City of Dawson Industrial/Commercial Lots

Feasibility and Costing for Infill Site 1-2

Prepared for Yukon Government Land Development Branch
Prepared by Stantec

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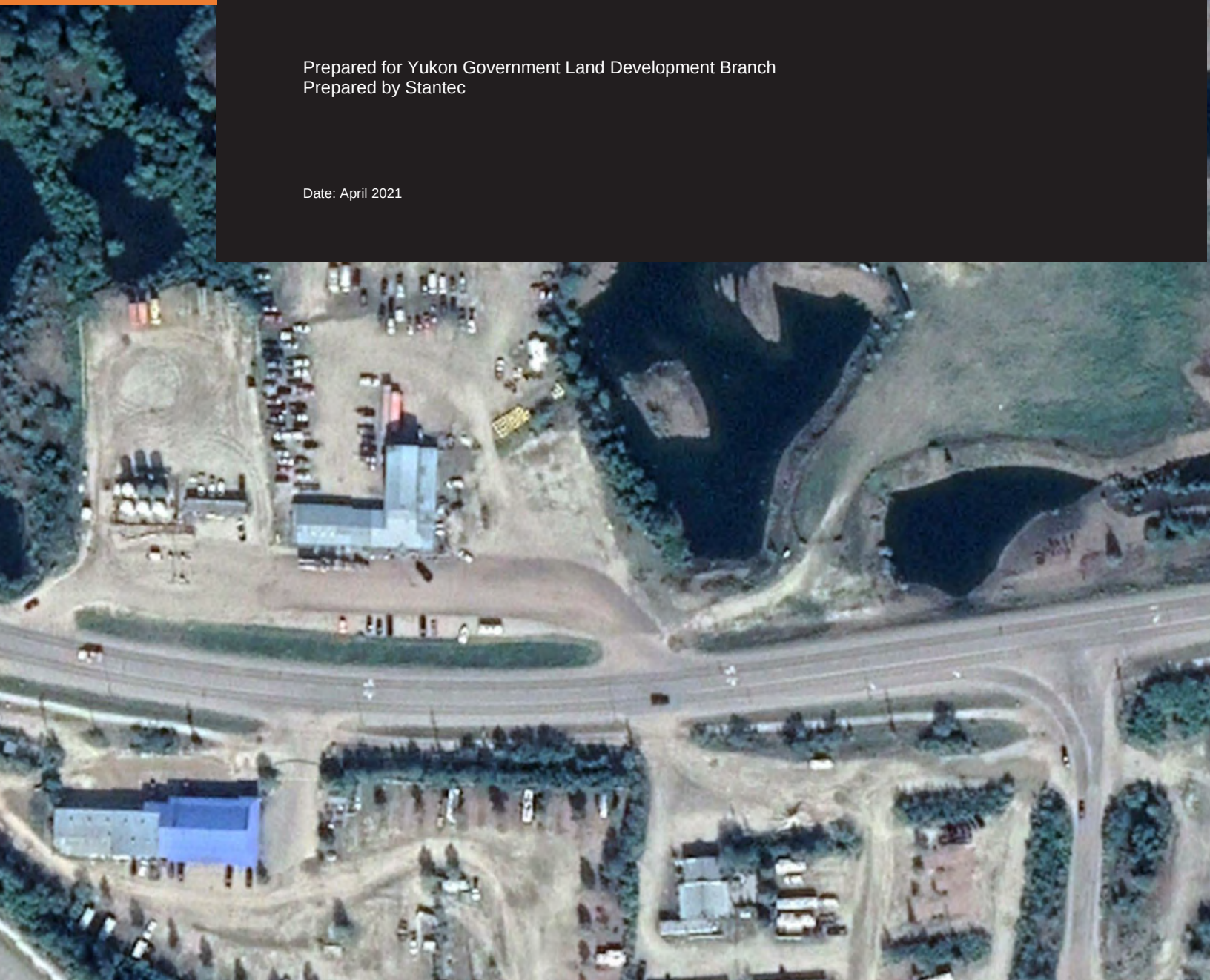

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1.0 INTRODUCTION

In 2020, Yukon government Land Development Branch asked Stantec to review two areas in Dawson City to determine their potential for development of industrial/commercial lots. To complete this task, photos and imagery, the Dawson City Official Community Plan and Zoning Bylaw, and existing geotechnical and environmental studies were reviewed. Meetings were held with representatives from the City of Dawson and Tr'ondëk Hwëch'in to discuss the proposed development potential of these two areas. Infill Site #1 is south of the North Klondike Highway near the intersection of the Rabbit Creek Road and Upper Bonanza Creek Road and Infill Site #2 is north of the North Klondike Highway near where Upper Bonanza Creek Road meets the Highway.

The information gathered was considered, and for each area, a Concept Plan or Plans showing proposed lot layout, options for consideration, and recommendations were developed. As a starting point, the development options were created to be consisting with the regulations of the City of Dawson Zoning Bylaw. After an initial review of development options and preliminary cost estimates, Yukon government asked that additional options be explored based on the physical characteristics, development potential and lot efficiency rather than the regulations of the Zoning Bylaw.

The content of this document reflects Stantec's professional judgment in light of the scope, schedule and other limitations stated in the report and in the contract between Stantec and the client. The opinions in this review are based on conditions and information existing at the time the document was published and do not consider any subsequent changes or information. This is a desk-top study only and additional studies such as geotechnical review, environmental assessment and approvals, flood risk analysis and transportation impact assessment may be required to determine actual developable area.

1.1 REVIEW CONSIDERATIONS

To review the potential of infill development at these two sites, the following information was considered:

Background information

- Plan of Survey
- City of Dawson Official Community Plan and Zoning Bylaw
- Land ownership

Physical characteristics of the area

- Topography and natural features
- Encroachments
- Tailings ponds
- Existing land use

- Vegetation

Access, easement and ROW

- Existing assesses and easements
- Potential for extension of existing roadways
- Potential roadway cross-section

Serviceability

- Logical extension of existing services
- Required servicing requirements
- Opportunity for on-site servicing options

Existing studies and information for Infill Site #1

- Plan of Easement (Elden R. Pfeiffer, August 25th 2020)
- Lot Development Guggieville Industrial Subdivision, Infill #1 – Fish, Wildlife and Rare Plant Summary (EDI, 2020)
- Geotechnical Feasibility Assessment Proposed Infill #1 Lot Development Guggieville Industrial Subdivision Area Dawson City, Yukon (Chilkoot Geological Engineers Ltd, 2019)
- Heritage Resource Impact Assessment For Two Sites (Ecofor Consulting Ltd, 2020)
- Phase I Environmental Site Assessment Guggieville Industrial Subdivision – Infill #1 Dawson City, Yukon (Chilkoot Geological Engineers Ltd., 2019-2020)
- Geotechnical Evaluation and Hydrogeological Assessment Proposed Infill #1 Lot Development, Guggieville Industrial Subdivision Area Dawson City, Yukon (Tetra Tech, Issued for Use version March 16, 2021)
- Tr'ondëk Hwëch'in Letter re: Planning and Land Development Work – Proposed Lot 1218, Quad 116 B/3 Dawson City and the second letter outlining specific citizen concerns dated November 2, 2020

Existing studies and information for Infill Site #2

- Geotechnical Feasibility Assessment Proposed Infill #2 - Lot Development Guggieville Industrial Subdivision Area Dawson City, Yukon (Chilkoot Geological Engineers Ltd, 2019)
- Phase I Environmental Site Assessment Guggieville Industrial Subdivision – Infill #2 Dawson City, Yukon (Chilkoot Geological Engineers Ltd., 2020)
- Heritage Resource Impact Assessment For Two Sites (Ecofor Consulting Ltd, 2020)
- Geotechnical Evaluation and Hydrogeological Assessment Proposed Infill #2 Lot Development, Guggieville Industrial Subdivision Area, Dawson City, Yukon (Tetra Tech, Issued for Use version March 17, 2021)
- Water and Sewer Expansion Project, Callison Expansion, Phase 1 – As Built (Shiltec Northern Engineering, Environmental Engineering, 1995)

1.2 CONSIDERATIONS FOR INDUSTRIAL/COMMERCIAL LOTS

The development of an industrial/commercial subdivision should consider best practices, existing conditions and desired outcomes. A variety of uses can take place on industrial/commercial lots including retail, residential, indoor and outdoor storage, warehousing, services, and light manufacturing. Specific requirements such parking, access, storage space and overall lot size will vary significantly depending on operational needs.

Typically, for industrial/commercial uses it is assumed that large flat areas for buildings is needed and adequate space for laydown yards and traffic movements will be beneficial. With these assumptions in mind, the following themes were considered as the Concept Plans were developed.

Shape of lots

Construction of large rectangular buildings and yards that are designed to optimize space for storage, movement of large items and vehicle turning are fundamental for most industrial sites. The development of square and rectangle shaped lots reduces unusable areas, creates efficiency of the site and offers flexibility in terms of building/site designs.

Size of lots

Since industrial and commercial uses vary significantly, so does the preferred lot size. In most industrial or commercial zones lots are a minimum of 0.4 ha (1 acre) which allows for an appropriate lot width, road frontage, front and rear parking, and safe vehicular movements. Lot needed for commercial sales may be significantly smaller as businesses and services take place mainly within an office or small warehouse.

Ability to combine lots

The size of lot needed to support industrial and commercial operations will vary greatly based on the specific uses. One lot can have one building with a small yard whereas another will require multiple buildings and large laydown or storage areas. Ideally a new subdivision is flexible and allows for a range of options. Developing lots at or near the minimum size required by zoning allows for businesses to buy several lots and consolidate them into a larger lot to meet their specific operational needs.

Grade of sites

The grade of a site can often restrict its layout and development potential. A minimal grade of around 2% across the site is ideal, allowing for large buildings to be constructed at grade and providing for continuous storage areas without the use of retaining walls. It is also important to have a comprehensive drainage plan that considers slopes, supports appropriate drainage and prevents pooling of water.

Site access and traffic movement

Industrial sites rely on vehicle access to move materials in and out, often using large vehicles. Access into a site and to adjacent roads is important. A wide lot frontage is also desirable as it provides sufficient area for a building that is visible from the road, while still having the potential for multiple accesses into and out of the site.

1.3 EXISTING INDUSTRIAL AND COMMERCIAL ZONING

Under the current City of Dawson Zoning Bylaw, the lots in the vicinity of these two Infill Sites are generally either M1 – Industrial or C2 – Commercial Mixed Use. A comparison of these two zones is provided in the table below.

There is overlap in terms of allowed uses in these two zones, however the following differences should be noted:

- The C2 zone allows single detached dwellings as a permitted use whereas in the M1 zone single detached dwellings are a secondary use.
- The M1 zone allows for more industrial land uses such as bulk fuel facilities, junkyards, exterior storage and processing of raw materials.
- The C2 zone allows for restaurants, retail stores, garden suites, hotels and campgrounds.

Table 1 – Zoning Comparison

	M1 – Industrial	C2 – Commercial Mixed Use
Minimum Lot Size	0.4 ha (1 ac)	0.4 ha (1 ac)
Maximum Lot Coverage	None	60%
Front Yard Setback	6.10 m (20 ft)	6.10 m (20 ft)
Side Yard Setback	6.10 m (20 ft)	6.10 m (20 ft)
Rear Yard Setback	6.10 m (20 ft)	6.10 m (20 ft)
Single Detached Dwelling	Maximum area 111.48 m^2 (1,200 sq ft)	No maximum area
Uses permitted in both zones	• accessory building or structure • commercial storage • contractor services • equipment sales, rentals, and service • fleet service • garden centre • greenhouse • manufacturing • residential security unit • service station • vehicle sales, rentals, and service vendor, food	• accessory building or structure • commercial storage • contractor services • equipment sales, rentals, and service • fleet services • garden centre • greenhouse • manufacturing • residential security unit • service station • vehicle sales, rentals, and service • vendor, food

Uses permitted in C2 only		• auctioneering • bed and breakfast • campground • eating and drinking establishment • convenience store • family day home • flea market • garden suite • home industry • home occupation • household repair service • lodging facility, permanent • lodging facility, non-permanent • modular home • motel • outside storage • retail store • secondary suite • single detached dwelling
Uses permitted in M1 only	• broadcasting and recording • bulk fuel facility • exterior storage • funeral services • heavy equipment storage • junkyard • natural resource development • offices • office support services • processing of raw materials • recycling depot • veterinary service	
Secondary uses	• Single detached dwelling • Lodging facility, permanent • Lodging facility, non-permanent	

2.0 INFILL SITE #1 EXISTING CONDITIONS (SOUTH SITE)

2.1 SITE LOCATION AND INFORMATION

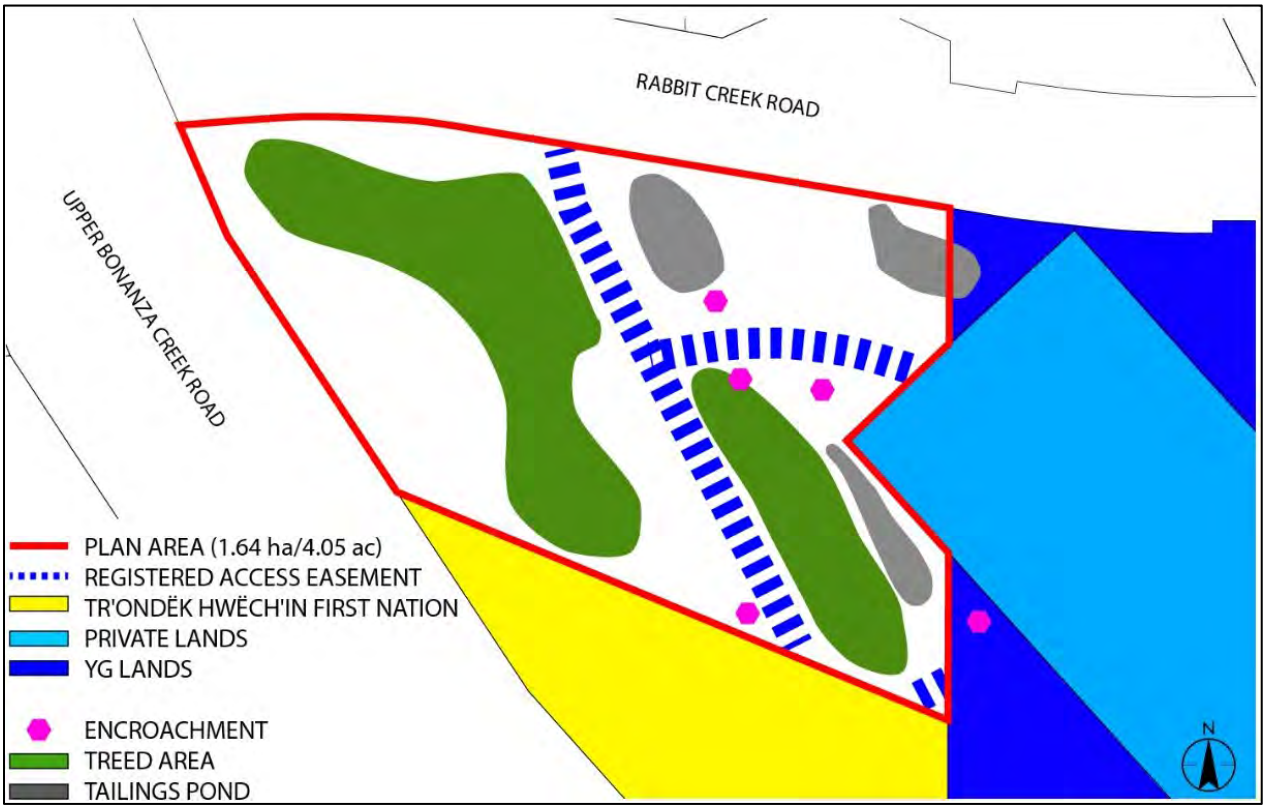
Located south of the North Klondike Highway, east of Dawson City, Infill Site #1 is southeast of the intersection of Rabbit Creek Road and Upper Bonanza Creek Road. The area is bounded by Rabbit Creek Road to the north, private land holdings to the east, Tr'ondëk Hwëch'in Settlement Parcel C-75FS to the south and Upper Bonanza Creek Road to the west and is shown in Figure 1.

The site is generally flat with only minor changes in elevation (+/- 3 m) where former mine tailings piles are present. Some of the tailings piles have been partially or fully levelled. As most of the site has been disturbed through historical mining activities, vegetation is sparse. There are, however, some stands of deciduous trees comprised of poplar, white birch and aspen. There is a small storage shed, vehicles and a fuel barrel on the site.

Table 2 – Plan Area Summary Infill Site #1

Site Size	• Approximately 1.64 ha (4.05 ac)
Infrastructure	• No piped water and sewer; three phase power is available to east along Rabbit Creek Road and one phase power is available directly north of the Infill Site
Roadways	• Area includes a registered road right-of-way and several access easements for driveways
Parcel Ownership	• Yukon government

Figure 1 – Existing Conditions Infill Site #1



2.2 CURRENT LAND USE AND ZONING

Infill Site #1 is currently zoned M1 – Industrial, as are the adjacent lots to the east. Across Upper Bonanza Creek Road to the west, and across Rabbit Creek Road to the north, the lots are zoned C2 – Commercial Mixed-Use. To the southwest of Site #1, and across Upper Bonanza Creek Road, there is a lot zoned R1 – Single Family Residential.

2.3 TR'ONDËK HWËCH'IN INPUT

There is a parcel of Tr'ondëk Hwëch'in settlement land directly to the south of infill Site #1 that is currently being used as a residence. Tr'ondëk Hwëch'in staff provided an initial letter requesting that any new lots in the area be developed as C2 – Mixed Use, rather than M1 – Industrial, as the C2 zone would better reflect the existing land uses and character of the area. The C2 zoning would also limit the types of industrial uses that could potentially produce more noise and other impacts to nearby property owners.

A second letter was received from the First Nation, reflecting input from the resident of the Settlement Parcel C-75FS. The resident stated that any development (industrial, commercial, or residential) of Infill Site #1 would not be compatible with their peaceful use and enjoyment of this property.

2.4 ROAD ACCESS

The main access to Infill Site #1 is located off Rabbit Creek Road on an unnamed road. The unnamed access is currently used by several residents in the area.

An access easement plan was completed in 2016 to identify a primary access as well and two additional access easements that connect to private driveway. While the registered location of the driveways is not ideal for the creation of new lots, consolidation of the accesses and additional subdivision is not expected as it would require landowner approval, reconstruction of existing driveways and identification of alternative accesses.

2.5 ENCROACHMENT

A number of encroachments have been identified on the Infill Site #1; adjacent landowners have been using the vacant Yukon government land for parking, storage and accessory structures. The encroachment is mainly on the east side of the site, between the unnamed road and the existing privately held residential property. There is a City of Dawson bylaw that prohibits this type of unauthorized use of vacant lands and sets up a process for City staff to work with landowners to remove items and adhere to the legal lot boundaries.

2.6 DEVELOPABLE AREA

According to the geotechnical reports, the area is generally flat and includes mine tailing piles and tailings ponds. Most of the site has been disturbed and vegetation is sparse. The site is generally deemed to be developable but will need to be graded using conventional cut/fill methods to flatten the site, fill in the tailings ponds and establish the required design elevation.

The geotechnical assessment states that building foundations should be constructed within the areas of the pre-existing mine tailings and recommends against developing building foundations in areas that are above filled-in ponds, as the subsurface conditions are unknown.

3.0 DEVELOPMENT PLAN FOR INFILL SITE #1

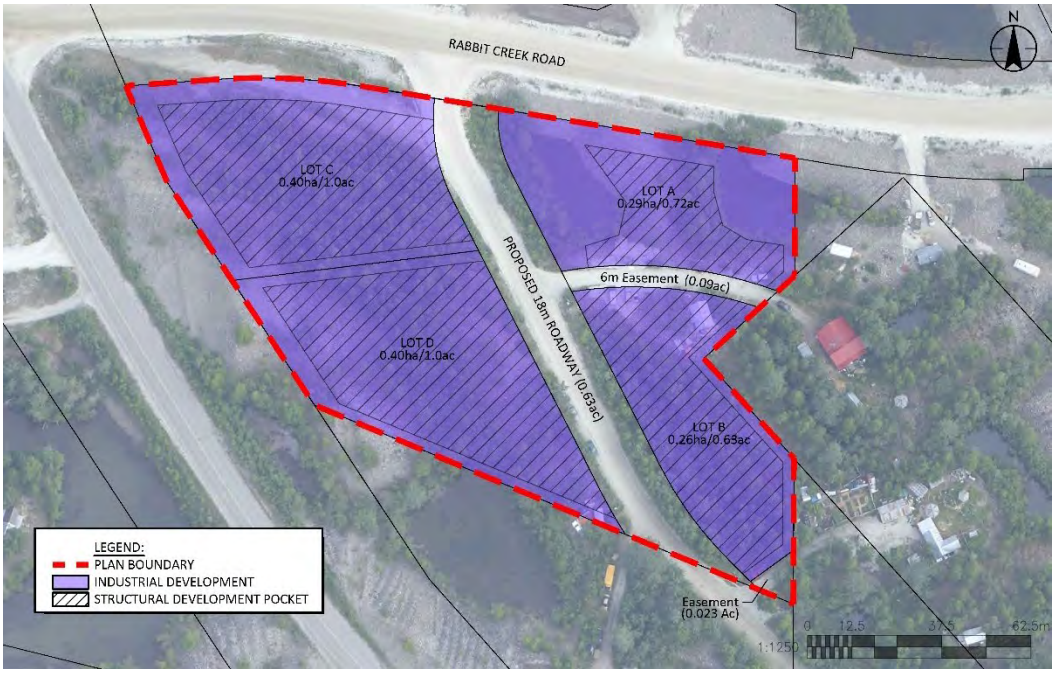
3.1 CONCEPT PLAN

Based on the background information and consideration of best practices for industrial/commercial lots, a Concept Plan for this area has been developed. This Plan, shown in the figure below, shows four new lots; two lots that are each 0.4 ha (1 ac) and two others that are 0.29 ha (0.72 ac) and 0.26 ha (0.63) respectively. In this proposed option, the lots will not be serviced by piped water or sanitary

It should be noted that these two smaller lots do not meet the minimum lot size required under the Zoning Bylaw for either CM2 – Commercial Mixed Use or M1 – Industrial zoning. Lots with private serving should be sized appropriate for the setbacks related to wells and septic fields and are typically 0.4 ha (1.0 ac) is size. Based on the smaller size of the lots, a more in-depth review of site-servicing considerations for Lot A and B is presented in Section 3.2.3.

The existing roadway and access easements have been used to keep the costs down. A future subdivision process will be required to create the four new lots, a reconfigured 18 m wide road ROW and the formalized driveway locations.

Figure 2 – Infill Site #1 Concept Plan



3.2 DEVELOPMENT CONSIDERATIONS

The Concept Plan shown above, and the opinion of probable cost presented in the following section are based on the following assumptions about the future development.

3.2.1 Geotechnical considerations

According to the geotechnical reports, pre-grading of the mine tailings will be required to establish level site grades and to fill in the ponded areas. Based on site observations, and to create final design elevations similar to those found in nearby developed areas, granular fill may have to be imported. Non-frost susceptible granular fill should be used. Also, it is recommended that new building foundations be constructed within the cut areas of the pre-existing mine tailings and not within the footprint of the filled-in ponds.

3.2.2 Site preparation

Infill Site #1 requires several site preparation activities to maximize developability for each proposed lot. The site preparation includes grading, tree clearing and backfilling of the existing tailings ponds. Yukon government can complete all of the site preparation activities listed below or may decide to leave the lots as they are, with responsibility for site preparation falling to future landowners.

Grading

Due to the size of the lots and potential future use, Infill Site #1 could be released with minimal site grading. The future owners could grade the lot based on their site needs and building plans. The costs for Infill Site #1 have been presented both with and without site grading.

Tree clearing

Due to the size of the lots and potential future use, Infill Site #1 could be released with minimal tree clearing. The future owners can clear the lot based on their site plans and specific requirements. The costs for Infill Site #1 have been presented with and without tree clearing.

Tailings ponds

As shown in Figure 1 – Plan Area, a number of tailings ponds exist within the site. To maximize the available developable space, the tailings ponds would need to be filled in with the appropriate non-frost susceptible material and properly compacted. While developing new buildings on the filled-in ponds is not recommended, it is acceptable to develop roads and parking areas over the filled-in ponds. Due to the regulatory, environmental and construction efficiencies, it is recommended that the tailings ponds be filled in prior to land release.

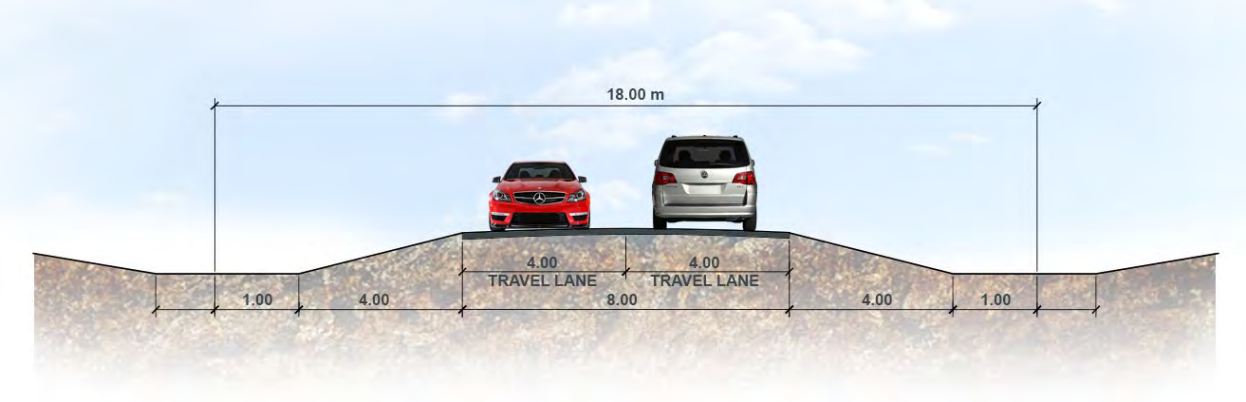
3.2.3 Site access and internal roads

A single access is adequate for the four potential lots and the existing road alignment has been used in the Concept Plan to reduce construction cost. Since the City of Dawson does not have an industrial road design standard, an 18 m road ROW has been proposed as shown in Figure 3.

Limited information is available about the construction of the existing unnamed road, making it difficult to comment on the road's condition or structure. As a future public roadway, the ROW and structure should be transferred to the City for future maintenance. To meet minimum requirements, the existing roadway would need to be upgraded by adding the proper sub-base and base materials, and by creating drainage ditches. Specific recommendations are provided in the Tetratech geotechnical study.

As stated in Section 2.4, the current road and two driveways are identified within an access easement. While an easement can be continued to be used, a surveyed road ROW is preferred as it provides greater clarity on the maintenance responsibility and formalized accesses.

Figure 3 – Roadway Cross-Section



3.2.4 Site servicing

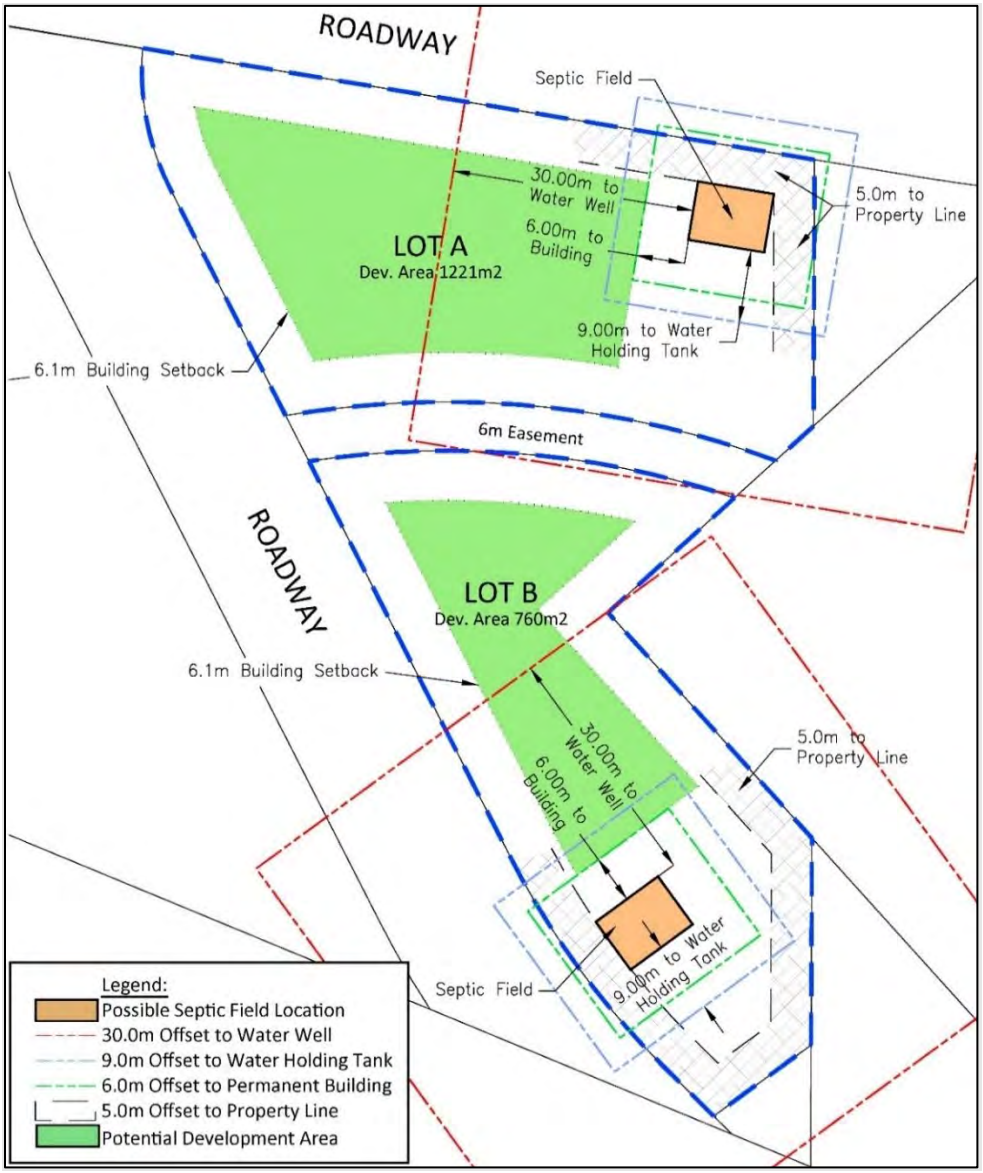
Due to limited adjacent servicing connections, no deep utilities are anticipated to be extended into the Plan Area, rather the installation and maintenance of a well, septic field or holding tank would be responsibility of the property owner. These costs have not been included in the estimates below.

Septic fields would need to be constructed where there are pre-existing mine tailings, and in some areas, this could limit their feasibility. Also, the groundwater table and the generally porous/coarse-grained nature of the mine tailings will need to be considered when selecting a septic field site. If the site conditions are not favorable for septic field installations, then an insulated holding tank would be required. The construction of either a septic field or holding tank will need to follow the *Yukon Public Health and Safety Act* and the associated *Design Specifications for Sewage Disposal Systems.* An additional review of Lots A and B has been completed due to the proposed small size of the lots and is shown in Figure 4.

To understand what work would be needed to bring power to these lots, staff from Yukon Energy Corporation were consulted. Based on the draft lot layout Stantec provided, Yukon Energy provided a draft plan of how power would be provided along with a cost estimate. It is important to note that estimating powerline construction cost in tailings piles and ponds is difficult.

Single-phase power is available within the site and connects to existing homes in the area. To supply power to the new lots, the existing power poles running through Lot C would need to be reconfigured and additional power poles would be added. Three phase-power is available to the east along Rabbit Creek Road, however significant new infrastructure would be required to extend this service to Infill Site #1. Due to the small number of lots, the potential for residential uses with small scale commercial operations, and the high costs, our costing includes only single-phase power for Infill Stie #1. Single-phase power supply will limit some type of larger commercial or industrial development on these lots.

Figure 4 – Septic Field Analysis



*Septic field size/location shown is suggestive only and may require relocation based on site conditions.
*Offsets shown are for the lot the septic field is shown on and development on adjacent lots may impact septic field location and/or development of the site.
*Development area represents total developable area. Structures shall be located outside of existing tailings ponds.

3.3 PRELIMINARY COSTS

An opinion of probable cost has been completed for lot preparation, roadway construction and power servicing. General requirements include mobilization and demobilization, traffic control, utility coordination, survey and construction management. Costs have also been provided for grubbing, stripping, tree clearing and earth balancing.

Due to number of unknowns related to the tailings ponds and the condition of the existing roadway, an opinion of probable cost has been presented rather than a Class C/D estimate. All cost are +/- 40%.

Costs are based on the following assumptions:

- A cut/fill balance has not been conducted, it is assumed that 50% granular fills will be needed to be imported to facilitate lot development
- The tailings ponds will be filled using the materials available on site and will also require imported granular fills
- The size and boundary of the tailings ponds have been assumed
- Each lot will have a single access driveway
- It is assumed that the existing roadway will need to be reconstructed, but there may be an opportunity to improve the existing roadway instead
- Single-phase power will be brought to the lot, each property owner will be responsible for hook up.
- Lot preparation includes: grubbing and stripping, tree clearing, and chipping, rough grading and tailings pond backfilling
- Cost excluding lot preparation includes tailings pond backfilling only
- Mobilization and demobilization are assumed at 10% of total construction cost
- Engineering is assumed to be 10% (detail design, construction admin)
- Additional required studies and regulatory approvals have not been identified in the cost.

Table 3 – Opinion of Probable Cost Infill Site #1

		Development of 4 Lots		**Development of Lots C and D Only**	
Item	**Description**	**Cost <u>including</u> Lot Preparation for Individual Lots** (tree clearing, rough grading and tailings pond backfilling)	**Cost <u>excluding</u> Lot Preparation for Individual Lots** (tailings pond backfilling only)	**Cost <u>including</u> Lot Preparation to Develop Only C and D** (tree clearing, rough grading and tailings pond backfilling)	**Cost excluding Lot Preparation to Develop Only C and D** (tailings pond backfilling only)
1	General Requirements (mob/demob, traffic control, utility coordination, survey)	$ 95,479	$ 85,311	$ 88,236	$ 82,166
2	Roadway Reconstruction	$ 46,487	$ 46,487	$ 46,487	$ 46,487
3	Power – single-phase	$ 73,220	$ 73,220	$ 73,220	$ 73,220
4	Lot A (0.29 ac)	$ 44,248	$ 22,395		
5	Lot B (0.26 ac)	$ 28,181	$ 9,060		
6	Lot C (0.4 ac)	$ 31,326	$ 975	$ 31,326	$ 975
7	Lot D (0.4 ac)	$ 31,326	$ 975	$ 31,326	$ 975
	Subtotal	**$ 350,268**	**$ 238,423**	**$ 270,596**	**$ 203,823**
	Contingency (20%)	$ 70,054	$ 47,685	$ 54,119	$ 40,765
	Engineering (10%)	$ 35,027	$ 23,842	$ 27,060	$ 20,382
	Total	**$ 455,349**	**$ 309,950**	**$ 351,775**	**$ 264,970**
	Lot	**Price Per lot**	**Price Per lot**	**Price Per lot**	**Price Per lot**
	Lot A (0.72 ac)	$ 128,784	$ 91,531		
	Lot B (0.63 ac)	$ 112,717	$ 78,196		
	Lot C (1.00 ac)	$ 115,862	$ 70,111	$ 175,887	$ 132,485
	Lot D (1.00 ac)	$ 115,862	$ 70,111	$ 175,887	$ 132,485
	Lot	**Price Per Net Developable Area**	**Price Per Net Developable Area**	**Price Per Net Developable Area**	**Price Per Net Developable Area**
		$ 135,925.07	$ 92,522.39	$ 175,887	$ 132,485

4.0 RECOMMENDATIONS FOR INFILL SITE #1 DEVELOPMENT

4.1 ZONING FOR THE PROPOSED LOTS

Both the M1 – Industrial and C2 – Commercial Mixed-Use zones would be appropriate for these proposed lots. Tr'ondëk Hwëch'in requested that these lots be zoned C2, to be more compatible with existing residential uses in the immediate area. Also, at the size of 0.25 to 0.4 ha, the lots may be more appropriate for mixed use residential/light industrial/commercial uses rather than larger-scale industrial uses.

On the other hand, because C2 zoning allows a single residential dwelling as a primary use, these lots could be purchased by a buyer who only wants to build a home and is not interested in an associated industrial or business use. This could result in new country residential uses developed in a growing industrial area which could lead to future land use conflicts.

Given the proximity to existing homes, and the comments from Tr'ondëk Hwëch'in, C2 zoning would be most appropriate for Site #1. It would also be possible to zone these properties C2 but add a restriction so that single residential dwellings are only allowed as a secondary use.

4.2 UNDERSIZED LOTS

Figure 2 shows a Concept Plan with the development of four new lots on this site. Due to the fragmentation of vacant land by easements and accesses, and the boundaries of the developable area, Lots A and B are both under 0.4 ha. These lots do not meet the minimum lot size requirements for either the M1 – Industrial or C2 – Commercial Mixed-Use zones. Below, we have provided several options for how Yukon government could proceed with developing this area.

Option #1 – Develop only Lots C and D

The first option is to only develop only Lots C and D at this time. The development could be phased, with Lots A and B being developed at some point in the future.

Pros: Two industrial lots could be developed and released relatively quickly.

Cons: Costs would be higher and cost recovery would be difficult. Also, this option leaves developable land with good access undeveloped and is inefficient from a land use perspective.

Option #2 – Change the minimum lot size in the C2 zone

A second option is to work with the City of Dawson to amend the zoning to lower the minimum lot size from 0.4 ha to 0.25 ha in the entire C2 zone (or the M1 zone if that is the zone selected). This would allow for the creation of all four lots at this site.

These lots are smaller than the surrounding lots, but are still big enough to be useful for some light industrial, mixed use, or commercial operations. The smaller lot size may mean that there might not be enough room for a septic field and wells, and so septic holding tanks and trucked water might be required instead.

Change the minimum lot size for the C2 zone would mean that smaller lots could be created anywhere in the community that shares this zoning. This could also mean that any C2 lot over 0.5 ha could be subdivided.

Pros: Land can be used effectively. Developing four lots makes cost recovery more feasible. Subdivision of larger lots by the private sector may mean that new smaller, and thus more affordable lots, are made available to potential buyers. Allowing for the creation of smaller C2 lots across the community could add additional housing options in mixed-use settings.

Cons: The City may not want to consider this option. The subdivision of existing lots could result in smaller lots in many areas and make it difficult for those with businesses to find a space big enough to support their operations. Also, allowing smaller lots may pose challenges when attempting to obtain permits for wells and septic fields.

Option #3 – Change the zoning to allow for these two undersized lots

A change could be made to the Zoning Bylaw to allow for the development of these two specific undersized lots. These lots are still big enough to be useful for some light industrial, commercial or mixed-use operations. These smaller lots could be allowed through a variance or spot zoning, depending on what is recommended by the City of Dawson.

Pros: Land can be used effectively and developing all four lots makes cost recovery more feasible. Only two smaller lots will be created, rather than allowing for the creation of smaller lots throughout this zone.

Cons: The City may not want to consider this option; allowing for smaller lots here could set a precedent and result in requests from existing landowners to subdivide C2 zoned lots in other areas. Dealing with existing encroachment might be challenging.

Option #4 – Expand the planning area

There is a potential to expand Lot A and Lot B by consolidating these parcels with adjacent vacant lands. This consolidation would reduce the number of fragmented parcels and could create more suitable lots in the area. The entire area south of Rabbit Creek Road could be reviewed to identify opportunities to consolidate, subdivide and create more functional lots. The owner of the privately-held parcel to the east could also be approached to see if they have any interest in reconfiguring or subdividing their lot.

Pros: This option could result in five or six new usable lots in the area and a more efficient use of land.

Cons: Expanding the developable area would take more time. The owner of the adjacent lot may not be interested in working with Yukon government on reconfiguring the boundaries.

4.3 ACCESS

As identified in Section 2.4, the current road and two driveways are formalized through an access easement. As part of the land release, Yukon government should transfer the lands to the City of Dawson with the access easement agreements being updated to be between the City and landowner. The City can determine whether the current easements would be registered as a road ROW's, easements or a combination. A road ROW will ensure public access and removes the need for access agreements. The process to subdivide the roadway would be minimal as it would be completed to the subdivision of the individual lots.

4.4 BYLAW ENFORCEMENT AND ENCROACHMENT

The City should work to enforce the Zoning Bylaw. The private residence to the west of the site currently has four structures and three access roads. It is not clear if the buildings are residences, rental cabins or accessory buildings like sheds or workshops. The zoning and use of this parcel should be reviewed to ensure conformity.

There are currently four areas within Infill Site #1 with encroachment concerns and stored items will need to be removed before lots A and B are developed. The City does have an Encroachment Policy, but staff does not intervene with encroachment issues between private properties. Yukon government, as the property owner, would be responsible for working with owners of the stored items and this process may be challenging.

5.0 EXISTING CONDITIONS SITE #2 (NORTH SITE)

5.1 SITE LOCATION AND INFORMATION

Infill Site #2 is located north of the Klondike Highway and south of the Klondike River, near the intersection of the Klondike Highway and the Upper Bonanza Creek Road. The area is bounded by the Klondike River to the north, Klondike Highway to the south, private land holdings to the west and Tr'ondëk Hwëch'in Settlement parcels THC-887FS and THC-13B to the east.

The site is generally flat, with only changes in elevation (+/- 5m) where former mine tailings are present. Some of the tailings piles have been levelled. Most of the site has been disturbed through historical mining activities and vegetation is sparse. However, some stands of trees made up of poplar, white birch, aspen and spruce are present, particularly in the northwest section of the infill area.

Table 4 – Plan Area Summary Site #2

Site Size	• Approximately 11.23 ha (27.75 ac)
Infrastructure	• Piped water and sewer south of Klondike Highway; three phase power is available on the south side of the Klondike Highway
Roadways	• Limited internal roadways
Parcel Ownership	• Yukon government

5.2 CURRENT LAND USE AND ZONING

Infill Site #2 is identified as FP – Future Planning in the Zoning Bylaw. Adjacent private lands to the west are zoned C2 – Commercial Mixed Use and Tr'ondëk Hwëch'in lands to the east are zoned FP – Future Planning. Nearby private lands are being used for light industrial or commercial operations, with some of the properties including a living suite. A zoning amendment will be needed to allow for the development of new lots in this area.

A number of trails, foot paths, seasonal water courses, tailings ponds, seeps, former dredge buckets and signs of shoreline erosion were also identified within the area.

5.3 ROAD ACCESS

Currently, the Plan Area has no internal access roads. A new access will need to be developed from the North Klondike Highway.

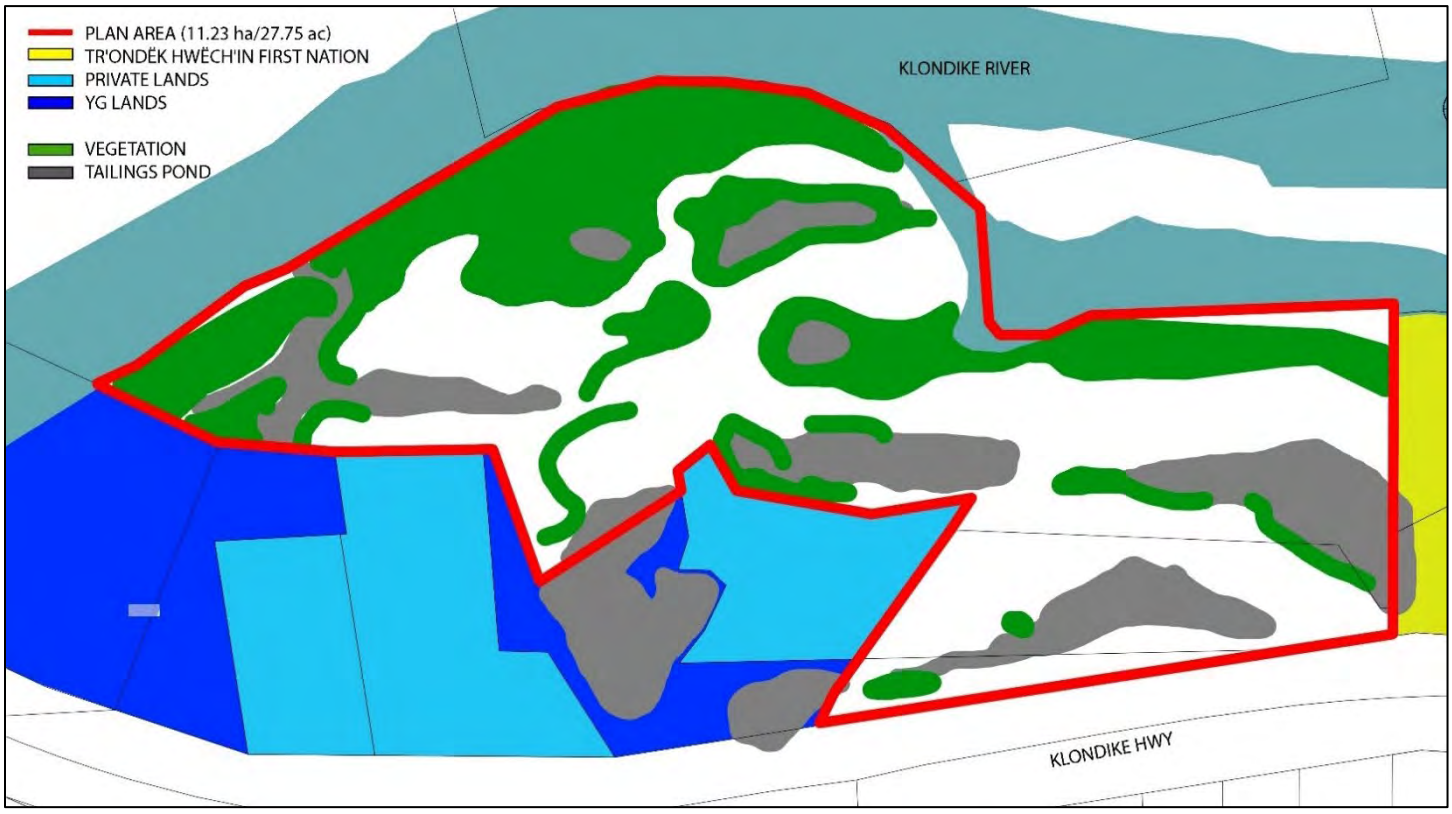
5.4 DEVELOPABLE AREA

Based on the geotechnical analysis, the northern portion of the site was deemed undevelopable. This undevelopable area is closer to the Klondike River, and includes naturally occurring ponds, active flood plains, and is made up of fine-grained and organic materials.

According to the Tetratech reports, pre-grading of the mine tailings will be required to establish level site grades and to fill in the tailings ponds. To create final design elevations similar to those found in nearby developed areas, non-frost susceptible granular fill may have to be imported. Also, it is recommended that building foundations only be constructed within the cut areas of the pre-existing mine tailings.

The report goes on to state that if the placement of building foundations over filled-in ponds is required, then special site preparation measures must be taken to reduce the potential for future settlement of the granular fill. This site preparation should involve removing all unsuitable surface material at the pond perimeter; having the exposed subgrade inspected by a qualified geotechnical engineer to confirm suitable ground conditions and provide additional recommendations if necessary; and recompacting the levelled tailings surface with a large vibratory drum roller.

Figure 5 – Existing Conditions Infill Site #2



6.0 DEVELOPMENT PLAN FOR INFILL SITE #2

6.1 CONCEPT PLAN OPTIONS INFILL SITE #2

In this section, three different development options are presented. The design of each option considered:

- Maximizing the space on each lot where a building foundation can be placed
- Reducing the amount of land used for roadways
- Creating developable blocks that have lotting flexibility

Option A shows 9 larger lots, whereas Options B and C show a mix of lot sizes, included smaller lots. Options B and C also represent a more efficient use of infrastructure and thus a more financially feasible development.

Due to the configuration and conditions of Infill Site #2, there is only one roadway alignment that results in an acceptable intersection, minimizes costs, and limits the use developable land taken up by road. As such, the same basic road layout is shown on each of the three options.

Second set of options, Option A1, B1 and C1 have been developed that show a potential roadway connection east to the Tr'ondëk Hwëch'in lands. Working with the First Nation on joint land development project could mean lower development costs and could facilitate a loop road with a second connection to the Highway.

Option A – Site Plan

Option A, shown in Figure 6, shows 9 lots that are between 0.4 ha (1.0 ac) to 0.65 ha (1.62 ac). Each of these proposed lots meets the minimum lot size in both the CM2 – Commercial Mixed Use and M1 – Industrial. Option A can be developed either serviced with piped water and sewer or providing water and sewer can be left to the property owner.

Option A-1, shown in Figure 7, presents a future road connection to Tr'ondëk Hwëch'in lands. The extension of this roadway does not impact the number of lots but does alter the size of some of them.

Figure 6 – Option A Infill Site #2

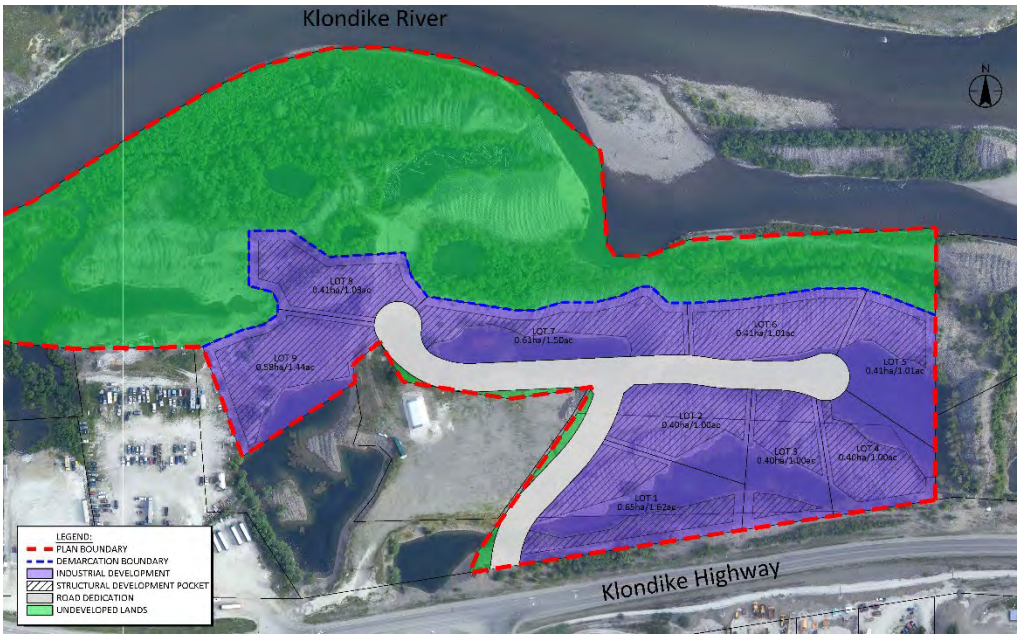
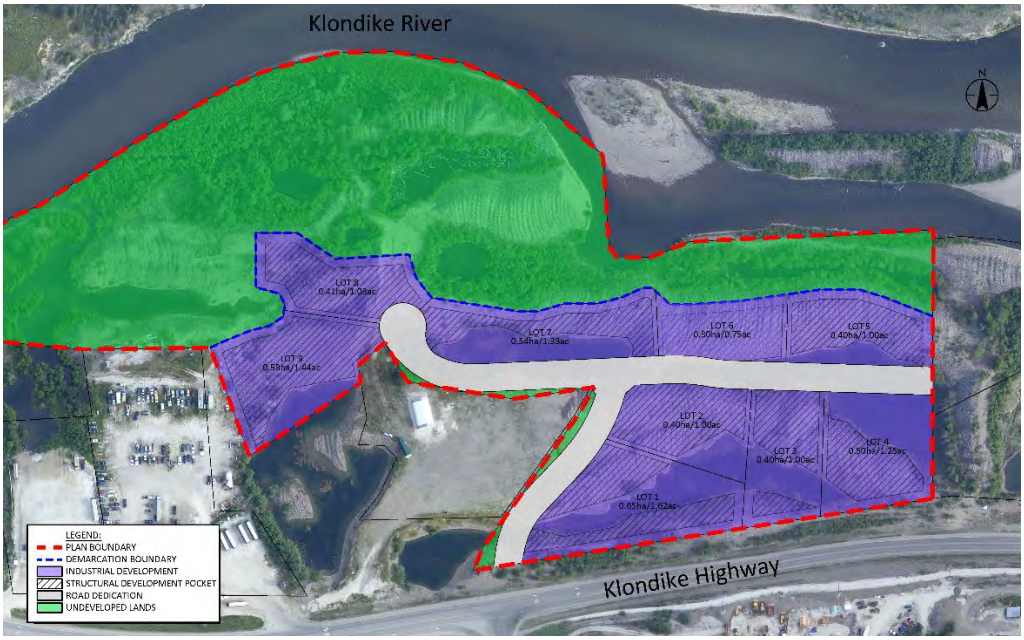


Figure 7 – Option A-1 Infill Site #2



Option B – Site Plan

Option B, shown in Figure 8, provides 16 lots that range from 0.2 ha (0.5 ac) to 0.4 ha (1.0 ac) in size. These lots do not currently meet the minimum lot standards for either the CM2 – Commercial Mixed Use and M1 – Industrial. As these lots are smaller, Option B would be required to be serviced with piped water and sewer.

Option B1, in Figure 9, presents a future road connection to adjacent Tr'ondëk Hwëch'in lands. The extension of this roadway does impact the lot layout.

Option C – Site Plan #2

Option C, in Figure 10 provides 22 lots that range in size from 0.12 ha (0.3 ac) to 0.4 ha (1.0 ac). These lots do not currently meet the minimum lot standards for either the CM2 – Commercial Mixed Use and M1 – Industrial. As these lots are smaller, Option C would be required to be serviced with piped water and sewer.

Option C1, in Figure 11, presents a future road connection to adjacent Tr'ondëk Hwëch'in lands. The extension of this roadway does impact the lot layout.

Figure 8 – Option B Infill Site #2

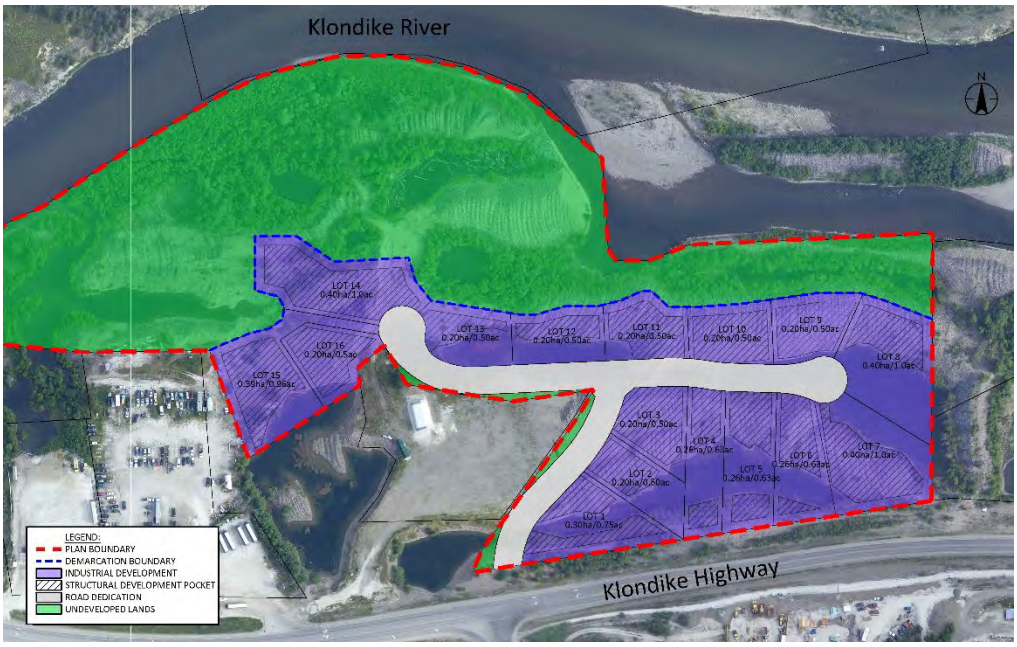


Figure 9 – Option B-1 Infill Site #2

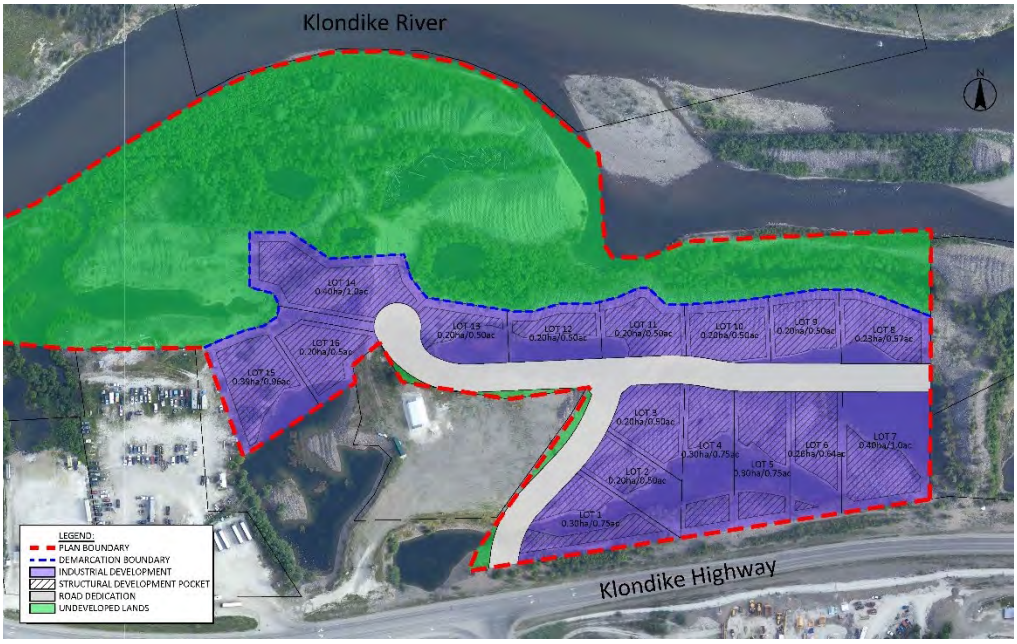


Figure 10 – Option C Infill Site #2

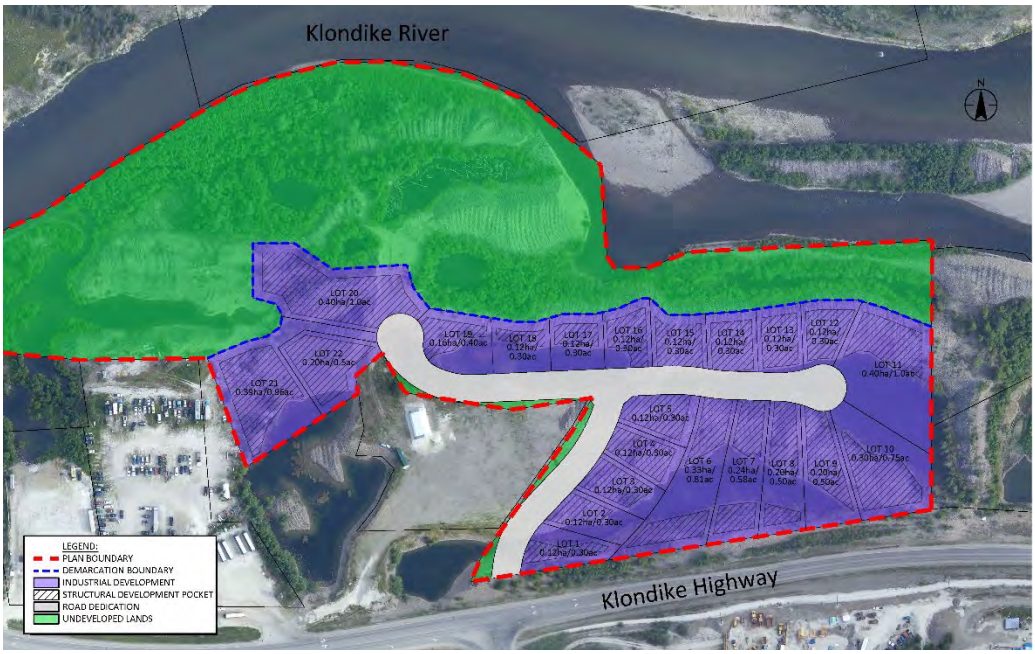
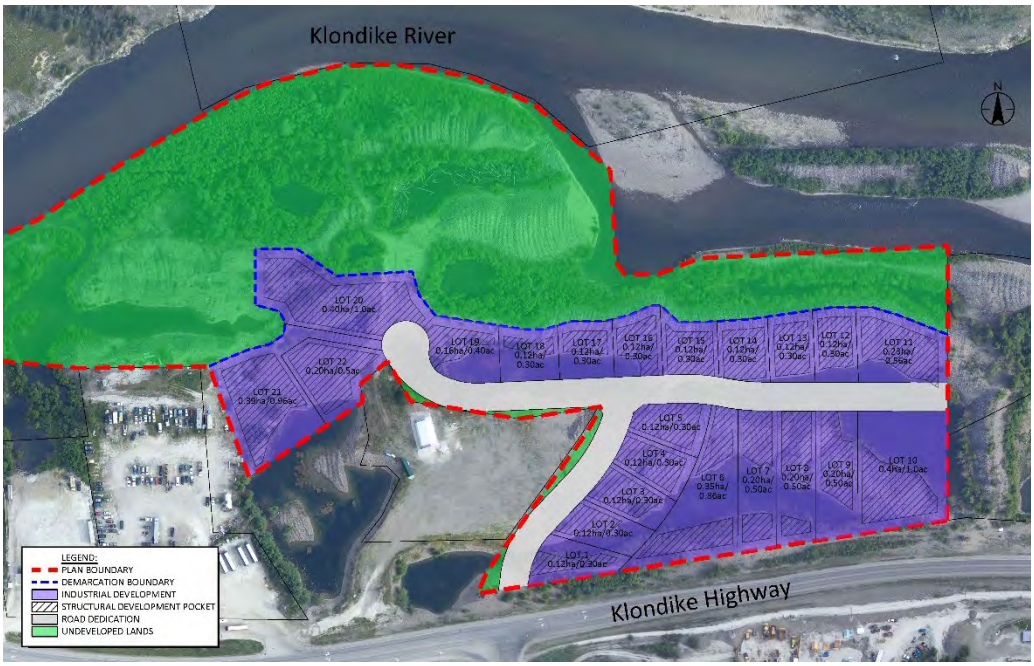


Figure 11 – Option C-1 Infill Site #2



6.2 DEVELOPMENT CONSIDERATIONS

6.2.1 Lot size

The required size of industrial/commercial lots will vary greatly based on operational needs. One operation may need only one building with a small yard whereas another may need multiple buildings and a large storage area. New subdivisions will ideally be flexible to allow for different types of uses. The best lot layout to select will also depend on whether there is more demand in Dawson for larger industrial lots or smaller mixed/use commercial lots.

6.2.2 Geotechnical considerations

According to the geotechnical reports, pre-grading of the mine tailings will be required to establish level site grades and to fill in the ponded areas. Based on site observations, and to create final design elevations like those found in nearby developed areas, granular fill may have to be imported. Non-frost susceptible granular fill should be used.

Also, it is recommended that new building foundations be constructed within the cut areas of the pre-existing mine tailings and not in the footprint of the filled-in ponds. Wherever possible, the filled-in ponds be used for parking, laydown areas or storage, rather than building foundations. If it is required that foundations are built over the filled-in ponds, then special site preparation measures must be taken to reduce the potential for future settlement of the granular fill. This site preparation should involve removing all unsuitable surface material at the pond perimeter; having the exposed subgrade inspected by a qualified geotechnical engineer to confirm suitable ground conditions and provide additional recommendations if necessary; and recompacting the levelled tailings surface with a large vibratory drum roller.

6.2.3 Site preparation

Infill Site #2 requires limited site preparation based on the existing conditions and minimal natural constraints. The primary site preparation will include the grading and filling of the existing tailings ponds.

Grading

The developable portion of the Infill Site #2 will require grading as part of the roadway construction, filling of the tailings ponds and overall site preparation. Determining a final development elevation and grading to this elevation is critical to minimizing future risk and damage associated with potential flooding. The future owners may need to finalize the grading of a lot based on their specific needs and placement of structures.

Tree clearing

Limited tree clearing is required. Existing trees and vegetation within the developable area will be removed during the roadway construction and filling of the tailings ponds.

Tailings ponds

To maximize the available developable space, the tailings ponds will be filled in. The fill should be appropriate non-frost susceptible material and should be properly compacted. Due to the regulatory, environmental and construction efficiencies, it is recommended that the tailings ponds be filled in prior to land release.

6.2.4 Site access and internal roads

To minimize new accesses along the North Klondike Highway, one new access has been proposed that will create a proper intersection with Upper Bonanza Creek Road. A single access road is adequate for the limited number of potential lots. All lots will be accessed using the new internal roadway to maintain traffic flow on the highway. Lot 1213 Quad 116B/03 has been provided access from the new internal roadway.

Options A, B and C show a road system with two cul-de-sacs, and Options A1, B1 and C1 show a through road running east that would connect to the adjacent Tr'ondëk Hwëch'in lots.

The intersection location was reviewed by the Yukon Highways and Public Works Department. Staff agreed that creating a proper intersection with the Upper Bonanza Creek Road is ideal and also requested that a frontage road be considered to access the private lot to the west (Lot 1047-2 Quad 116B/03) that currently has direct highway access. This frontage road is not shown on any of these options.

Since the City of Dawson does not have an industrial road design standard, an 18 m road ROW has been proposed as shown in Figure 3. The internal roadway will consist of an 8 m carriage with ditches on both sides for overland storm drainage. This road standard will be sufficient for access by larger trucks, fire trucks and other emergency vehicles.

6.2.5 Site servicing

For Option A, on-site services or piped services would be feasible, but it is assumed for costing purposes, that water and sewer will not be provided. For Options B and C, piped water and sewer would be extended to each site. Each new lot will have one water service and one sanitary service.

There is an existing 200mm diameter water main and 200mm diameter forcemain that follows the south shoulder of the Klondike Highway to the Guggieville Lift Station. The Guggieville Lift Station is located on the east side of the entrance to Upper Bonanza Creek Road.

A new sanitary main can be extended throughout the proposed development, and drain to the Guggieville Lift Station, where it will be pumped to either the existing Wastewater Treatment Plant or the new lagoon. A new water main will be constructed alongside the sanitary main, throughout the proposed development and connect to the existing water main on the south side of the Klondike Highway.

The new services will be recirculation (expected to be 25mm supply and 20mm return), and as per City of Dawson standards. The core service pipe will be contained within an insulated casing pipe so that the service pipe can be replaced in the future if needed. The water service will connect at a new 900mm diameter access vault along the main. An insulated sanitary service will connect to the sanitary main, as per City of Dawson standards. Services should be placed at the same depth as the existing infrastructure.

Further analysis will have to be completed to ensure that the Guggieville Lift Station can handle the new sanitary loads and that there is enough pressure in the water main to extend throughout the new development. Also, a thermal analysis will have to be completed to ensure that sufficient temperatures are maintained throughout the piping to avoid freezing.

To understand what work would be needed to bring power to these lots, staff from Yukon Energy Corporation were consulted. Based on the draft lot layout Stantec provided, Yukon Energy provided a draft plan of how power would be provided along with a cost estimate. It is important to note that estimating powerline construction cost in tailings piles and ponds is difficult.

Under all presented options, three-phase power will be extended throughout the new development. Property owners will then be able to arrange for service to be brought to their lot to meet their operational needs.

6.2.6 On-site servicing

For Option A, the installation and maintenance of a well, septic field or holding tank would be responsibility of the property owner. Septic fields would need to be constructed where there are pre-existing mine tailings, and in some areas, this could limit their feasibility. Also, the groundwater table and the generally porous/coarse-grained nature of the mine tailings will need to be considered when selecting a septic field site. If the site conditions are not favorable for septic field installations, then an insulated holding tank would be required. The construction of either a septic field or holding tank will need to follow the *Yukon Public Health and Safety Act* and the associated *Design Specifications for Sewage Disposal Systems.*

6.3 PRELIMINARY COSTS

An opinion of probable cost has been completed and includes general requirements, lot preparation, roadway construction, and three phase power. General requirements include mobilization and demobilization, traffic control, utility coordination, survey and construction management. Site preparation includes grubbing, stripping, tree clearing and earth balancing.

Due to number of unknowns related to the tailings ponds and the fact that there is no accurate survey information, an opinion of probable cost has been presented rather than a Class C/D estimate.

General assumptions:

- A cut/fill balance has not been conducted, it is assumed that 50% granular fills will be needed to be imported to facilitate lot development
- The tailings ponds will be filled using the materials available on site and will also require imported granular fills
- The size and boundary of the tailings ponds have been assumed
- Lot preparation will include: tree clearing, grading, tailings pond fill, power connection and underground servicing
- Each lot will have a single access driveway
- Three-Phase power is brought to the lot, each property owner will be responsible for hook up.
- Mobilization and demobilization are assumed at 10% of total construction cost
- Engineering is assumed to be 10% (detail design, construction admin)
- Additional required studies and regulatory approvals have not been identified in the cost.

Table 5 shows the opinion of probable cost for the three options. The breakdown of costs is provided Appendix B and in the excel spreadsheet that accompanies this report.

Table 5 – Opinion of Probable Cost Infill Site #2

Item	Description	Cost
	Site Development	
1	General Requirements (mob/demob, traffic control, utility coordination, survey)	$ 279,772
2	Roadway Construction	$ 156,886
3	Site Preparation	$ 146,598
4	Backfill of Tailings Ponds	$ 424,078
5	Water Main	$ 252,500
6	Sanitary Main	$ 145,500
	Subtotal	*$ 1,405,333*
	Lot Development (per lot)	
7	Driveway Access	$ 975
8	Water Service	$ 8,715
9	Sanitary Service	$ 3,300
10	Power Per Lot (1 post for every 2 lots)*	$15,000

DAWSON INDUSTRIAL/COMMERCIAL LOTS

Development Plan for Infill Site #2

	Subtotal (per lot)	$27,990
	Percentage Based	
11	20% Contingency	
12	10% Engineering Fees	
	Development Options ((Site Development/# of Lots) + (# of Lot x lot development cost))	
13	Option A Non-Serviced (9 lot)	$ 1,450,009
	Price per Net Developable Area per ac (10.61 ac)	*$ 136,664*
	Price per lot	*= size (ac) of lot x $ 136,664*
	Price per lot (1.0-1.62 ac)	*= $ 136,664 - $ 221,395*
14	Option A Serviced (9 lot)	$ 2,107,984
	Price per Net Developable Area per ac (10.61 ac)	*$ 198,679*
	Price per lot	= size (ac) of lot x *$ 198,679*
	Price per lot (1.0-1.62 ac)	*= $ 198,679 - $ 321,859*
15	Option A-1 Non-Serviced (9 lot)	$ 1,463,969
	Price per Net Developable Area per ac (10.61 ac)	*$ 137,980*
	Price per lot	= size (ac) of lot x *$ 137,980*
	Price per lot (1.0-1.62 ac)	*= $ 137,980 - $ 223,528*
16	Option A-1 Non-Serviced (9 lot)	$2,121,944
	Price per Net Developable Area per ac (10.61 ac)	*$ 199,995*
	Price per lot	= size (ac) of lot x *$ 199,995*
	Price per lot (1.0-1.62 ac)	*= $ 198,679 - $ 323,992*
17	Option B (16 lot)	$2,284,693
	Price per Net Developable Area per ac (10.61 ac)	*$ 215,334*
	Price per lot	= size (ac) of lot x *$ 215,334*
	Price per lot (0.5-1.0 ac)	*= $ 107,667 - $ 215,334*
19	Option B-1 (15 lot)	$2,281,766
	Price per Net Developable Area per ac (10.61 ac)	*$ 215,058*
	Price per lot	= size (ac) of lot x *$ 215,058*
	Price per lot (0.5-1.0 ac)	*= $ 107,529 - $ 215,058*

DAWSON INDUSTRIAL/COMMERCIAL LOTS

Development Plan for Infill Site #2

20	Option C (22 lot)	$2,444,515
	Price per Net Developable Area per ac (10.61 ac)	*$ 230,397*
	Price per lot	= size (ac) of lot x *$ 230,397*
	Price per lot (0.3-1.0 ac)	*= $ 69,119 - $ 230,397*
21	Option C-1 (22 lot)	$2,458,478
	Price per Net Developable Area per ac (10.61 ac)	*$ 231,713*
	Price per lot	= size (ac) of lot x *$ 231,713*
	Price per lot (0.3-1.0 ac)	*= $ 69,514 - $ 231,713*

7.0 RECOMMENDATIONS FOR INFILL SITE #2

7.1 ZONING FOR THE PROPOSED LOTS

As the current zoning of this area is FP – Future Planning, a zoning amendment will be needed before these lots can be developed. Both the M1 – Industrial and C2 – Commercial Mixed-Use zones would be appropriate for these proposed lots. These two zones have the same minimum lot size and setbacks, so the zoning does not impact the lot layout. The final decision on the zoning should be made after consulting with the City of Dawson staff and leadership to determine if the community has a greater need for industrial or commercial lots.

Applying the C2 zoning will mean that the area may develop with more residential uses as single-family dwellings are allowed as a primary use in this zone. As part of this decision, the City of Dawson will need to consider if residential, commercial or industrial lots are needed at this location. Residents will have an opportunity to provide comments on the rezoning application.

7.2 TAILINGS PONDS

The construction of buildings is not recommended on reclaimed tailings ponds. The description and location of the tailings ponds should be registered on title as a restrictive caveat to ensure that the future landowner is aware of the constraints. By having the existing tailings ponds described on the titles, the City of Dawson will have the necessary information during the review and approval of building permits.

7.3 PROXIMITY TO THE RIVER

Based on the high-level hydrologic investigation completed for Infill Site #2 development is located within the 200-year floodplain. The 200-year event is the “regulatory” flood in British Columbia (MWLAP 2004, APEGBC 2017), and events of similar return periods events have been adopted by jurisdictions across Canada. Yukon does not currently have a regulatory flood standard, however proponents are required to demonstrate mitigation of negative impacts to the environment and socio-economic conditions under YESAA.

New development (and particularly infilling) within the regulatory flood limits can alter flood levels. It can also alter and erosion and sedimentation patterns around the development site by reducing cross section area, altering cross-section geometry, and changing flow patterns. Proper due diligence prior to land release related to flooding, erosion, and sedimentation is required to reduce the risk of damage and legal responsibility for YG as the landowner and the City as the approving municipality. In addition, regulatory or assessment agencies (such as YESAB) typically require assessment of existing vs. proposed conditions flooding and anticipated impacts to the river prior to approval, to demonstrate that the negative impacts of the proposed project have been mitigated. Given these considerations, it is highly

recommended that, at minimum, an appropriate level of flooding, erosion, and sedimentation assessment be done during the next stage of feasibility, Master Planning or detailed design.

Detailed hydraulic analysis and river impact assessment, early in the project, provides additional benefit to the community planning process, as it would offer return period flood elevations to a higher degree of confidence and resolution, and would also identify the different zones of flood hazard (e.g., floodway vs. flood fringe). This information would allow the developing agency and planners to manage their risk by delineating appropriate areas for development types with different risk profiles (e.g., recreational trails vs. residences). It would also identify the need and type of mitigations which would decrease risk for a given development type in the community plan (e.g., floodproofing, evacuation plans, etc.).

While previous reports noted that the development area is within the 200-year flood limits, an assessment of the proposed development's impact on flood levels or erosion and sedimentation in the Klondike River should be completed. Recognizing the potentially project-limiting impacts of these development effects, it is recommended the completion of a feasibility-level hydraulic and river process (erosion and sedimentation) assessment for the general nature of proposed conditions be completed prior to any decisions related to the future of the Plan Area. The hydraulic and river process analyses is comparable to the level of effort being completed for other feasibility-related components of the potential project (e.g., geotechnical, fish habitat, etc.).

7.4 FISH PRESENCE AND HABITAT

One of the next steps will need to be carrying out an assessment to determine if there are fish present in any of the ponds that are to be filled in. If the ponds which are to be filled in are determined to include fish habitat, then this infilling would represent an impact to fish and/or fish habitat according to the *Fisheries Act*. A Request for Review (RFR) would need to be submitted to Fisheries and Oceans Canada (DFO). In the RFR, the proponent would characterize and quantify the existing fish and fish habitat which will be impacted, and the proposed design and measures to mitigate the impacts. These mitigation measures might include construction phase measures (fish salvage, water management, erosion and sediment control plans) as well as proposed conditions design including any permanent habitat mitigation, rehabilitation, or offsetting. DFO will review and assess the proponent's submission and make a determination about how to move forward.

7.5 EXPAND THE PLANNING AREA

Development in this area is constrained by the proximity to the Klondike River and the North Klondike Highway, the direction to avoid developing buildings on filled-in tailings ponds, and existing private properties. One option for this area is to expand the planning area to include private lands and Yukon government lands between the North Klondike Highway and the Infill Area #2.

Another option is to work with Tr'ondëk Hwëch'in to develop their two parcels to the east. Collaborating with the First Nation on a joint industrial development could lead to more efficient use of land. Also, there

is a tailings pond that straddles the Yukon government and Tr'ondëk Hwëch'in property; it would make more sense to fill in the entire pond, but this can likely not be done without the permission and cooperation of the First Nation. Costs of developing the road, servicing and earth works could be shared which could result in an overall cost savings.

APPENDIX A – CONCEPT PLANS

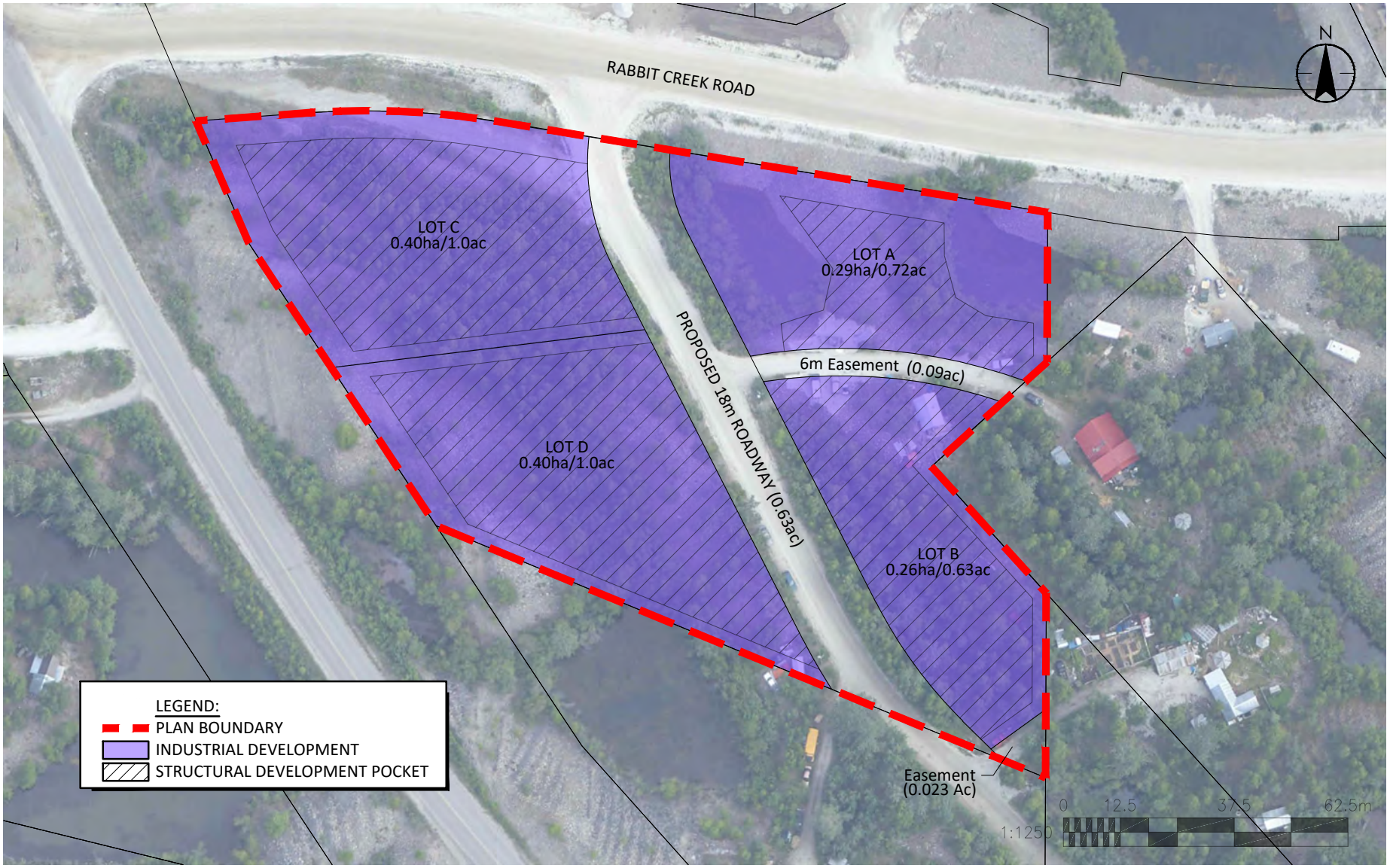


Figure 2.0

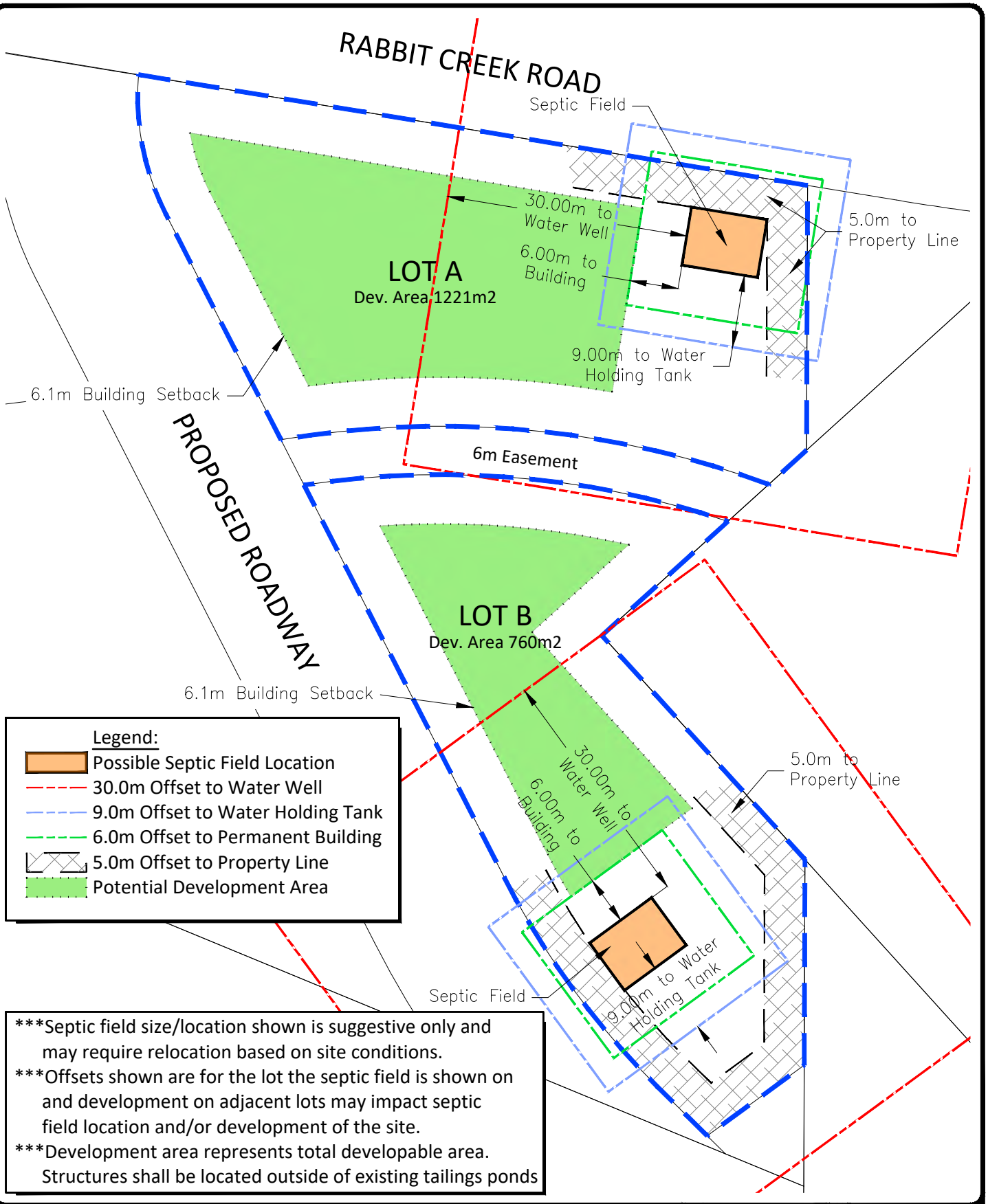
Infill Site #1 - 4 Lot Development

Prepared for:
Government of Yukon

Stantec
#1100, 4900-50th Street, Red Deer, AB T4N1X7
Ph:(403) 341-3320 Fx:(403) 342-0969

DRAWN BY: SAS
CHECKED BY: GCL
SCALE:1:1,250
PROJECT #: 144903045

April, 2021



***Septic field size/location shown is suggestive only and may require relocation based on site conditions.
***Offsets shown are for the lot the septic field is shown on and development on adjacent lots may impact septic field location and/or development of the site.
***Development area represents total developable area. Structures shall be located outside of existing tailings ponds

Figure 4.0

Infill Site #1 - Lots A & B Setback Review

Government of Yukon

Prepared for:

Stantec
#1100, 4900-50th Street, Red Deer, AB T4N1X7
Ph:(403) 341-3320 Fx:(403) 342-0969

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:NTS
PROJECT #:

March, 2021

Updated 21/03/15, 1:20 PM;By: SSTAFFORD

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Updated 21/04/14, 2:06 PM;By: SSTAFFORD

Klondike River

N

LOT 8
0.41ha/1.03ac

LOT 7
0.61ha/1.50ac

LOT 6
0.41ha/1.01ac

LOT 5
0.41ha/1.01ac

LOT 9
0.58ha/1.44ac

LOT 2
0.40ha/1.00ac

LOT 3
0.40ha/1.00ac

LOT 4
0.40ha/1.00ac

LOT 1
0.65ha/1.62ac

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

Klondike Highway

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 2A.DWG

Figure 6.0 - Option A

Infill Site #2 - 9 Lot Cul-de-sac (1.0ac Lots)

1:2000 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

Updated 21/04/14, 2:35 PM;By: SSTAFFORD

Klondike River

N

LOT 8
0.41ha/1.03ac

LOT 9
0.58ha/1.44ac

LOT 7
0.54ha/1.33ac

LOT 6
0.30ha/0.75ac

LOT 5
0.40ha/1.00ac

LOT 2
0.40ha/1.00ac

LOT 3
0.40ha/1.00ac

LOT 4
0.50ha/1.25ac

LOT 1
0.65ha/1.62ac

Klondike Highway

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 3.DWG

Figure 7.0 - Option A-1

Infill Site #2 - 9 Lot Cul-de-sac (1.0ac Lots)

1:2000 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

Updated 21/04/14, 3:33 PM;By: SSTAFFORD

Klondike River

N

LOT 14
0.40ha/1.0ac

LOT 16
0.20ha/0.5ac

LOT 15
0.39ha/0.96ac

LOT 13
0.20ha/0.50ac

LOT 12
0.20ha/0.50ac

LOT 11
0.20ha/0.50ac

LOT 10
0.20ha/0.50ac

LOT 9
0.20ha/0.50ac

LOT 8
0.40ha/1.0ac

LOT 3
0.20ha/0.50ac

LOT 4
0.26ha/0.63ac

LOT 6
0.26ha/0.63ac

LOT 7
0.40ha/1.0ac

LOT 5
0.26ha/0.63ac

LOT 2
0.20ha/0.50ac

LOT 1
0.30ha/0.75ac

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

Klondike Highway

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 4.DWG

Figure 8.0 - Option B

Infill Site #2 - 16 Lot Cul-de-sac (Mixed sized lots)

1:2000 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

Updated 21/04/14, 3:34 PM;By: SSTAFFORD

Klondike River

N

LOT 14
0.40ha/1.0ac

LOT 16
0.20ha/0.5ac

LOT 15
0.39ha/0.96ac

LOT 13
0.20ha/0.50ac

LOT 12
0.20ha/0.50ac

LOT 11
0.20ha/0.50ac

LOT 10
0.20ha/0.50ac

LOT 9
0.20ha/0.50ac

LOT 8
0.23ha/0.57ac

LOT 3
0.20ha/0.50ac

LOT 4
0.30ha/0.75ac

LOT 5
0.30ha/0.75ac

LOT 6
0.26ha/0.64ac

LOT 7
0.40ha/1.0ac

LOT 2
0.20ha/0.50ac

LOT 1
0.30ha/0.75ac

Klondike Highway

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 5.DWG

Figure 9.0 - Option B-1

Infill Site #2 - 15 Lot Connector Roadway (Mixed Lots)

1:2000 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

Updated 21/04/14, 4:05 PM;By: SSTAFFORD

Klondike River

N

LOT 20
0.40ha/1.0ac

LOT 19
0.16ha/0.40ac

LOT 18
0.12ha/
0.30ac

LOT 17
0.12ha/
0.30ac

LOT 16
0.12ha/
0.30ac

LOT 15
0.12ha/
0.30ac

LOT 14
0.12ha/
0.30ac

LOT 13
0.12ha/
0.30ac

LOT 12
0.12ha/
0.30ac

LOT 11
0.40ha/1.0ac

LOT 22
0.20ha/0.5ac

LOT 21
0.39ha/0.96ac

LOT 5
0.12ha/0.30ac

LOT 4
0.12ha/0.30ac

LOT 6
0.33ha/
0.81ac

LOT 7
0.24ha/
0.58ac

LOT 8
0.20ha/
0.50ac

LOT 9
0.20ha/
0.50ac

LOT 10
0.30ha/0.75ac

LOT 3
0.12ha/0.30ac

LOT 2
0.12ha/0.30ac

LOT 1
0.12ha/0.30ac

Klondike Highway

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 6.DWG

Figure 10.0 - Option C

Infill Site #2 - 22 Lot Cul-de-sac (Mixed sized lots)

1:2000 — 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

Updated 21/04/14, 4:05 PM;By: SSTAFFORD

Klondike River

N

LOT 20
0.40ha/1.0ac

LOT 22
0.20ha/0.5ac

LOT 21
0.39ha/0.96ac

LOT 19
0.16ha/0.40ac

LOT 18
0.12ha/
0.30ac

LOT 17
0.12ha/
0.30ac

LOT 16
0.12ha/
0.30ac

LOT 15
0.12ha/
0.30ac

LOT 14
0.12ha/
0.30ac

LOT 13
0.12ha/
0.30ac

LOT 12
0.12ha/
0.30ac

LOT 11
0.23ha/
0.56ac

LOT 5
0.12ha/0.30ac

LOT 4
0.12ha/0.30ac

LOT 3
0.12ha/0.30ac

LOT 2
0.12ha/0.30ac

LOT 1
0.12ha/0.30ac

LOT 6
0.35ha/
0.86ac

LOT 7
0.20ha/
0.50ac

LOT 8
0.20ha/
0.50ac

LOT 9
0.20ha/
0.50ac

LOT 10
0.4ha/1.0ac

LEGEND:
- PLAN BOUNDARY
- DEMARCATION BOUNDARY
- INDUSTRIAL DEVELOPMENT
- STRUCTURAL DEVELOPMENT POCKET
- ROAD DEDICATION
- UNDEVELOPED LANDS

Klondike Highway

V:\1128\TEMPORARY\1128 DAW IND\DRAWING\NORTH SITE\FIGURE 7.DWG

Figure 11.0 - Option C-1

Infill Site #2 - 22 Lot Connector Roadway (Mixed Lots)

1:2000 0 20 60 100m

Prepared for:
Government of Yukon

DRAWN BY: SAS
CHECKED BY: GCL
SCALE: 1:2000
PROJECT #:

April, 2021

APPENDIX B – COSTING

Table 1 - Detailed Opinion of Probable Cost Infill Site 1

Item	Description	Quantity	Units	Unit Price	Extension
Schedule 1A - Dawson Industrial Site #1 (With Site Preparation)					
Part 1A.1 - General Requirements					
.1	Mobilization and Demobilization	1	LS	$ 25,479	$ 25,479
.2	Traffic Control	1	LS	$ 5,000	$ 5,000
.3	Utility Coordination	1	LS	$ 15,000	$ 15,000
.4	Survey & Layout	1	LS	$ 50,000	$ 50,000
				Part 1A.1 Subtotal	**$ 95,479**
Part 1A.2 - Road Improvements					
.1	Grubbing and Stripping, Tree Clearing, and chipping	2,593	sq.m.	$ 5	$ 11,667
.2	Rough Grading	2,593	sq.m.	$ 3	$ 7,778
.3	Subgrade Preparation	2,593	sq.m.	$ 3	$ 7,778
.4	Sub-base Material - 300mm of 80 mm minus pitrun	428	m3	$ 35	$ 14,984
.5	Base Material - 150mm of 20 mm minus crush	214	m3	$ 20	$ 4,281
				Part 1A.2 Subtotal	**$ 46,487**
Part 1A.3 - Site Preparation for Area A					
.1	Grubbing and Stripping, Tree Clearing, and chipping	2,914	sq.m.	$ 5	$ 13,112
.2	Rough Grading	2,914	sq.m.	$ 3	$ 8,741
.3	Subgrade Preparation	40	sq.m.	$ 3	$ 120
.4	Driveway Access - Sub-base Material 300 mm of 80 mm minus pitrun	12	m3	$ 35	$ 420
.5	Driveway Access - Sub-base Material 150 mm of 20 mm minus crush	6	m3	$ 20	$ 120
.6	Driveway Access - Culvert	7	l.m.	$ 45	$ 315
.7	Tailings Pond Fill - Pond #1 (west)	250	m3	$ 35	$ 8,733
.8	Tailings Pond Fill - Pond #2 (east)	363	m3	$ 35	$ 12,688
				Part 1A.3 Subtotal	**$ 44,248**
Part 1A.4 - Site Preparation for Area B					
.1	Grubbing and Stripping, Tree Clearing, and chipping	2,550	sq.m.	$ 5	$ 11,473
.2	Rough Grading	2,550	sq.m.	$ 3	$ 7,649
.3	Subgrade Preparation	40	sq.m.	$ 3	$ 120
.4	Driveway Access - Sub-base Material 300 mm of 80 mm minus pitrun	12	m3	$ 35	$ 420
.5	Driveway Access - Sub-base Material 150 mm of 20 mm minus crush	6	m3	$ 20	$ 120
.6	Driveway Access - Culvert	7	l.m.	$ 45	$ 315
.7	Tailings Pond Fill - Pond #3	231	m3	$ 35	$ 8,085
				Part 1A.4 Subtotal	**$ 28,181**
Part 1A.5 - Site Preparation for Area C					
.1	Grubbing and Stripping, Tree Clearing, and chipping	4,047	sq.m.	$ 5	$ 18,211
.2	Rough Grading	4,047	sq.m.	$ 3	$ 12,141
.3	Subgrade Preparation	40	sq.m.	$ 3	$ 120
.4	Driveway Access - Sub-base Material 300 mm of 80 mm minus pitrun	12	m3	$ 35	$ 420
.5	Driveway Access - Sub-base Material 150 mm of 20 mm minus crush	6	m3	$ 20	$ 120
.6	Driveway Access - Culvert	7	l.m.	$ 45	$ 315
				Part 1A.5 Subtotal	**$ 31,326**
Part 1A.6 - Site Preparation for Area D					
.1	Grubbing and Stripping, Tree Clearing, and chipping	4,047	sq.m.	$ 5	$ 18,211
.2	Rough Grading	4,047	sq.m.	$ 3	$ 12,141
.3	Subgrade Preparation	40	sq.m.	$ 3	$ 120
.4	Driveway Access - Sub-base Material 300 mm of 80 mm minus pitrun	12	m3	$ 35	$ 420
.5	Driveway Access - Sub-base Material 150 mm of 20 mm minus crush	6	m3	$ 20	$ 120
.6	Driveway Access - Culvert	7	l.m.	$ 45	$ 315
				Part 1A.6 Subtotal	**$ 31,326**
Part 1A.7 - Power					
.1	Single Phase Power	1	LS	$ 73,220	$ 73,220
				Part 1A.7 Subtotal	**$ 73,220**

SUMMARY OF SCHEDULE 1A		
Part 1A.1 - General Requirements		$ 95,479
Part 1A.2 - Road Improvements		$ 46,487
Part 1A.3 - Site Preparation for Area A		$ 44,248
Part 1A.4 - Site Preparation for Area B		$ 28,181
Part 1A.5 - Site Preparation for Area C		$ 31,326
Part 1A.6 - Site Preparation for Area D		$ 31,326
Part 1A.7 - Power		$ 73,220
SCHEDULE 1A SUBTOTAL		**$ 350,268**
Contingency	20%	**$ 70,054**
Engineering & Construction Management	10%	**$ 35,027**
SCHEDULE 1A TOTAL		**$ 455,349**

Table 3 - Detailed Opinion of Probable Cost Infill Site 2

Item	Description	Quantity	Units	Unit Price	Extension		
Schedule 2A - Dawson Industrial Site #2					9 Lot	16 Lot	22 Lot
Part 2A.1 - General Requirements							
.1	Mobilization and Demobilization	1	LS	$ 154,772	$ 154,772	$ 154,772	$ 154,772
.2	Traffic Control	1	LS	$ 5,000	$ 5,000	$ 5,000	$ 5,000
.3	Utility Coordination	1	LS	$ 20,000	$ 20,000	$ 20,000	$ 20,000
.4	Survey & Layout	1	LS	$ 100,000	$ 100,000	$ 100,000	$ 100,000
				Part 2A.1 Subtotal	**$ 279,772**	**$ 279,772**	**$ 279,772**
Part 2A.2 - Baseline Costs							
.1	Road Improvements	1	LS	$ 156,886	$ 156,886	$ 156,886	$ 156,886
.2	Site Prep for All Lot Configuration (Grubbing, Stripping, Rough Grading)	1	LS	$ 146,598	$ 146,598	$ 146,598	$ 146,598
.3	Backfill Tailings Ponds	1	LS	$ 424,078	$ 424,078	$ 424,078	$ 424,078
.4	Water Main	1	LS	$ 252,500	$ 252,500	$ 252,500	$ 252,500
.5	Sanitary Main	1	LS	$ 145,500	$ 145,500	$ 145,500	$ 145,500
				Part 2A.2 Subtotal	**$ 1,125,561**	**$ 1,125,561**	**$ 1,125,561**
Part 2A.3 - Per Lot Costs							
.1	Drive Access (one per lot)	1	LS	$ 975	$ 8,775	$ 15,600	$ 21,450
.2	Water Service Per Lot	1	LS	$ 8,715	$ 78,435	$ 139,440	$ 191,730
.3	Sanitary Service Per Lot	1	LS	$ 3,300	$ 29,700	$ 52,800	$ 72,600
.4	Power Per Lot (power cost is not directly related to number of lots)	1	LS	$ 15000-10000	$ 135,000	$ 180,000	$ 225,000
				Part 1A.3 Subtotal Per Lot	**$ 251,910**	**$ 387,840**	**$ 510,780**

SUMMARY OF SCHEDULE 2A			Number of Lots:	9	16	22
Part 2A.1 - General Requirements				$ 279,772	$ 279,772	$ 279,772
Part 2A.2 - Baseline Costs				$ 1,125,561	$ 1,125,561	$ 1,125,561
Part 2A.3 - Per for lots				$ 251,910	$ 387,840	$ 510,780
SCHEDULE 2A SUBTOTAL				**$ 1,502,471**	**$ 1,793,173**	**$ 1,916,113**
Contingency	20%			**$ 300,494**	**$ 327,680**	**$ 352,268**
Engineering & Construction Management	10%			**$ 150,247**	**$ 163,840**	**$ 176,134**
SCHEDULE 2A TOTAL				**$ 2,107,984**	**$ 2,284,693**	**$ 2,444,515**

Design with
community in mind