

**EROSION AND SEDIMENT CONTROL REPORT  
FOR SPY HILL AGGREGATE OPERATIONS  
NW ¼ OF SECTION 28-25-2-W5M, AND NE ¼ OF SECTION 28-25-2-W5M  
BY GOVERNMENT OF ALBERTA**

Prepared for: **Government of Alberta**

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## 1.0 INTRODUCTION

This report outlines erosion and sediment control for phases 1 and 2 of the Spy Hill Aggregate pit. The pit is located in the northwest corner of the City of Calgary, directly west of the Young Offenders Centre and north of the University Research Centre. The area covered by Phases 1 and 2 is 120 ha (300 ac). Refer to MAPS 1 and 2 in the Spy Hill Aggregate Operations Application for Conservation and Reclamation Approval

## 2.0 LOCATION AND SITE CHARACTERISTICS

### 2.1 SITE TOPOGRAPHY

The topography of phase 1 is undulating, poorly drained land that drains generally in a northeasterly direction towards 85<sup>th</sup> street; whereas the land in phase 2 slopes gently to the north into a drainage course that crosses the northwest part of section 28 -25-2-W5M. There are no significant stands of trees within phases 1 and 2, with most of the land open grassland.

### 2.2 GEOTECHNICAL CONSIDERATIONS

An on site drilling program was undertaken for the Spy Hill pit. From the borehole logs it was found that the aggregates are overlaid by 9 to 15 metres of overburden.

### 2.3 EROSION POTENTIAL

To determine erosion potential, the site was divided into the berms, stockpiles, and pit areas. Refer to Map 6 Erosion and Sedimentation Control Phases 1 and 2 in the Spy Hill Aggregate Operation Application for Conservation and Reclamation Approval. For the berms and the side slopes of the pit the slope gradient will be 1:3, and for the stockpiles the slope gradient will be 1:2. The slope gradient is classified as steep for the berms, pit side slopes, and stockpiles. The slope length for berm was determined to be 9 to 12m, and for the stockpiles the slope length was determined to be 25m. For the pit the slope length was determined to be 90m. The slope length for the berms and the stockpiles is classified as moderate, and the slope for the pit is classified as long. Without a detailed geotechnical investigation it is difficult to determine the erodibility of the soil. Based on the following soil types:

- Sandy / Clay for the berms with loam as top dressing
- Loam for the top soil stockpile
- Browns ( a mixture of organic and sandy / clay) for the browns stockpile
- Sandy / Clay for the overburden stockpile
- Gravel for the pit side slopes

and the slope gradients and lengths discussed above the erodibility was determined and is presented in table 1

**Table 1: Soil Erosion Potential**

Area (ha)	Slope Gradient (%)	Slope Length (m)	Soil Erodibility
Berms	1. 3 (steep)	9 - 12 (moderate)	High
Stockpiles	1. 2 (steep)	25(moderate)	High
Pit side slopes	1. 3 (steep)	90 (long)	Low

## **2.4 IMPACT OF SEDIMENT LADEN FLOWS**

The impact of sediment laden flow on the drainage course in section 28 from the operation of the pit in phases 1 and 2 will not be a concern, in that all sediment laden flow from the stock piles will be directed into the pit where the runoff will collect in a pond at the northeast corner of phase 1 and filtered down into the gravel of the pit. Sediment laden flow within the pit will be contained in the pit and as in the case of runoff from the stockpiles will collect in the pond at the northeast corner of phase 1 and filtered down into the gravel of the pit.

The pit in phase 2 will extend westward to within 20 m of the top of the slope of the drainage course that crosses section 28. The 20m undisturbed buffer strip will ensure sediment-laden flows are contained in the pit.

Sediment laden flows from the berms adjacent the drainage course will be controlled by means identified in Section 4.0 Erosion and Sedimentation Controls.

## **3.0 PROPOSED DEVELOPMENT**

The gravel in phase 1 of the pit will be mined starting at the northeast corner adjacent to 85<sup>th</sup> street and progress westward. Topsoil approximately 150 mm thick will be stripped from the area of the first phase and used to top dress the berms. Approximately 9 to 15 m of overburden will then be removed from the initial area of the pit to be mined and used to construct the berms. The volume of overburden, including topsoil and browns in the initial mining area of phase 1 is estimated at 750,000 m<sup>3</sup>. The overburden material surplus to that required for berm construction will be stockpiled in the area on MAP 6 designated as overburden storage. This area will also be used to stockpile topsoil and browns as well as overburden. Sufficient separation will be provided between the stockpile to prevent mixing. The berms will be constructed including landscaping with trees and seeding to grass prior to mining of the gravel from the pit. When the gravel mining operation has advanced to a stage so that reclamation will not interfere with the mining operation the overburden will be replaced in the mined area, along with the topsoil. To complete restoration of the mined areas in the pit the topsoil will then be seeded with grass.

The gravel mining operation will proceed into phase 2 as the gravel in phase 1 is depleted.

### **3.1 STOCKPILES**

In keeping with Alberta Environment guidelines, three types of stockpiles for each area of the site will be created to ensure that material from each area is not mixed. One pile is for the first few centimeters of pure topsoil, the second pile is for browns (topsoil mixed with clay) and the third pile is for overburden. Once the gravel is removed from the pit area and the overburden replaced, browns will be replaced in each area, followed by the topsoil.

## **4.0 EROSION AND SEDIMENT CONTROLS**

Using silt fencing will contain sediment laden flows from the berms along 101 St. The location of the silt fencing is shown on MAP 6

Sediment laden flow from the berm adjacent the ditch on 85<sup>th</sup> street will be contained by installing silt fence along the property line. A space of 6 m will be left between the fence and the toe of the berm. At the north end of the berm a silt fence will be installed as shown on MAP 6 to prevent any sediment from flowing north into the drainage course.

All erosion and sediment control measures will be installed prior to proceeding with any stripping and excavation. The silt fencing for the berms will be maintained until the grass on the berms is established

To prevent soils from being tracked offsite onto 85<sup>th</sup> street by trucks during wet weather a gravel pad will be provide next to the paved access road for the truck to drive across.

Ditches will be constructed as indicated on MAP 6 to control storm water runoff.

#### **4.1 GOOD HOUSEKEEPING MEASURES**

Appropriate measures will be taken to minimize dust. All truckloads from the site will be secured tightly to prevent loose gravel, dirt and dust from dirtying existing roads.

#### **4.2 SIGNS AND FENCING**

A sign indicating the names and phone numbers of the Developer and/or Consultant will be erected on the site for area residents to contact should dust arise during the life of the pit operation.

#### **5.0 INSPECTION AND MAINTENANCE**

Stripping and grading is expected to commence in 2003-2004. The total life of the phases 1 and 2 gravel pits is expected to be about 22 years. Inspection of erosion and sediment controls during construction of the berms will be done immediately following any rainfall or runoff event and repaired as required. As a minimum, bi-weekly inspections will be done to insure that all erosion and sediment control measures are maintained in proper working order.

#### **6.0 CONCLUSION**

The measures of control described in this report will provide effective and cost efficient erosion and sediment control. It is hoped that this report has addressed all of Alberta Environment's concerns regarding erosion and sediment control for phases 1 and 2 of the Spy Hill Aggregate pit.

## REFERENCES

Spy Hill Aggregate Operation Application for Conservation and Reclamation Approval, prepared by Brown and Associates Planning Group and Russ Gerrish Consulting , March 2003

City, 2001. Guidelines for Erosion and Sediment Control, The City of Calgary, Wastewater and Drainage, Urban Development. February 2001.

**CORPORATE AUTHORIZATION**

This report "Erosion and Sediment Control Report for Phases 1 and 2 Spy Hill Aggregate Pit by Government of Alberta." was prepared by D.A. Watt Consulting Group Ltd.

CORPORATE PERMIT

PROFESSIONAL SEAL