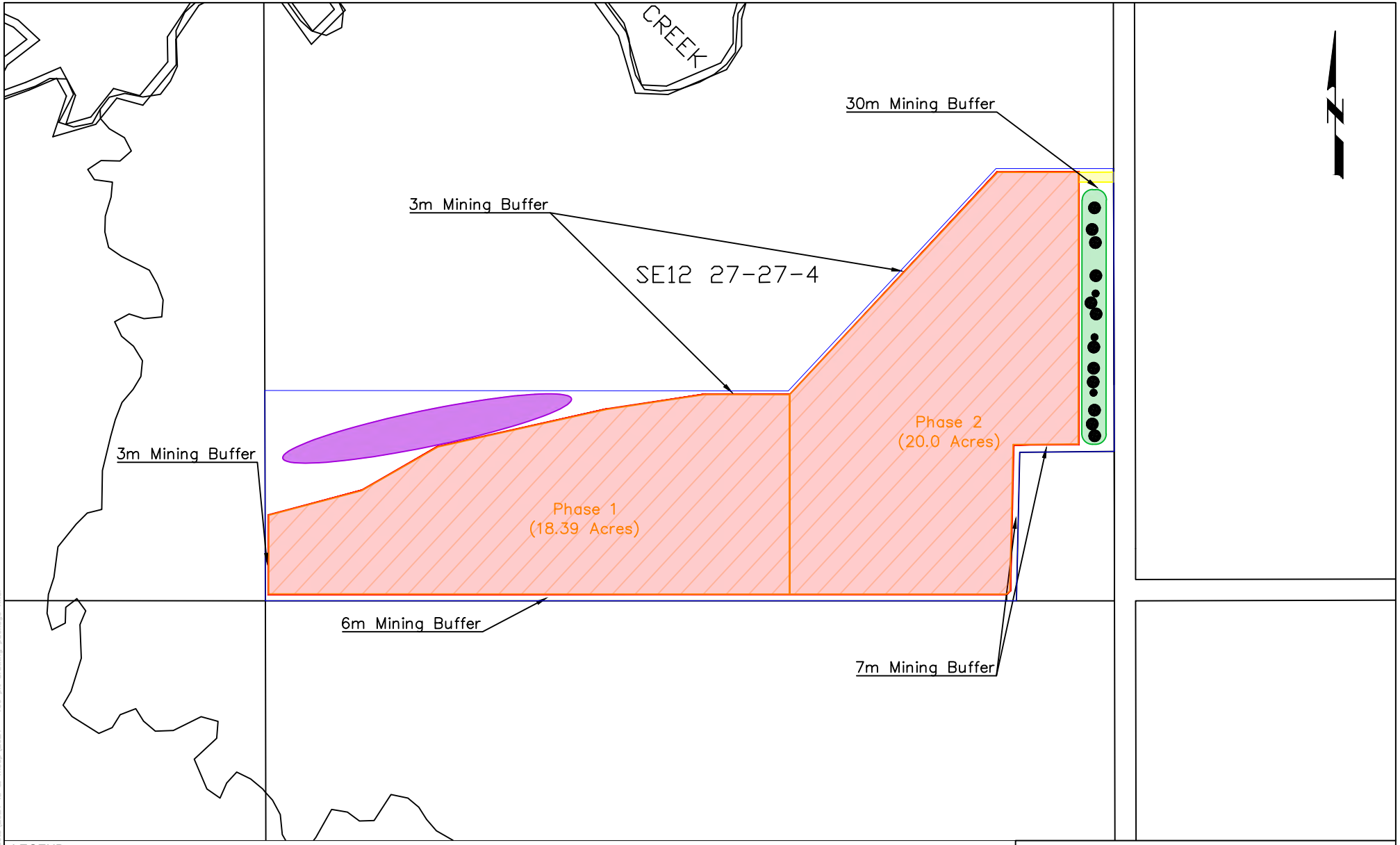

LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- MINE PHASES
- TOPSOIL PILE
- OVERBURDEN PILE
- SITE ACCESS
- CADASTRAL
- VEGETATION BUFFER

BURNCO Rock Products Ltd

ROE GRAVEL PIT

MINE PHASE PLAN

SE 12-27-27 W4M

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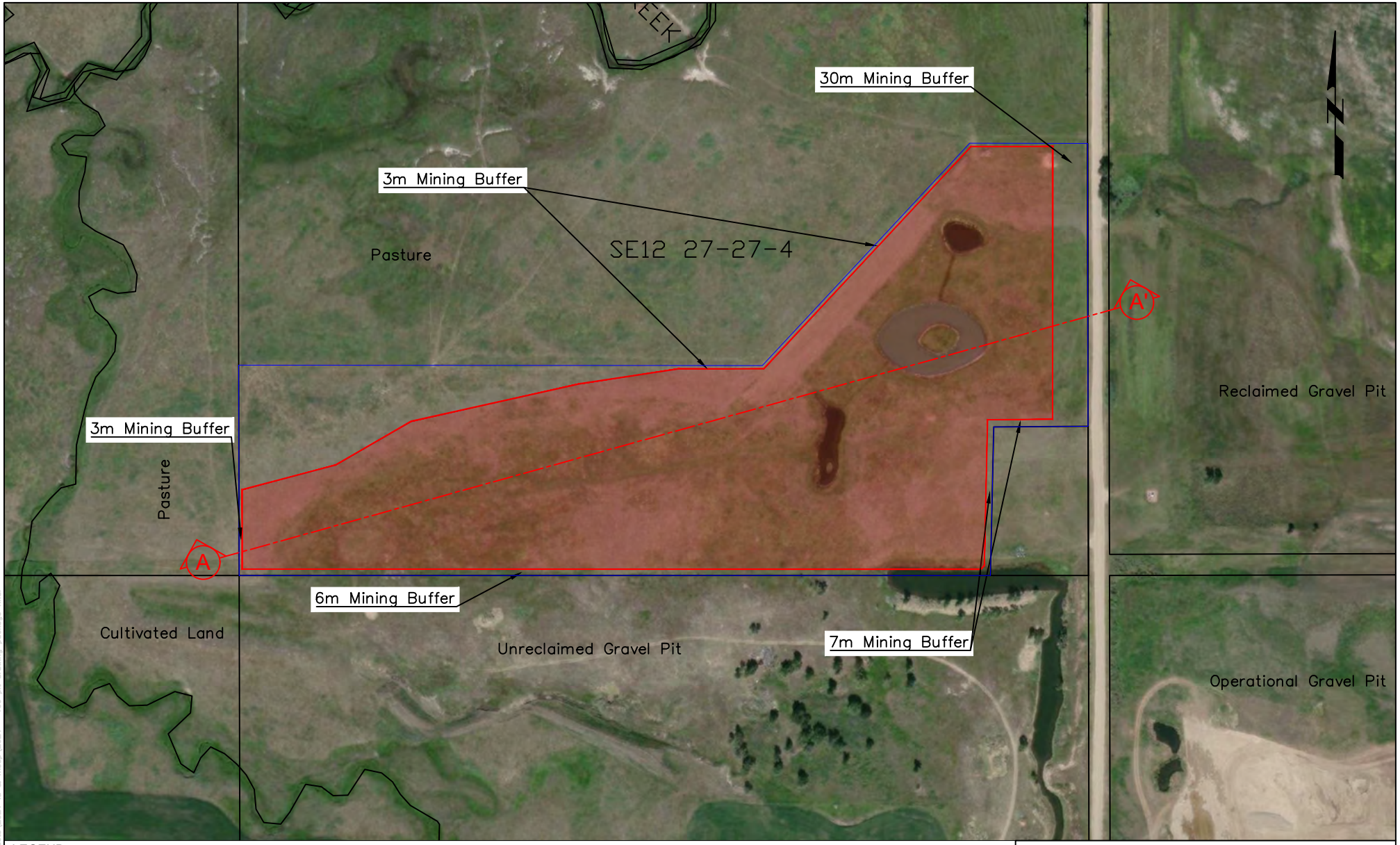

LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

ROE GRAVEL PIT

SITE MAP

SE 12-27-27 W4M

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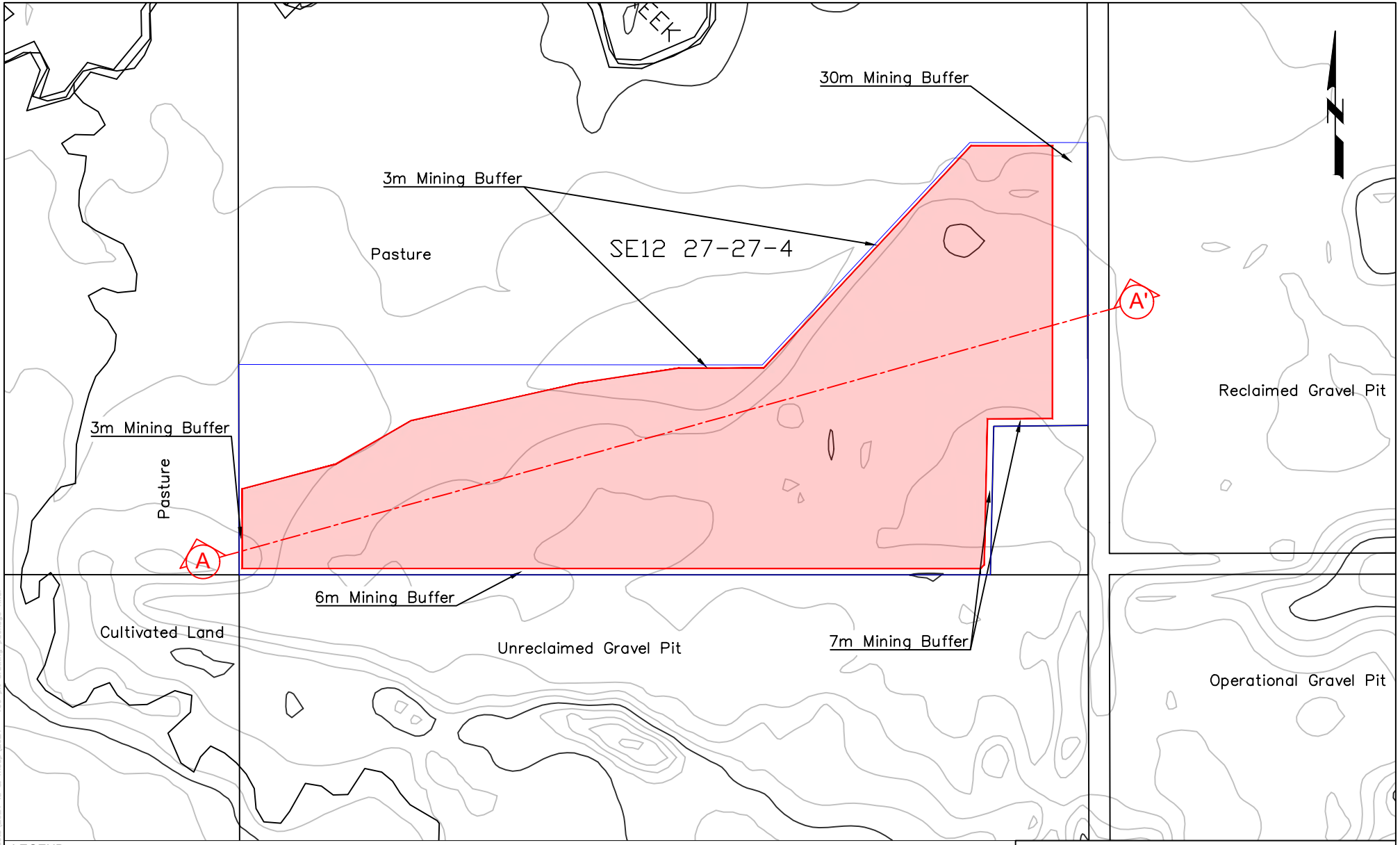

LEGEND:

- LAND USE AREA (47.75 ACRES)
- MINING AREA (38.39 ACRES)
- CADASTRAL
- CROSS SECTION

BURNCO Rock Products Ltd

ROE GRAVEL PIT

SITE EXISTING CONTOURS MAP

SE 12-27-27 W4M

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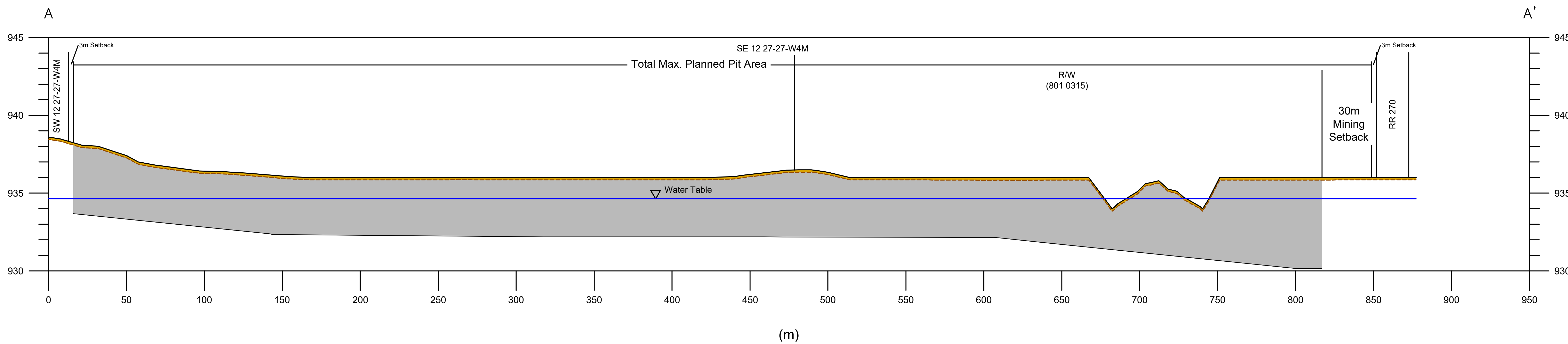

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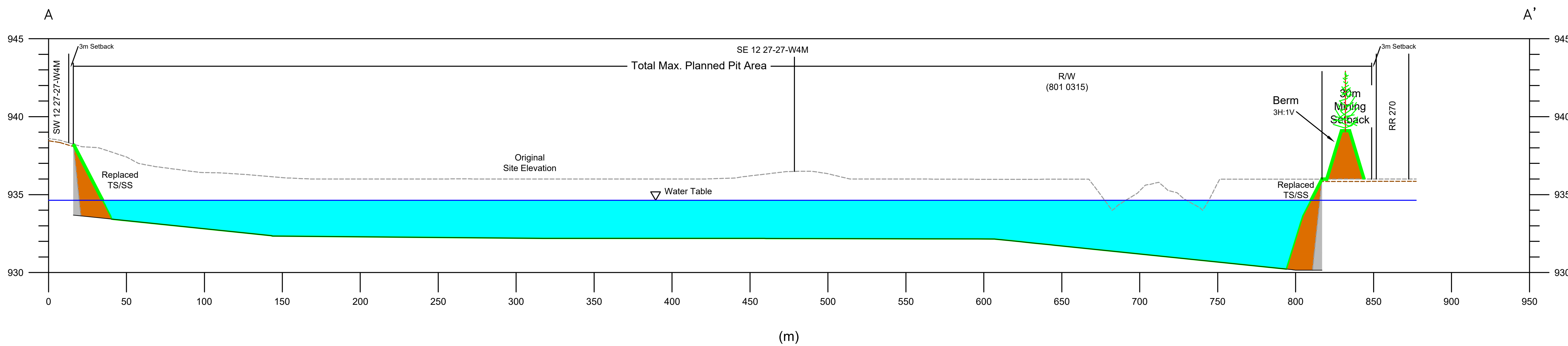

NOTES:

- Gravel will be mined at 1H:1V.
- Lake shore will be backfilled and reclaimed to 5H:1V 1 meter below the water table and then it will be graded to 3H:1V for the rest of the depth of the lake.
- Topsoil and subsoil will be replaced at ±10cm and ±11cm respectively.

BURNCO Rock Products Ltd

ROE GRAVEL PIT
CROSS SECTION A-A'
SE 12-27-27 W4M

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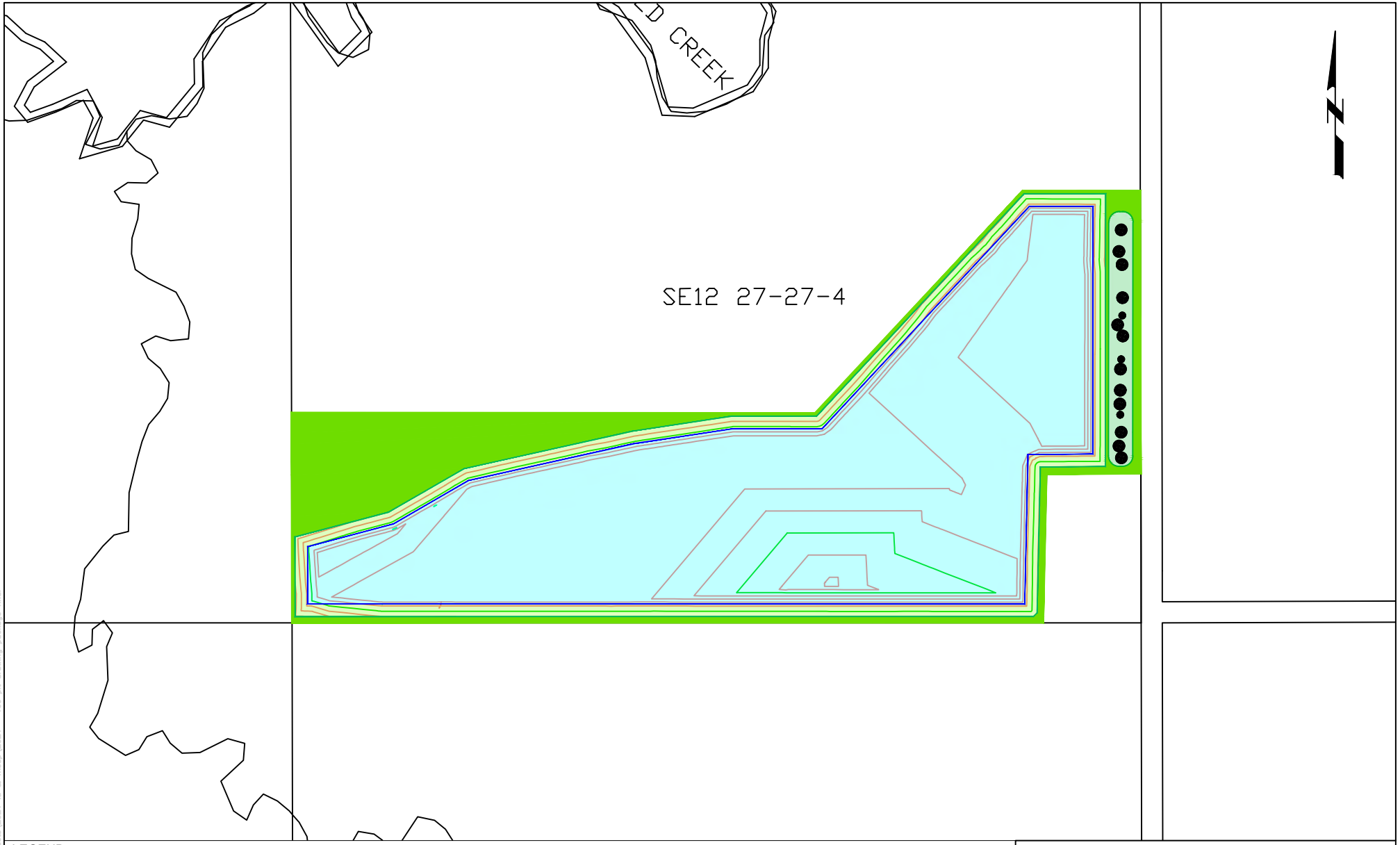

LEGEND:

- END PIT LAKE (32.22 ACRES)
- LAKE SHORE (12 METER HORIZONTAL DISTANCE)
- 1M CONTOURS
- 5M CONTOURS
- CADASTRAL
- LANDSCAPE BERM
- PASTURE
- VEGETATION BUFFER

BURNCO Rock Products Ltd

ROE GRAVEL PIT

RECLAMATION PLAN

SE 12-27-27 W4M

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DEC. 2021	1:5000	ML	7
DATE SUBMITTED: DEC. 2021		CHECKED BY: TC	

APPENDIX B: MILLENNIUM EMS SOLUTIONS LTD. THIRD PARTY RELIANCE

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toll free: 888.722.2563
www.mems.ca

[Name of recipient]

[Date]
DELIVERED VIA E-MAIL

Dear [name],

RE: RELIANCE LETTER PERTAINING TO LANDSCAPING PLAN

BURNCO Rock Products Ltd. ("**Client**") retained Millennium EMS Solutions Ltd. ("**Millennium**") to prepare "Landscaping Plan" ("**Report**") for the property located at SE 12-027-27 W4M.

We understand that you wish to rely on the information presented in the Report. Millennium has agreed to allow you to rely on the contents of the Report based on the terms and conditions below:

1) The limitations and assumptions stated in the Report in association with any closure statement continue to apply to your use of the Report.
2) You may have an interest in the Report that conflicts with the interest of Client. Millennium takes no responsibility for claims, liabilities, damages or expenses that arise because of such conflict.
3) Millennium expressly disclaims any and all warranties in connection with the Report. This disclaimer of warranties includes, without limitation, any warranty that the Report and any associated site investigation work has uncovered all potential environmental liabilities associated with the property that is the subject of the Report. Millennium disclaims any warranty of the completeness or accuracy of information supplied to Millennium that was relied upon in the preparation of the Report. You will waive any claim against Millennium, its officers, employees, agents, assignees and successors as a result of use of the Report.
4) You agree to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses, including but not limited to delay of project commencement or completion, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, or conflicts of interest, whether foreseeable or unforeseeable, which may arise directly or indirectly, to any party, as a result of your use of the Report.
5) Millennium's and its officers, employees, agents, assignees, and successors liability arising out of or relating to the use of the Report is limited to one thousand Canadian dollars (CAD$1,000.00). We will not be liable for consequential, incidental or indirect damages as a result of your use of the Report.
6) Use of the Report, including all information and recommendations prepared or issued by Millennium within the Report or pertaining to the Report, is for your exclusive use. No other use is authorized, including distribution to any other party without our prior written consent, which may be arbitrarily withheld. You will release us from liability and agrees to defend, indemnify, protect and hold harmless Millennium and its officers, employees, agents, assignees and successors from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.

Please sign in the space provided below to indicate your acceptance to the above conditions.

Regards,

MILLENNIUM EMS SOLUTIONS LTD.

By: _____
MEMS Representative
Title
Date

Agreed to this ____ day of •, _____.
[THIRD PARTY]

By: _____
Name:
Title
Date