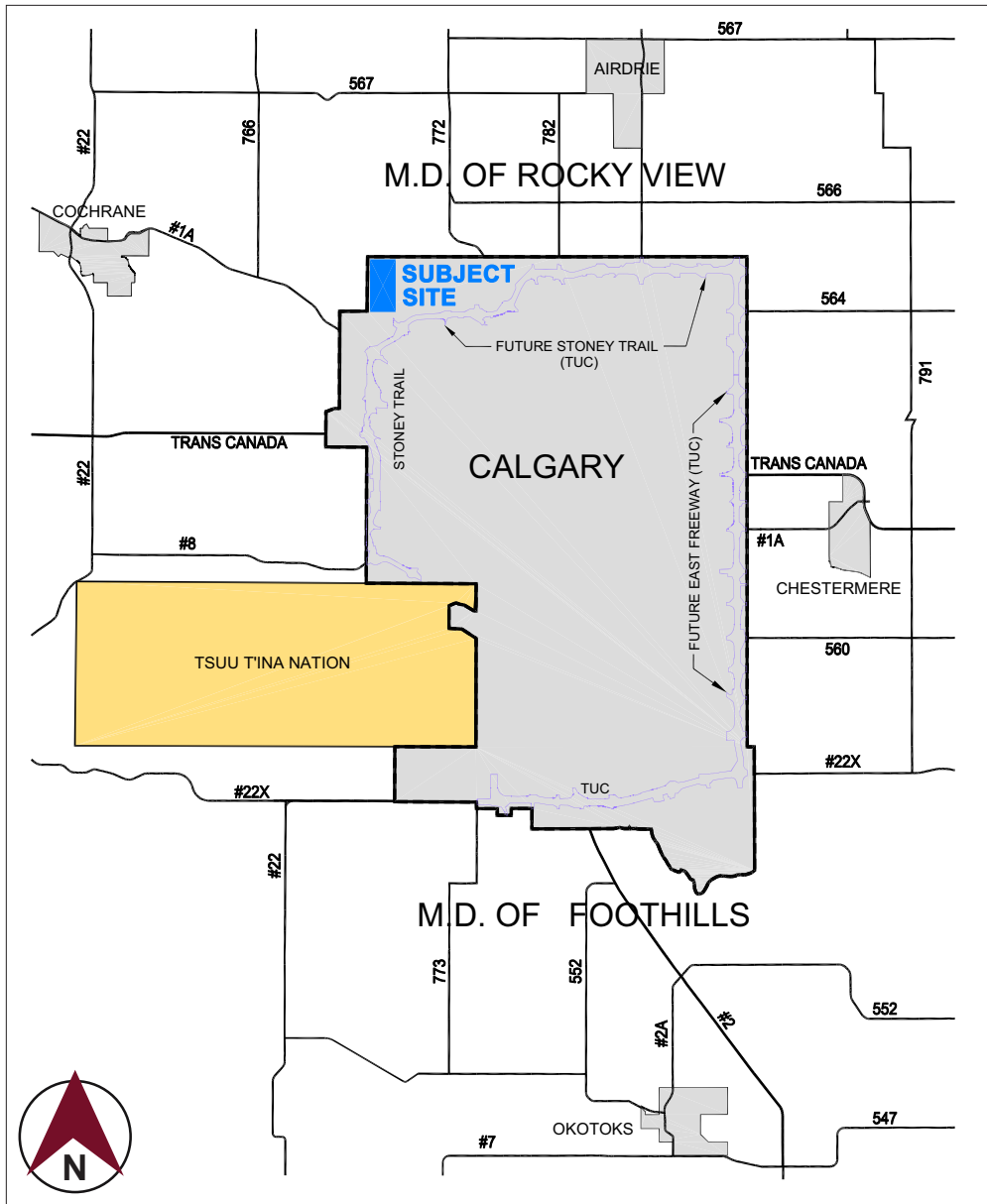


# Project Status



- **Welcome** to Public Open House #3 for the Spy Hill Lands Development Project.
- There are extensive aggregate reserves located on the Spy Hill lands. **Alberta Transportation, in consultation with Alberta Infrastructure, is interested in using these reserves for future infrastructure development** in the Calgary region, including the Stoney Trail construction project scheduled to begin in the near future, regional highway maintenance and longer term construction of the east Calgary ring road.
- The purpose of this meeting is to display and discuss the **proposed plan for aggregate extraction at the subject site.** The proposed plan was prepared after considering comments from the December 2002 and May 2003 public open house meetings.
- The **next steps** in the development process will be to submit an application to Alberta Environment for approval/registration. Alberta Transportation is seeking to start operations during 2004 in support of the Stoney Trail ring road project.

# Study Process & Issues

## THE STUDY PROCESS

### Stakeholder Consultation

Discussions with leaseholder, municipal staff, aggregate operators, aggregate consumers and nearby landowners.

### Open House #1 (December 2002)

Open House meeting to provide project information, seek comments, and discuss concerns about preliminary site development concepts.

### Prepare Phase 1 Concept Plan

Consider input received from all stakeholders and prepare the recommended Concept Plan.

### Open House #2 (May 2003)

Open House meeting to display and discuss the recommended Concept Plan and Draft Development Plans.

### Technical Studies (Summer 2003)

Prepare dust study, groundwater study, historical resources study and species-at-risk study.

### Prepare Proposed Development Plans

Prepare Proposed Development Plans based on the Recommended Concept Plan, results of Technical Studies, and public/stakeholder input.



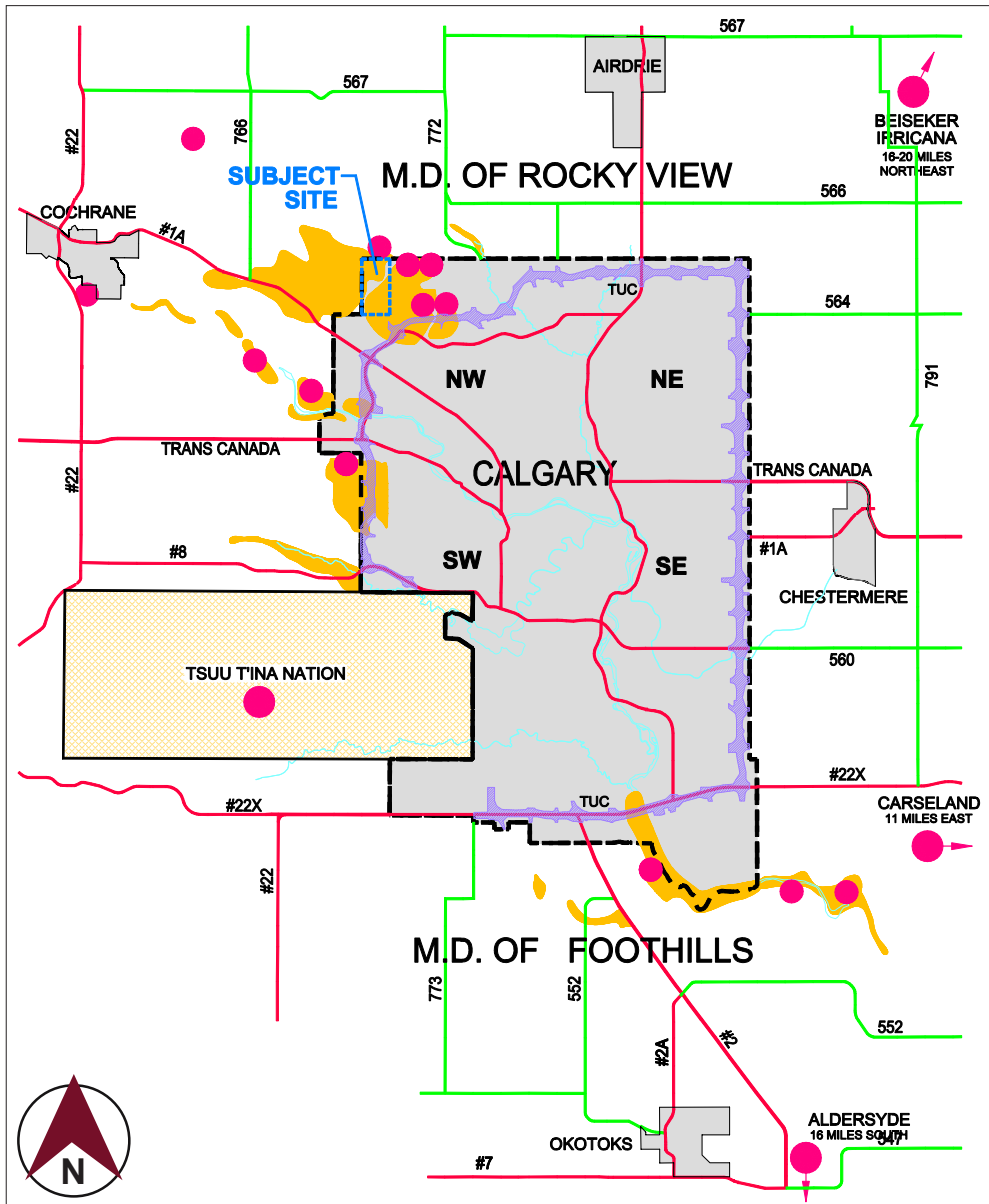
### Open House #3 (Fall 2003)

Open House meeting to display and discuss the Proposed Development Plans.

### Submit Plans to Alberta Environment

Submit Proposed Development Plans to Alberta Environment for review under the Environmental Protection and Enhancement Act.

# Regional Aggregate Resources

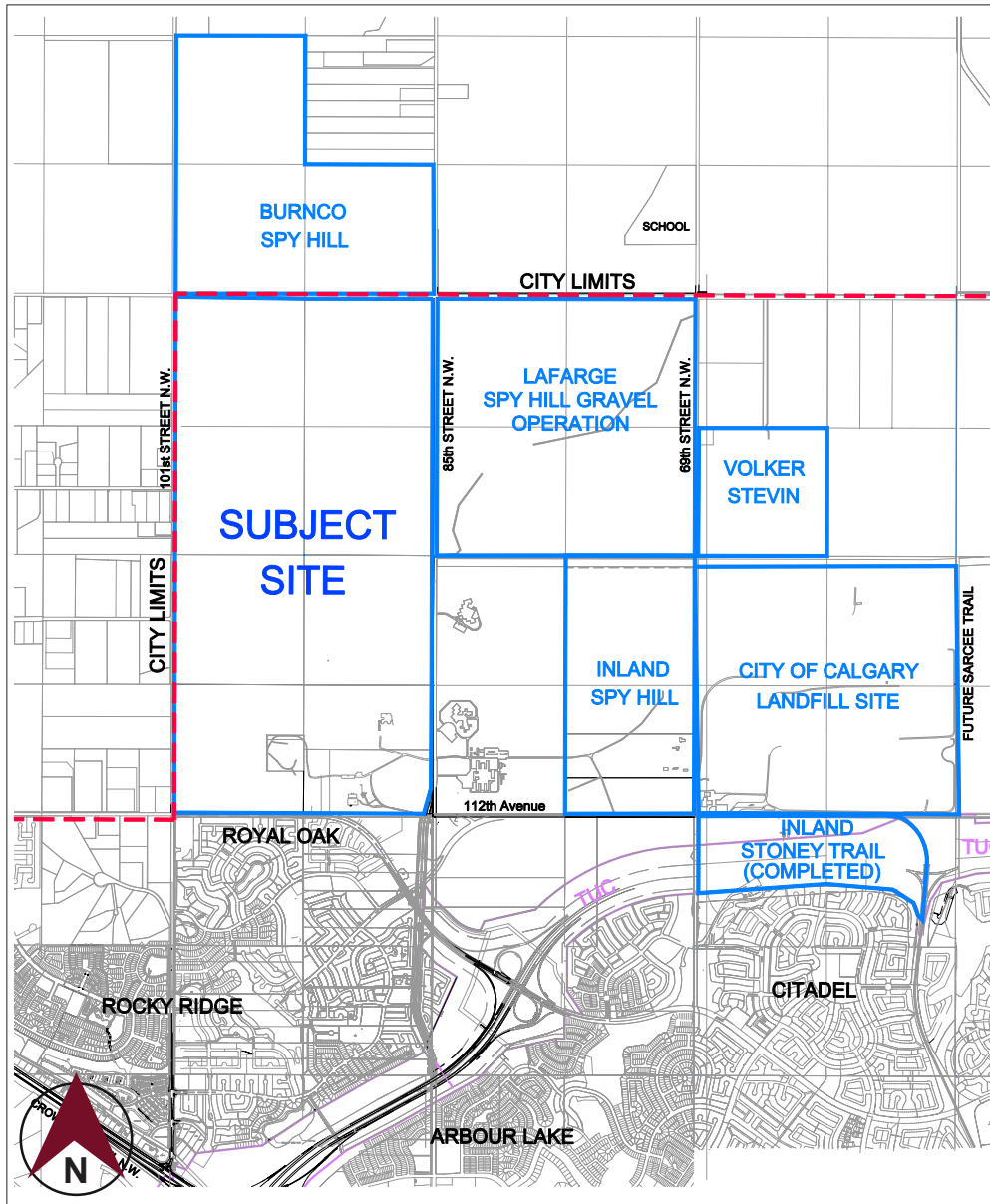


- Aggregates (sand and gravel) are a non-renewable natural resource that can be found only in locations where they have been deposited by nature.
- Aggregates are essential for development of the infrastructure on which our communities depend, including roadways, bridges, utilities, sidewalks, foundations and buildings.
- Regional aggregate demand is about 9.5 million tonnes per year. Over the next 50 years it is expected to be about 710 million tonnes.
- The majority of the region's gravel, as shown on the adjacent map, has been built-over with surface development. This gravel is not recoverable.
- The existing supply of gravel in operating pits in the Calgary region is estimated to be about 170 million tonnes, far short of long-term requirements.
- Finding new supplies of gravel is becoming increasingly difficult and expensive. The ability of the industry to find additional recoverable and approvable supplies of gravel is uncertain.
- As near-by gravel supplies become scarce, the cost of infrastructure development for all regional residents and taxpayers will increase. It is in the public interest to ensure that aggregates are recovered and used for infrastructure projects wherever possible.

- APPROVED GRAVEL PITS
- KNOWN GRAVEL DEPOSIT  
(BASED ON S.R. MORAN, ALBERTA RESEARCH COUNCIL, 1986)
- EXPRESSWAY / FREEWAY  
PRIMARY HIGHWAY
- SECONDARY HIGHWAY
- ▨ TRANSPORTATION UTILITY CORRIDOR



# Spy Hill Aggregates



- Existing aggregate operations in the Spy Hill area contain almost 60% (100 million tonnes) of the existing gravel supply in the Calgary region.
- The existing supply in approved aggregate operations will serve regional demand for no more than 20 years. However, operators are seeking, and will find some new supplies during this period. These new supplies will be located farther from major end-use and therefore more costly.
- Alberta Transportation estimates it could need as much as 45 million tonnes of gravel for public infrastructure and maintenance projects over the next 50 years in the Spy Hill area.
- The provincial Spy Hill property contains 135 million tonnes of recoverable, high quality gravel that could be used to support tax payer-funded public infrastructure projects. Up to 90 million tonnes could be made available over time to replace the depleting supply of gravel for other public and private sector development projects.

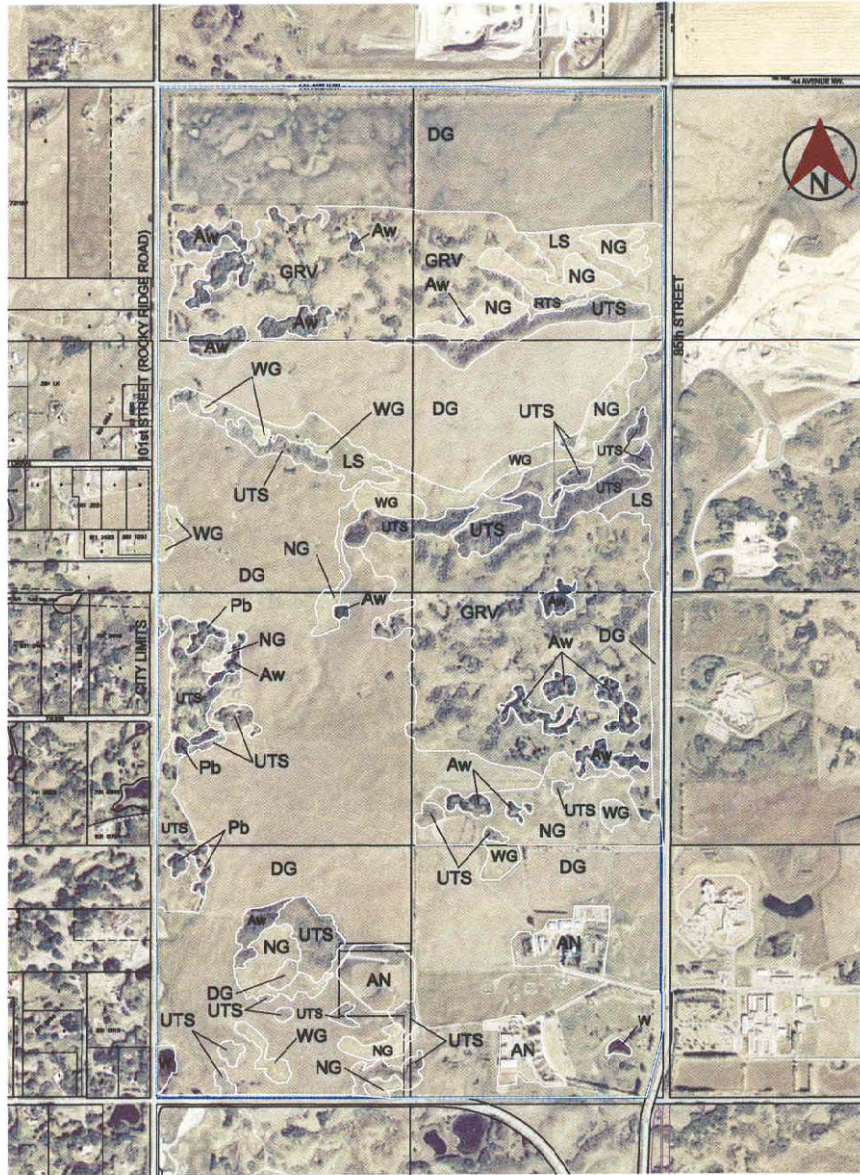
# Aerial Photo



SPY HILL LANDS - Development Project

Photo Date - September, 2001

# Environmental Inventory

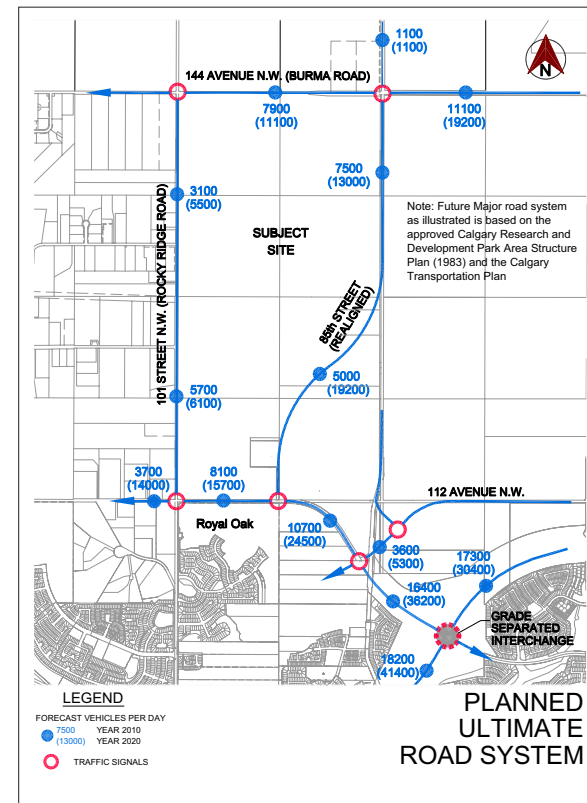
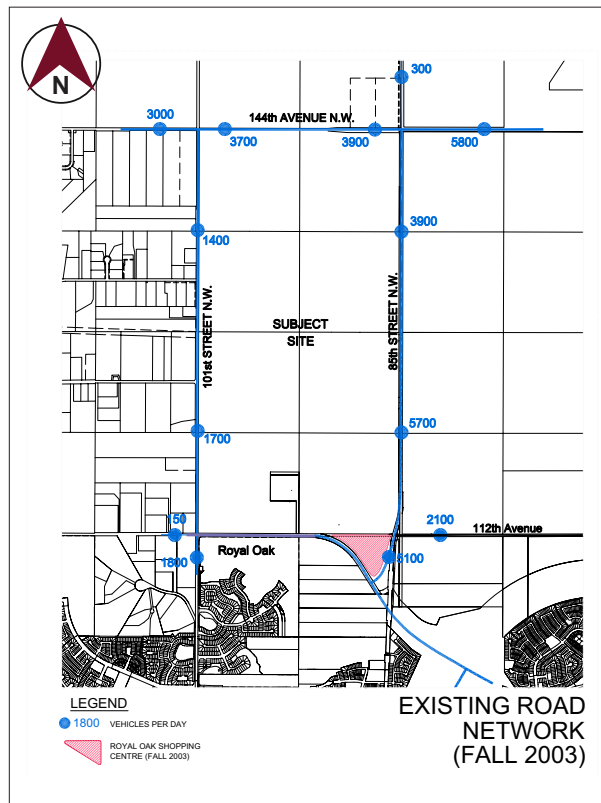


CODE	HABITAT TYPE	HECTARES
AN	Anthropogenic	12.4
Aw	Aspen Forest	18.3
DG	Disturbed Grassland	295.2
GRV	Willow Groveland	90.2
LS	Low Shrub	20.7
NG	Native Grassland	34.1
Pb	Balsam Poplar	3.2
UTS	Upland Tall Shrub	35.4
W	Water	1
WG	Wet Graminoid	6.3
<b>TOTAL HABITAT AREA</b>		<b>516.8</b>

Information provided by Ursus Ecosystem Management Ltd., October 2002

- Willow groveland and Upland tall shrub on ravine slopes are the most ecologically significant habitat types.
- Extraction of gravel will create a final reclamation grade that is generally lower than the base of the existing ravine (except the no mining area adjacent to 85th Street.) In this situation, protection of the existing ravine's drainage function and vegetation is not practical.
- The consulting team recommends a re-engineered linear, overland drainage system and planting program to replace vegetation associated with the existing ravine.

# Roads and Traffic

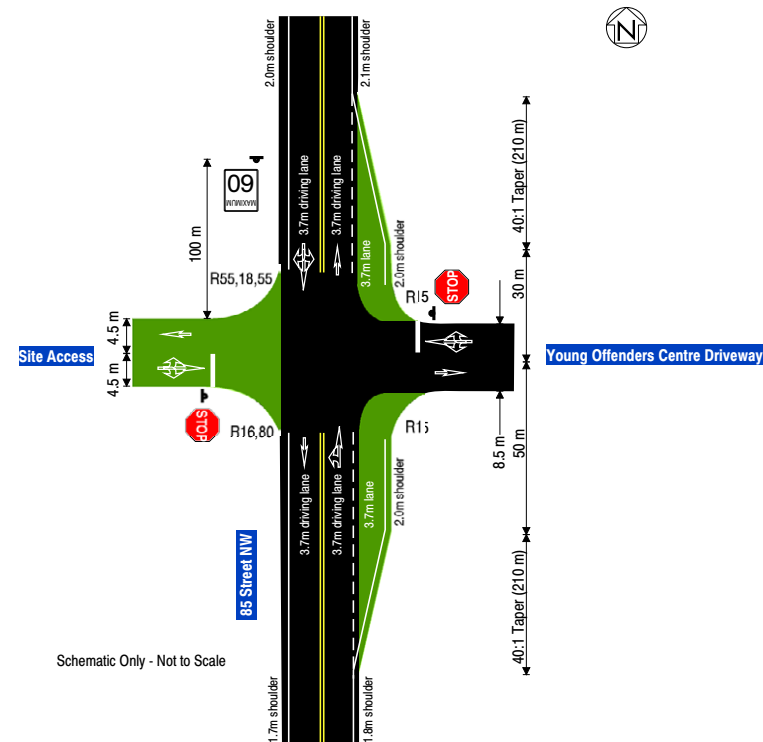


- The **Existing Road Network** (Fall 2003) will serve the early years of the gravel operation. Existing traffic levels illustrated are Fall 2002 counts.
- 85th Street and 144th Avenue are currently designated as City of Calgary Truck Routes.
- During the first 15 years of operations at the site on typical extraction rates of 1 to 2 million tonnes per year will generate 420 to 840 truck trips per day (210 to 420 loads). Note that this is comparable to the number of car trips generated by 42 to 84 new single family dwellings. Not all of these gravel-related trips will be new trips on the road system since some of these "loads" would otherwise come from other pits in the area.
- The actual number of trucks using the site will fluctuate from year to year. During the first 15 years of operation traffic is expected to "peak" at 1100 truck trips per day (550 loads) during construction of Stoney Trail in 2007.
- The proposed **site driveway** location is opposite the existing Young Offenders Centre driveway on 85th Street. The intersection will be upgraded as required to maintain safe truck access and egress on 85th Street.

- The **Planned Ultimate Road System** will be built as a result of future urban development in the area. The Ultimate Road System illustrated is contained in current City of Calgary bylaws and is subject to review as part of a forthcoming Area Structure Plan for the broader Spy Hill area.
- Forecast traffic volumes are from the City of Calgary Forecasting Division and are subject to future review.
- Based on current City-approved plans, the following road improvements are expected during 2003 and 2004:
  - upgrade Country Hills Boulevard to a 4-lane major road between Stoney Trail and west end of proposed shopping centre.
  - extend 2-lanes of Country Hills Boulevard westward to 101st Street NW.

# Intersections

- Finn Transportation Consultants reviewed intersections and driveway requirements based on forecast peak volumes during construction of Stoney Trail. During the first 15 years of operations, truck traffic to/from, the site is expected to peak at an average of 1,100 vehicle trips per day during the construction of Stoney Trail. (Comparable to car trips generated by 110 single family dwellings)
- From year to year the actual truck trips will be distributed northward and southward on the road system in accordance with annual demand for regional highway maintenance, ring road construction and other projects.
- The intersection of 85<sup>th</sup> Street and County Hills Boulevard will be upgraded by adjacent development in the Fall of 2003 to accommodate existing and immediate future traffic volumes.
- The intersection of 85<sup>th</sup> Street/144<sup>th</sup> Avenue will continue to operate at a very good “Level of Service” (L.O.S “A”) with development traffic superimposed on background traffic. The intersection is located near the top of a hill. Therefore a combination of signage, enforcement and driver awareness is required to maintain safe driver behaviour.
- Based on peak-year volumes, improvements at the 85<sup>th</sup> Street/site driveway intersection will be provided to maintain safe turning movements and avoid interference with through-traffic on 85<sup>th</sup> Street.



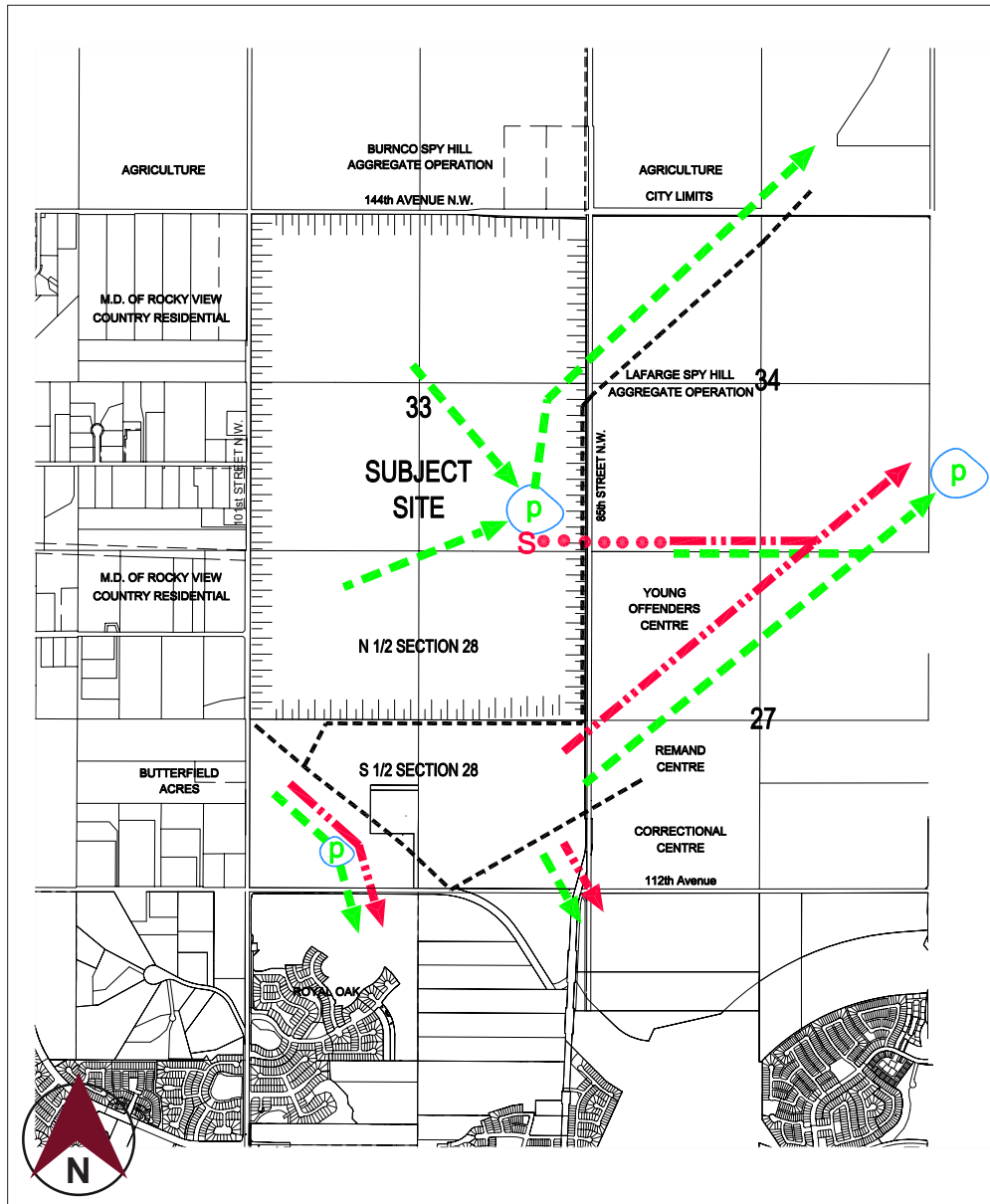
## RECOMMENDED SITE DRIVEWAY AND 85TH STREET IMPROVEMENT



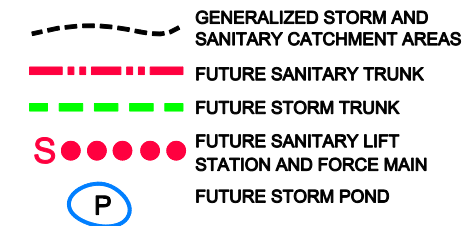
# Existing Land Use Policy

- The Spy Hill lands were **annexed to the City** in 1982 for purposes of accommodating the proposed Calgary Research and Development Park.
  - Calgary Council approved the **“Calgary Research and Development Park Area Structure Plan”** in April 1983. The plan allows for a range of “research and development” business land uses. Adjacent roadways, including 85<sup>th</sup> Street, 144<sup>th</sup> Avenue, and 101<sup>st</sup> Street are designated as future urban major roads. In 2001, Calgary Technologies Inc. advised Alberta Infrastructure that it was not planning to construct a research park on the property.
  - The City of Calgary’s Employment Centres Strategy (July 1999) recommends development of an **“Employment Area”** on the site in the future. An employment area would “accommodate business activity that prefers a more land extensive but quality environment such as business/office parks in a campus-like setting or ‘flex’ uses comprising substantial office with clean manufacturing. These areas tend to be auto-oriented with no residential use and limited retail.”
- **The Rocky View / Calgary Intermunicipal Development Plan (Nov 1998)** identifies the gravel deposits in northwest Calgary as “Development Constraints” (Map 5). Policies contained in the plan:
    - support ongoing extraction of gravel from approved operations, and
    - consideration of impacts on existing land uses when reviewing new sand and gravel pit extractions (pg 13-14).
  - The **Province of Alberta Land Use Policies**, adopted pursuant to the *Municipal Government Act* encourages municipalities:
    - to identify areas where extraction of sand and gravel should be a primary land use;
    - to direct subdivision and development activity so as not to constrain or conflict with non-renewable resource development;
    - to utilize mitigative measures to minimize possible negative impacts on surrounding areas and land uses.

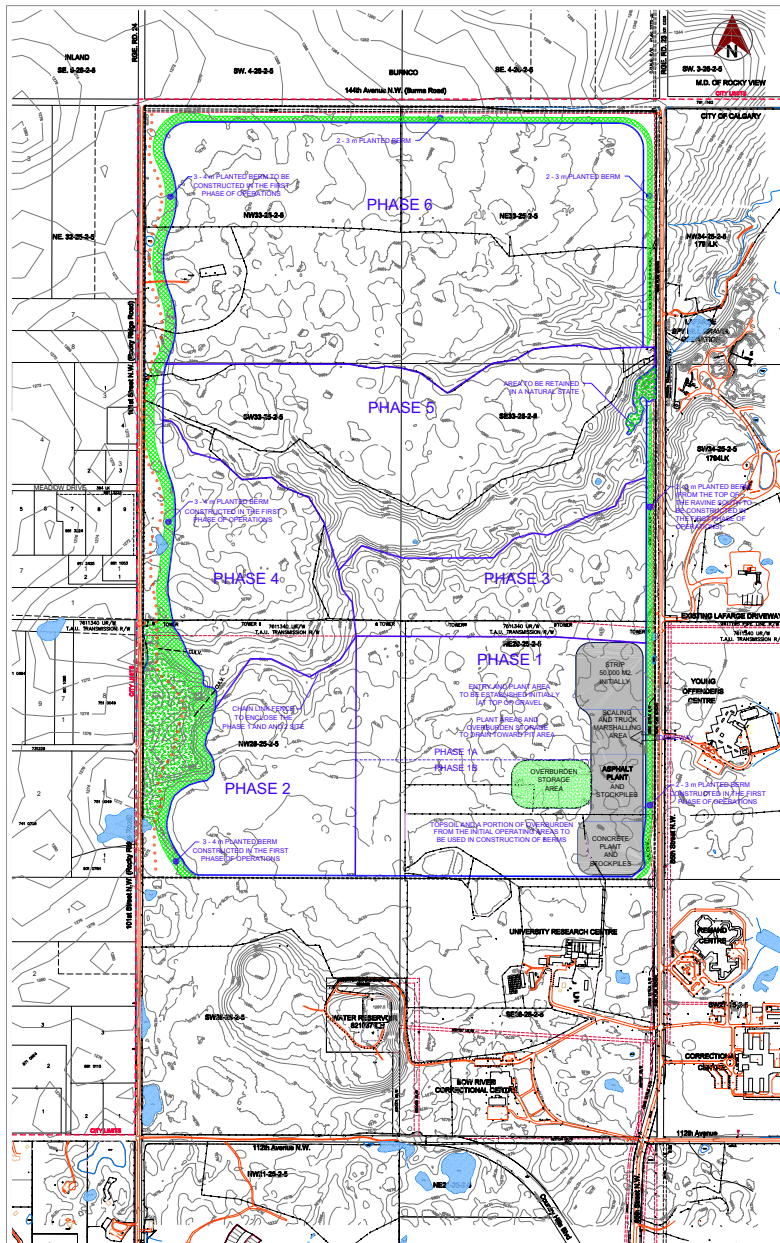
# Final Grading Concept



- Reclamation and final grading of the site will be done in a manner that supports urban development and connection to Calgary's City trunk sewer systems.
- The majority of the site currently drains toward the northeast ravine system. Final grading of the site will maintain drainage in this direction.
- A stormwater pond in the "drainage low" area will treat stormwater prior to release into the northeast ravine.
- Sanitary sewer flows from urban development will flow to the drainage low and then across the extracted Lafarge and Volker Stevin properties to connect to sanitary trunk laterals extended from the City's Symons Valley development area.
- There are a number of options for servicing the south half of Section 28. One option will be a connection to the City's existing 85<sup>th</sup> Street trunk sewer, if sufficient capacity is available.



# Extraction Plan



- **Extraction area** to include Section 33 and north half of Section 28. The south 1/2 of Section 28 will not be part of the operation due to existing buildings and a large knoll.
- Extraction operations should proceed generally **from the east and the south toward the west and the north**. Proceeding from 85<sup>th</sup> Street (east) toward the west will ensure the extraction face is not visible from dwellings to the west.
- Operating area to be no larger than 100 acres at any point in time. Extraction and reclamation to be as direct and sequential as possible.
- Provide **a safe access** onto 85<sup>th</sup> Street, aligned with the existing Young Offender's Centre driveway. All truck access will be onto 85<sup>th</sup> Street NW. Scaling and plant areas will be located near the 85<sup>th</sup> Street driveway.
- No extraction within a 60-100 metre setback area adjacent to Rocky Ridge Road.
- Prior to any gravel extraction, **construct a 3-4 metre tall berm** along the west side of the operation within a 60-100m setback area. The berm will be taller in valley areas to ensure it is higher than the elevation of Rocky Ridge Road (101<sup>st</sup> St.) Landscape the berm to provide visual relief and visual screening wherever possible.
- Construct pedestrian pathway within the west setback area.
- Lower the **existing power transmission line** to the bottom of the reclaimed site.
- **Transplant** willow groveland plants onto north-facing backslopes.
- **Recreate** the existing drainage channel alignment and plant with wetland vegetation.

- LANDSCAPED BERM (HEIGHT VARIES)
- EXTRACTION PHASE LINE
- LINEAR OPEN SPACE

# Dust Control

## AIR QUALITY ASSESSMENT

Alberta Transportation is committed to maintaining good air quality and meeting environmental and regulatory guidelines with respect to acceptable ambient particulate concentrations (products of incomplete combustion and dust). The most significant source of dust to be controlled is from trucks traveling within the pit. Other sources of dust such as stockpiles and crushers tend to be of less importance due to encrustation, the inherent moisture of the material and blanketing effects.

## Dust Control Program

- Pave driveways from 85<sup>th</sup> Street entry to plant circulation areas
- Regular application of dust suppressants (water, petroleum resin) to unpaved site driveways
- Watering and sweeping of paved driveway
- Enclosure (blanketing or housing) around crushing operations

## Air Quality Assessment Study (2003)

- An “Air Quality Assessment” study for the proposed Spy Hill operation was undertaken by DM Leahey & Associates and Jacques Whitford Environment Limited.
- The study assessed particulate emissions related to a “peak conditions” operating scenario in 2022.
- The 98<sup>th</sup> percentile daily average concentrations for fine dust ( $PM_{2.5}$ ) predicted for areas outside the pit, were much less than the relevant Canadian Wide standard (see Figure 1).
- All daily and average annual concentrations of coarser dust ( $PM_{10}$ ) as predicted for the environs of the pit, were also less than relevant US Environmental Protection Agency standards (see Figure 2).
- The study concluded that “particulate emissions associated with dust generation and diesel exhausts from activities at AT’s proposed sand and gravel operations should have no adverse effects on the environment.”

## Ongoing Monitoring Program

- Alberta Transportation will design and implement a monitoring program, in co-operation with regulatory agencies, to measure ambient air quality levels adjacent to its aggregate operation.
- Monitored data will be continuously evaluated to determine if the dust control program needs to be modified to ensure acceptable air quality is maintained in the near vicinity of the operation.
- Results of the air monitoring will be made available to the public and regulatory agencies, in a timely fashion throughout the life of the operation.

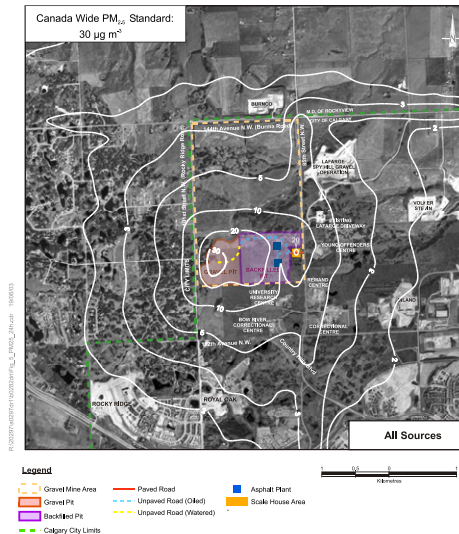


Figure 1

Isopleths of 98<sup>th</sup> Percentile Daily Average Ground-Level  $PM_{2.5}$  Concentrations ( $\mu g/m^3$ ) Associated with the Proposed Spy Hill Sand and Gravel Operations as Predicted Using Modified Winds.

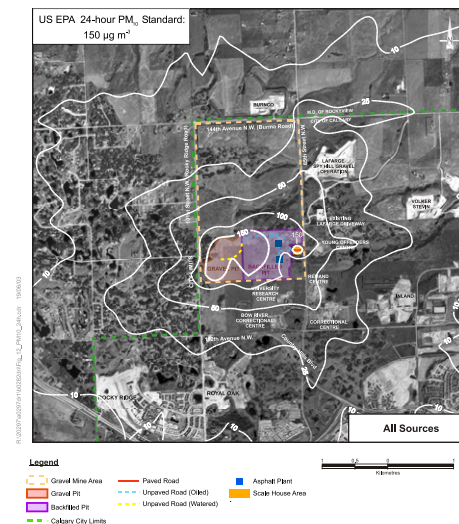


Figure 2

Isopleths of Maximum Predicted Daily Average Ground-Level  $PM_{10}$  Concentrations ( $\mu g/m^3$ ) Associated with the Proposed Spy Hill Sand and Gravel Operations

# Noise Reduction

Background	Initiatives
<p>Conceptual noise analysis by Patching Associates Acoustical Engineering Ltd. modelled “worst-case” noise impacts at the west property line adjacent to 101<sup>st</sup> Street (Rocky Ridge Road). Worst case assumptions included:</p> <ul style="list-style-type: none"><li>• Winds from the east at 7.5 km/hour</li><li>• Crusher located in the centre of the site at the top of the gravel layer.</li><li>• Asphalt/concrete plants located near the 85<sup>th</sup> Street entrance</li><li>• Temperature of 0 degrees</li></ul> <p>Key findings of the Noise Assessment Study include the following:</p> <ul style="list-style-type: none"><li>• The maximum “worst-case” noise levels for extraction activities would be 61 dBA at the west property line, lower than the City of Calgary Noise Bylaw daytime maximum of 65 dBA.</li><li>• Key noise sources that will require attention are the crushing operations and the temporary surface stripping operations near the west side of the site.</li></ul>	<p>Alberta Transportation recognizes that noise levels from the operation should be maintained at levels that are well-below City of Calgary bylaw requirements. A combination of the following noise mitigation techniques can be used wherever feasible and appropriate.</p> <ul style="list-style-type: none"><li>• Construction of 3-4 metre tall berm along the west edge of the operation.</li><li>• Consider enclosing the crusher with a noise attenuating structure.</li><li>• Placement of gravel stockpiles to provide a barrier effect to the receiver locations.</li><li>• Orientation of the equipment to direct noise away from the receptor location.</li><li>• Locating noise sources at lower depths (e.g., crusher will normally be located at the bottom of gravel layer, 30 metres below the surface).</li><li>• Adding additional noise control to the electrical power plant enclosure.</li><li>• Operator awareness when operating mobile equipment.</li><li>• Limiting the duration of an activity in a particular location (limited hours of operation for specific activities).</li><li>• Keeping equipment maintained for peak efficiency and overall reduction of noise.</li><li>• Installing noise reducing accessories for equipment where available.</li></ul>

# Visual Screening

## Background

The provincial Spy Hill site is located at a high elevation relative to surrounding lands to the north, east and south. The City's "Top Hill Water Reservoir" is the highest point in the City.

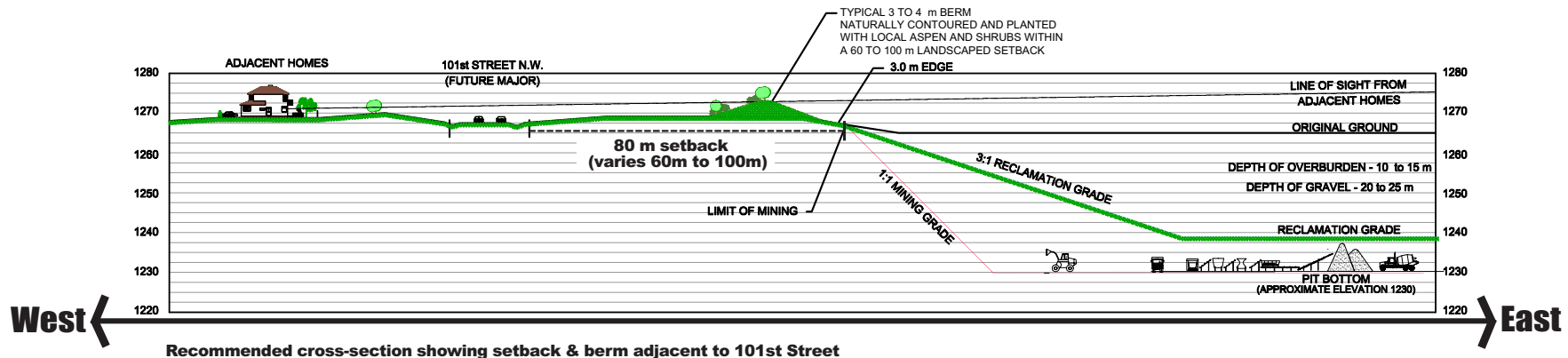
New aggregate operations such as Burnco and Inland have established an attractive landscaped berm along public roadways.

Site operations will need to be sensitive to the fact that some lands to the west will have long-range views of surface operations (original ground).

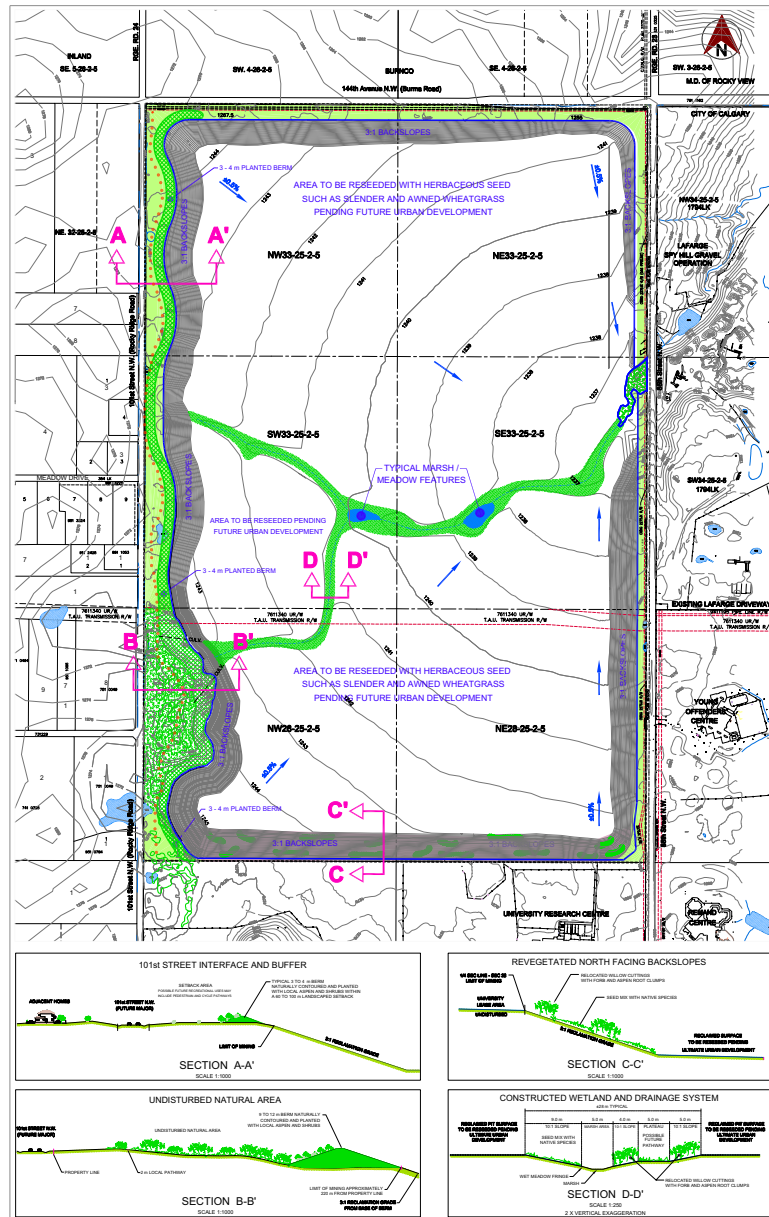
Once established, pit operations will occur about 30 metres below existing grade levels and will not normally be visible.

## Initiatives

- Prior to any gravel extraction, construct a 3-4 metre berm within a 60-100 metre setback area along the west side of the operation.
- Use a "meandering" berm with contours that mimic natural landforms.
- Use vegetation (transplanted where possible) such as aspen and willow bushes to vegetate the side and top of berms.
- Provide a shale or crushed gravel public pathway in the road widening area at the base of the 101<sup>st</sup> Street berm.
- Minimize the surface area that is "open" to operations at any particular time. Reclaim and seed completed areas as soon as possible.



# Final Grade & Reclamation Plan



- Future roadways are normally built or upgraded when urban development occurs on the site. Aggregate operations and reclamation on the site can be adapted to accommodate the City's long term arterial road system requirements for the broader Spy Hill area.
- Transplanted willow groveland vegetation and stormwater ponds provide a natural park. Recreate the drainage channel in its existing location and plant with wetland vegetation types.
- North-facing backslopes can be planted to establish attractive vegetated slopes and open spaces in the ultimate urban environment.
- Maintain the landscaped setback area and berm along 101<sup>st</sup> Street as separation between future land uses.
- Realignment of 85<sup>th</sup> Street could allow for "mining-through" the interface with adjacent gravel operation, thereby eliminating "suspended ridge" features in the future urban area.

# Hydro-Geological Assessment

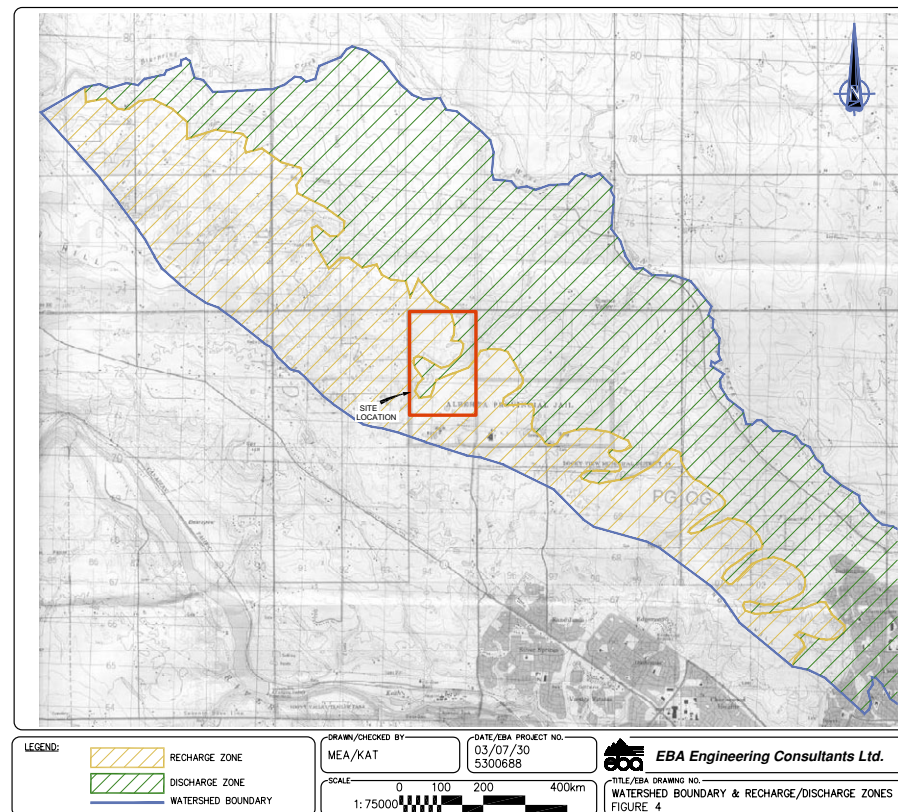
## Purpose and Method

EBA Engineering Consultants Ltd. (EBA) conducted a hydrogeological assessment of the proposed gravel mining operation to determine whether the project could present any risk to the existing water wells in the vicinity of the mining operation, and to determine if the mining could affect the surface water bodies west of the site.

EBA reviewed available hydrogeologic reports and water well databases, conducted site visits to existing gravel operations in the area and prepared a "water balance" for the site under pre-development and development conditions to identify possible changes to groundwater recharge attributable to the gravel operation.

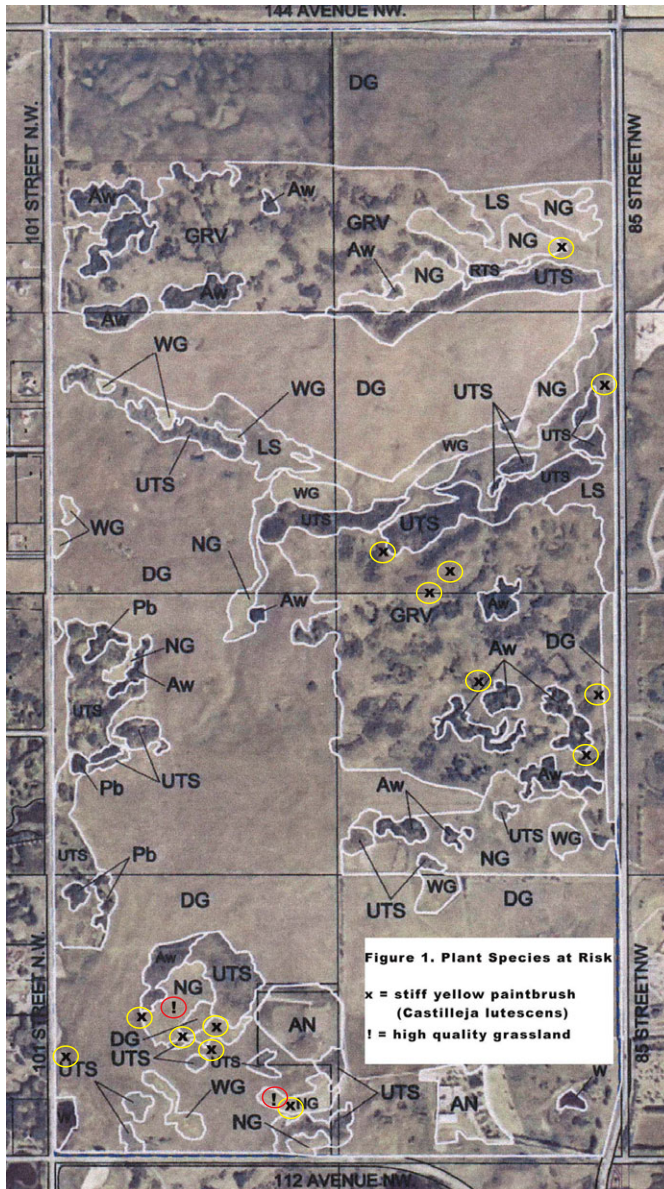
## Findings and Conclusions

- Two distinct water-bearing units (i.e., aquifers) have been identified using information in the water well database, and various literary sources. They consist of a Tertiary gravel unit and the bedrock Paskapoo formation. The proposed Spy Hill aggregate operation will extract gravels from the Tertiary gravel unit.
- The Tertiary gravels at the Spy Hill subject site appear to be unsaturated. Therefore, the extraction of the gravel should have a minimal impact on portions of the gravel unit that do contain water. Within the local watershed, the Tertiary gravel unit makes up an intermittent and largely unused aquifer. Only 10 of 722 water wells in the watershed were completed in the gravel. Therefore, the extraction of the gravel should have a minimal impact on portions of the gravel unit that do contain water.
- Extraction of the gravel is anticipated to minimally increase recharge to the underlying Paskapoo Aquifer.
- Surface water bodies to the west of the subject site are ponded on low permeability surface soils and therefore, should not be affected by the gravel extraction operation.
- To the northeast, groundwater discharge to West Nose Creek should not be reduced as a result of the gravel extraction. Recharge to any saturated (wet) portions of the gravel (and hence potential discharge to West Nose Creek) should not be affected. Recharge to the deeper bedrock (Paskapoo) aquifer should increase (i.e., there should be no negative impact on that aquifer).
- There is no apparent potential for an impact on domestic groundwater supplies resulting from the gravel extraction.





# Species At Risk Survey



## Purpose and Method

Ursus Ecosystem Management Ltd. (URSUS) undertook the following surveys during the spring, summer and fall of 2003 to verify the presence/absence and abundance of potential wildlife and plant species at risk on the Spy Hill lands.

- Songbird call survey – June 2003
- Rare plant survey – June and July 2003
- Transect survey for badger – August 2003
- Nocturnal amphibian survey – May and June 2003

## Findings and Conclusions

- No COSEWIC\* (2003) listed plant or vertebrate species were found in the study area.
- Overall, there is a scarcity of plant “species at risk”\*\* and their habitats within the study area. One provincially rare species (stiff yellow paintbrush) has been identified. While a number of stiff yellow paintbrush (*Castilleja lutescens*) populations will be removed by gravel operations, the largest concentration of these plants is located in SW 28 and will not be affected by gravel operations.
- A rare high quality fescue grassland community is located in the southwest corner of the study area (SW 28). This grassland is not located within the proposed extraction development area and will not be affected by the proposed operation. The grassland can be protected by leaving the area ungrazed and not removing the native prairie cover.
- Two vertebrate “species at risk” were detected during field surveys: Swainson’s Hawk and Badger. Their occurrence can be maintained after reclamation if grassland habitat and ground squirrel populations persist. Swainson’s Hawk also requires trees or tall shrubs as nesting substrate.
- Although not detected during the surveys, there are two additional “species at risk” that are likely to occur within the study area: long-tailed weasel and garter snakes. The presence of these “species at risk” can be maintained after reclamation if sufficient habitat with a mixture of hiding cover and moist grasslands are fostered. Any garter snake hibernacula encountered during excavation should be reported to the regulatory authority for assessment and appropriate mitigation.

\* COSEWIC (2003) – Committee on the Status of Endangered Wildlife in Canada.

\*\* “Species at Risk” in this context refers to any species listed either federally (COSEWIC 2003) or provincially (AEP 2000 & 2001). COSEWIC designates listed species as Endangered, Threatened or Special Concern. Alberta Environmental Protection (AEP) designates species as At Risk, May Be At Risk, and Sensitive. Swainson’s Hawk are listed as Sensitive under AEP and not listed under COSEWIC. Badger are listed as Sensitive under AEP and Not At Risk under COSEWIC.