PROPERTY OPPORTUNITY NOTICE

Municipality: Kamloops

Street Address of Site: 515, 523 and 527 Columbia St

Posted: June 24, 2024

Submission Deadline: November 20, 2024

BC Builds homes for people

BRITISH COLUMBIA StrongerBC BC HOUSING

Supported in partnership by the Province of British Columbia and BC Housing.

Overview

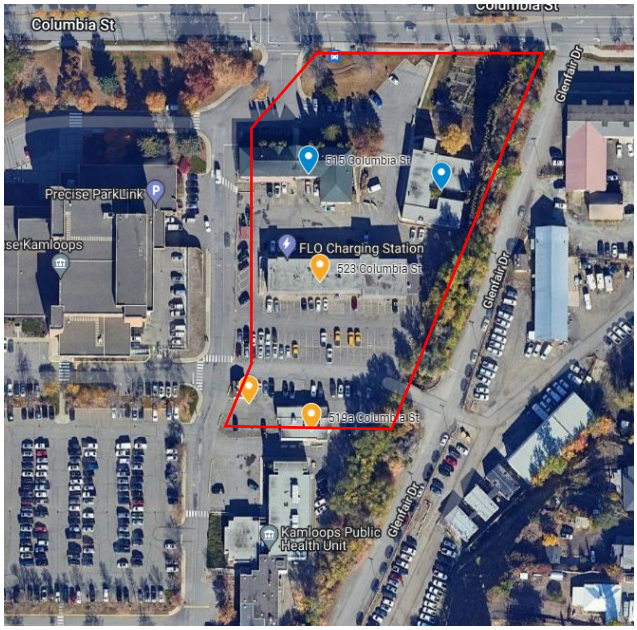
BC Builds is a rental housing program for middle income households. These are households earning a range of $84,780 to $131,950 per year for couples with no children for a studio or one-bedroom apartment and $134,410 to $191,910 per year for couples with children, needing a two bedroom or larger home. The aim of the program is to provide housing within these ranges and to help achieve this goal, BC Builds can provide:

- Low-cost construction financing for buildings that are owned and operated by for-profit and non-profit developers and First Nations development corporations.
- Direct access to CMHC construction financing with up to a 50-year amortization for buildings owned and operated by non-profit and private developers, as approved by CMHC.
- Access to low-cost take-out financing with a 35-year amortization for buildings not approved for 50-year amortization.
- Grants of up to $225,000 per unit for buildings owned and operated by co-operative or non-profit developers and First Nations controlled development corporations, with the goal of having at least 20% of the units at 20% below market rents. Where grants are provided, below market rents will be secured in a range of ways including a forgivable mortgage, housing agreement, section 219 covenant, or operating agreement.

Please refer to the BC Builds Rental Supply Program Framework for full program details before submitting your proposal.

Site Context

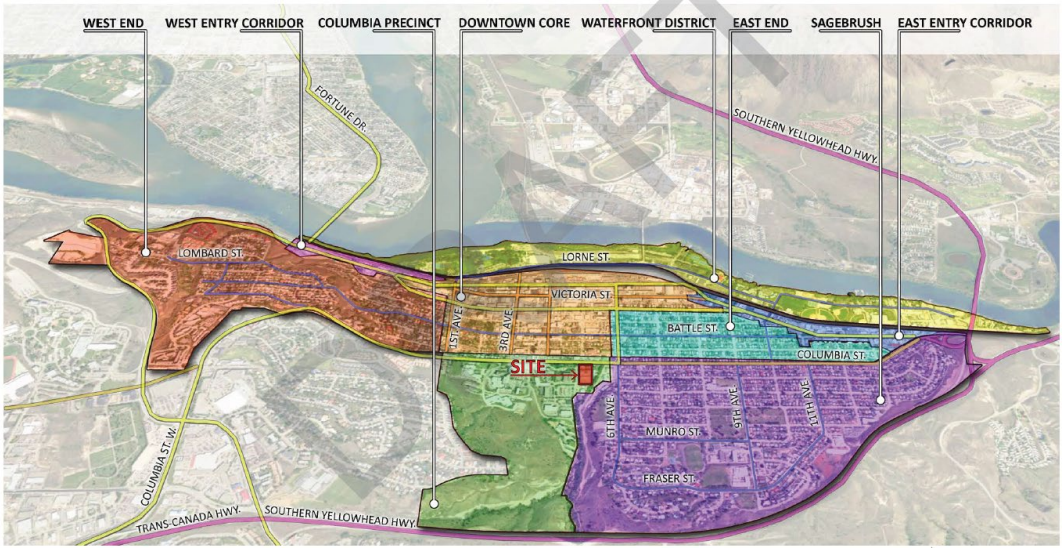
Satellite Map



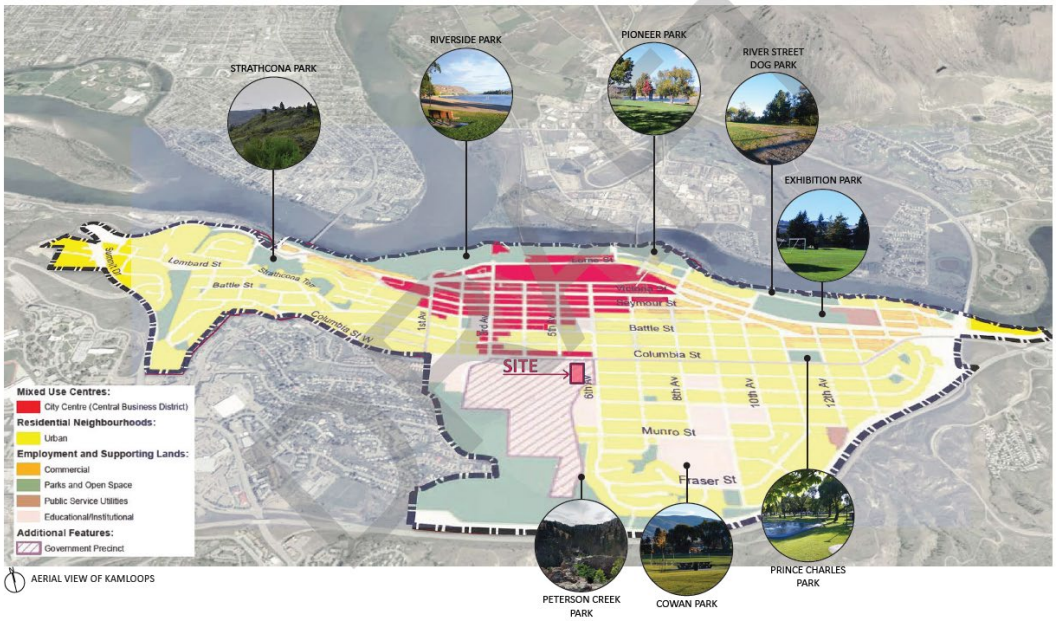
The Site is currently comprised of one lot with three government buildings and a fourth building that straddles the southern property line. It has been owned by the provincial government since 1959. Internal drive aisles and surface parking areas occupy portions of the Site between the buildings. The Site is +/- 3.5 acres and is situated at a prominent entrance of the Government Precinct along Columbia Street. There is a +/- 7m grade change from the SW to the NE corner of the Site. Given the Site's prominent location within the Government Precinct and its interface with Columbia Street and the Central Business District, development will play a key role in reinforcing and defining this important Site. The Site is otherwise surrounded by Peterson Creek to the east and government buildings and surface parking.

Area Plan Map

The Columbia Precinct is a provincially owned and managed site in the City of Kamloops (CoK). The site is attractive for its central location downtown and next to a regional hospital, convenient access to nature trails and multi-modal connections to Peterson Creek Park, on top of its notable redevelopment potential. The CoK recognized the site's development potential in its 2019 Downtown Plan, naming it as a "Big Move" site that can help the CoK realize its vision for a vibrant downtown.



The Downtown Plan area contains some of Kamloops' most densely populated neighbourhoods, with a diversity of commercial, institutional, park, and residential land uses ranging from 100-year-old single-family homes to 10-storey office towers that are organized around a traditional urban street grid. Economic activity in the plan area consists of restaurants, retail, office, health care facilities, and arts and entertainment venues. The area also features several City parks, recreational facilities, and designated heritage resources.



Parcel Identification (PID)	009-697-543
Registered Owner	Ministry of Citizens' Services
Civic Address	515, 527 and 523 Columbia Street, Kamloops
Lot Area (Size)	1.42 Ha approx.
Lot Frontage	5th Ave frontage: 152.4m (future road dedication proposed) Columbia St frontage: 100m
Site Servicing	Sewer, Storm, Hydro, Tel, Water
Links to relevant planning policies (OCP, Local Area Plan, other relevant documents)	Official Community Plan (KAMPLAN) | City of Kamloops 2019.12.17_downtownplan_final.pdf (kamloops.ca)

Property Details

Please enter N/A for fields that don't apply to your site.

Zoning	P4 (Public and Institutional Use)

Permitted Use Within Zoning (only relevant uses highlighted in correlation to the program's funding)	(a) Assembly Use (b) Assisted Living Residence (c) Cemetery, including accessory crematorium, mausoleum, and chapel (d) Child development centre (e) Community Care Facility (f) Cultural Facility (g) Education/Training Facility (h) Funeral home (i) Government building, including Office, storage, and maintenance facilities (j) Hospital, convalescent home, and rest home (k) Hostel (l) Municipal facilities, including fire hall, police station, swimming pool, community centre, and convention centre (m) Seniors Housing (n) Seniors Housing, Independent or Light Care (o) Utility installation and storage reservoir (p) Utility compound, including necessary Office Use and storage and maintenance facility Accessory Uses (a) Food Truck or Trailer (b) Licensed Lounge or club (c) Mobile Food Concession (d) Personal Services (e) Restaurant or Café, or food service Permitted Uses - Site Specific: (c)Multi-Family Residential in the case of the Columbia Precinct, as shown in the 2019 Downtown Plan
Permitted Height and Density	Height Requirements listed in the Downtown plan: #9 page 49: Require a building height impact assessment to determine shadow impacts and encroachment into public view corridors for buildings that exceed six storeys.
Applicable Development Permit Controls	Downtown and Multi-Family Development Permit Areas and Building Permit

Current Use	Institutional
Surrounding Use	Institutional/ City Center Commercial
Environmental features (stream, creek, grades, soils etc)	Adjacent to a Riparian Area ESA1 has been conducted Feb 2024 and determined a clean site.
Any easements or restrictive covenants on title	Title review conducted by the project's council found a few SROW's in favour of the city primarily for road, infrastructure maintenance and creek culvert works. Two easements are registered on title that allow for Lot B to have access to the SRW areas for maintenance and repair over the easement area. There are no legal notations or charges on the title to the Property that would adversely impact the marketability of the Property, nor would they adversely impact the ongoing use of the Property for residential purposes.
Community engagement requirements or expectations	n/a
Amenity/Bonusing Requirements	Standard P4 zoning regulations apply
Sustainability/Energy Requirements (for anything beyond BC Building Code)	n/a
Accessibility Requirements (for anything beyond BC Building Code)	n/a

Applicant Type

Please indicate which of these apply to your site. ***Please check all that apply****:*

☒ Seeking a developer ***and also*** a housing owner/operator and willing to enter into a long-term lease (60 – 99 years) with successful proponent with a land cost of $10.

☐ Seeking a developer ***and also*** a housing owner/operator and willing to dispose of land to successful proponent at $10.

☐ Seeking ***only*** a developer/builder to provide a turn-key building to an operator you've preselected.

☒ Owner/operator ***must be*** a non-profit society, co-op or First Nations development corporation.

☐ Owner/operator ***must be*** a private developer.

☐ Owner/operator can be either a non-profit society, co-op or First Nations development corporation or a private developer.

Building Owner/Operator

If you have already selected an owner and operator for the building, please provide the owner/operator name here.

Additional Property Information

- BC Builds engaged Faction Projects to prepare a feasibility study for this property to determine that it is a viable BC Builds project. The feasibility is attached as an Appendix.
- **Please note** applicants should submit proposals that reflect **Option 2 "The Preferred Option"** in the feasibility study in terms of building placement, as this site configuration has been requested by the Ministry of Attorney General to ensure adequate space between the residential buildings and the Provincial Courthouse. Please see pages 27-28, and 30-32 for details on Option 2 / "The Preferred Option."
- Other than the placement of the buildings, applicants are encouraged to use the evaluation criteria below to bring forward competitive proposals rather than simply relying on the information (eg cost per square foot, BC Builds grant per unit, unit mix, etc) in the feasibility study.
- A geotechnical study was also conducted as part of the feasibility study. The geotechnical analysis will be posted as an UPDATE to this Property Opportunity Notice in early July.
- $250,000 has been spent to develop the project feasibility study and should also be included in the proforma.

- The site is currently owned by the Ministry of Citizens' Services (CITZ). The site will be transferred from the CITZ to the Provincial Rental Housing Commission (PRHC) which will hold the long-term land lease (60-99 years) with the successful applicant on a nominal ($) basis.
- There are four buildings on the property: 515 and 527 Columbia Street (Phase 1) and 523 and 519a (Phase 2). 515 and 527 Columbia will be demolished in the summer of 2024 to make way for Phase 1. The estimated gross capital cost of this demolition is $1.8M for all 4 buildings in 2024 dollars. Even though some of the demolition work will be complete by the time a successful proponent is selected, this cost *should be included in the project's proforma (demo and abatement was included in the project budget in the feasibility study).*
- 523 and 519a are in use by CITZ client ministries and the local health authority and will need to be demolished by the successful proponent as part of Phase 2, subject to CITZ relocating existing tenants.
- This Property Opportunity Notice is for both Phase 1 and Phase 2 of the project. The successful proponent will own and operate both buildings. Phase 1 should start construction in 2025. Phase 2 should start construction following the successful relocation of CITZ tenants in 2027.
- Both buildings will have a mix of residential above provincial government office space. CITZ will use CBRE as property manager for office space. The office space will be leased to CITZ at rates still to be determined based on current market rates at building completion. For the purposes of developing a proforma for this project, please assume a competitive market commercial rent necessary to cover the shell construction costs of the office area and required surface parking.
- During the preconstruction period and the construction period, the successful applicant will work closely with BC Builds and with CITZ and its client ministries to ensure a continuous flow of information is provided to those who work in the area.
- The site is adjacent to a Provincial Courthouse. The successful proponent will work with CITZ and the Ministry of Attorney General on a noise mitigation plan for construction to ensure that the Courthouse operations are not negatively impacted by the housing construction.

Eligibility and Evaluation Criteria

General information

- Successful projects must break ground within 12 -18 months (depending on the complexity of the project) of the successful proponent receiving a Conditional Land Contribution Letter following the completion of the evaluation period.
- The land must be used to create new housing for middle income families as defined in the BC Builds Rental Supply Program Framework.
- Eligible projects must be primarily residential but can include ground floor commercial and/or community uses and/or childcare with the non-residential components not to exceed 30% of floor area or cost.
- Land will be leased at nominal value by the landowner to the successful applicant on 60- to 99-year basis or disposed of at nominal value. Please see individual Property Opportunity Notices for details.

Equity requirements

"Equity" for the purposes of this application is defined as the financial contribution that an applicant is making to the project.

Proposals from private market developers that provide more below market units at a greater percentage below market will be given priority. To achieve this, an equity contribution will likely be required from private developers. Sites seeking a developer/builder only to provide development management services for a turnkey building to a non-profit, co-op or municipal/regional housing corporation are exempt from this equity requirement.

For non-profit and co-operative developers and First Nations controlled development corporations intending to own and operate buildings, there is no equity contribution required during the proposal submission process. However, these proponents are eligible to access capital grants of up to $225,000 per unit. Applicants may bring additional equity or equity partners to the proposal to increase affordability. Proposals from non-profits, co-operatives and First Nations development corporation that require a lower grant per unit amount while still achieving at least 20% of the units at least 20% below market will be given priority.

Eligibility Criteria

All proposals will be assessed first to determine qualification based on these eligibility criteria. Proposals that qualify will then be assessed according to the evaluation criteria below.

Eligible Applicant

Applicant must:

- Be registered and in good standing with the BC Corporate Registry or partner with a business or organization that is.
- Have previous property development and property management experience or engage professional third-party consultants or property management company.
- Have a plan for construction and operations that's financially viable.
- Meet equity requirements. See below.

Target Household Incomes

Project targets households in BC Builds income ranges with rents that don't require households in this range to spend more than 30% of their income on rent: $84,780 to $131,950 per year for couples with no children for a studio or one-bedroom apartment and $134,410 to $191,910 per year for couples with children, needing a two bedroom or larger home. *See evaluation criteria and evaluation matrix below for information about how this will be scored for applicants that are deemed eligible.*

Property Management (Applies only to properties where a housing owner/operator is being sought): Applicants must have a minimum of five (5) years property management experience. In lieu of property management experience, applicants may hire or partner with a professional third-party property management firm or organization to help build their organization's capacity over the first five years of operation.

Real Estate Development Experience: Applicants must have successfully completed a similar project on time and within budget. Alternatively, applicants may hire or partner with a third-party developer who has experience building similar projects and/or assemble a design and construction consultant team to carry out the project.

Evaluation Criteria

Proposals received during the submission period will be ranked in comparison to other proposals. More specifically, the following criteria will be used to evaluate, rank, and determine a proposal's overall strength and level of project suitability. Please see scoring matrix below.

Financial Viability and Sustainability: The project is feasible and viable, both through capital financial assembly and ongoing operating pro-forma, as well as the project environment (geotechnical, environmental, site constraints etc.) Projects must demonstrate a means to be financially sustainable without an ongoing operating subsidy from BC Builds (BC Housing). All potential funding sources must be disclosed, including the potential to apply for financing and grant funding through BC Builds, together with details of the intended funding strategy and any supporting documentation. If the building will require an ongoing operating subsidy, the applicant must provide information about how they would provide that subsidy to the project and demonstrate how that will be in place over the life of the building.

Household incomes and rents: BC Builds targets middle-income households, with income thresholds for eligibility set at the middle-income Limits which are defined as follows:

> *Units with fewer than two bedrooms:* Middle-income households are those whose gross household income does not exceed the 75th income percentile for families without children, as determined by BC Housing from time to time. The current range of middle-income households that are the target of the BC Builds program is $84,780 to $131,950.
>
> *Units with two or more bedrooms:* Middle-income households are those whose gross household income does not exceed the 75th income percentile for families with children, as determined by BC Housing from time to time. The current range of middle-income households that are the target of the BC Builds program is $134,410 to $191,910.
>
> For projects involving a mix of unit sizes, the corresponding income threshold will be applied to each unit type.

Priority will be given to projects that target household incomes as low as possible in these income ranges while still maintaining project viability without the need for ongoing operating subsidy from BC Builds.

Rents must be suitable for middle income households, as defined above.

Projects with non-profit partners, public housing corporations or First Nations-controlled development corporations receiving capital grants of up to $225K/unit:

- Units must target eligible households for a minimum of thirty-five (35) years
- Include minimum of 20% of units rented at 20% below market for a minimum of thirty-five (35) years.

Projects with private developers:

- Units must target eligible households for a minimum of ten (10) years

The rent structure will vary depending on the characteristics of the project and whether or not funding from other partners is layered into the project. All units in the development must be rented at or below market as determined by an appraisal of current market rents in the community, and at rents suitable for eligible households considering the location and average household income for the area but must not exceed 30% of the Middle-Income Limits in effect at time of occupancy and at unit turnover.

Speed to Market: How rapidly does the proposed timeline bring new homes to market? How realistic is the proposed timeline? Processes to speed up the development and construction timelines and innovative construction methods will be given priority.

Environmental Sustainability Considerations: Projects must be built to the BC Building Code. Priority will be given to projects that can provide additional environmental sustainability benefits while maintaining project viability.

Accessibility Considerations: Projects must be built to the BC Building Code. Priority will be given to projects that can provide additional accessibility benefits while maintaining project viability.

Unit Mix Considerations: No requirement for a particular unit mix, but priority will be given to projects that provide two- three- and four-bedroom units while maintaining project viability and staying below the per unit maximum grant amount of $225,000 for co-operative and non-profit developers and First Nations controlled development corporations.

Equity Contribution: For private developers, does the proposed equity contribution help deliver more below market units at a greater percentage below market? For non-profit and co-operative developers and First Nations controlled development corporations, what is the lowest grant amount per unit required (up to a maximum of $225,000) to achieve at least 20% of the units at a minimum of 20% below market?

Scoring Matrix

Mandatory Requirements
Eligible Applicant
Meets Target Household Incomes
Demonstrated Property Management Experience (if seeking operator)
Demonstrated Development Experience
Ranked Criteria (Overall Weighting)
Financial Viability & Sustainability (20%)
Amount of per-unit grant required (15%)
Percentage of units at 20% below market (15%)
Target Household Incomes (15%)
Speed to Market (15%)
Financial Equity Contribution (5%)
Unit Mix (5%)
Additional Accessibility Benefits (5%)
Additional Sustainability Benefits (5%)

How to Apply and Proposal Submission Requirements

1. Review detailed property information, criteria and deadlines in this Property Opportunity Notice.
2. Attend an optional Property Information for this opportunity. Please see the property listings web page for times and dates.
3. Contact BC Builds info@bcbuildshomes.ca if you have any questions about a Property Opportunity Notice. Please do not contact landowners directly. Doing so will result in immediate disqualification from the application process.
4. Review the BC Builds Rental Supply Framework.
5. Applicants can present their submission in the form and format of their choice, with the option of using this capital and operating budget template. A development schedule and typical schematic design that includes drawings and site concept plan including massing, renderings, basic floor plans, and an indication of how the building(s) is located on the property is expected as part of the proposal submission. Total submission should include no more than 20 type-written pages. In addition to the type-written pages, schematic design that includes drawings and site concept plan including massing, renderings, basic floor plans etc may be added.
6. Letters of reference can be submitted to demonstrate experience in delivery of similar projects.
7. Proposals must be sent to info@bcbuildshomes.ca on or before the due date listed in the Property Opportunity Notice.

How long it takes

It should take several weeks (goal of 4 to 6 weeks) for BC Builds to review your project proposal and let you know if your proposal is approved. The successful proponent will be required to sign a Conditional Land Contribution agreement between the proponent, BC Builds and the landowner which lays out a 12-to-18-month timeline to securing funding, financing, Development Permit, Building permit and begin construction and a shared and collaborative approach to meeting or exceeding this timeline.

Cost

There is no cost to apply.

Additional Information

This PON is available to projects that meet and/or exceed the minimum requirements as outlined in the above criteria. Verification of project details and evaluation will determine whether a project is selected. Simply meeting the minimum requirements will not guarantee that a proposal will be selected. Applicants are responsible to provide sufficient documentation that will verify compliance with the eligibility requirements.

Note that BC Builds will consider all proposals but is under no obligation to approve any application and move forward with the PON if, in BC Builds' opinion, no suitable submissions are received.

Disclaimer

The PON is a non-binding document. BC Builds does not make any representation or provide any undertaking to prospective respondents other than to invite them to submit a proposal. This PON does not oblige BC Builds to negotiate or execute an agreement with any prospective respondents, not to grant rights of any sort to any prospective respondents and, BC Builds shall incur no liability to any prospective respondent as a result of responding this PON.

BC Builds will not be liable for, nor will it reimburse any prospective respondent for costs incurred in the preparation, submission or presentation of any proposal, for interview or any other activity that may be requested as part of the PON process.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – October 22 2024

Q1: We note that in the addendum issued on August 8, 2024, answer A3 notes that only architectural renderings are required to be included in the submission. Please confirm whether a complete design package as noted in item 5 of "How to Apply and Proposal Submission Requirements" is required (*"typical schematic design that includes drawings and site concept plan including massing, renderings, basic floor plans, and an indication of how the building(s) is located on the property is expected as part of the proposal submission").*

A1: Thanks for an opportunity clarify. The direction in the Property Opportunity Notice is correct: A development schedule and typical schematic design that includes drawings and site concept plan including massing, renderings, basic floor plans, and an indication of how the building(s) is located on the property is expected as part of the proposal submission. Total submission should include no more than 20 type-written pages. In addition to the type-written pages, schematic design that includes drawings and site concept plan including massing, renderings, basic floor plans etc may be added." In our answer on August 8th we took "other consultants" to mean structural, civil etc. but should have referred back to the Property Opportunity Notice for clarity.

Q2: We are looking how we can get in touch with a housing operator that would be aligned with BC Builds / Housing's Requirements for the BC Builds opportunities in the interior.

A2: Builders/developers looking for a non-profit owner-operator to partner with could do up a 1–2 page Expression of Interest (EOI) seeking non-profits interested, having them respond with background of their organization, existing portfolio, how delivering market rental attainable housing fits within their portfolio and growth plans. Good partnerships are values aligned ones, and that could come through in this format. The developer then selects a couple to explore further conversation with. The BC Non-Profit Housing Association (BCNPHA) can send out the EOI through their Housing Updates or directly to non-profits in the select geographic area. (communications@bcnpha.ca)

Another suggestion is to check out the Rental Protection Fund page with prequalified non-profits: https://rentalprotectionfund.ca/pre-qualified-non-profits. These are all non-profits who have been vetted for capacity, have an interest in delivering market rental housing and

have plans for growth, so it's a good starting point. What is not captured in this approach is finding those non-profits with an interest in new development that don't have an interest in acquisition. The EOI approach suggested above accommodates for that.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – September 5 2024.

Q1: Can you advise if the contractor will require bonding for this project.

A1: BC Builds has the ability to waive the necessity for bonding and does not usually require the contractor to have bonding but has certain requirements that need to be met including vetting a list of the subtrades involved in a project, executing a cost overrun agreement, and including security by guarantors/covenantors.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – August 30 2024.

Q1: We recalled for the 377 Tranquille road opportunity notice, and over the info session meeting, the city was seeking the unit mix comprising 60% bachelor/one bed units, 20% two bed units and 20% three bed units. However, in this opportunity in line with the HOUSING NEEDS ASSESSMENT FINAL REPORT released in October 2020, the targeted mix is a quite different, and seeking almost 60% three & four bed units and just 11% bachelor/ one bed units. could you please give us more clarification why such a dramatic difference is in place regarding these two areas?

A1: The 377 Tranquille Road opportunity notice was following the unit mix as suggested by the Housing Target Guidelines issued by the Ministry of Housing in support of Housing Supply Act Legislation. The 523 Columbia Street opportunity is targeted towards providing attainable housing for middle-income residents such as teachers, nurses, transit operators, construction workers and others that are more likely to require a dwelling with more than two bedrooms.

Q2: With respect to option B (Preferred Option), the design is seeking 85 parking variances for the development of both phases. Given the property is located in the "Reduced Parking Area" as per the Figure 19 in subsection 4.7.1 of Kamloops Zoning bylaw, and knowing the rate of $20,000 per parking space for lots within the Reduced Parking Area should be paid for the parking variances according to subsection 4.8.1 of Kamloops Zoning bylaw, Please confirm that this requirement will apply to this opportunity and the respective cost should be reflected in the proforma.

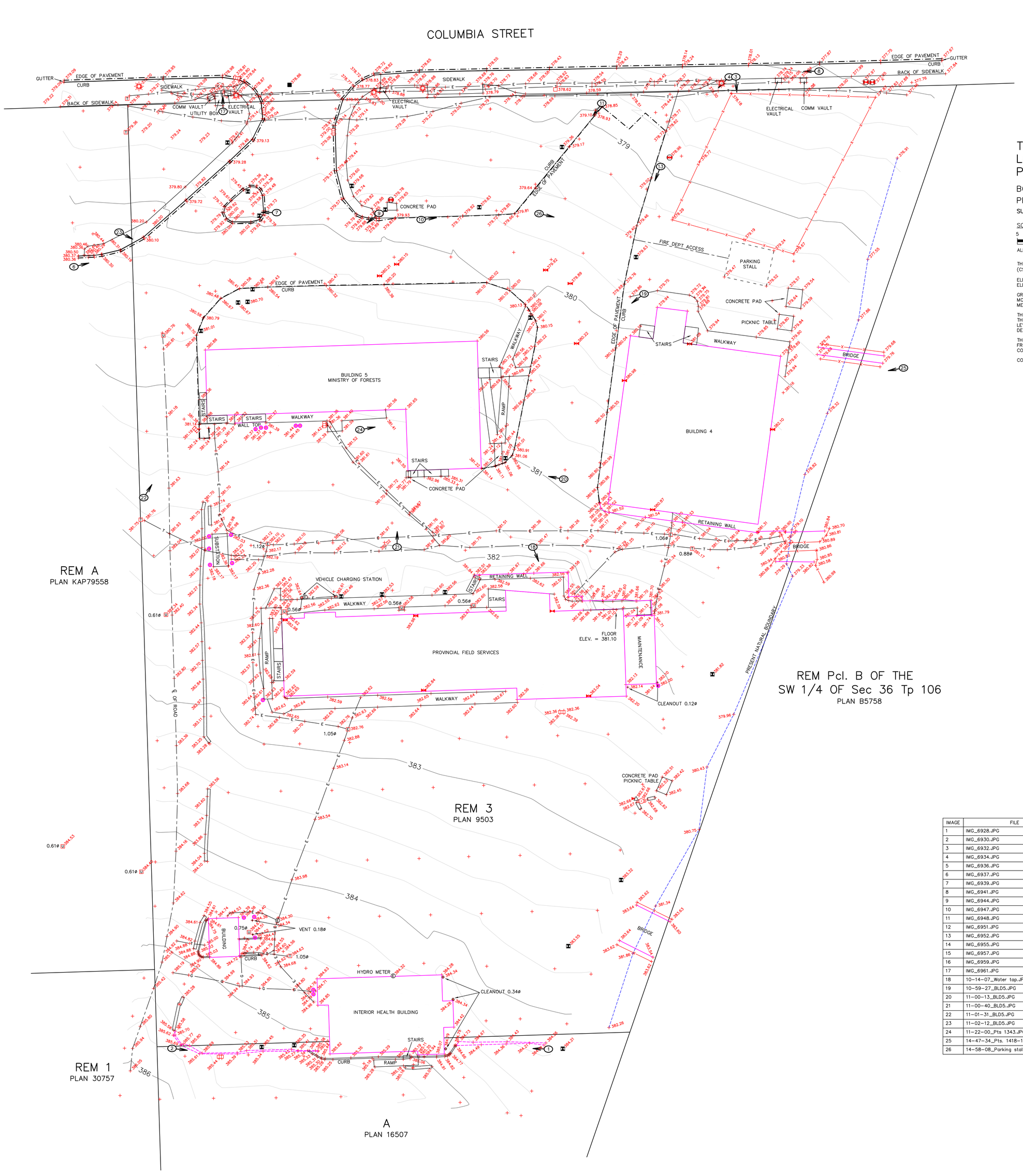
A2: Standard parking requirements apply in accordance with the City Center reduced parking area. This includes the Cash in Lieu Parking Reductions. Therefore, any proposed cash in lieu of parking payment should be included in the proforma.

Q3: If the proponent is looking for increasing the height of the buildings (even partially) to the maximum allowable of 40 m, we are wondering what restrictions in terms of shadowing will apply to the design, specifically in Columbia Street? Please clarify.

A3: Mid-rise or tall buildings may require a shadow impact study to demonstrate that shadows do not exceed a one-hour duration on the rear yards, decks, patios and pools of adjacent residential properties on the summer solstice and autumn equinox. A roof design should avoid casting shadows on neighbouring residential properties with the use of massing cut-outs and building contouring.

Q4: Will BC Builds provide us with the survey plans? it would be greatly helpful to examine other options for site context.

A4: A survey is included on the following page. Also please note in terms of site context, proponents should submit proposals for Option B which is the preferred option of the Ministry of Attorney General the closest neighbour to the project.



TOPOGRAPHICAL SURVEY OF
LOT 3 Sec 36 Tp 106 KDYD
PLAN 9503 EXCEPT PLAN EPP55218

BCGS 92 I 069

PREPARED FOR: BC HOUSING DEVELOPMENT SERVICES

SURVEY DATE: FEBRUARY 22–24, 2024

SCALE 1:250

5 0 5 10m

ALL DISTANCES AND ELEVATIONS ARE IN METRES

THIS PLAN LIES WITHIN INTEGRATED SURVEY AREA No. 23, CITY OF KAMLOOPS NAD83 (CSRS) 4.0.0.BC.1.

ELEVATIONS ARE BASED UPON GEODETIC CONTROL MONUMENT 819029 (MARKED 77H6639) ELEVATION = 389.19

GRID BEARINGS ARE DERIVED FROM OBSERVATIONS BETWEEN GEODETIC CONTROL MONUMENTS MARKED 77H6639 AND 77H6519 AND ARE REFERRED TO THE CENTRAL MERIDIAN OF UTM ZONE 10.

THIS PLAN SHOWS HORIZONTAL GROUND LEVEL DISTANCES IN METRES AND DECIMALS THEREOF UNLESS OTHERWISE SPECIFIED. TO COMPUTE GRID DISTANCES, MULTIPLY GROUND LEVEL DISTANCES BY THE AVERAGE COMBINED FACTOR OF 0.99997999 WHICH HAS BEEN DERIVED FROM GEODETIC CONTROL MONUMENTS MARKED 77H6639 AND 77H6519.

THE UTM COORDINATES AND ESTIMATED ABSOLUTE ACCURACY ACHIEVED ARE DERIVED FROM THE MASCOT PUBLISHED COORDINATES AND STANDARD DEVIATIONS FOR GEODETIC CONTROL MONUMENTS MARKED 77H6639 AND 77H6519.

CONTOUR INTERVAL = 0.25 m

IMAGE	FILE
1	IMG_6928.JPG
2	IMG_6930.JPG
3	IMG_6932.JPG
4	IMG_6934.JPG
5	IMG_6936.JPG
6	IMG_6937.JPG
7	IMG_6939.JPG
8	IMG_6941.JPG
9	IMG_6944.JPG
10	IMG_6947.JPG
11	IMG_6948.JPG
12	IMG_6951.JPG
13	IMG_6952.JPG
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18	10-14-07_Water tap.JPG
19	10-59-27_BLD5.JPG
20	11-00-13_BLD5.JPG
21	11-00-40_BLD5.JPG
22	11-01-31_BLD5.JPG
23	11-02-12_BLD5.JPG
24	11-22-00_Pts 1343.JPG
25	14-47-34_Pts. 1418-1421.JPG
26	14-58-08_Parking stall 1434-1437.JPG

LEGEND

- SIGN POST
- CONTROL POINT (SPIKE)
- WATER VALVE
- IRRIGATION JUNCTION
- FIRE HYDRANT
- LAMP STANDARD
- STORM SEWER MANHOLE
- UNKNOWN SEWER MANHOLE
- TELECOMMUNICATIONS MANHOLE
- ELECTRICAL MANHOLE
- SANITARY SEWER MANHOLE
- CATCH BASIN
- ELECTRICAL JUNCTION
- BOLLARD
- NO POST
- XXX.XX SPOT ELEVATION
- IMAGE REFERENCE POINT
- EDGE OF PAVEMENT
- GUTTER
- TOP OF CURB
- BACK OF SIDEWALK
- ℄ OF ROAD
- BREAK-LINE
- FENCE LINE
- PRESENT NATURAL BOUNDARY
- RETAINING WALL
- E ELECTRICAL LINE
- T COMMUNICATIONS LINE
- G GAS LINE

LEGAL LINES ARE SUBJECT TO SURVEY

NOTE:
THE AUTOCAD DRAWING FILE IS ONLY CERTIFIED IN ITS ORIGINAL FORMAT. (DATED February 28, 2024)

CAD FILE: T07161-TOPO.DWG (Feb 28/24)

UNDERHILL & UNDERHILL
PROFESSIONAL LAND SURVEYORS
201-925 McMASTER WAY
KAMLOOPS, B.C. V2C 6K2
TEL. (250) 372-8835

THIS PLAN LIES WITHIN THE THOMPSON-NICOLA REGIONAL DISTRICT

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – August 27 2024.

Q1: Have any Hazardous Material Assessments been completed for the buildings to be demolished? Has demolition commenced?

A1: Hazardous Material Assessments have been completed. Demolition of the first two buildings (517 Columbia and 521 Columbia) is underway to make way for Phase 1 of the project and should be completed this fall.

Q2: Will BC Builds be providing any pre-development funds (either loan or grant) for the pre-construction phase?

A2: BC Builds can provide low-cost predevelopment funds in the form of a low-cost loan for the pre-construction phase subject to receiving a detailed PDF budget.

Q3: Just to clarify, will the selected builder and operator be for both Phase 1 and 2? Or will there be another call for Phase 2?

A3: This Property Opportunity Notice is seeking a developer/builder and owner/operator for both Phase 1 and Phase 2. There will not be another call for Phase 2.

Q4: In the feasibility study, it indicates offsite costs associated with the redevelopment of the Glenfair Retirement Community. Could we get further detail on what these costs/upgrades are expected to be? (table at bottom right of page 23).

A4: Road improvements as well as sewer, storm and electricity upgrades. Please refer to the feasibility study for the costing.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – August 21 2024.

Q1: In the question about the offsite services, we were instructed to carry 46% of the $17million (I Imagine over phases A and B). However, in the proforma for the project, it only allocates $5,2 Million over the two projects. Can you please clarify and also clarify how much we should allocate to each phase?

A1: The $17M was a conservative estimate in the case the Creekside project would be responsible for all civil upgrades in the area. $5.2 for offsites is the estimated amount from the project's civil study and is the best number to continue to use as it pertains to the Creekside project. Allocate 90% of all offsite work to phase 1.

Q2: Can you also clarify how much each phase of the project the demolition and feasibility study should get allocated? Would it be a 50/50 split?

A2: 50/50 is logical

Q3: It has come to our attention that the exterior parking area in the project will have to be a suspended slab with parking below in order to meet the city of Kamloops parking by law. Can you clarify whether we should alter our proposal to include that budget amount? Are you able to include a cost amount for this to ensure all applicants are working apples to apples?

A3: We do not have any costing outside of the current proforma. Details of the design and future build will be worked out with the selected partner and budget refinement is expected to be a natural evolution of the project's progression

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – August 8 2024.

Q1: We would like to know if you want separate budgets for phase one and two, and how you would like them broken up if you do?

A1: We would like separate budgets for phase one and two. A separate capital and operating budget spreadsheet for each phase would be acceptable. Please see the budget template linked from the Property Opportunity Notice and the Housing Development Opportunities page.

Q2: Can you also clarify if the reference letters are included in the 20-page limit for submissions?

A2: Letters of reference can be in addition to the 20-page type-written submission.

Q3: We would also like to clarify that you only need architectural renderings for the submission and no schematic plans from any other consultant disciplines.

A3: This is correct, only architectural renderings are necessary that show the buildings and also the buildings in the site context.

Addition to PON – A geotechnical report for the site has also been appended to the Property Opportunity Notice. It follows the Feasibility Study.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – July 30 2024.

Q1: We would like to know if the applicant is to build the civil costs (over $17 million) into the proforma?

A1: Assume that the Creekside project will bear 1/3 of the civil costs, as other projects are being developed in the vicinity, they likely will carry elements of the civil infrastructure upgrades. That said as an extra contingency the Creekside project should carry a contingency of an additional 13% to cover a potential 46% of the civil costs.

Q2: We would also like to know how the BC Hydro costs and archeological costs are to be incorporated into the proforma.

A2: RG: Design costs for BC Hydro and the costs of Archeological studies are also to be included as project cost. BC Hydro design costs and connection fees are a typical project cost for any new redevelopment. The Archeological costs are of minimal impact to the overall project budget. They are currently estimated to be 20k inclusive of AIA and AOA scopes of work.

ADDENDUM TO PROPERTY OPPORTUNITY NOTICE – July 12 2024
Clarified response to a question asked and partially answered partially during the info session.

Q: Who is responsible for the loan guarantee during construction and what is the amount required for the loan guarantee?

A: This project will be structured as a long-term lease between the non-profit owner-operator and the Provincial Rental Housing Commission (PRHC), which is BC Housing's land-owning entity. A lease will be signed between the PRHC and the successful non-profit owner-operator before the construction loan is disbursed. Therefore, the construction loan will be made to the non-profit owner-operator who will be the borrower. BC Housing backs the non-profit loans and no loan guarantee from the developer-builder is necessary.

NB this is not a forward-sale of a turn-key building from a developer-builder to a non-profit as the non-profit will be the land lease holder. The developer-builder should build their project management / construction management fees into the proposal proforma rather than assume profit from the sale of the building.

Appendix A

Feasibility Analysis (Phase 1)

523 Columbia Street

Kamloops, BC **June 2024**

FACTION

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523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC June 2024

1.0 Introduction

BC Housing ("BCH") was established as an agency of the Province of British Columbia in 1967 to manage provincial and federal-provincial housing and property. In all its programs and activities, it is accountable to the provincial ministry responsible for housing. The Provincial Rental Housing Corporation ('PRHC') is the land holding corporation for provincially owned social housing. BCH administers PRHC, which buys, holds and disposes of properties, and leases residential properties to non-profit societies and co-operatives. 523 Columbia Street (the 'Site'), is a unique property located west of Peterson Creek, at the north end of the Columbia Government Precinct which is owned by the Ministry of Citizens' Services ('CITZ'). The approximately 3.9-acre property is located in an urban area with convenient access to Columbia Street. The Site is currently underutilized and is occupied by four existing government buildings that are aging and need of extensive and costly repairs. BCH and CITZ are working together to facilitate redevelopment of the Site, CITZ will be transferring the Site to the PRHC and will receive new office space on the Site as it is redeveloped under the BC Builds program. BC Builds is a housing program, delivered by BC Housing, to speed up the development of new homes for middle-income working people throughout British Columbia.

Over the years there have been significant efforts from non-profit agencies, the City of Kamloops ('CoK'), and local businesses impacted by housing shortages to encourage new development of rental housing stock. These efforts have been ongoing for nearly a decade and have had positive impacts but have not kept pace with the ever-increasing demand. It is well known that there are housing gaps in Kamloops. BCH is committed to the construction of new rental housing as a significant step toward addressing Kamloops' housing needs. The CoK, BCH, and CITZ created a Steering Committee to facilitate a redevelopment concept that will help address the current rental housing shortage by adding to Kamloops' housing inventory and targeting specific segments of the housing continuum identified in their Housing Needs Assessment. BCH will redevelop the Site to make a positive difference in people's lives and the broader community through safe, affordable, and quality housing. The redevelopment will reflect BCH's commitment to high professional standards, leading sustainable solutions, and strong relationships and partnerships. Key to creating healthy and inclusive communities is the availability of a variety of housing options to meet the differing needs of current and future residents. Providing access to a range of housing forms, including affordable and accessible housing, is becoming an ever-increasing priority for many communities across the province, including the City of Kamloops. The Site is currently zoned P4 - Public and Institutional Uses which can accommodate an inviting form of development that will have a significant positive impact on the community's rental housing.

In the winter of 2024, BCH contracted Faction Projects Inc. ('FPI') as the Lead Development Consultant to assist BCH with developing a comprehensive land use plan for the future use of the Site. This report is a summary of the Phase 1 Feasibility Analysis which has been focused on the viability of redeveloping the Site. BCH has indicated that Phase 2 will not proceed as originally planned and that the project will be posted as a Development Opportunity by BC Builds.

The Concepts included in this report were developed with Steering Committee input. The Steering Committee believes the proposed Concept would meet the needs of the targeted population and the local community in general. Housing type / unit allocations, site density, parking, transportation, utility services, and Kamloop's unique qualities as a leader in sustainable living were all considered while developing the Concept.

Kamloops is situated on the traditional lands of the Tk'emlúps te Secwépemc ('TteS') within Secwepemcúl'ecw, the traditional and unceded territory of the Secwépemc People. Tk'emlúps, which means "where the rivers meet" which refers to the convergence of the North and South Thompson Rivers, has been an important centre of trade routes for centuries. The Secwépemc developed a unique culture that was totally self-sufficient pre-European contact through the seasonal use of natural resources. As we face the challenges of climate change together, we have the opportunity to learn from traditional ecological knowledge to understand local climate impacts and foster sustainable ways of living that have long been practised on these lands. This redevelopment project provides the opportunity to replace aging buildings and infrastructure and to offer additional affordable and modern housing units to help address the housing challenges facing the Kamloops community. BCH will continue to own the Site following redevelopment and will need to consider how to best move forward with an operational partner.

Steering Committee

BC HOUSING

FACTION

BRITISH COLUMBIA

Kamloops

Canada's Tournament Capital

FACTION INC

WSP

2.0 Planning Framework

2.1 Policy Context

2.1.1 Official Community Plan

The Site is currently designated Educational / Institutional and lies within the Government Precinct as outlined in the Official Community Plan (OCP). The purpose of this Future Land Use designation is to 'provide for services to the community, including schools; universities; correctional facilities; hospitals; fire halls; cemeteries; major government, cultural, or recreational facilities; community centres; and places for religious assembly'. As such, the OCP doesn't outwardly signal that multi-family residential development is appropriate for the Site but it does note that 'in the event that government agencies relocate from this area, the City will consider opportunities to redevelop these lands for a mix of commercial and residential uses'. As noted in Section 2.1.2 of this report, the City recently introduced additional residential uses to the P4 zone, specifically for the Government Precinct, which is a clear indication that the City is supportive of the Government Precinct redeveloping to include residential uses. Relevant OCP Policies considered while framing this project are as follows:

Housing Diversity - Increase the diversity of housing types to create inclusive and complete neighbourhoods

- In the event that government offices relocate from the Government Precinct lands, consider opportunities for commercial, residential, and mixed-use redevelopment of the area.

Housing for Vulnerable Populations - Provide a range of housing options for persons with disabilities, seniors, low-income individuals and families, and those who require ongoing supports

- Encourage housing options that incorporate universal design features and provide ease of access and mobility for seniors and persons with disabilities.
- Ensure that supportive housing, subsidized housing, and community care facilities are located within the Core Sector or within, or adjacent to, the major neighbourhood centres to (a) enable access to services and facilities required for daily living, and (b) allow for individuals and families that require supports to be integrated into the social fabric of the community.

Natural Environment - Maintain, restore, and enhance the city's natural environment and biodiversity

- Connect neighbourhoods, where possible, with new and existing multi-use pathways and trails that provide linkages to mixed-use centres, neighbourhood centres, and parks and recreation areas via a greenways network, which can help preserve natural biodiversity and facilitate the safe movement of wildlife.

Walking - Be a pedestrian -friendly community with networks that integrate with transit, neighbourhood amenities, parks, open space, and schools

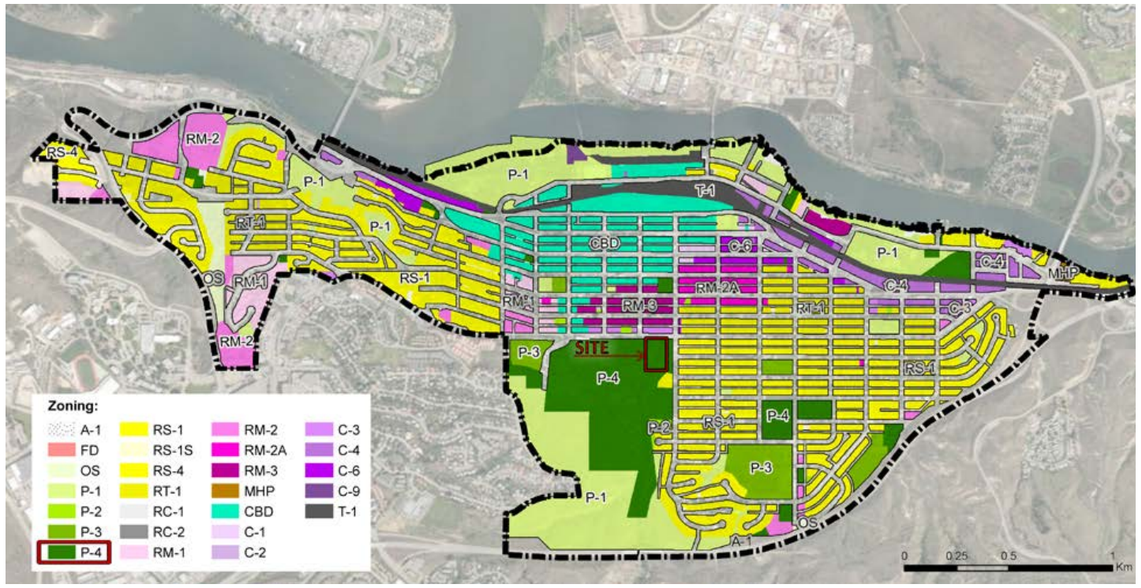
- Increase the safety and accessibility of sidewalks and pathways by improving the design of new streets and retrofitting existing streets as they are replaced or upgraded.

Although the Educational / Institutional Future Land Use designation doesn't explicitly promote residential forms of development, an Official Community Plan amendment will not be required as the existing P4 zone does allow for residential development of a scale that meets BCH's expectations.

Development Permit Areas

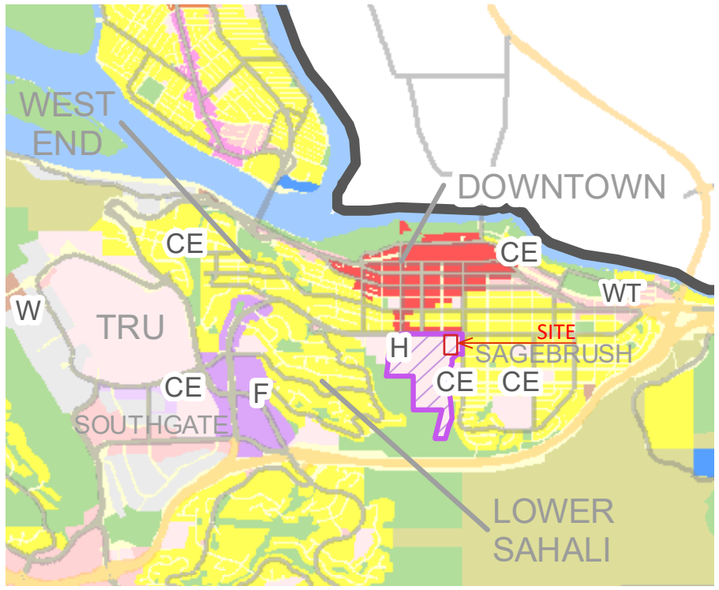
Redevelopment of the Site will require a Riparian Areas Regulation Development Permit due to its location within 30 meters of Peterson Creek. A form and character Development Permit will also be required as the Site is located within the Downtown Development Permit Area and the proposed development will be a Multi-family residential form of development.

2.1.2 Zoning & Future Land Use



N **SOURCE: CITY OF KAMLOOPS - ZONING MAP AND PROVISIONS**

The Site is currently zoned P4 - Public and Institutional Uses and the Zoning bylaw was recently updated to include a broader array of housing uses in the P4 zone, a rezoning application will not be required as the P4 zone can accommodate residential and mixed use forms of development. The P4 zone also permits ancillary commercial uses that could include personal or food services.



N **SOURCE: OFFICIAL COMMUNITY PLAN - 2021** **N.T.S.**

The Site is currently designated Educational / Institutional and lies within the Government Precinct as outlined the Official Community Plan (OCP). The purpose of this Future Land Use designation is to 'provide for services to the community, including schools; universities; correctional facilities; hospitals; fire halls; cemeteries; major government, cultural, or recreational facilities; community centres; and places for religious assembly'.

KAMPLAN

Map 1,
Land Use

Mixed Use Centres:
- City Centre (Central Business District)
- North Shore Town Centre
- Tranquille Market Corridor
- McGill Corridor
- Sahali Town Centre

Residential Neighbourhoods:
- Urban
- Suburban
- Rural

Employment and Supporting Lands:
- Agricultural
- Commercial
- Light Industrial
- Medium and Heavy Industrial
- Sand/Gravel Extraction
- Parks and Open Space
- Golf Course
- Public Service Utilities
- Educational/Institutional
- Airport

Future Development Areas:
- Future Industrial Development Area
- Future Development Area

Additional Features:
- City of Kamloops Boundary
- Tk'emlúps te Secwépemc
- Growth Management Boundary
- Government Precinct
- Agricultural Land Reserve
- Lakes and Rivers
- Controlled Access Highways
- Major Roads

A - Airport
F - Firehall
L - Landfill
W - Works Yard
CE - Cemetery
H - Hospital
ST - Sewage Treatment Plant
WT - Water Treatment Plant

N

2.1.3 Downtown Plan

The Downtown Plan notes that the Site is located in the Downtown Area to the south of the Central Business District. The Columbia Precinct is described in the Downtown Plan as a key redevelopment site that will be a catalyst for the area.

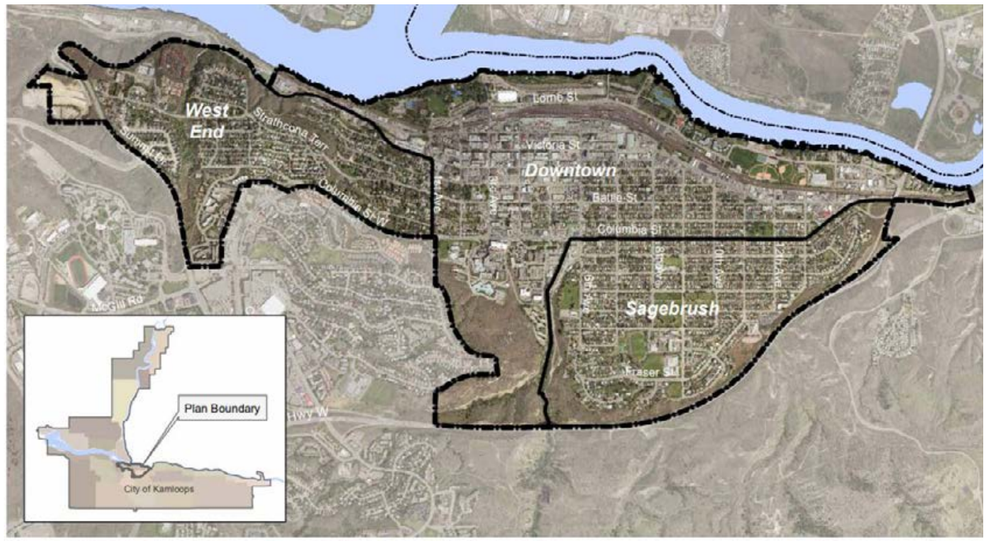
Columbia Precinct Character Area
The Columbia Precinct is a large tract of Crown land located to the south of the Downtown Core that contains a mix of provincial government offices, social housing, and some of the city's largest government institutions, including Royal Inland Hospital and the Kamloops provincial courthouse. As the precinct contains large vacant and underutilized areas, there are opportunities to work with the Province to explore redevelopment for uses including residential, commercial, and institutional. Redevelopment should also aim to enhance the natural features of Peterson Creek, which runs through the precinct; provide a higher-profile gateway for Peterson Creek Park to the south; and enhance the area's active transportation network. The implementation of the objectives and policies in this section will require collaboration, partnership, and agreement between the City and the Province.

The Columbia Precinct **Objectives** that are relevant to the redevelopment of the Site are noted below:

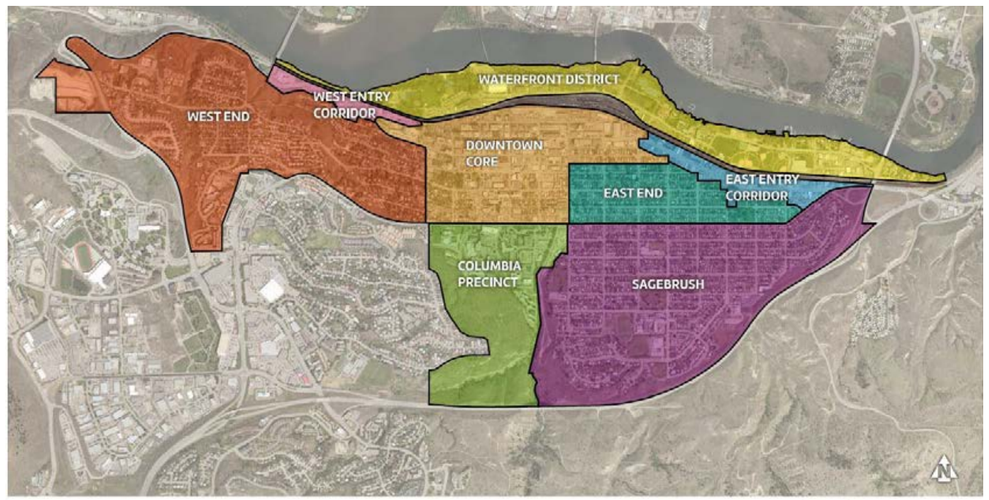
- To collaborate with the Province in the review and update of the Columbia Street Precinct Master Plan (2008) and ensure alignment with the vision, goals, objectives, and policies of this plan.
- To provide a mix of housing, including market and affordable units, to respond to community needs.
- To support small-scale commercial amenities that provide retail sales or limited service functions for residents of the surrounding neighbourhood.
- To incorporate Peterson Creek into the Site in a manner that protects and enhances its natural ecosystem in accordance with the provincial Riparian Areas Protection Regulation while providing a greenway and trail corridor for pedestrians and cyclists.
- To provide a safe and convenient on-site walking and cycling experience, with internal pathways and connections to transit and the City's active transportation network.

The Columbia Precinct **Policies** that are relevant to the redevelopment of the Site are noted below:

- Economic Activity - Support the redevelopment of the Columbia Precinct based on a highest and best use analysis, which should consider institutional and commercial office, retail, and multi-family residential uses that contribute to the vitality and economic health of the area.
- Residential Development - Support redevelopment of existing provincially-owned social housing to higher densities, provided that tenants who are displaced are offered accessible subsidized units on other sites in the plan area during the redevelopment process and offered first opportunity for accessible subsidized units in new social housing developed onsite.
- Height Requirements - Require a building height impact assessment to determine shadow impacts and encroachment into public view corridors for buildings that exceed six storeys.
- Transportation and Connectivity - Allow for continuation of the Xget'tem' Trail (Peterson Creek multi-use pathway) through the Site and toward a connection with the future 5th Avenue bicycle lane.
- Transportation and Connectivity -Encourage a greenway and trail corridor adjacent to the Peterson Creek riparian setback area with path lighting, sitting areas, and way finding signage
- Public Realm - Retain public view corridors of the valley landscape and mountains to the north throughout the Site.
- Parks & Public Places - Maintain riparian setback areas from Peterson Creek in compliance with the provincial Riparian Areas Protection Regulation and the results of riparian assessments conducted through the master plan update process.



Plan Area and Neighbourhood Boundaries



Downtown Plan Character Areas

2.1.4 Community Climate Action Plan

The CoK is committed to building a healthy and sustainable community. A place with clean air and pristine drinking water where residents can walk, bike, or roll to access their daily needs; where wildlife and nature thrive; where local food systems provide nourishment; and where secure, green jobs support a vibrant local economy. The CoK has identified '8 Big Moves' as the foundation for their strategies that will have the biggest impact towards achieving their goal of an 80% emissions reduction by 2050. This project will help the CoK move towards it's targets by creating a community that pushes the boundaries on the following Big Moves:

Low Carbon Development (Big Move 1)
How and where new development occurs is one of the most important determining factors that influence a community's carbon emissions. Low-density residential development located far from a city's core results in higher emissions due to greater car use and environmental impacts from land clearing, habitat fragmentation, and creating impervious surfaces. By 2050, 90% of residents can access their daily needs and efficient transit within a 10-minute walk or roll.

Car-Light Community (Big Move 2)
In 2017, 66% of Kamloops' greenhouse gas (GHG) emissions came from transportation, with the majority (49%) coming from passenger vehicles. By 2050, 50% of trips in Kamloops are to TARGET be by active transportation and transit.

Zero-Carbon Homes & Buildings (Big Move 4)
Buildings account for 29% of GHG emissions in Kamloops and are the second largest source after transportation. Homes have been growing in size, with residential energy consumption increasing concurrently in recent decades. All new homes and buildings in the community will be net-zero energy ready by 2030 and zero carbon by 2040. Retrofitting 2% of existing dwelling units per year to achieve, on average, 50% GHG emissions reductions per unit.

Healthy Urban Ecosystems (Big Move 8)
An ecosystem is a community of living organisms, such as plants, animals, and microbes, that interact with one another and with non-living components of their environment, such as air, water and minerals. Healthy ecosystems can help address climate change by sequestering carbon (e.g. in the leaves of trees and the roots and soil of native grasslands). To enhance and restore urban ecosystem health to improve carbon storage capacity and resilience to climate change.

Source: Kamloops Community Climate Action Plan

2.1.5 Kamloops Housing Needs Assessment

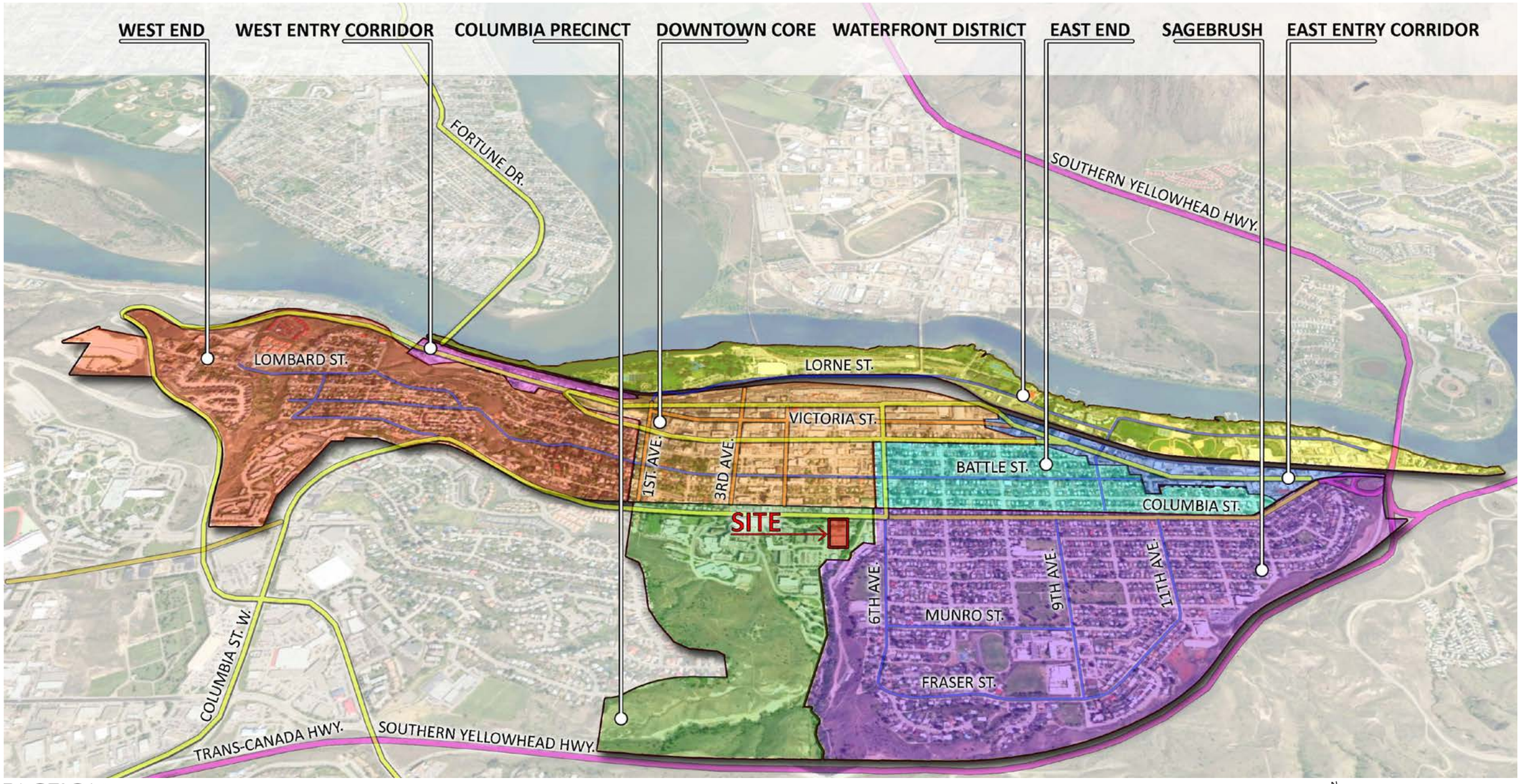
Key to creating healthy and inclusive communities is the availability of a variety of housing options to meet the differing needs of current and future residents. Providing access to a range of housing forms, including affordable and accessible housing is becoming an ever-increasing priority. The CoK's Housing Needs Assessment (August 2020) points to a number of key trends and issues facing Kamloops. In addition to the analysis of current need, the Housing Needs Assessment also points to future needs across the housing spectrum. The results of the Housing Needs Assessment show that, as a high-level estimate, anticipated future housing needs vary across different types and tenures of housing.

Housing Need Category	Specific Need	2020-2024 (~Units Needed)	2025-2029 (~Units Needed)	2030-2039 (~Units Needed)
Unit Size	Bachelor	20	15	30
	1-Bedroom	360	340	625
	2-Bedroom	895	820	1,370
	3-Bedroom	1,040	935	1,560
	4-Bedroom	1,005	945	1,725
Tenure	Ownership	2,555	2,400	4,160
	Rental	760	655	1,160
Affordable	Ownership	1,300	1,220	2,120
	Rental	655	650	995
People with Disabilities	Accessible	450	430	770
	Housing with Supports (Mental Illness and Addictions)	30-75	30-70	50-125
	Housing with Supports (Intellectual Disabilities)	25-30	25-30	45-50
Specific Populations	Indigenous Peoples	335	460	1,075
	Seniors	2,550	2,375	2,325
	Families	940	905	1,640

Source: Kamloops House Needs Assessment Consultant Projections

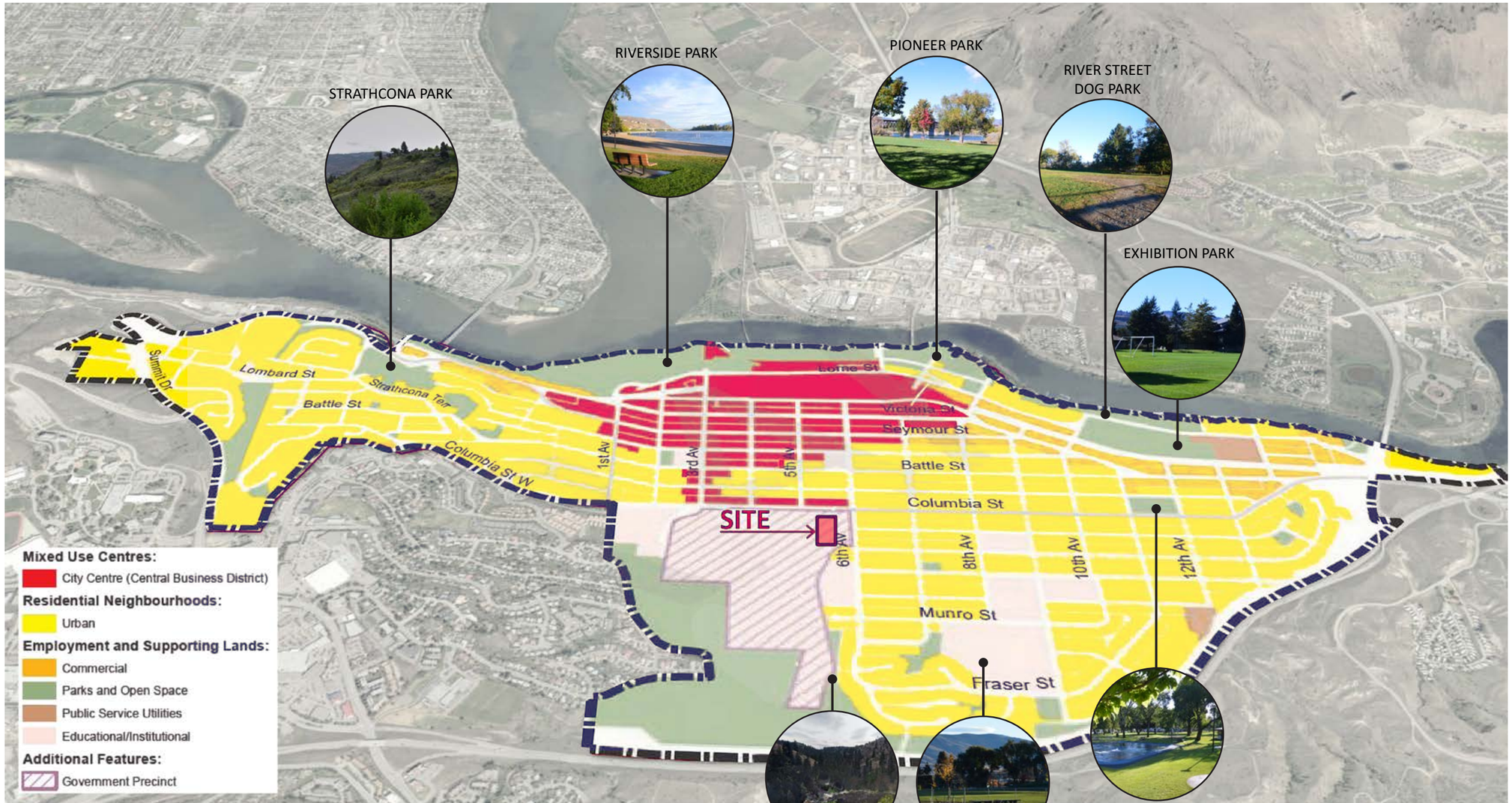
2.2 Community Context

The Columbia Precinct is a provincially owned and managed site in Kamloops that is attractive for its central location downtown and next to the hospital, convenient access to nature trails and multi-modal connections in Peterson Creek Park, and notable redevelopment potential. The CoK recognizes this development potential in its 2019 Downtown Plan, naming it as a “Big Move” site that can help the CoK realize its vision for a vibrant downtown.



AERIAL VIEW OF KAMLOOPS

The Downtown Plan area contains some of Kamloops' most densely populated neighbourhoods, with a diversity of commercial, institutional, park, and residential land uses ranging from 100-year-old single-family homes to 10-storey office towers that are organized around a traditional urban street grid. Economic activity in the plan area consists of restaurants, retail, office, health care facilities, and arts and entertainment venues. The area also features several City parks, recreational facilities, and designated heritage resources.



AERIAL VIEW OF KAMLOOPS

2.3 Neighbourhood Context

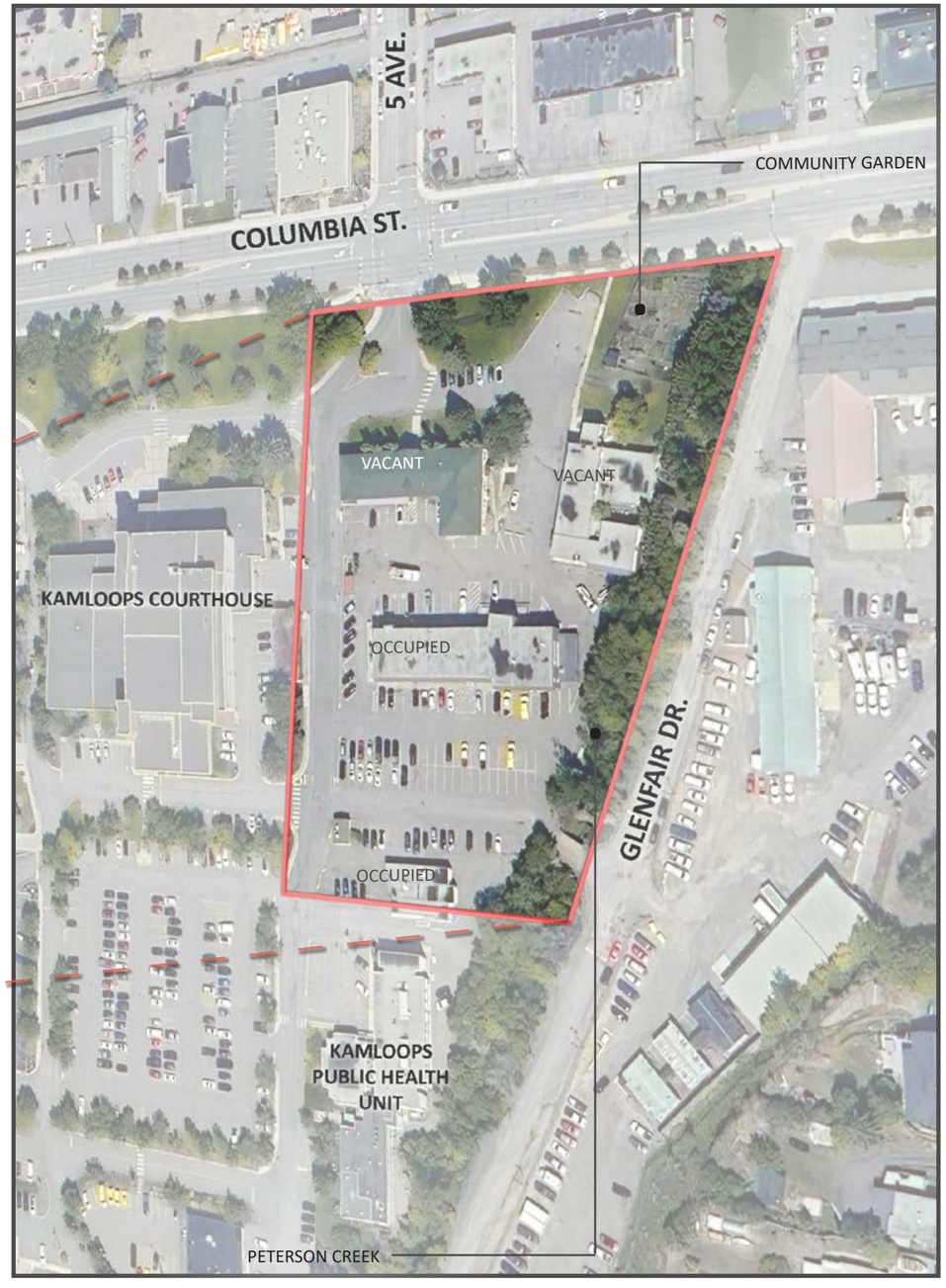
2.3.1 Site Description

The Site is currently comprised of one lot with three government buildings and a fourth building that straddles the southern property line. It has been owned by the provincial government since 1959. Internal drive aisles and surface parking areas occupy portions of the Site between the buildings. The Site is +/- 3.9 acres and is situated at the front door of the Government Precinct along Columbia Street. There is a +/- 7m grade change from the SW to the NE corner of the Site.

2.3.2 Urban Form

Given the Site's prominent location within the Government Precinct and its interface with Columbia Street and the Central Business District, development will play a key role in reinforcing and defining this important Site. The Site is otherwise surrounded by Peterson Creek to the east and government buildings and surface parking.

N
SITE CONTEXT
N.T.S.



N
SITE LOCATION
N.T.S.

2.3.3 Site Context

Existing Site Photos Keyplan N.T.S

A North Entry - View South

B East Bridge Access - View West

C South Entry - View North

D West Lane - View East

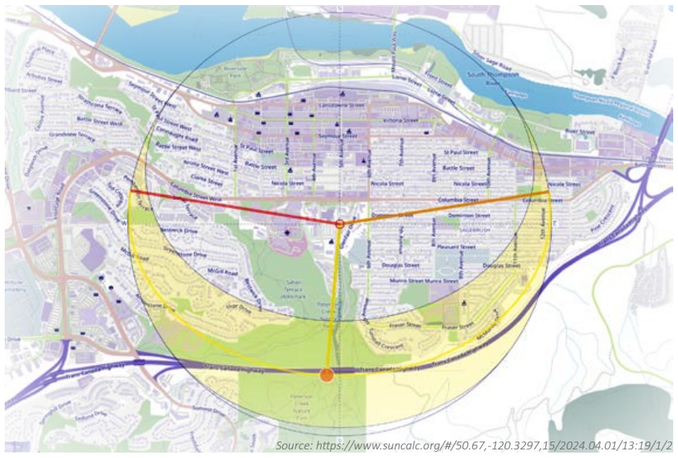
E Northeast Corner - View South

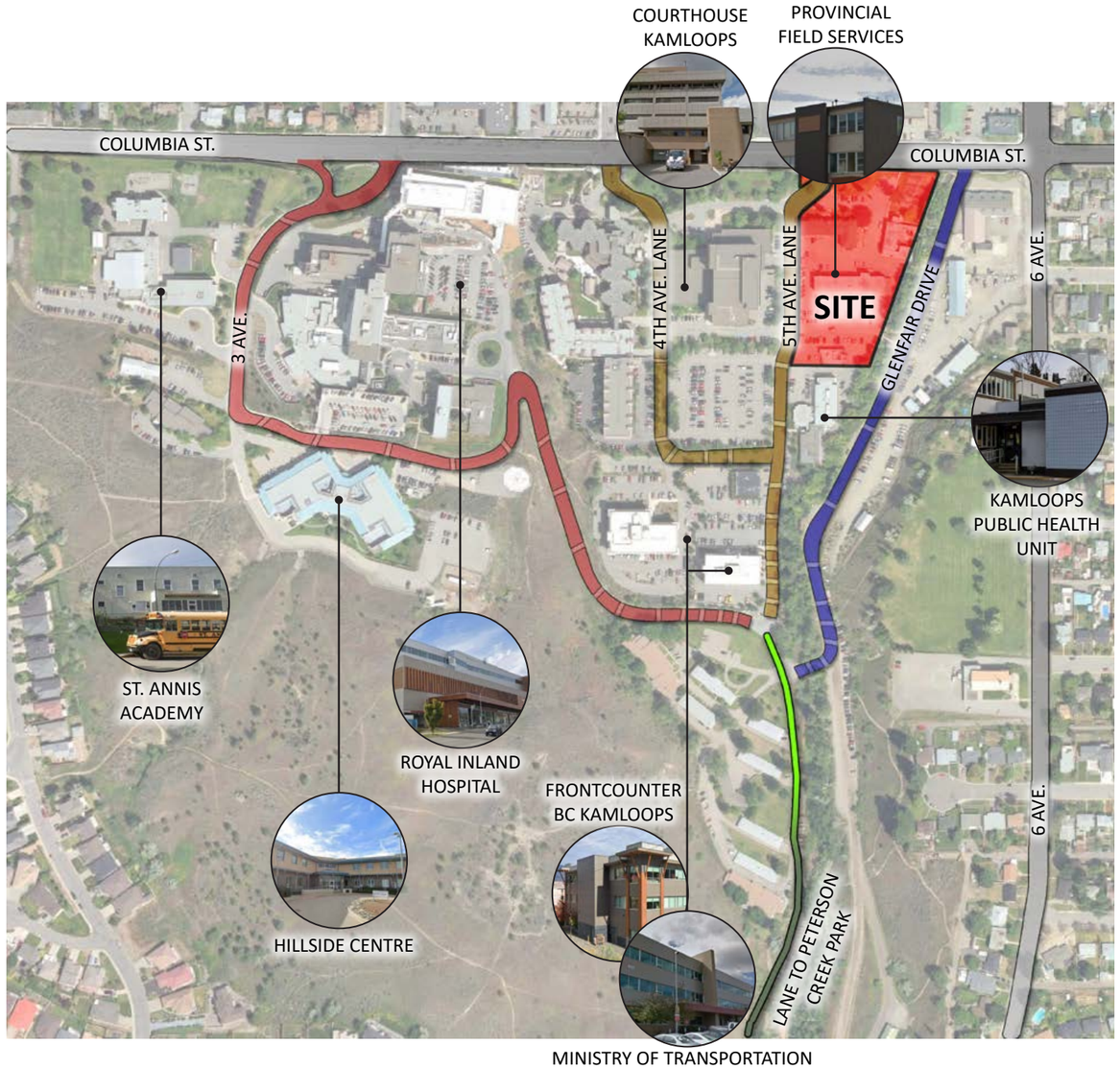
2.3.4 Circulation

The Site has legal road frontage along Columbia Street, the main access through Government Precinct is from the informal 5th Avenue extension. The precinct's primary vehicle access is its northern boundary at the Columbia Street & 5th Avenue intersection which leads into the primary north-south internal road running through the Precinct. Two additional vehicle accesses are located on Columbia Street & 4th Avenue and Glenfair Drive, and another access is to the southwest connecting to the Royal Inland Hospital (RIH). People travelling actively can also enter the Site from the south via the Peterson Creek Multi-Use Path ('MUP') which was recently built by the CoK.

2.3.5 Solar Orientation

Although beneficial during the winter, undesirable heat gain from low afternoon solar exposure during the summer months will need to be considered in the final form of development. The implications of these solar orientation factors are important considerations in determining the form and architectural expression of the proposed development.





2.3.6 Streetscape Views

3.0 Site Analysis

3.1 Survey & Title

A detailed site survey was completed to better understand the Site's existing conditions. The survey is attached as Appendix I. There are a few encumbrances registered on title; there are two statutory right of ways ('SRW') (KX161995 & CA2665786) that provide the City access to and use of a portion of the Site for the purposes of constructing, operating, and maintaining various City and 3rd party utilities. The detailed site survey is attached as Appendix I.

Peterson Creek

3.2 Geotechnical Assessment

Once complete, the detailed results of the geotechnical investigation including discussion and recommendations for development of the Site are to be added to the Feasibility Study and will be attached as Appendix II.

3.3 Riparian Areas Assessment

PGL Environmental Consultants visited the Site on January 15, 2024, to assess the portion of Site located along the east bank of Peterson Creek. The focus of the field survey was to assess the creek's biophysical characteristics and determine the Special Protection and Enhancement Area ('SPEA'). The stream was observed to be well-defined and had distinct banks on either side and the stream appeared to be in its natural state for most of the length of the Site. There was no evidence of floodplain mobility observed beyond the high-water mark. While flooding beyond the channel at this location may occur occasionally during conditions greater than the one-in-five-levels, it is not expected to ever flow over the channel top of bank. It was determined that adjacent to the Site the Peterson Creek Channel Width is 2.2m and the SPEA is 10m. The full assessment has been submitted to Ministry of Water, Land and Resource Stewardship is attached as Appendix III.

3.4 Arboricultural Assessment

A tree assessment was completed to better understand the health and condition of the existing trees within the Peterson Creek Riparian Area and their spatial relationship to the existing structures and surfaces and inform the potential future Site redevelopment. There were no trees identified as requiring removal or pruning to accommodate the project. There were trees identified as being situated in close proximity to the proposed construction site. Given the sensitive location of these trees, the construction plan could potentially encroach upon the root zones of these trees. The root zones are integral to the trees' health and stability, serving as the foundation for not only their structural integrity but also for water and nutrient absorption. To mitigate the risk of damage that could compromise the trees' health or lead to structural failure, it was recommended to have tree protection fencing erected prior to construction. The full Arboricultural Assessment is attached as Appendix IV.

3.5 Phase I Environmental Assessment

A Phase I Environmental Assessment was completed. No areas of potential environmental concern were identified, and no further work was recommended. The assessment, prepared by SLR, is attached as Appendix V. The full report including appendices is available upon request.

3.6 Archeological Assessment

BCH has been working with TteS to conduct an Archeological Overview Assessment ('AOA'). The AOA noted the project area is assessed as having high potential for buried archaeological resources based on the proximity to documented archaeological sites and the (proximity to waterways It was also noted there have been extensive land alterations to the Site and that several structures have been constructed and most of the property has been capped with pavement. However, due to the high potential nature of the subject property's location, the archaeological potential remains high until the depth of disturbance can be verified by an archaeologist. The AOA, attached as Appendix VI, recommended that the project area be subject to an Archaeological Impact Assessment prior to the commencement of construction activities.

3.7 Existing Civil Infrastructure Assessment

Existing Water Infrastructure
The CoK's GIS system shows existing municipal water infrastructure in proximity of the Columbia Precinct to be as follows:

- A 300 mm diameter watermain west of 4th Ave. along Columbia St.
- A 200 mm diameter watermain east of 4th Ave. along Columbia St.
- A 150 mm diameter watermain along 6th Ave.
- A 900 mm diameter supply line along Glenfair Dr.
- Municipal fire hydrants where Columbia St. intersects with 4th Ave. 5th Ave. and 6th Ave.
- Multiple private onsite fire hydrants located throughout the Subject site.

Existing Sanitary Infrastructure
Sanitary flows from the Site are collected and conveyed through an existing municipal 150 mm diameter sanitary-main at the northwest corner of the site to an existing 200 mm diameter sanitary-main along 5th Ave for treatment at the municipal treatment centre. Sanitary flow monitoring was conducted in 2021 to confirm the flows from the Columbia Precinct and the Glenfair development that is serviced by the existing 150 mm diameter sanitary-main. Sanitary flow monitoring yields accurate values for the existing onsite and offsite sanitary flows. The onsite flow monitor was installed at the manhole on the edge of the project boundary in which all onsite sanitary disposal drains to. The Columbia Precinct flow monitor was installed in the last manhole prior to the Columbia Street 200 mm diameter sanitary main. Offsite flows are quantified by subtracting the onsite flow monitor from this offsite flow monitor. See Appendix VII for the full Site Servicing Plan.

Stormwater Management
From publicly available satellite imagery, we understand the Columbia Precinct site slopes from west to east and from south to north. Information on the existing onsite storm infrastructure within the Columbia Precinct is limited. From the CoK's GIS system the onsite storm infrastructure consists of:

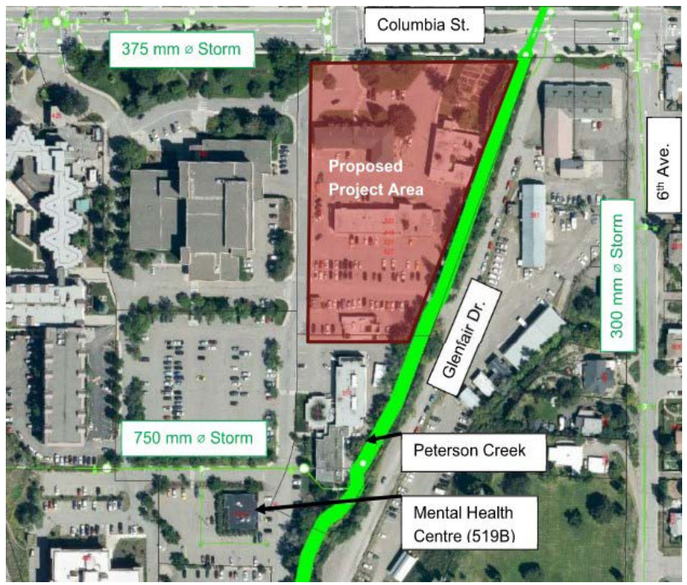
- A 750 mm diameter storm-main near the southern end of the Columbia Precinct.
- We understand this storm-main collects and conveys flows from the properties to the west and discharges into Peterson Creek to the east.
- This storm-main also appears to collect surface runoff from the parking lot of the Mental Health Centre (building 519B) via onsite catchbasins.

The CoK's GIS system shows offsite storm infrastructure, in proximity of the Columbia Precinct, to include:

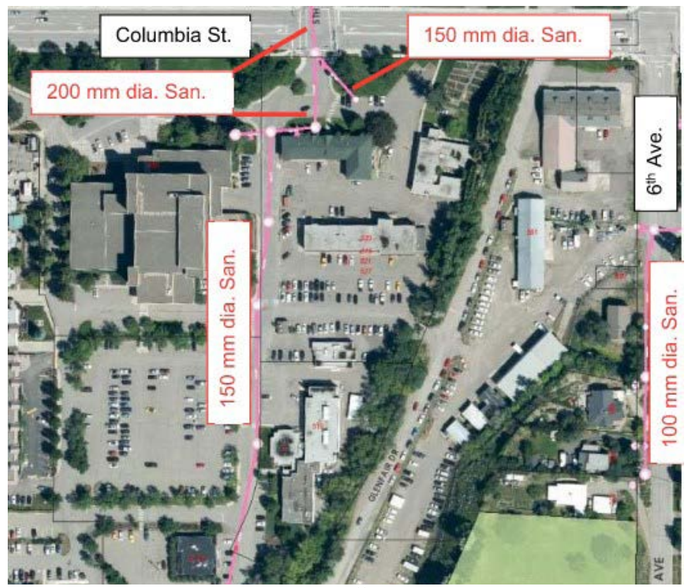
- A 375 mm diameter storm-main along Columbia St., between 4th Ave. and 5th Ave.
- A 300 mm diameter storm-main along 6th Ave.

See Appendix VII for full Site Servicing Plan.

Existing Water Infrastructure



Existing Stormwater Infrastructure



Existing Sanitary Infrastructure

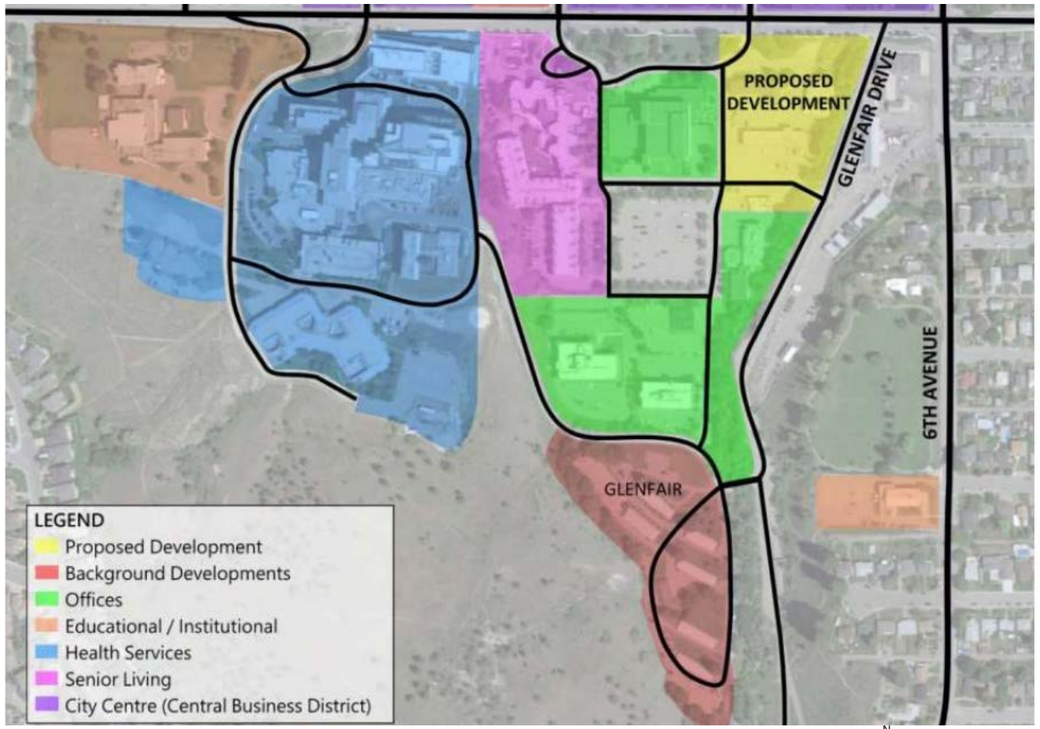
Road Network
The Site is located west of Glenfair Drive and just south of Columbia Street. The 5th Avenue and Columbia Street intersection is expected to be the primary access to the proposed development. The following road classifications are based on the Kamloops Street Classifications map system.

Columbia Street is a four-lane arterial running west-east with a speed limit of 50 km/hr. West of 6th Avenue, Columbia Street is a major arterial, and east of 6th Avenue, Columbia Street is a minor arterial. Sidewalks and curbs are provided on both sides.

6th Avenue is a four-lane major arterial north of Columbia Street and a two-lane minor collector south of Columbia Street, running north south with a speed limit of 50 km/hr. Sidewalks and curbs are provided on both sides with the exception of the west side of 6th Avenue south of Columbia Street.

5th Avenue is a two-lane local road running north-south with a speed limit of 50 km/hr. Sidewalks and curbs are provided on both sides north of Columbia Street. South of Columbia Street, sidewalks and curbs are provided on the west side only in existing conditions, with proposed plans to provide sidewalks and curbs on both sides as shown in Appendix B. Parking is provided on both sides north of Columbia Street.

Glenfair Drive is a local road intersecting Columbia Street. Glenfair Drive has gravel shoulders providing parking spaces on the east side. Based on the Columbia Precinct Sustainable Parking Strategy Report prepared by Stites Consulting Inc. in 2021, Glenfair Drive is mainly used for parking by CITZ. See Appendix VIII for the full Traffic Impact Assessment.

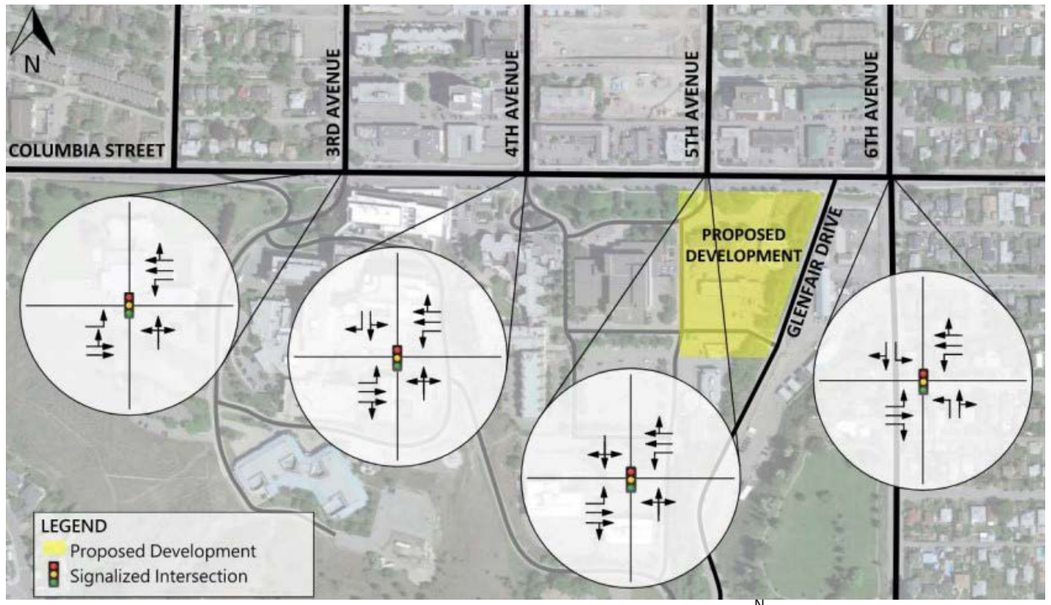


Site Location

Existing Traffic Volumes
Morning and afternoon peak period traffic volume data was provided by the City of Kamloops for the study intersections. The dates for traffic count collection at each of the study intersections are noted below:

- Wednesday, April 12th, 2023 for 3rd Avenue and Columbia Street;
- Thursday, May 25th, 2023 for 4th Avenue and Columbia Street and 5th Avenue and Columbia Street; and,
- Tuesday, June 6th, 2023 for 6th Avenue and Columbia Street.

The morning peak hour traffic volume was determined to be 7:45 a.m. – 8:45 a.m., and the afternoon peak hour traffic volume was determined to be 4:00 p.m. – 5:00 p.m. The existing 2023 peak hour traffic volumes are illustrated in the adjacent figure. See Appendix VIII for the full Traffic Impact Assessment.

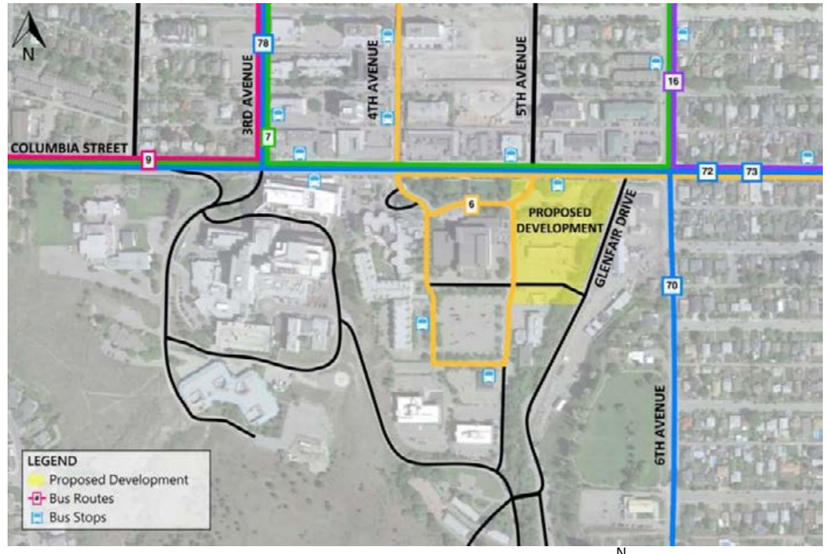


Existing Lane Configuration

Transit Network
Kamloops' transit system is operated by BC Transit and consists of regularly scheduled routes. Bus routes 6, 7, and 16 operate close to the Site. The Site is directly adjacent to the nearest bus stop, providing access to Route a few routes as shown on the adjacent figure.

Bicycle & Pedestrian Network
The CoK has a cycling network consisting of painted bike lanes, multi-use pathways, and bikeways in major streets and minor streets within the city. As informed by the CoK, a protected bicycle lane is provided on 6th Avenue, north of Columbia Street. A minor street bikeway is also currently provided on 5th Avenue, extending approximately 400 m south from Columbia Street and connecting to an existing multi-use pathway. A future MUP will be developed in conjunction with the improvements envisioned for the Columbia Precinct and the Steering Committee is currently working to determine the most feasible location. For the purposes of this Feasibility Study, it has been assumed that the MUP will be constructed along the future 5th Avenue road dedication immediately adjacent to the Site.

Sidewalks are available on all roadways in the study area – Columbia Street, 6th Avenue, 5th Avenue, 4th Avenue, and 3rd Avenue - with the exception of the west side of 6th Avenue. All study intersections provide pedestrian crossings in all directions. Sidewalks and curbs are provided on the west side only in existing conditions on 5th Avenue south of Columbia Street, with proposed plans to provide sidewalks and curbs on both sides.



Bus Stop Locations

Cycling Network

4.0 Design Considerations

4.1 Sustainability Framework

BCH has independently adopted a GHG policy for new construction projects that it funds and finances (irrespective of the building ownership) with the goal of reducing GHG emissions to the greatest extent possible while being cost effective. Kamloops has 3400 Heating Degree Days below 18 Degrees which is in Climate Zone 5. A sustainability framework was developed with various objectives including the reduction of energy consumption, the promotion of green building and construction standards, improvements to air and water quality and the development of an affordable housing community. The components of this framework are outlined below:

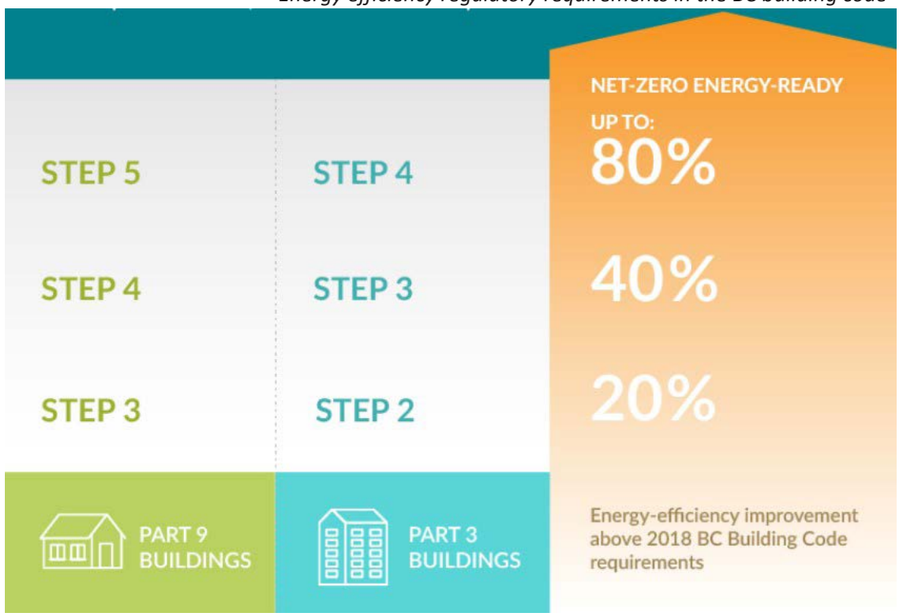
The project will be targeting BC Building Step Code Level 3 which is a higher building energy performance than the Cok's requirements for Part 3 buildings. The project will meet the CoK's energy efficiency requirement and support the Community Climate Action Plan target of reducing community wide GHG emissions. Part 3/Step 3 is 40% more energy efficient than the 2018 BC Building Code (ASHRAE 90-1).

The CoK's General Process for Step Code projects will be followed for the duration of the project. Energy performance will be verified through energy modelling at each stage of design through to post construction. If passively cooled, thermal comfort evaluation is required, and overheating hours per year will not exceed 20 hours per year. The CoK's Step Code framework notes that buildings represent 29% of Kamloops's greenhouse gas (GHG) emissions.

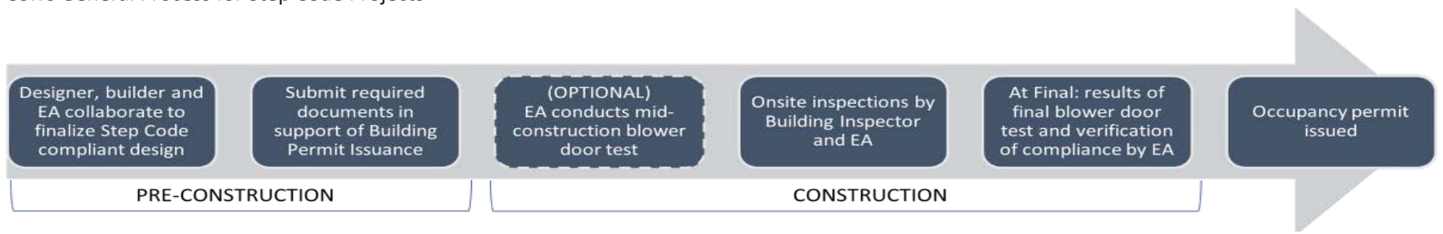
Whole building air tightness will be calculated during design; tested once air leakage rates can be confirmed; and reported. If the building does not achieve the targeted air leakage the contractor must find and seal the sources of air leakage.

Where possible, energy savings are to be pursued using passive design strategies, including shape and geometry to control solar gain; appropriate window to wall ratios; landscape elements for temperature regulation; solar shading and a good thermal building envelope. Energy efficient systems will be selected using utility rebate recommendations and/or from pre-qualified lists from NRCan, BC Hydro and Fortis BC. Energy equipment and appliances will be Energy Star rated where applicable and meet the criteria laid out by BCH. These efforts will work to address and fit within the CoK's Community Climate Action Plan: 1C Green New Neighbourhoods and 4A New Homes and Buildings - Community-Wide.

Energy efficiency regulatory requirements in the BC building code



CoK's General Process for Step Code Projects



Affordability

BC Housing projects will preferentially select materials and designs that emphasize durability and ease of maintenance to minimize the long-term operating costs for the non-profit owner-operators. LED lighting is an example of this – low energy and low maintenance due to their longevity. Energy and water savings will provide ongoing savings to the operator.

Waste & Materials

Construction waste is approximately one third of the waste stream in BC. It is difficult to compress and takes up a great deal of space in landfills, shortening their potential use. Much of this waste is wood, which anaerobically decomposes, producing methane – a potent greenhouse gas. BCH requires that 60% of both construction and demolition waste be diverted from landfills. To ensure success contractors are required to submit a Waste Management Plan prior to demolition and construction. Waste is required to be tracked, and reports submitted at:

1. Completion of demolition,
2. 50% construction progress claim, and
3. Substantial completion.

A deficiency holdback for incomplete waste tracking provides accountability. To promote ongoing recycling by the occupants the site shall be equipped with a collection and storage area for garbage, recyclable materials and organics, in accordance with municipality requirements. In the selection of construction materials, local and high recycled content, and materials from the Site will be given priority.

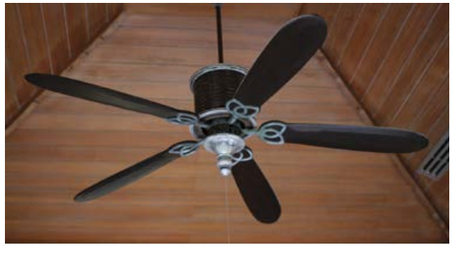
Water

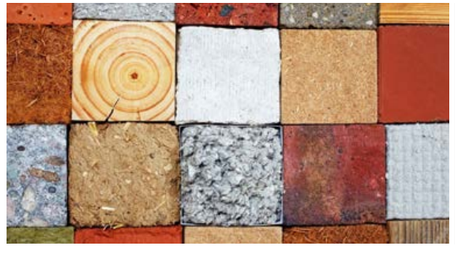
In addition to requiring whole building water metering and submetering for separately commercial/retail leased areas, BC Housing requires indoor fixtures and appliances to meet the following:

Fixture	*BC Plumbing Code Max. Water Flow/Flush Rates*	*BC Housing Requirement*
Private Lavatory	5.7 L/min	Aerated, 2 L/min
Kitchen	8.3 L/min	5.7 L/min
Shower	7.6 L/min	5.7 L/min
Water Closet	4.8 Lpf	4.8 Lpf
Washing Machines	n/a	Energy Star ~ 33% less water
Dish Washers	n/a	Energy Star ~ 33% less water

Health

BCH will ensure high quality, healthy living conditions for its occupants by integrating daylighting and outdoor views into rooms, selecting materials that either reduce or eliminate indoor pollutants and providing optimal levels of air exchange. Each bedroom should be provided with a window(s) to allow natural ventilation and daylighting. The materials selected for the project, such as interior paints, coatings, adhesives, sealants, flooring, composite wood, ceilings, walls, and thermal and acoustic insulation must meet applicable standards for low VOC emissions.





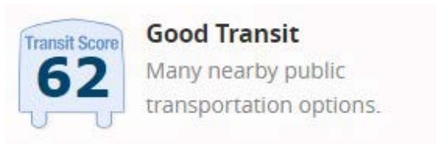
Sustainable Site Water Management & Landscape

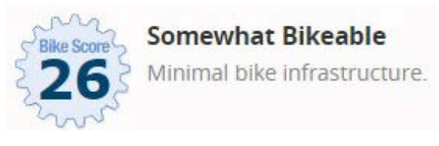
The following efforts will work to address and fit within the CoK's Community Climate Action Plan: 8A – Urban Ecosystems for Climate Resilience and 8C - Green Infrastructure

- A Pollution, erosion and sedimentation control plan for all construction activities associated with the project should be created and implemented.
- A comprehensive site water management strategy should be developed by the project team, such as implementing pervious paving, rain gardens, and bio swales.
- Native or drought resistant landscaping will be provided to avoid the need for a permanent landscape irrigation system.
- The landscape plan should minimize the heat island effect around the building and reduce solar intensity.

Sustainable Site & Transportation

The Site has services nearby that can help reduce vehicle distance travelled and promote walkability, this is expected to improve over time as the Kamloops continues to urbanize and the City's modal split improves the addition of active transportation infrastructure.





The Site currently has a Walk Score of 80 and is considered to be 'Very-Walkable'. Construction of the Peterson Creek MUP should help improve the Site's Bike Score significantly. The are 4 bus routes that stop within 100m of the Site. Each of the Options will provide sufficient bike parking spaces for all three options to reduce carbon footprint and encourage daily physical activity. These efforts will work to address and fit within the CoK's Community Climate Action Plan: 1A Ten-Minute City, 2A Active Mobility and 2C Shared Streets.

Social Sustainability

Understanding current and future tenant housing needs and experiences enables a design that is more considerate of how the tenant will interface with their housing and the development once completed. While the workforce is the primary demographic identified, there are diverse perspectives and intersecting experiences that need to be integrated. It is not about making the design as neutral as possible but rather as accommodating as possible to meet the needs of everyone. For example, "feeling safe" and "crime prevention" will be common themes as the project moves forward.

There are many design details that will contribute to aspects of social sustainability, including: housing needs, accessibility, environmental sustainability, multi-modal connectivity, safety and security, community collaboration, Indigenous engagement, social connectivity and tenant engagement. The following design recommendations align with social sustainability objectives and seek to provide an inclusive development that facilitates a sense of belonging and wellness among all tenants:

- Crime Prevention Through Environmental Design (CPTED) – Future redevelopment concepts should advance CPTED.
- Inclusive and Accessible Design Standards - The building, surrounding amenities and the site design should reflect inclusive and accessible design standards to ensure that current tenants and future tenant have access to a development that accommodates all their immediate mobility needs.
- Ensure Pedestrian Connectivity to Columbia Street – BCH will need to work with the CITZ and the CoK to implement a pedestrian safety plan to ensure tenants have a safe access route to Columbia Street.
- Protect Natural Areas – Protecting Peterson Creek's hillside and riparian area would respect how people value and experience the surrounding area. Design features such as building height, building façade and elements of environmental sustainability should consider the natural area and minimize impacts.
- Outdoor Social Spaces – Social spaces should be provided that enable community gatherings and social recreational activities among tenants. This supports greater interculturalism opportunities among tenants and the wider community. In addition, it facilitates a sense of belonging, reducing incidents of isolation and loneliness.
- Tenant Hobbies - Provide areas that support tenant hobbies such as community gardens and flower beds.

Enhanced Wellness

The quality of buildings and spaces has a strong influence on the quality of people's lives. Decisions about the design, planning and management of places can enhance or restrict a sense of belonging. They can increase or reduce feelings of security, stretch or limit boundaries, promote or reduce mobility, and improve or damage health. They can remove real and imagined barriers between communities and foster understanding and generosity of spirit. Social, cultural and economic inequalities are still being built into new places, and planners and designers need to examine more closely the impact of their decisions. Good design supports health and well-being for all people, considering physical, mental, and emotional effects on building occupants and the surrounding community. Redevelopment of the Site will create a welcoming community by focusing on the following principles:

- A sense of connectivity and community can be achieved through the addition of pathways, indoor and outdoor gathering spaces, and open sightlines. The design development will concentrate on creating a pedestrian friendly enviroment with easy access to amenities. These elements can create a sense of inclusivity, safety and belonging through the promotion of seeing and engaging with other users of the space.
- Striving for a connection to nature keeps us feeling happy and promotes a sense of wellbeing. This can be achieved through creative landscape design, the integration of biophilic elements into indoor spaces and capturing views to the Peterson Creek riparian area.
- Housing design that incorporates private open space, gardens, greenspace and children's play areas to foster social connections, inclusion and intergenerational relationships with a focus of creating social connections through design.
- Working towards achieving a balance between artificial and natural lighting. Lighting can affect a person's mood, productivity, and emotions. It also plays an important role in ensuring the comfortability of a building's occupants. Natural light is essential for both physical and mental health and plays a large role in the reduction of health-related illnesses and diseases. Examples of ways that balanced lighting can be achieved is through building positioning on the site, window size and positioning, shading achieved through exterior architectural treatments, and utilize flexible lighting options for a mixture of ambient and task lighting.
- Promoting movement by creating pedestrian and bike-friendly connections between residences and amenity areas that are enjoyable to travel through; and providing secure storage for bicycles.

4.2 Urban Design Principles

In step with the CoK's desire to increase density within the Downtown Core and more specifically the Columbia Precinct, this project endeavors to provide medium to high density housing options. This responds to the increased demand for centrally located, urban alternatives to the traditional forms of low-density residential development common in Kamloops. Although the final form of development is still to be determined, the redevelopment will contribute to Kamloops' urban fabric as it transitions toward a more sustainable future. BCH, CITZ and the Lead Consultant Team have worked collaboratively with the CoK on the following guiding principles:

- For the overall site layout, the main design intent is to respond to the existing context while also addressing the future transition envisioned for the area.
- The apartment buildings are situated on top of a recessed or semi recessed parkade.
- Locating a large portion of the parking stalls under the building, and reducing the amount of site parking will allow for a balanced approach to parking and amenity space / natural areas.
- Creating an appropriate transition and interface with the courthouse.
- Protection of the Peterson Creek Riparian Area and the relocation of the community garden as appropriate.

In addition to these guiding principles the following design elements were also taken into consideration when developing the Options and should be carried forward in future Development Permit submissions.

Built Form
- Balance building height and massing with the impact of overshadowing of adjacent properties and streets.
- Building height and massing that complements the visual character of the Downtown and contributes to an enhanced public realm.

Character
- Incorporate a visually distinctive and consistent architectural design.
- Reinforce a sense of place through increased pedestrian activity.
- Treat building exteriors to capture the local character.

Access and Circulation
- Incorporate pedestrian-oriented design and enhance community connections through the Columbia Precinct via the extension of the Peterson Creek Multi Use Path.
- Activate street edges with active frontages and buildings that address the street.
- Incorporate prevailing innovative green building design and construction principles.

Parking
- Incorporate bicycle parking and storage.
- Locate parking areas so they do not visually dominate the community.
- Parking should be placed beneath and / or behind buildings to the maximum extent possible.
- Any parking areas visible from the street or publicly used open spaces should be landscaped.

A key vision for the Concept Options is to reinforce the pedestrian character of the project. The development should provide a pedestrian friendly treatment with the installation of planting and shade trees. The main entrance to the buildings should include a wide and inviting entry with decorative paving, seating, bike racks, a large feature shade tree and the development signage. Connectivity from the Site to each street frontage exists between each phase of the project.

4.3 Infrastructure Principles

Civil Infrastructure refers to the assets used to provide water, manage stormwater, collect and manage solid waste, and collect and treat wastewater. It also includes CoK roads and the transportation network. Like other cities, Kamloops is facing a number of infrastructure challenges, including growth induced demand for more and improved services, aging infrastructure, regulatory demands and a backlog of projects with limited options for raising capital to respond. These challenges have resulted in an infrastructure deficit at a critical time where new infrastructure is necessary to respond to the impacts of climate change. For BCH keeping residents safe and healthy is the paramount priority for infrastructure investment. This project will result in a more compact and efficient land use and servicing system that emphasizes higher densities, energy conservation, and environmental sustainability. Recognizing this, the redevelopment must find a financially sustainable path to deliver infrastructure upgrades that support growth and improved services while helping to address some of the infrastructure deficits in the immediate area. The following design and sustainability approaches, that align with the CoK's OCP Infrastructure policies (Section D-4), will be considered as the project progresses:

Water Network

- Continue to manage drinking water supply and distribution through conservation measures to provide an adequate supply;
- Ensure that Peterson Creek maintains adequate flow and temperature conditions to support a thriving and resilient aquatic habitat.

Storm Drainage

- Support an integrated stormwater management approach that addresses surface water, stormwater, and groundwater and mitigates development impacts in order to help preserve watercourse health and habitat and protect life and property;
- The use of adaptive planning and low-impact development techniques (e.g. swales, rainwater harvesting, amended topsoil) to manage stormwater on site and minimize runoff, subject to suitable site conditions;
- Protect, enhance, and use existing natural drainage patterns as the primary storm drainage system;
- Design new stormwater infrastructure to manage flows to pre-development rates including future climate change projections;
- Encourage the capturing of stormwater and discharging to ground where appropriate, while reducing impact to downslope properties;
- Mimic the natural ecosystem processes in stormwater system design and construction where possible;
- Minimize impervious surfaces and maximize infiltration where appropriate to reduce runoff;
- Require that stormwater design accounts for maximizing water quality;
- Apply best practices to land use management to prevent erosion and sedimentation during construction.

Sanitary Sewer

- Meet or exceed provincial and federal wastewater treatment regulations to safeguard public health and protect the environment, using the Kamloops Sewage Treatment Center on Mission Flats Road as the primary means of wastewater treatment within the city.

Connectivity & Transportation

- Prioritize development of walking and biking connections that provide safe, convenient and accessible linkages to the Peterson Creek MuP;
- Adopt a complete streets approach where appropriate to adjacent land uses that provides users of all ages and abilities (including pedestrians, bicyclists, public transit passengers, drivers of private automobiles, and operators of commercial vehicles) with safe and comfortable access, movement, and crossing;
- Consider using alternative street standards in new development areas, in conjunction with an overall development plan, to encourage a reduction in the impact of automobile traffic on neighbourhood livability Traffic-calming measures may be implemented in existing developed areas.

4.4 Civil Design Strategy

Taking the Civil Infrastructure Principles (Section 4.3) into account WSP has proposed the following upgrades in order to meet the CoK's servicing expectations as part of the final redevelopment plan (See Appendix VII for Servicing Report). The Costs associated with this strategy are summarized at the end of this section.

Proposed Water Upgrades & Future Demands
It has been recommended that the project be serviced with domestic water and fire-flows from the 1429 Pressure Zone (PZ-1429). WSP understands, from the water model received from the CoK, that PZ-1429 currently services the downtown core, the Columbia Precinct and existing developments located north and west of Munro Street. WSP further understand that PZ-1429 has adequate capacity to support the proposed development. However, as per the CoK's comments, the existing 200 mm diameter watermain along Columbia Street, between 5th Avenue and 6th Avenue, is required to be upgraded. WSP assumes it will be upgraded to a 300 mm diameter main.

To determine system capacities and pipe velocities, a preliminary layout consisting of a new 200 mm diameter onsite loop and a 300 mm diameter connection to the existing infrastructure along Columbia Street is proposed. The exact location of the loop will need to be finalized in conjunction with the Preferred Option.

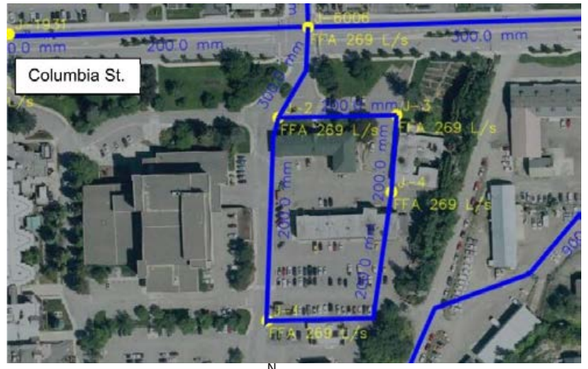
Sanitary Servicing Strategy
In the fall of 2022, WSP assessed the condition of the existing onsite sanitary infrastructure from the 1100 Glenfair Drive, through the Columbia Precinct to the intersection of Columbia Street and 5th Avenue The assessment showed the existing onsite sanitary infrastructure was at "end of life" and in need of significant repairs. As such, It is recommended that the existing onsite sanitary-main, from Glenfair to Columbia St. be replaced with a new PVC sanitary-main to be in line with the Bylaw. It is further recommended that the existing sanitary-main be upsized to accommodate the proposed development and allow for future growth/developments. The proposed sanitary-main upgrades are shown in the adjacent figures.

The recommendations in this report assume that offsite (north of the Columbia St. and the Columbia Precinct) municipal sanitary infrastructure has adequate capacity to convey the additional flows from the proposed Glenfair and Columbia Precinct developments identified in this report. Analysis of offsite downstream sanitary infrastructure is beyond the scope of this report.

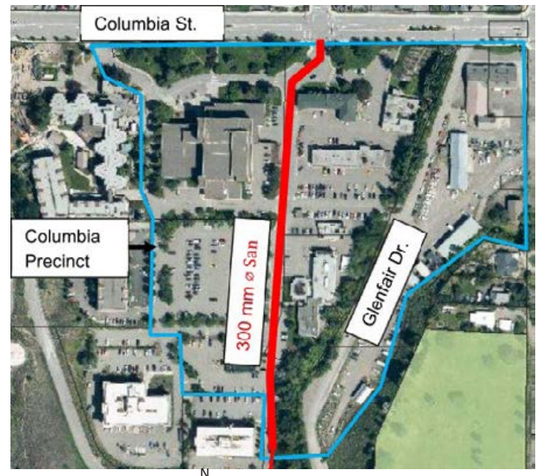
Though the downstream capacity is not analyzed in this report, WSP anticipates that the existing downstream sanitary infrastructure will require the existing offsite sanitary main to be upgraded from a 200 mm diameter main to a 300 mm diameter sanitary-main from 5th Ave, along the Columbia – Nicola Laneway to 4th Ave., at a minimum.

Stormwater Management
The stormwater management plan for the proposed development includes the assumption that the ground is not suitable for infiltration of runoff into the ground and therefore runoff must be conveyed offsite. We anticipate groundwater in the area generally at the water level of the creek. A geotechnical assessment of ground conditions is required to confirm this assumption
The onsite storm infrastructure includes:

- Onsite catch basins and piping to convey minor storms to detention tanks
- Onsite detention tanks to detain runoff from all storms up to and including a 1:10 year return storm.
- Detained runoff to be control released at a rate not exceeding a 1:5 year predevelopment runoff rates.
- All released runoff from parking areas to be treated through oil grit separators prior to release to Peterson Creek.
- Overland flow routes for major storms exceeding the 1:10 year return period.



Proposed Water Infrastructure

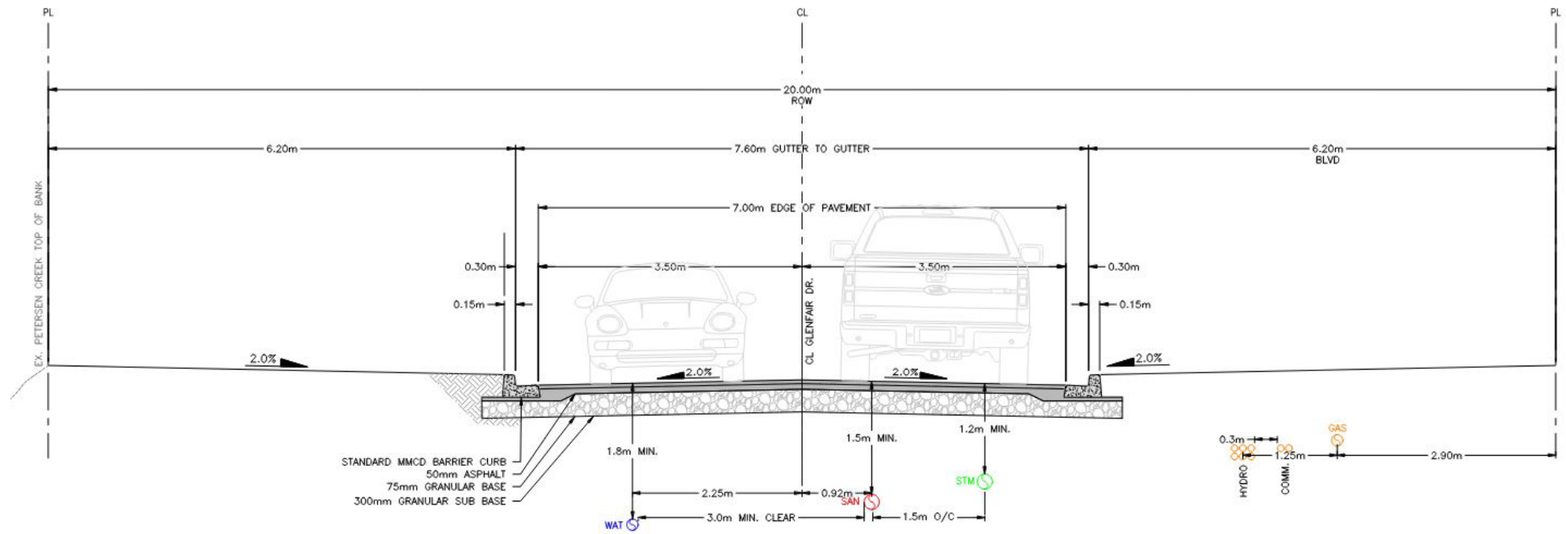


Proposed Sanitary Infrastructure

Proposed Offsite Sanitary Infrastructure

Access Road

Currently, the Columbia Precinct can be accessed via two access roads from Columbia Street that intersect with 4th and 5th Avenues. The eastern portion of the precinct can be accessed using Glenfair Drive which can also be used to access the remainder of the precinct from the south. The main access to the Site has been proposed from the informal 5th Avenue intersection which is currently inefficient and does not provide for good site circulation. It has been proposed that this access be redeveloped to a modern municipal road and that 5th Avenue be extended through the Columbia Precinct with a 20m right-of-way width with a 7.0m travel width. A sample road section has been included below.



Road Alignment

The road alignment should be designed to adhere to the Riparian Areas Regulation (RAR) requirements of a Streamside Protection and Enhancement Area (SPEA) for Peterson Creek. A RAR report will have to be sent to the Province of British Columbia for review once construction dates are set. The site plan was designed in an effort to construct only in previously disturbed areas avoiding conflict with the SPEA. Provided this is not achievable in certain areas, the 10m SPEA setback is applied.

Peterson Creek Bridges

Watson Engineering Ltd. performed a bridge condition survey in December 2021. The engineer's comments from this report state that the bridges overall conditions are very poor with limited structural capacity that does not meet modern standards for loading, lane width, sidewalk width and barriers. WSP understands this bridges are the property of CITZ and replacement is not considered part of this project's scope.

REACH	CHANNEL TYPE	CHANNEL WIDTH (M)	SPVT	LARGE WOODY DEBRIS ZOS (M)	LITTER FALL AND INSECT DROP ZOS (M)	SHADE ZOS (M)	SPEA (M)
1	Riffle pool	2.2	Tree	10	10	6.6	10

Preliminary Cost Estimate

The cost estimates of the Creekside project, Glenfair and the road section between them are found in the following tables. The cost estimates are for separate areas consisting of:

- Area 1 (red) – Creekside Development area.
- Area 2 (green) – Municipal Road Upgrade area.
- Area 3 (blue) – Glenfair Redevelopment site.

These are class D cost estimates and are intended to provide an indication of the civil construction costs. The total values include 5% insurance and mobilization, 15% for engineering fees and 40% contingency. The full estimate for, including more detailed estimates for each civil cost area is include in WSP Site Servicing report attached as Appendix VII.

Civil Cost Areas

ITEM	DESCRIPTION	ESTIMATED AMOUNT
Earthworks	Demolition of Existing Buildings, Foundations and Disposal	$550,000
Roads	From Columbia Street to the southern boundary of Area 1. Approximately 160 m.	$400,000
Intersection	Intersection upgrades at Columbia Street and signalization	$500,000
Water	Onsite water infrastructure. Approximately 400 m Offsite water infrastructure upgrades along Columbia St. from 5th Ave. to 6th Ave. Approximately 200 m.	$600,000
Sanitary	From Columbia Street to the southern boundary of Area 1. Approximately 350 m. Offsite upgrades along 5th Ave and Columbia-Nicola Laneway. Approximately 250 m	$500,000
Storm	Onsite storm infrastructure with detention tank and new outlet to Peterson Creek. New storm infrastructure along onsite road upgrade. Approximately 160 m.	$325,000
Franchise Utilities	Underground Hydro, Telecommunications/Fiber, and Gas,	$175,000
Misc. Studies	Environmental, Geotechnical, Transportation	$150,000
	Subtotal:	$3,200,000
	Total:	**$5,120,000**

Creekside Offsite Costs

ITEM	DESCRIPTION	ESTIMATED AMOUNT
Area 1	Proposed development of the Columbia Precinct and associated upgrades	$5,120,000
Area 2	Municipal road and utilities upgrade along the corridor between the Columbia Precinct and the Glenfair Retirement Community.	$2,600,000
Area 3	Proposed redevelopment of the Glenfair Retirement Community and associated upgrades.	$4,360,000
	Total:	**$12,080,000**

Government Precinct & 1100 Glenfair Drive Offsite Costs

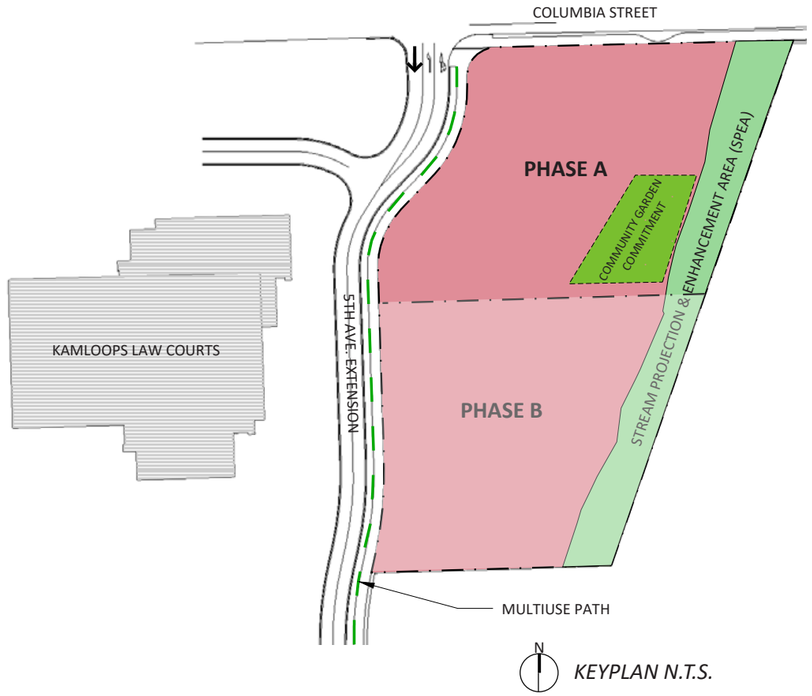
5.0 Concept Option Development

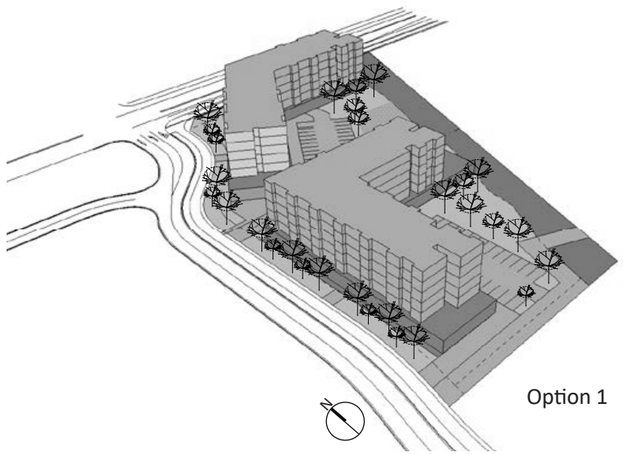
There are significant housing gaps in Kamloops' existing housing stock and both of these Concept Options will allow for the delivery of an impactful project that will include a mix of unit types and sizes. BC Builds is meant to help middle-income British Columbians – such as teachers, nurses, transit operators, construction workers, small business owners, and others – find housing they can afford, in the communities where they live and work. The Site is ideally located for workforce housing.

Concept development and stakeholder engagement happened concurrently through Phase 1 and will continue to happen throughout subsequent phases. This will aid in the integration of thoughtful design elements centered around connectivity, community, and wellness. Design Considerations have been established that relate to the Planning Framework, Stakeholder Engagement, BCH expectations and industry best practices. Good design supports health and well-being for all people, considering physical, mental, and emotional effects on building occupants and the surrounding community.

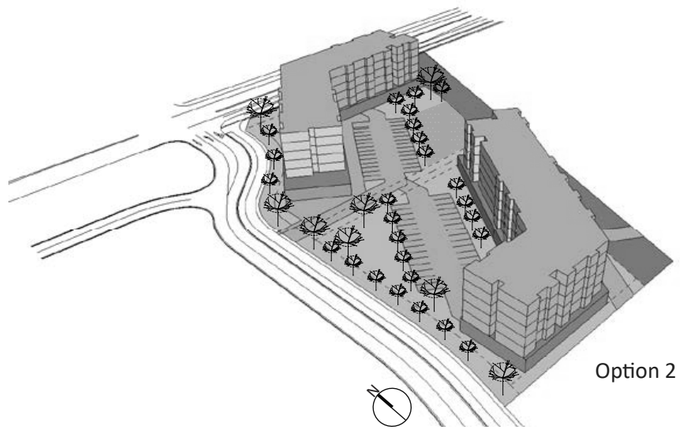
Although the Site is +/- 3.9 acres, the site analysis indicates that only a portion of the Site is developable due to the Peterson Creek setback, the community garden commitment, and the 5th Avenue road and multi use path dedication. Additionally, the Site will be subdivided to create two development parcels, Phase A & Phase B. The two existing buildings within Phase A will be demolished summer 2024 to prepare for development. The two existing buildings within Phase B will be demolished when that portion of the Site is prepared for development. This will happen once Phase A is occupied.

The approach to the conceptual options has acknowledged the interdependence of urban systems and communities as well as the effects of global issues, such as climate change resilience and economic uncertainty, on the future of our cities. The concept options were built on a collective insight into the way places influence wellbeing, work and lifestyle, as well as technical understanding of interconnected systems such as transport, energy, waste and information. In accordance with current and future planning initiatives within the municipality, the options were tested and refined with tools and analysis that join up the quantifiable and subjective aspects of spatial, social, environmental and economic context. Each option identifies densities, uses, unit yields and considers phasing, implementation and includes proforma analysis. A high-level cost analysis of each option is included. The options consider pedestrian and vehicle movements including parking, location of existing services, zoning limitations, sustainability opportunities and constraints, geographic features, the potential for views and daylighting, and opportunities for access to exterior spaces for residents and the public alike. With policy support from the CoK's Official Community Plan, Downtown Plan and Community Climate Action Plan, three Options were initially proposed for the Site. Of the three options, only Options 1 & 2 were chosen by BCH to be developed further.





Option 1



Option 2

RENDERINGS ARE ARTISTIC INTERPRETATIONS FOR ILLUSTRATIVE PURPOSES ONLY

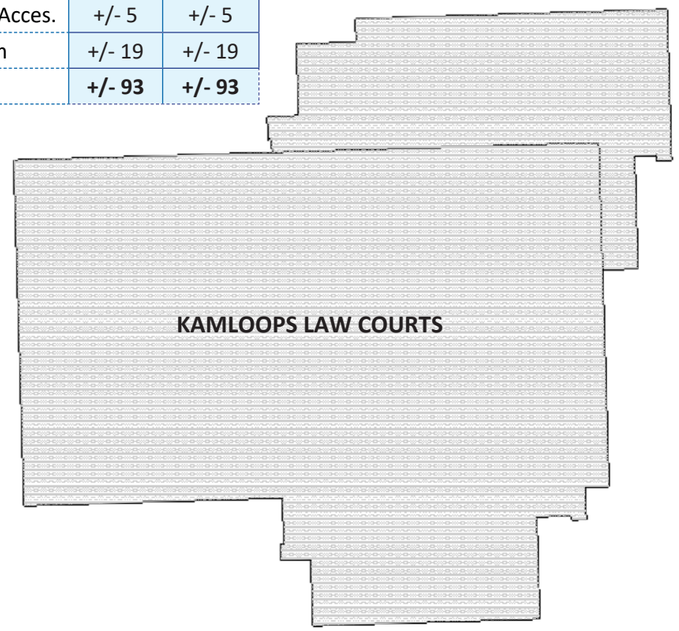
5.1 Option 1

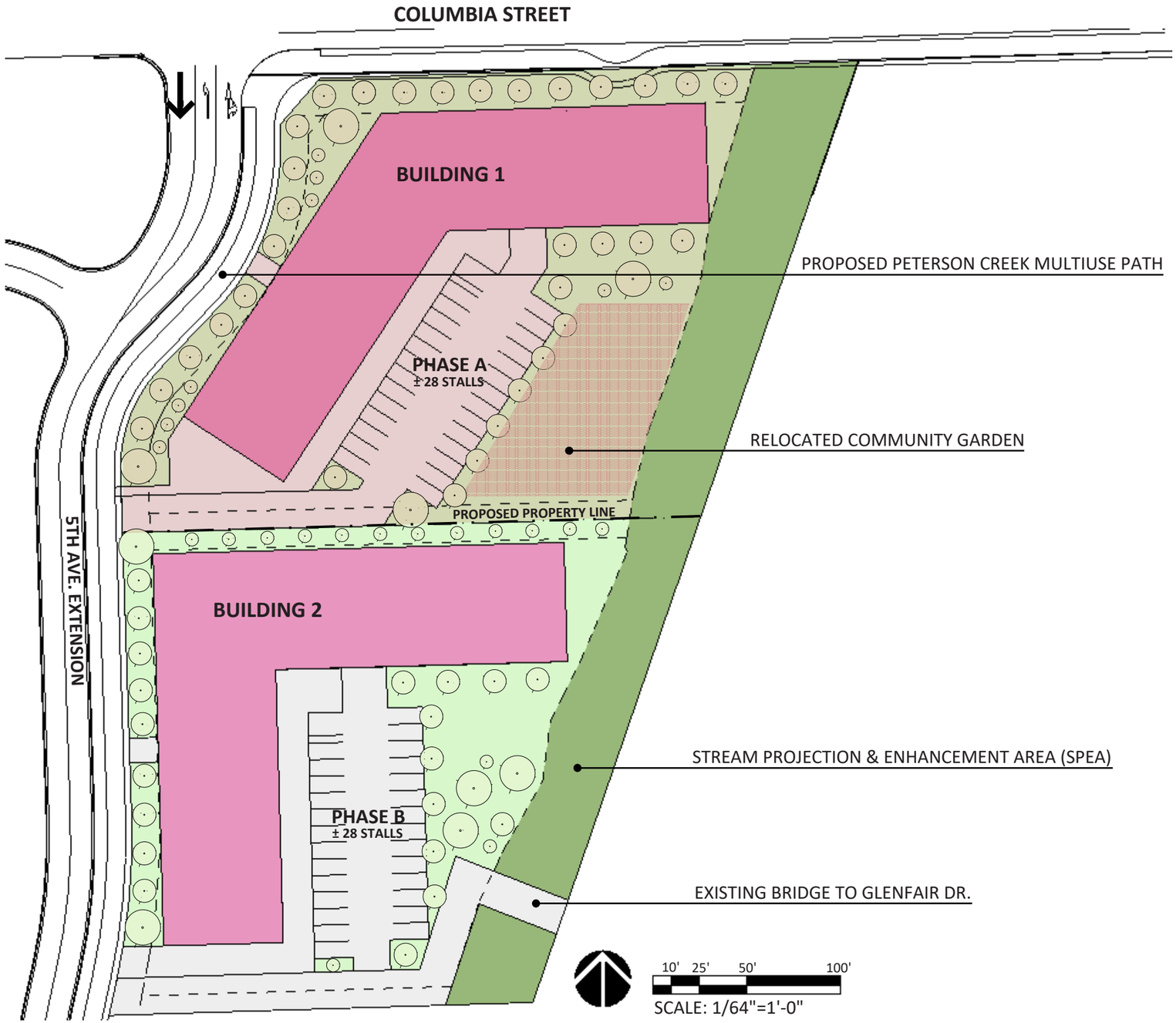
This option includes two 6-storey wood frame mixed use buildings with each building having a ground floor office space and 93 residential units on floors 2-6. An indoor amenity space is provided for residents in each building. It is anticipated that the underground parking will be for residents and the surface parking will be reserved for the office building during office hours. The proforma for Option 1 is attached as Appendix IX.

Office Space	*GFA (ft²)*
Phase A	+/- 21,330
Phase B	+/- 23,425
Total	**+/- 44,755**

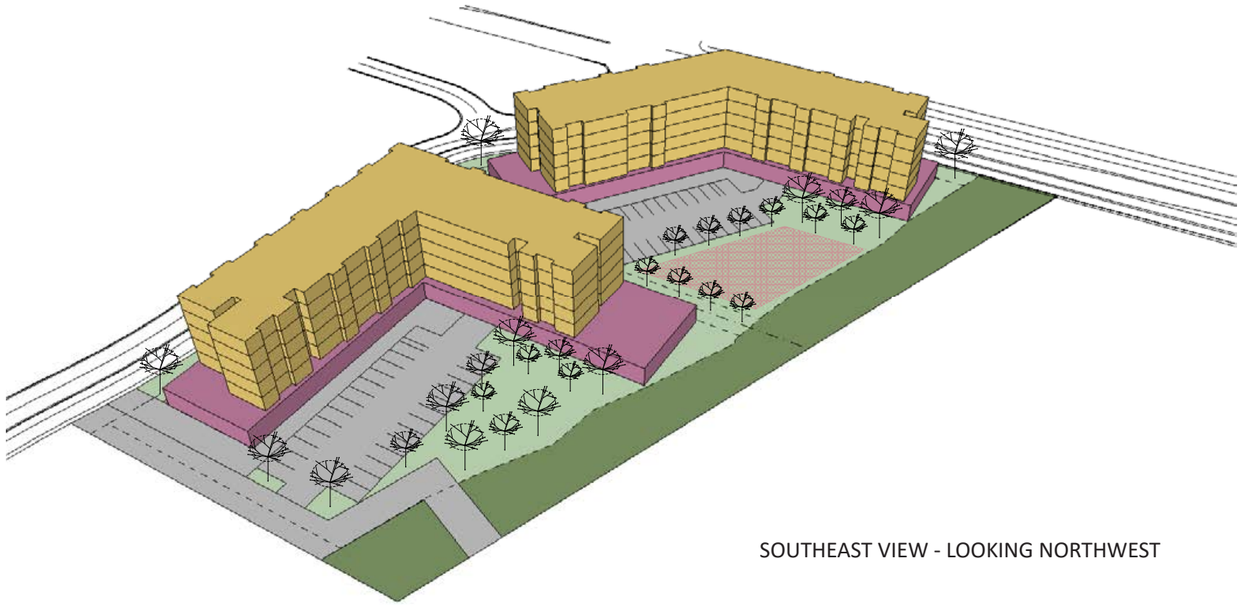
Parking	***Stalls***
Underground	+/-122
Surface	+/- 53
Total Provided	**+/- 178**
Total Required	**+/- 265**
Parking Variance	**+/- 87**

Residential Units	***Phase A***	***Phase B***
One Bedroom	+/- 25	+/- 25
Two Bedroom	+/- 44	+/- 44
Two Bedroom Acces.	+/- 5	+/- 5
Three Bedroom	+/- 19	+/- 19
Total	**+/- 93**	**+/- 93**





SOUTHWEST VIEW - LOOKING NORTHEAST



SOUTHEAST VIEW - LOOKING NORTHWEST

NORTH VIEW - LOOKING SOUTHEAST

RENDERINGS ARE AN ARTISTIC INTERPRETATION FOR ILLUSTRATIVE PURPOSES ONLY

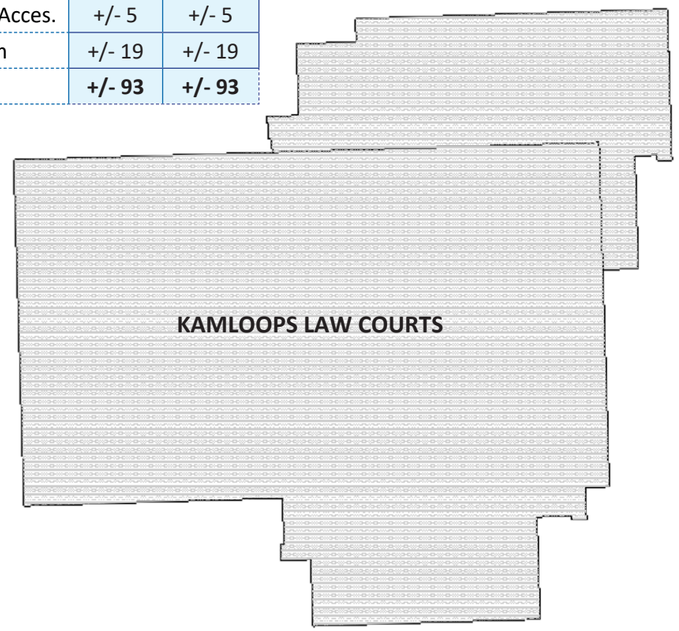
5.2 Option 2

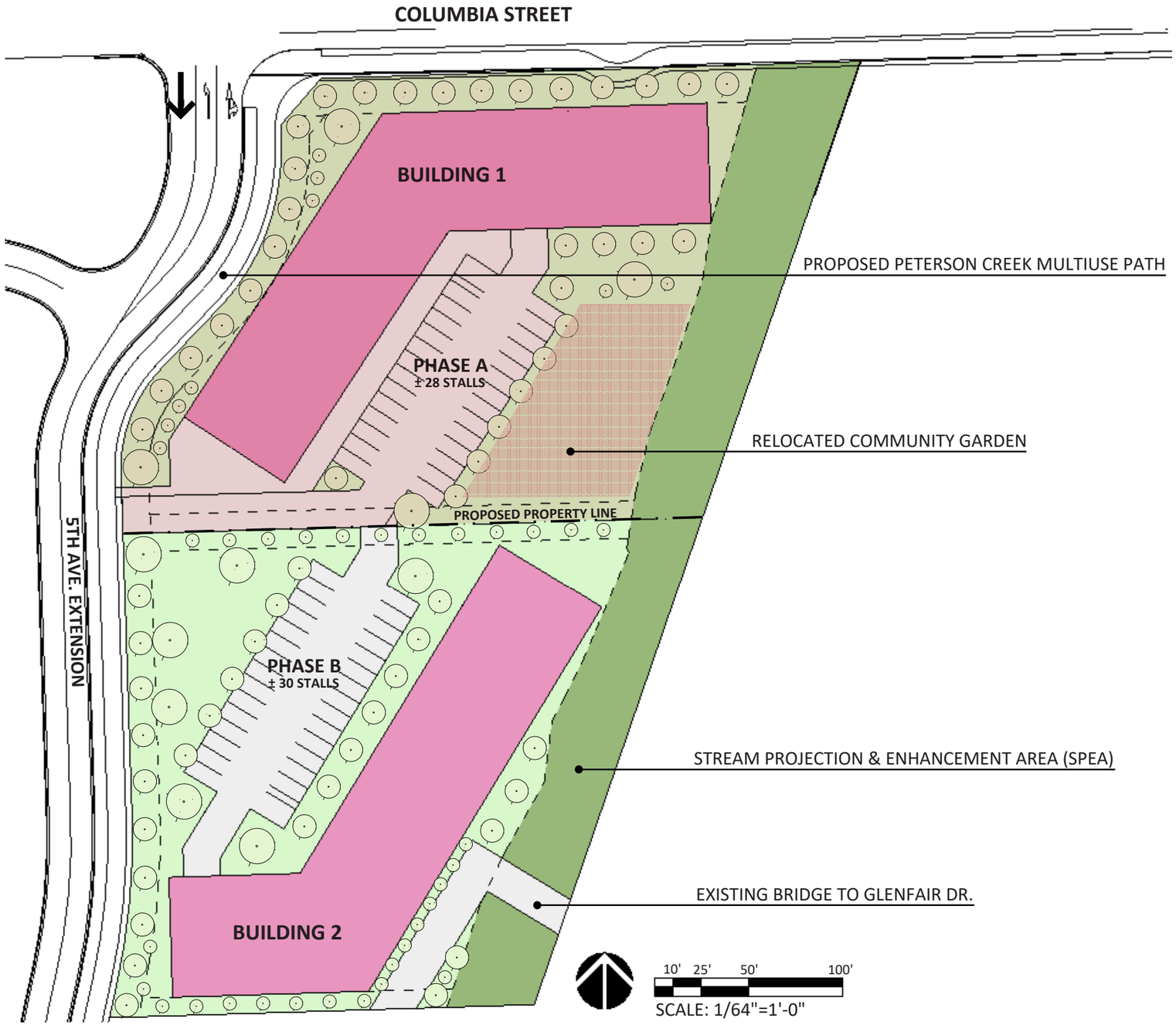
This concept includes two 6-storey wood frame mixed use buildings with each building having a ground floor office space and 93 residential units on floors 2-6. An indoor amenity space is provided for residents in each building. It is anticipated that the underground parking will be for residents and the surface parking will be reserved for the office building during office hours. Option 2 has less office space than Option 1.

Office Space	*GFA (ft²)*
Phase A	+/- 21,330
Phase B	+/- 19,825
Total	**+/- 41,155**

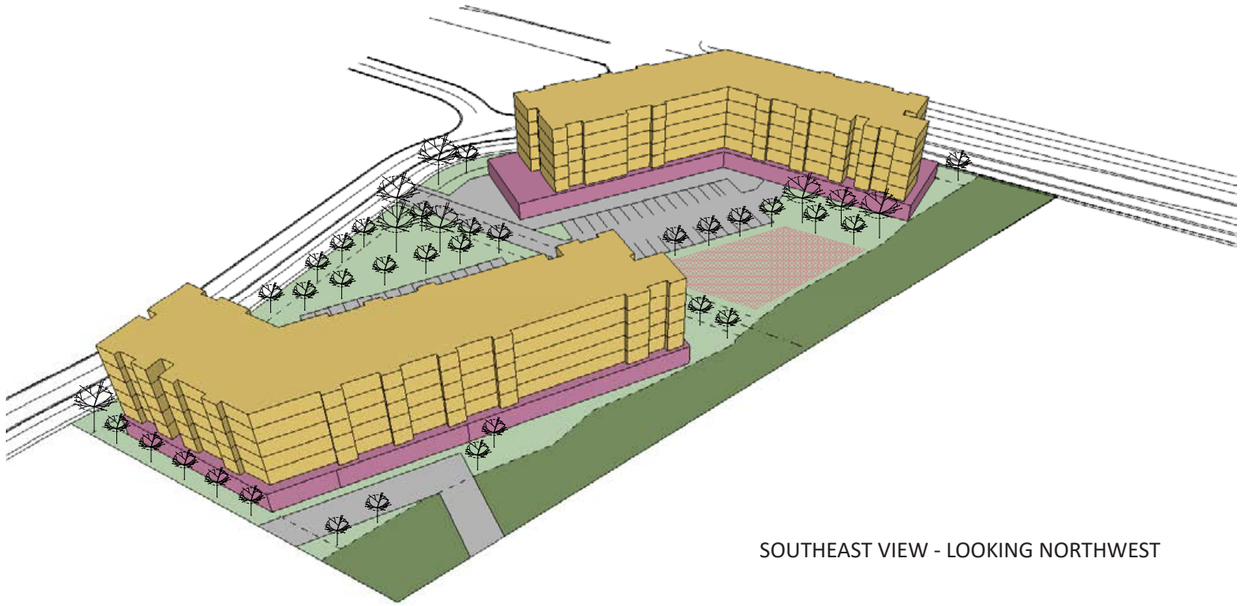
Parking	*Stalls*
Underground	+/-113
Surface	+/- 58
Total Provided	**+/- 171**
Total Required	**+/- 256**
Parking Variance	**+/- 85**

Residential Units	***Phase A***	***Phase B***
One Bedroom	+/- 25	+/- 25
Two Bedroom	+/- 44	+/- 44
Two Bedroom Acces.	+/- 5	+/- 5
Three Bedroom	+/- 19	+/- 19
Total	**+/- 93**	**+/- 93**

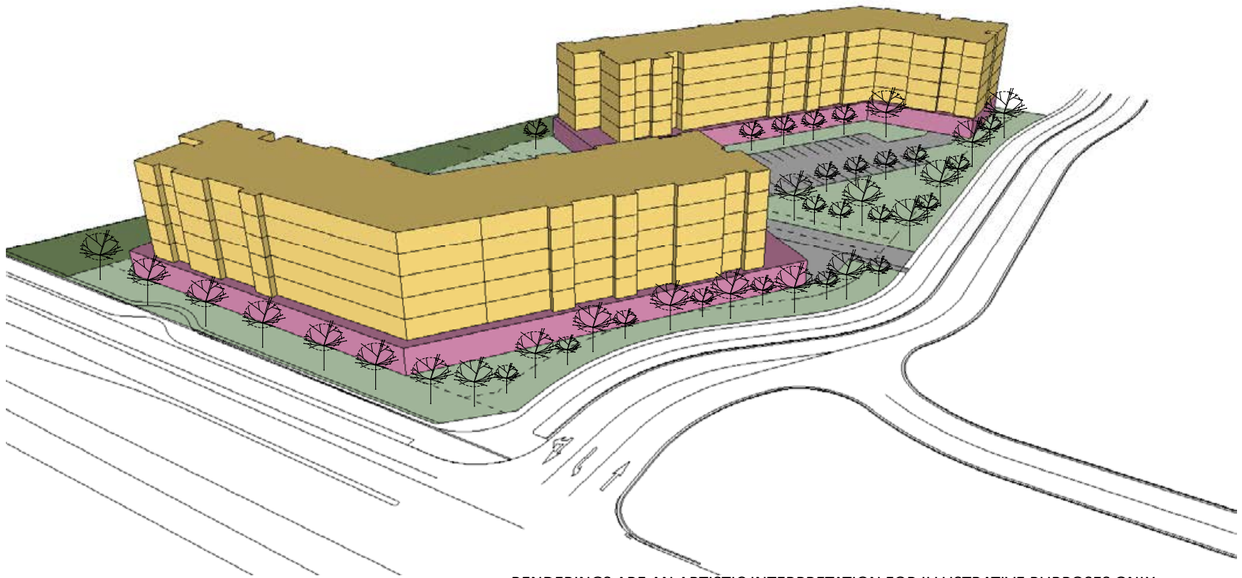




SOUTHWEST VIEW - LOOKING NORTHEAST



SOUTHEAST VIEW - LOOKING NORTHWEST



NORTH VIEW - LOOKING SOUTHEAST

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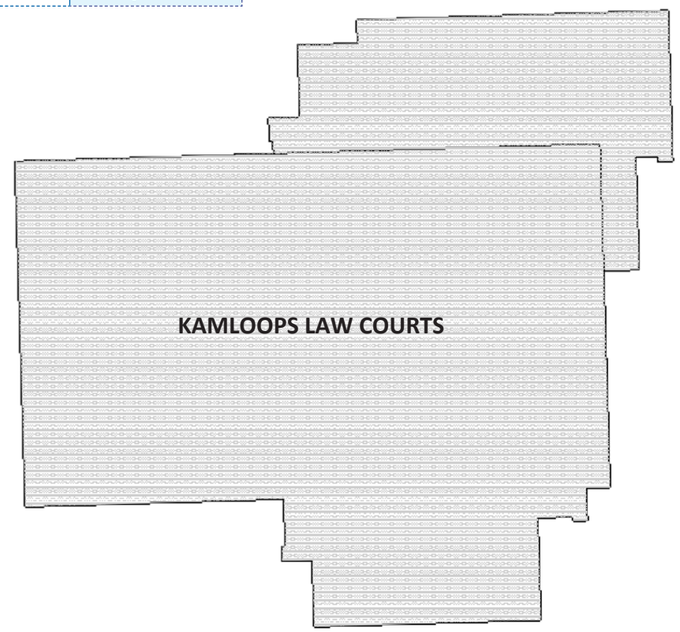
5.3 Option 3

Option 3 was presented at the April 2, 2024, Coordination Meeting where it was decided that this option would not be developed any further. More residential units and office space would be provided but livability and functionality would be compromised and this option would be more inefficient to build. This concept includes four 6-storey wood frame mixed use buildings with each building having a ground floor office space and residential units on floors 2-6.

Office Space	***GFA (ft²)***
Total	**+/- 42,975**

Residential Units	
One Bedroom	+/- 70
Two Bedroom	+/- 96
Three Bedroom	+/- 66
Total	**+/- 232**

Parking	
Underground	+/-131
Surface	+/- 56
Total Provided	**+/- 187**
Total Required	**+/- 319**
Parking Variance	**+/- 132**



FACTION

5.4 The Preferred Option

RENDERINGS ARE AN ARTISTIC INTERPRETATION FOR ILLUSTRATIVE PURPOSES ONLY

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC **June 2024**

Resulting from the April 23, 2024, meeting with the Attorney General's office, BCH confirmed that Option 1 does not need to be developed any further and that Option 2 should be further developed as the Preferred Option. The Preferred Option was further developed and underwent additional financial analysis. The Preferred Option consists of two buildings located around a central outdoor common area that includes, surface parking, a plaza area, and community gardens. Building 1 is located along the intersection of Columbia Street and 5th Avenue with office space at grade fronting the street. Building 2 has been set back from 5th Avenue and is located adjacent to Peterson Creek to create a buffer from the Kamloops Law Court.

General Site Layout

The site layout responds to the goal of creating a central common area and activity hub while also managing density and pedestrian and vehicular movements. The design emphasizes the pedestrian experience resulting in a layout that maximizes green space and outdoor amenity space. Building 1, which is the main interface with Columbia Street, is designed to create an urban street edge which will enhance the entrance into the Government Precinct. This treatment animates the street while satisfying the CoK's expectations and OCP policy for street fronting commercial uses within this central location. This helps emphasize pedestrian movements and creates an inviting space for residents and workers. Generous landscape buffers, which can include the CoK's multi-use path is the project's interface with 5th Avenue. The central plaza area fronting 5th Avenue also provides green space for residents and office workers to gather. The project's main access is from 5th Avenue and is located directly across from Kamloops Law Court 'Sally Port' to create an aligned entry way.

Massing

The approach to massing strategically distributes density to provide access, frame views and meet building code requirements. The massing profile breaks up the building volume and creates open spaces between buildings. This provides the opportunity for different uses and interfaces that relate to their immediate surroundings while creating views and accessibility into and through the site.

Program & Unit Mix

The program consists of office space at grade, 1-bedroom, 2-bedroom, and 3-bedroom units. An indoor amenity space is provided for residents in each building. The proposed building program and outdoor amenity spaces create an animated social atmosphere with a focus on workforce housing which is currently lacking within the Government Precinct.

Parking

Both buildings have an underground parking structure beneath the building footprint, this parking will for building residents. There are +/- 28 at grade parking spaces adjacent to each building which will be used for office workers during the workday and visitor parking on evenings and weekends to maximize the efficiency of the overall parking strategy. This option will require a parking variance of +/- 90 parking stalls.

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VIEW FROM PLAZA PARK - LOOKING NORTHEAST

RENDERINGS ARE AN ARTISTIC INTERPRETATION FOR ILLUSTRATIVE PURPOSES ONLY

VIEW FROM COMMUNITY GARDEN - LOOKING SOUTHWEST

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC June 2024

Building Height:	Maximum		Proposed
	40m	+/-	22.0m

Floor Area Ratio (FAR):	Maximum	Building 1 Proposed*		Building 2 Proposed*
	N/A	+/- 1.36		+/- 1.45

*Based on definition of FAR per City of Kamloops Zoning Bylaw No. 55

Parking Stalls:	Use		CoK Rate		Building 1 Required		Proposed	Building 2 Required		Proposed
	Residential[1]	1 Br & Greater	0.75	per unit	70	+/-	59	70	+/-	54
	Office[2]		3.0	per 100m^2	51	+/-	28	47	+/-	28
	Total				120	+/-	87	117	+/-	82

[1]Residential Variance Required. 0.85 stalls / unit proposed Phase 1 (±34 stalls). 0.77 stalls / unit proposed Phase 1 (±39 stalls).

[2]Office Variance Required. 1.66 stalls / 100m^2 GLA proposed Phase 1 (±23 stalls). 1.79 stalls / 100m^2 GLA proposed Phase 2 (±19 stalls).

Bicycle Parking:	Long-Term	CoK Rate		Building 1 Required		Proposed	Building 2 Required		Proposed
	Apartment Housing	0.5	per unit	47	+/-	47	47	+/-	47
	Commercial	0.4	per 100m^2	7	+/-	7	6	+/-	6
	Total			53	+/-	0	53	+/-	53

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AERIAL VIEW - LOOKING SOUTH

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC **June 2024**

Number & Breakdown of Units:

Building 1

Level	1-Bedroom		2-Bedroom Unit		2-Bedroom Accessible Unit		3-Bedroom Unit		Building Totals	
1	+/-	0	+/-	0	+/-	0	+/-	0	+/-	0
2	+/-	5	+/-	8	+/-	1	+/-	3	+/-	17
3	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
4	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
5	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
6	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
Unit Type Sub-total	+/-	25	+/-	44	+/-	5	+/-	19	+/-	93

Building 2

Level	1-Bedroom		2-Bedroom Unit		2-Bedroom Accessible Unit		3-Bedroom Unit		Building Totals	
1	+/-	0	+/-	0	+/-	0	+/-	0	+/-	0
2	+/-	5	+/-	8	+/-	1	+/-	3	+/-	17
3	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
4	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
5	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
6	+/-	5	+/-	9	+/-	1	+/-	4	+/-	19
Unit Type Sub-total	+/-	25	+/-	44	+/-	5	+/-	19	+/-	93

Floor Area:

Building 1

Level		Units (ft2)		Amenity (ft2)		Commercial (ft2)		Circ/Service (ft2)		GLA (m2)[1]		GLA (ft2)[1]		TRA (m2)[2]		TRA (ft2)[2]
1	+/-	0	+/-	0	+/-	18,131	+/-	3,200	+/-	1,982	+/-	21,330	+/-	1,684	+/-	18,131
2	+/-	12,356	+/-	1,500	+/-	0	+/-	2,289	+/-	1,500	+/-	16,145	+/-	1,287	+/-	13,856
3	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
4	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
5	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
6	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
Subtotal	+/-	68,552	+/-	1,500	+/-	18,131	+/-	13,873	+/-	9,481	+/-	102,055	+/-	8,191	+/-	88,183

Parkade

Level		GLA (m2)		GLA (ft2)
P1	+/-	1,982	+/-	21,330
Total (incl. Parkade)	+/-	11,463	+/-	123,385

Building 2

Level		Units (ft2)		Amenity (ft2)		Commercial (ft2)		Circ/Service (ft2)		GLA (m2)[1]		GLA (ft2)[1]		TRA (m2)[2]		TRA (ft2)[2]
1	+/-	0	+/-	0	+/-	16,851	+/-	2,974	+/-	1,842	+/-	19,825	+/-	1,566	+/-	16,851
2	+/-	12,356	+/-	1,500	+/-	0	+/-	2,289	+/-	1,500	+/-	16,145	+/-	1,148	+/-	12,356
3	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
4	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
5	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
6	+/-	14,049	+/-	0	+/-	0	+/-	2,096	+/-	1,500	+/-	16,145	+/-	1,305	+/-	14,049
Subtotal	+/-	68,552	+/-	1,500	+/-	16,851	+/-	13,647	+/-	9,341	+/-	100,550	+/-	7,934	+/-	85,403

Parkade

Level		GLA (m2)		GLA (ft2)
P1	+/-	1,842	+/-	19,825
Total (incl. Parkade)	+/-	11,183	+/-	120,375

[1] Alternative solution would be required to achieve Building Area (GFA) for Level 1.

[2] Total Residential Area (TRA) as defined per BC Housing Design Guildines.

RENDERINGS ARE AN ARTISTIC INTERPRETATION FOR ILLUSTRATIVE PURPOSES ONLY

VIEW FROM WEST - LOOKING EAST

5.4.1 Capital Budget & Operating Costs

An Opinion of Probable Cost, at the Class 'D' level, has been provided using unit rates from local data and a previous estimate prepared by SSA Quantity Surveyors Ltd. for BCH's 1100 Glenfair Drive project. The estimated construction cost reflects the current construction industry market conditions for the size and type of project in Kamloops. It has been assumed that the work will be delivered on a Design-Bid-Build (DBB) or a Design-Build (DB) basis. It was assumed that the majority of the scope will be competitively tendered to a minimum of 3 contractors, where each trade contract is bid on a competitive stipulated price basis. It is also predicated upon the assumption that the project will be bid with normal and reasonable market conditions and that any unforeseen, aberrant, or abnormal market conditions are not contemplated in the estimate. The estimate is an opinion of fair market value for the construction of the project with a fall 2025 start date and does not attempt to predict a low bid value. This estimate has been developed at a Class D level and carries a risk of ±30%, 18 times out of 20. Project Cost assumptions assume a BCH development, funding approval process, and Step Code Level 3 project.

Operating Costs
While many operating decisions are made in later project phases, it is important to keep these details in mind early in the planning process. This is especially important for a complex project that includes a variety of users and is built in multiple phases. As the project nears construction, more operating details will be understood, and the operating cost projections and budgets can be refined.

Operating Cost Estimate	Per Unit / Month
Snow removal	$17.92
Landscaping	$8.96
Property Taxes	$134.41
Water and Sewer	$26.88
Utilities	$14.18
Insurance	$44.80
Legal and Administrative	$4.48
Management	$31.36
Repairs and Maintenance	$40.00
Garbage Collection	$5.00
Elevator Maintenance	$9.68
Contingency/Replacement Reserve	$75.00
Total (2024)	**$413**
Total Adjusted for Inflation (2029)	**$459**

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC **June 2024**

5.4.2 Pro Forma & Financial Analysis

Developed in 2 Phases

BCH requested that financial analysis be undertaken to test how the project performs with 80% of the units at market rents and 20% of the units rented at 80% of market rents. The Project must be implementable and operate self sufficiently without the need for ongoing operating subsidies. This analysis models performance assuming the project is developed in two-year increments with a fall 2025 construction start for Phase A and construction concluding on Phase B in 2029. BCH has been provided the working pro forma so that other rental scenarios can be examined as the project progresses.

This section overviews how developing the project in phases with two-year increments would perform. This approach demonstrates the required capital contribution with the following parameters:

- 80% of the units at market rents and 20% of the units rented at 80% of market rents
- All offsite works completed with Phase A
- Phase A - Fall 2025 construction start / Phase B - Fall 2027 construction start
- 2% Residential Vacancy Rate & 0% Office Vacancy Rate

Rental Rates

		HILS		65% of Market		80% of Market		Market (at Occupancy 2030)	
	Total	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent
1 Bed	50	0	$ -	0	$ 1,305	10	$ 1,606	40	$ 2,007
2 Bed	88	0	$ -	0	$ 1,650	18	$ 2,030	70	$ 2,538
2 Bed Accessible	10	0	$ -	0	$ 1,650	2	$ 2,030	8	$ 2,538
3 Bed	38	0	$ -	0	$ 2,095	8	$ 2,579	30	$ 3,223
	186	**0**	**$ -**	**0**	**$ -**	**38**	**$ 77,291**	**148**	**$ 374,931**

Annual Income Summary

	Office Revenue	$	1,788,543
	Res Revenue	$	5,239,339
less	Vacancy Allowance	-$	104,787
less	Op Costs Residential	-$	1,001,946
less	Op Costs Office	-$	426,600
	Annual Income Before debt	***$***	***5,494,549***
less	Debt Service		-$4,983,742
	Net Cashflow	***$***	***510,807***

Area and Cost Assumptions

Gross Area Residential (ft²)	161,450
Gross Area Commercial (ft²)	41,155
Gross Area Under Bldg parking (in res GFA)	41,155

Capital Cost Summary

Acquisition	$	-
Hard Costs	$	90,683,306
Soft Cost	$	16,322,995
Offsites and Servicing	$	5,200,000
contingencies	$	11,220,630
Total Project Cost (before GST)	$	123,426,932

Equity Summary

Land	$	-
	$	-
	$	-
Grant/BC Housing Capital Contribution	$	35,900,000

Debt Service Summary Total

Principal for Debt Service	$	87,526,932
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$4,983,742

Debt Service Summary Residential

Principal for Debt Service	$	76,367,345
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$4,348,321

Debt Service Summary CITZ

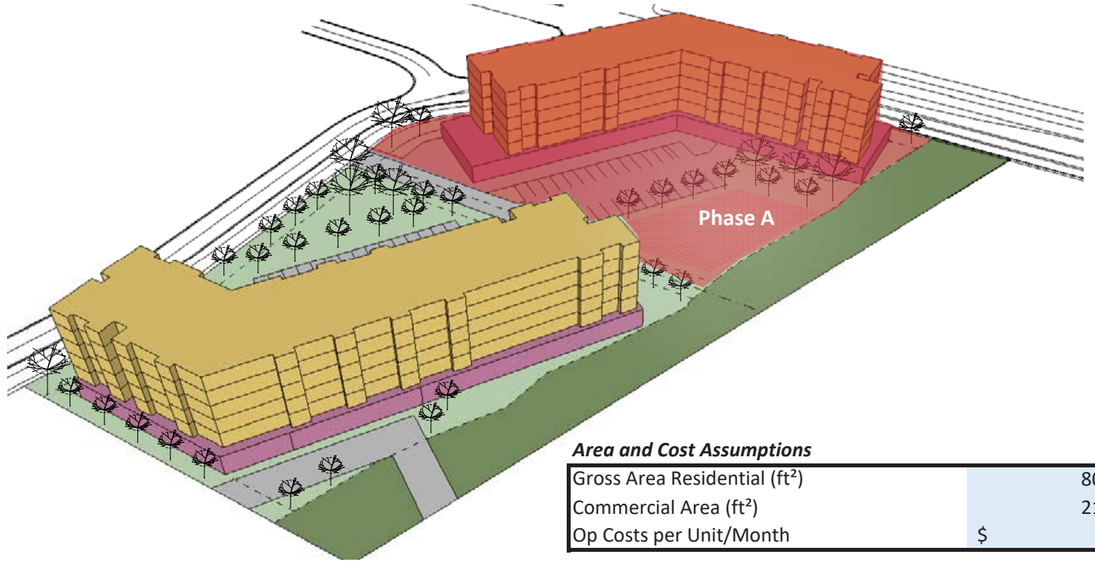
Principal for Debt Service	$	11,159,586
Amortization (Years)		35

Analysis

Capital Cost Per Unit	$	663,586
BC Housing Capital Cost Contribution Per Unit	$	193,011
Percentage of BC Housing Equity Contribution (not including land)		29%
Percentage of BC Housing Equity Contribution (including land)		29%
Annual Operating Surplus (after debt service) Per Unit	$	2,746
Total Debt Coverage Ratio		110%

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC **June 2024**



Phase A

This section overviews how developing Phase A, as the first phase of development, performs and demonstrates the capital contribution required with the following parameters:

- 80% (74 units) - Market Value Rents
- 20% (19 units)- 80% of Market Rents
- Office Lease Rate of $33.25 per ft² to achieve a 110% Debt Coverage Ratio
- Fall 2025 start of construction and 2027 Occupancy

Rental Rates

		HILS		65% of Market		80% of Market		Market (at Occupancy 2028)	
	Total	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent
1 Bed	25	0	$ -	0	$ 1,242	5	$ 1,433	20	$ 1,910
2 Bed	44	0	$ -	0	$ 1,570	9	$ 1,812	35	$ 2,415
2 Bed Accessible	5	0	$ -	0	$ 1,570	1	$ 1,812	4	$ 2,415
3 Bed	19	0	$ -	0	$ 1,994	4	$ 2,301	15	$ 3,068
	93	**0**	**$ -**	**0**	**$ -**	**19**	**$ 34,484**	**74**	**$ 178,432**
		0%		0%		20%		80%	

Feasibility Summary - Residential

	Project Capital Cost	$ 50,438,574
less	BC Builds Equity (100% to residential)	-$ 18,400,000
	Principal for debt service	$ 32,038,574
	Res Revenue	$ 2,554,996
less	vacancy allowance	-$ 51,100
less	Op cost	-$ 489,587
	Annual Income before debt	***$ 2,014,309***
less	debt service	-$1,824,261
	Net Cashflow	***$ 190,048***
	DCR	110%
	Operating subsidy Per Unit	$ 2,044

Feasibility Summary - Office

	Project Capital Cost			$ 11,159,586
less	BC Builds Equity (100% to res)			$ -
	Principal for debt service			$ 11,159,586
Revenue Base Rent		$	33.25	$ 709,223
Tenant recoverable op costs				$ 202,635
less	vacancy allowance			$ -
less	Op cost	$	10.00	-$ 213,300
	Annual Income before debt			***$ 698,558***
less	debt service			-$635,422
	Net Cashflow			***$ 63,136***
				110%

Analysis

Capital Cost Per Unit	$	662,346
BC Housing Capital Cost Contribution Per Unit	-$	197,849
Percentage of BC Housing Equity Contribution (not including land)		30%
Percentage of BC Housing Equity Contribution (including land)		30%
Annual Operating Surplus (after debt service) Per Unit	$	2,044
Total Debt Coverage Ratio		110%

Area and Cost Assumptions

Gross Area Residential (ft²)		80,725
Commercial Area (ft²)		21,330
Op Costs per Unit/Month	$	439

Capital Cost Summary

Acquisition and Servicing	$	-
Class D Hard Cost	$	44,151,125
Soft Costs	$	7,947,203
Offsites and Servicing	$	3,900,000
Contingencies	$	5,599,833
Total Project Cost*	**$**	**61,598,160**

Equity Summary

Land	$	-
	$	-
	$	-
Grant/BC Housing Capital Contribution	$	18,400,000

Debt Service Summary Total

Principal for Debt Service	$	43,198,160
Ammortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$2,459,683

Debt Service Summary Residential

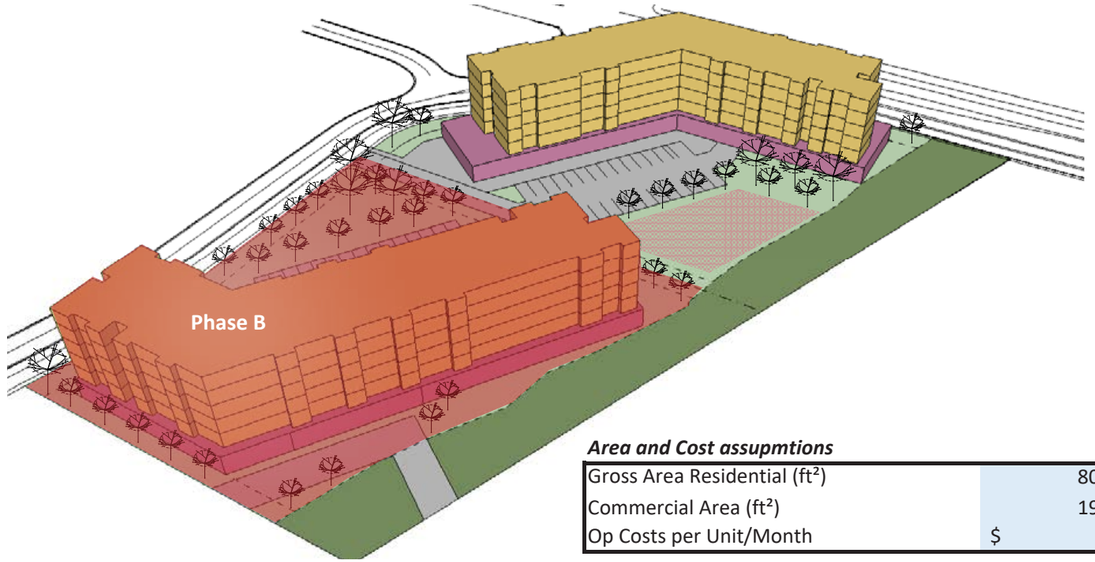
Principal for Debt Service	$	32,038,574
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$1,824,261

Debt Service Summary CITZ

Principal for Debt Service	$	11,159,586
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$635,422

523 Columbia Street - Feasibility Analysis (Phase 1)

Kamloops, BC **June 2024**



Phase B

This section overviews how developing Phase A, as the first phase of development, and demonstrates the capital contribution required with the following parameters:

- 80% (74 units) - Market Value Rents
- 20% (19 units)- 80% of Market Rents
- Office Lease Rate of $34.00 per ft² to achieve a 110% Debt Coverage Ratio
- Fall 2027 start of construction and 2029 Occupancy

Rental Rates

		HILS		65% of Market		80% of Market		Market (at Occupancy 2030)	
	Total	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent	Units	Monthly Rent
1 Bed	25	0	$ -	0	$ 1,305	5	$ 1,505	20	$ 2,007
2 Bed	44	0	$ -	0	$ 1,650	9	$ 1,903	35	$ 2,538
2 Bed Accessible	5	0	$ -	0	$ 1,650	1	$ 1,903	4	$ 2,538
3 Bed	19	0	$ -	0	$ 2,095	4	$ 2,418	15	$ 3,223
	93	**0**	**$ -**	**0.00**	**$ -**	**19**	**$ 36,230**	**74.00**	**$ 187,465**
		0%		0%		20%		80%	

Area and Cost assupmtions

Gross Area Residential (ft²)		80,725
Commercial Area (ft²)		19,825
Op Costs per Unit/Month	$	459

Capital Cost Summary

Acquisition and Servicing	$	-
Class D Hard Cost	$	46,532,181
Soft Costs	$	8,375,793
Offsites and Servicing	$	1,300,000
Contingencies	$	5,620,797
Total Project Cost*	**$**	**61,828,771**

Equity Summary

Land	$	-
	$	-
	$	-
Grant/BC Housing Capital Contribution	$	17,500,000

Debt Service Summary Total

Principal for Debt Service	$	44,328,771
Ammortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$2,524,059

Debt Service Summary Residential

Principal for Debt Service	$	33,709,612.04
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$1,919,409

Debt Service Summary CITZ

Principal for Debt Service	$	10,619,159
Amortization (Years)		35
Rate (2027 BCH Rate)		4.52%
Annual Debt Service		-$604,650

Feasibility Summary - Residential

	Project Capital Cost		$ 50,438,574
less	BC Builds Equity (100% to residential)		-$ 17,500,000
	Principal for debt service		$ 32,938,574
	Res Revenue		$ 2,684,343
less	vacancy allowance		-$ 53,687
less	Op cost		-$ 512,359
	Annual Income before debt		***$ 2,118,297***
less	debt service		-$ 1,919,409
	Net Cashflow		***$ 198,888***
	DCR		110%
	Operating subsidy Per Unit		$ 2,139

Feasibility Summary - Office

	Project Capital Cost			$ 10,619,159
less	BC Builds Equity (100% to res)			$ -
	Principal for debt service			$ 10,619,159
Revenue Base Rent		$	34	$ 674,050
Tenant recoverable op costs				$ 202,635
less	vacancy allowance			$ -
less	Op cost	$	10	-$ 213,300
	Annual Income before debt			***$ 663,385***
less	debt service			-$ 604,650
	Net Cashflow			***$ 58,735***
				110%

Analysis

Capital Cost Per Unit	$	664,825
BC Housing Capital Cost Contribution Per Unit	-$	188,172
Percentage of BC Housing Equity Contribution (not including land)		28%
Percentage of BC Housing Equity Contribution (including land)		28%
Annual Operating Surplus (after debt service) Per Unit	$	2,139
Total Debt Coverage Ratio		110%

FACTION

5.4.3 Cash Flow Analysis

A cash flow analysis was generated to help BCH project their cash inflows and outflows as the project is developed over time between 2024-2029. The financing strategy outlines how the project can be financed while under construction.

Capital Cost Cash Flow								Project Cost Summary
	2024	2025	2026	2027	2028	2029	2030	
Building 1								
Hard Costs	$-	$22,075,563	$22,075,563					$44,151,125
Soft Costs	$3,973,601	$1,986,801	$1,986,801					$7,947,203
Contingencies	$-	$2,799,916	$2,799,916					$5,599,833
Offsite	$-	$2,925,000	$975,000					$3,900,000
Building 2								
Hard Costs	$-	$-	$12,098,367	$17,216,907	$17,216,907			$46,532,181
Soft Costs	$-	$1,046,974	$4,187,896	$2,093,948	$1,046,974			$8,375,793
Contingencies	$-	$-	$-	$2,810,399	$2,810,399			$5,620,797
Offsite	$-	$-	$338,000	$481,000	$481,000			$1,300,000
Project Cost Summary	**$3,973,601**	**$30,834,254**	**$44,461,543**	**$22,602,254**	**$21,555,280**			**$123,426,932**
Financing Strategy								
BCH Contribution	$3,973,601	$15,473,373	$16,453,026	$-	$-			$35,900,000
Financing	$-	$15,360,881	$28,008,517	$22,602,254	$21,555,280			$87,526,932

5.4.4 Operating Analysis

An operational cash flow was generated to illustrate the net cash flow that accounts for revenues, operating expenses and debt servicing as the project is developed over time (2025-2030). It's important to reiterate that the DCR increases over time as the development stabilizes, this is due to rising rents more than offsetting increases in operating costs. The ultimate rent structure can be modified to provide a broader mix of below market rents, or should BCH wish to dedicate less capital to the project more units rented at market value can be introduced to improve performance.

Operational Cash Flow							
	2024	2025	2026	2027	2028	2029	2030
Income							
Building 1 Residential				$2,554,996	$2,618,871	$2,684,343	$2,751,451
Building 1 Commercial				$911,858	$911,858	$911,858	$911,858
Building 2 Residential						$2,684,343	$2,751,451
Building 2 Commercial						$876,685	$876,685
Total Income				**$3,466,854**	**$3,530,729**	**$7,157,228**	**$7,291,445**
Operating Expenses & Vac. Allowance							
Building 1				-$753,987	-$772,837	-$792,158	-$811,962
Building 2						-$779,346	-$798,829
Total Expenses				**-$753,987**	**-$772,837**	**-$1,571,503**	**-$1,610,791**
Debt Service							
Building 1				-$2,459,683	-$2,459,683	-$2,459,683	-$2,459,683
Building 2						-$2,524,059	-$2,524,059
Total Debt Service				**-$2,459,683**	**-$2,459,683**	**-$4,983,742**	**-$4,983,742**
Net Cash Flow				**$253,184**	**$298,209**	**$601,983**	**$696,912**
DCR				**110%**	**112%**	**112%**	**114%**

5.4.5 Sensitivity Analysis

The following sensitivity analysis plays an important role in analyzing how the project will perform over time or how certain changes can impact the project's financial performance. The sensitivity analysis was run on the entire project assuming that it is developed in four separate phases. This sensitivity analysis explored the following key variables:

- Funding / Interest rates
- Rental Revenue / Capital Costs

The following analysis shows the impact that changes in these metrics have on the assumed annual operating surplus of +/-$ 2,746 per unit.

Funding / Interest rates

Interest rates remained low for many years but increased significantly over the past few years. Rates will start to gradually come down leading up to construction and should stabilize. The coming years will likely continue to be volatile for the inflation and interest rate environment. Although the adjacent table shows what could happen if interest rates decrease, the most likely scenario is that they hold over time but the impact of this should be muted by debt levels decreasing over time. If interest rates increase again, this would have a negative impact on the operating budget as rental apartment buildings are very sensitive to interest rates. If Interest rates increase slightly or hold, this will be mitigated by decreasing debt levels and the likelihood of offsetting rental increases tied to inflation. Should this project receive a smaller grant than anticipated, the required operating surplus could become an operating deficit. Delivering a successful affordable rental housing project will require a large capital grant but this model does not require an operating subsidy. The BCH Capital Contribution is $35,900,000 and the baseline interest rate is assumed to be 4.52%.

% Change in Interest Rates

% Change in Capital Grant/ other sources of funding		**-50%**	**-25%**	**0%**	**25%**	**50%**
	-50%	$6,080	$1,848	-$2,749	-$7,675	-$12,888
	-25%	$8,076	$4,205	-$1	-$4,508	-$9,278
	0%	$10,072	$6,561	**$2,746**	-$1,341	-$5,668
	25%	$10,871	$7,503	$3,845	-$75	-$4,224
	50%	$12,069	$8,917	$5,494	$1,825	-$2,058

Rental Revenue / Capital Costs

A certain rental rate needs to be realized to justify undertaking the project, and as outlined, the anticipated rental revenues show that the project is viable. Changes in both Rental Revenues and Capital Costs can improve or impact the viability of the project. In tight rental markets, Rental Revenues generally increase over time, so the risk of decreasing rental revenues is minimal. If Rental Revenues do decrease, that would likely be a factor of higher than anticipated vacancy rates. Over time it's likely that rental rates will increase. Escalation in Capital Costs over time is likely, and the longer it takes to make the decision to move forward with the project, the higher the eventual Capital Costs will be. This is an important consideration as all projects are sensitive to increases in capital costs.

% Change in Capital Costs

% Change in Rental Revenue		**-10%**	**-5%**	**0%**	**5%**	**10%**
	-10%	$3,708	$1,819	-$71	-$1,960	-$3,849
	-5%	$5,116	$3,227	$1,338	-$551	-$2,441
	0%	$6,525	$4,635	**$2,746**	$857	-$1,032
	5%	$7,933	$6,044	$4,155	$2,265	$376
	10%	$9,342	$7,452	$5,563	$3,674	$1,785

5.5 Financial Considerations Summary

As summarized in the Risk Management Plan, BCH will be taking on risk while moving forward with the project. Risks will need to be managed appropriately to ensure that the project's maximum value is achieved, and funding strategies are successful. The following financial considerations are central to all project assumptions and were considered while developing the concepts. They are crucial to the project's economic and financial success and must be monitored as the project progresses. The pro forma is a 'living' document that will be updated as the project progresses. There are certain metrics that can have a significant impact on the project budget and proforma that should be taken into consideration. A few notable factors include:

Construction Cost Escalation
An annual allowance of 2% has been included. This allowance, when included, is a reserve of funds to cover possible price increases from the time that the estimate is prepared to the time that the project is tendered. We have assumed that Phase A will tender in Fall 2025. Construction Costs have seen significant escalation over the past few years, it is anticipated delays will result in further cost escalation which will make the project more difficult to deliver over time.

Rent Increases
Rental rates are also anticipated to increase over time, but those rental increases won't have as significant of an impact as the increase in construction costs.

Parking Provision - 'There is no such thing as free parking'
Finding the appropriate amount of parking has been a central theme for this project. Having to provide additional parking or meet the CoK's parking requirements could mean there is less space onsite for other forms of programming / amenities and the costs associated with constructing additional parking stalls are significant.

BCH Funding Availability
Redeveloping the site will be a significant capital undertaking, it will be important for BCH to consider how much capital can be allocated to this project in the context of other strategic redevelopment opportunities. The availability of capital and the relative importance of this project will need to be taken into consideration with BCH's broader investment priorities as this could have an impact on the project schedule moving forward.

Design Details
There are many minor design details that can help facilitate the successful long-term management and maintenance of the project. Applying a property management filter as the design progresses will result in a project that is practical to manage and maintain. This will include details about how common areas are designed, where janitorial closets are located, and how waste is managed. BCH has the benefit of witnessing operational issues with their previous projects. This historic experience will also help inform design decisions as this project progresses.

Life Cycle Cost Analysis
BCH has a long history of designing and constructing quality, innovative building projects. In continuing this tradition, BCH still works to ensure that new and renovated buildings meet residents' needs as effectively and efficiently as possible. This is especially important as over 30 years of a building's life, the present value of maintenance, operations, and utility costs is nearly as great as the initial project costs. Cost-effectiveness is a key component of design for BCH. The long-term cost implications of building projects, however, range far beyond initial design and construction expenses. As the housing stock that BCH owns continues to grow, age, and become more diverse, the cumulative cost of subsidizing, operating, and maintaining facilities significantly impacts the overall budget. In turn, to improve the cost-effectiveness of its building and renovation programs, BCH invests in designs and systems with improved long-term performance by building to the BC Energy Step Code. It is imperative to consider not only the "first costs" of a building (design and construction expenses) but also long-term costs, including utilities, operations, and maintenance. During the Schematic/Design Development phases, the Steering Committee makes increasingly detailed decisions about the final design for the building, including; Mechanical, Electrical, Structural, Telecommunications, and Plumbing systems. During this period, the project manager should work with the Steering Committee to conduct a series of analyses comparing the costs of various building system options with the goal of delivering an affordable housing project with appropriate break-even horizon.

5.6 Phasing & Relocation Strategy

The project has been planned to allow for two phases of development. From a design and delivery perspective developing all phases concurrently would be the most cost-effective approach. Construction costs are likely to be greater in a phased project for the following reasons:

- Inflation is likely to impact construction costs.
- Efficiencies in grading attributable to balancing cut and fill areas might be unavailable.
- Contractors are likely to be more competitive on a larger project.
- The same general contractor may be unavailable for later phases of the development, and subcontractors must be reassembled (pursuant to a new bidding process) at one or more later dates.

Although less efficient, a phased approach is required in order to accommodate existing office tenants and is more realistic due to the significant project budget required for full build-out of both Phase A & B. Although there are a few approaches to deliver the project in phases, the suggested approach is outlined below and based on the assumption that BCH will be responsible for both phases.

Begin with Phase A at the North End of the Site

This approach would involve clearing two existing buildings to create the construction and staging area. This approach would involve the following details:

- Construction access can be limited to a single location along the informal 5th Avenue road adjacent to the Site.
- Road and offsite water and sanitary improvements completed with Phase A.
- Temporary servicing plan will be required to allow existing Government Precinct building to remain operational during construction.
- The two buildings located within Phase B will need to be retained until Phase A receives occupancy and the tenants within Phase B office buildings can relocate to Phase A. Once this move is complete the two buildings within Phase B can be demolished to prepare for construction in 2027.

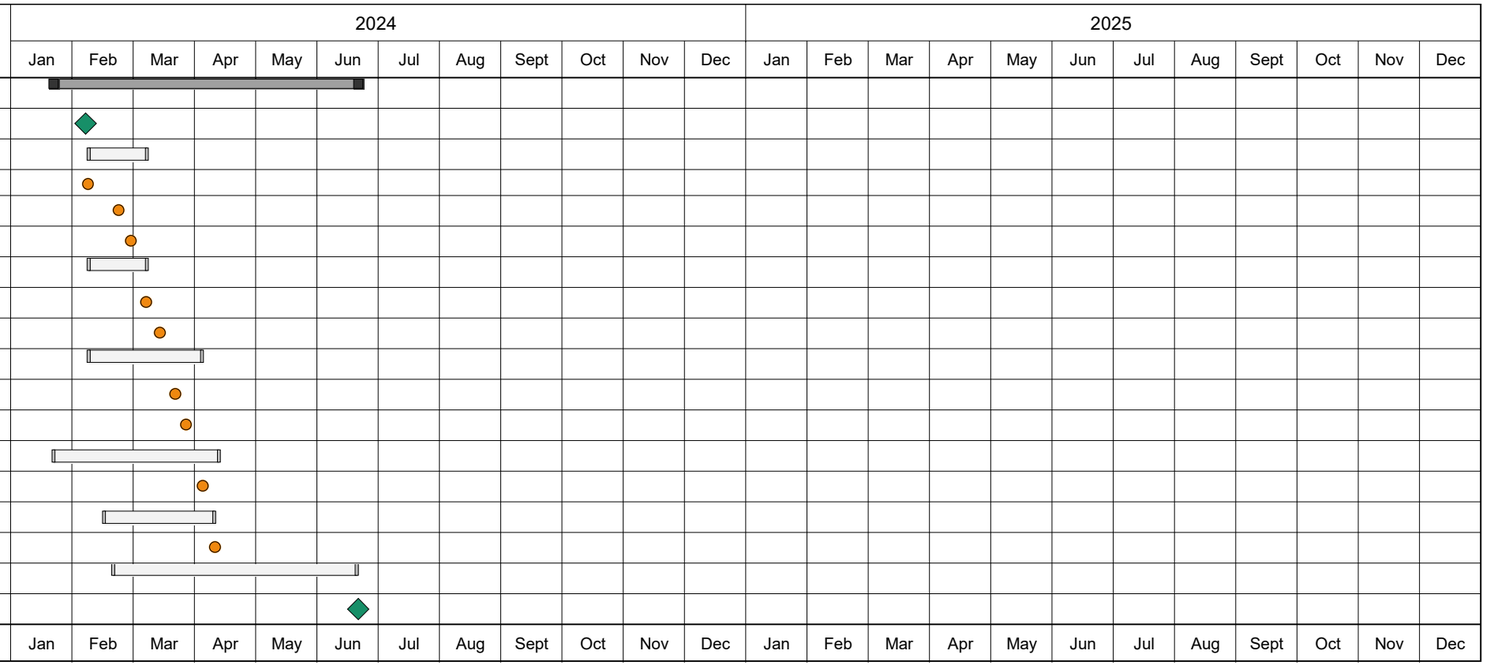
5.7 Risk Identification & Analysis

	IDENTIFY RISKS						MITIGATION
	Description of Risk (Identify the risk and the impact or effect of the risk)	**Risk Category**	**L 1-5**	**C 1-5**	**Risk**	**Current Risk Level**	**Mitigation Strategies**
1	Development permit applications could be delayed by CoK, leading to re-design, delays, cost overruns.	Political, Financial & Schedule	4	4	16	HIGH	City officials and Steering Committee to collaborate closely on the project. Work with the CoK to address any outstanding concerns.
2	Land transfer from CITZ to BCH is delayed or does not proceed.	Schedule / Financial	4	4	16	HIGH	This project relies on the strategic partnership of BCH and CITZ with both parties coming to the table with a best efforts approach to moving the project forward.
3	Proposed Servicing & Transportation Plan not acceptable to CoK and / or CITZ.	Financial & Schedule	4	4	16	HIGH	Work with the CoK and CITZ to address emerging and any outstanding concerns.
4	Funding may not be adequate to meet project objectives. Constructions costs and inflation are continually increasing.	Financial	4	4	16	HIGH	An innovative and efficient project can be delivered within the budget based on identified scope and suggested funding but economic and inflationary pressures must be monitored and planned for.
5	Community Acceptance	Approval & Schedule	3	3	14	HIGH	Community support will be crucial as the project moves forward. The Steering Committee will monitor progress and identify concerns if they arise.
6	The level of density supported by the stakeholders may not support the project costs.	Approval / Schedule / Financial	3	2	6	MEDIUM	Lead Consultant Team will be very mindful of project costs and proforma analysis and will inform the Steering Committee of concerns as the project progresses.
7	Soil conditions could be unsuitable and may require specialized treatment resulting in possible cost overruns.	Site Selection	3	2	6	MEDIUM	A geotechnical investigation has been completed for the concept options; further and more detailed analysis will be required.
8	Ground conditions may contain bio- hazards/chemical hazards could lead to delays and additional removal costs.	Site Selection	3	2	6	MEDIUM	An Environmental Assessment has been completed and ongoing monitoring is recommended.
9	Construction delays from lack of skilled workers, materials delay could disrupt the construction schedule resulting in delays.	External Environment	3	2	6	MEDIUM	Hiring of qualified CM contractor with access to major trades subcontractors.
10	AOA reveals that the Site is considered to be of archeological significance.	Site Selection	3	2	6	MEDIUM	Continue to work with Ttes on the assessment and field review.
11	Maintaining utility services during construction will require planning and oversight.	Operations	2	2	4	LOW	Utility locates have been documented. Phased connections to buildings will minimize impacts.
12	Fire or property damage during construction could lead to loss of assets, time delays, additional costs.	Constructions	2	2	4	LOW	Additional insurance to cover property loss as required by BCH. Contractors will provide on-site security, training, and safety.
12	May be requested to raise operating capital and operations oversight from the community.	Financial/Operations	1	1	3	LOW	The Kamloops Housing Operator group could be limited, and they may not have the capacity to oversee and operate new buildings. BCH to continue to work with potential operators.

5.8 Phase 1 - Project Schedule

Phase 1 - Project Schedule
Phase 1 of the project was delivered as outlined in the schedule below.

Activity Name	Duration (Weeks)	Start Date	Finish Date
1.0 Feasibility Analysis	**0.80**	**24-1-22**	**24-6-21**
.1 Startup Meeting	0.00	24-2-7	24-2-7
.2 Background and Site Snalysis	4.00	24-2-9	24-3-7
Steering Committee Meeting	0.00	24-2-9	24-2-9
Steering Committee Meeting	0.00	24-2-23	24-2-23
Coordination Meeting	0.00	24-2-29	24-2-29
.3 Option Identification, Opportunities and Constraints	4.00	24-2-9	24-3-7
Steering Committee Meeting	0.00	24-3-8	24-3-8
Coordination Meeting	0.00	24-3-15	24-3-15
.4 Option Development (3 options)	8.00	24-2-9	24-4-4
Steering Committee Meeting	0.00	24-3-22	24-3-22
Coordination Meeting	0.00	24-3-28	24-3-28
.5 Develop Supporting Technical Documentation and Proforma Analysis	12.00	24-1-22	24-4-12
Steering Committee Meeting	0.00	24-4-5	24-4-5
.6 Stakeholder Engagement Process Planning	7.80	24-2-16	24-4-10
Coordination Meeting	0.00	24-4-11	24-4-11
.7 Draft Summary Report ...	**0.60**	**24-2-20**	**24-6-20**
.8 Final Summary Report	0.00	24-6-21	24-6-21



6.0 Summary & Next Steps

The Lead Development Consultant has undertaken a comprehensive Feasibility Analysis that has allowed the Steering Committee to better understand the planning framework, site features, design strategies, cost framework and concept options that should be considered for the Site's redevelopment. By undertaking this process, the Steering Committee is now well equipped to move forward with Phase 2 of this project with a solid foundation of information that hadn't previously been analyzed, understood or pulled together in a comprehensive report. A few prominent themes will be central to the process moving forward and will need to be further refined and agreed upon as the project progresses, they are as follows:

Land Transfer & Building Demolition
BCH and CITZ must continue to work collaboratively to reach mutually agreeably terms for the anticipated land transfer and to commence demolition of the two buildings within Phase A prior to July.

Servicing & Access
The proposed servicing and transportation plans were developed by WSP in consultation with the Steering Committee, but further conversations will need to be held as the design progresses. It is recommended that CITZ and BCH be prepared to dedicate the 5th Avenue road allowance adjacent to the Site and potentially a portion of the Peterson Creek Riparian Management Area. This will help to formalize private vs. public areas and the CoK would assume responsibility for maintenance. More formal conversations will also need to be held with the Steering Committee to discuss the implications and costs associated with the proposed servicing and access strategies.

Parking Variance
A parking variance has been proposed in order to achieve Transportation Demand Management strategies within the Columbia Precinct and Downtown Core. The form of development, transportation improvements and extension of the MUP adjacent to the Site will help provide transportation alternatives. This parking variance will increase approval risk and should be monitored and supported with a strong strategy and rationale in the DP submission package.

Peterson Creek Bridges
The survey indicates there is currently one vehicle and two pedestrian bridges that cross Peterson Creek for access to the Site. Understanding whether the vehicle bridge can remain is important as it has an impact on the site layout and potentially the project budget if it needs to be upgraded or removed. Preliminary discussions between BCH and the Ministry of Water, Land and Resources Stewardship have indicated that these bridges may need to be removed as part of the Riparian Areas Protection Regulation permitting.

Archeological Overview Assessment
By working closely with Ttes on the AIA, BCH can be well informed and positioned as the assessment progresses.

Project Costs & Proforma
This Feasibility Analysis has been completed during a volatile time for the construction and development industry. Inflation and interest rates are changing monthly and need to be monitored closely as the project progresses. This is a large project that will be impacted by these external factors.

The Steering Committee will need to be cognizant of these main factors as the project moves forward.

BC HOUSING MANAGEMENT COMMISSION

HOUSING DEVELOPMENT, 523 COLUMBIA STREET, KAMLOOPS, BC

GEOTECHNICAL ENGINEERING ASSESSMENT REPORT

JULY 31, 2024

HOUSING DEVELOPMENT, 523 COLUMBIA STREET, KAMLOOPS, BC

GEOTECHNICAL ENGINEERING ASSESSMENT REPORT

BC HOUSING MANAGEMENT COMMISSION

GEOTECHNICAL ENGINEERING ASSESSMENT REPORT (REV. 0)

PROJECT NO.: CA0014660.3828

DATE: JULY 31, 2024

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July 31, 2024

BC Housing Management Commission
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Attention: Robyn Gerry c/o: Douglas Randell & Aamir Ahmad - WSP Kamloops Office

Subject: Geotechnical Engineering Assessment Report - Housing Development, 523 Columbia Street, Kamloops, BC

As requested, WSP Canada Inc. (WSP) has prepared this geotechnical engineering assessment report for the above-referenced project site in Kamloops, BC. This report has been prepared in general accordance with our proposal (Reference Number: 2023CA127331, Rev. 1), dated March 28, 2024. Authorization to proceed with the scope of work discussed in the proposal was received from BC Housing Management Commission (the Client) on April 2, 2024.

Our geotechnical scope of services for this project did not include a geohazard assessment, flood hazard assessment, assessment of the site soil or groundwater with respect to environmental considerations, or assessment/recommendations for any off-site works required as part of the proposed development.

Yours truly,

WSP Canada Inc.

Per: Marisa Loude, AScT, PMP, LEED Green Assoc.
Consulting Geotechnical Engineering Technologist

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REVISION HISTORY

FIRST ISSUE

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Consulting Geotechnical Engineering Technologist

July 31, 2024

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July 31, 2024

Engineers & Geoscientists BC Permit # 1000200

STATEMENT OF LIMITATIONS

WSP Canada Inc. (“WSP”) prepared this report solely for the use of the intended recipient, BC Housing Management Commission, in accordance with the professional services agreement between the parties. In the event a contract has not been executed, the parties agree that the WSP General Terms for Consultant shall govern their business relationship which was provided to you prior to the preparation of this report.

The report is intended to be used in its entirety. No excerpts may be taken to be representative of the findings in the assessment.

The conclusions presented in this report are based on work performed by trained, professional and technical staff, in accordance with their reasonable interpretation of current and accepted engineering and scientific practices at the time the work was performed.

The content and opinions contained in the present report are based on the observations and/or information available to WSP at the time of preparation, using investigation techniques and engineering analysis methods consistent with

those ordinarily exercised by WSP and other engineering/scientific practitioners working under similar conditions, and subject to the same time, financial and physical constraints applicable to this project.

WSP disclaims any obligation to update this report if, after the date of this report, any conditions appear to differ significantly from those presented in this report; however, WSP reserves the right to amend or supplement this report based on additional information, documentation or evidence.

WSP makes no other representations whatsoever concerning the legal significance of its findings.

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In preparing this report, WSP has relied in good faith on information provided by others, as noted in the report. WSP has reasonably assumed that the information provided is correct and WSP is not responsible for the accuracy or completeness of such information.

WSP disclaims any responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions /or costs.

Benchmark and elevations used in this letter are primarily to establish relative elevation differences between the specific testing and/or sampling locations and should not be used for other purposes, such as grading, excavating, construction, planning, development, etc.

Design recommendations given in this report are applicable only to the project and areas as described in the text and then only if constructed in accordance with the details stated in this report. The comments made in this report on potential construction issues and possible methods are intended only for the guidance of the designer. The number of testing and/or sampling locations may not be sufficient to determine all the factors that may affect construction methods and costs. We accept no responsibility for any decisions made or actions taken as a result of this report unless we are specifically advised of and participate in such action, in which case our responsibility will be as agreed to at that time.

Overall conditions can only be extrapolated to an undefined limited area around these testing and sampling locations. The conditions that WSP interprets to exist between testing and sampling points may differ from those that actually exist. The accuracy of any extrapolation and interpretation beyond the sampling locations will depend on natural conditions, the history of Site development and changes through construction and other activities. In addition, analysis has been carried out for the identified physical parameters only, and it should not be inferred that other physical conditions are not present. WSP cannot warrant against undiscovered environmental liabilities or adverse impacts off-Site based on the results this geotechnical investigation.

The original of this digital file will be kept by WSP for a period of not less than 10 years. As the digital file transmitted to the intended recipient is no longer under the control of WSP, its integrity cannot be assured. As such, WSP does not guarantee any modifications made to this digital file subsequent to its transmission to the intended recipient.

This limitations statement is considered an integral part of this report.

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1 SITE AND PROJECT DESCRIPTION

1.1 SITE DESCRIPTION

The site is comprised of four lots currently identified as 523 Columbia Street, located at the south-west corner of the intersection of Glenfair Drive and Columbia Street in Kamloops, BC. The site is currently occupied by four buildings surrounded by asphalt-surfaced driveway and parking areas. A garden is present in the north-east corner, there is a landscaped area on the north side of the site, and large trees line the eastern site boundary. The site and surrounding area slope gently downwards from south to north.

The site is bordered by Peterson Creek with an associated riparian area and Glenfair Drive on the east side. The south and west sides of the site are bordered by developed sites. Columbia Street borders the north side of the site. The site is surrounded by government, residential, and commercial buildings, including the Royal Inland Hospital to the west.

The site is shown on the attached site plan, Figure 1 in Appendix A.

1.2 PROJECT DESCRIPTION

We understand that the project is a new multi-unit residential housing development. We anticipate the building will consist of 5 storeys of wood-frame construction to be founded on strip pad footings, with a 1-storey buried parkade. It is expected that the final exterior site grade will be within 1 m of the current surface grade with the below grade parkade slab at about a depth of 4 m. The proposed building location on the site has not been provided to us.

Associated on-site asphalt-surfaced driveway and parking areas are also expected as part of the development. Furthermore, 5th Avenue may be extended along the west boundary of the site.

2 GEOTECHNICAL INVESTIGATION

2.1 BACKGROUND INFORMATION REVIEW

We reviewed relevant background information publicly available for the site area. Following is a list of the documents reviewed.

- Surficial geology mapping for the Site and surrounding area;
- Survey drawings for the site;
- Well drill logs from the surrounding site area;
- Climate data from Environment Canada for the site area;
- Seismic hazard data from Natural Resources Canada based on the 2020 National Building Code of Canada;
- Municipal hazard online mapping;
- Municipal development servicing bylaws; and
- Historical aerial photographs from online municipal mapping and Google Earth historical images.

2.2 SUBSURFACE EXPLORATIONS

To assess the soil and groundwater conditions at the site, on May 7 and 8, 2024, WSP advanced a total of three (3) boreholes (BH24-01 to BH24-03) for geotechnical purposes throughout the site using a track mounted drill rig equipped with continuous sonic casing. BH24-01, BH24-02, and BH24-03 were advanced to depths of approximately 30.5, 9.8, and 19.8 meters below existing grade respectively. Standard Penetration Tests (SPTs) were advanced in all three boreholes at regular intervals to assess the *in-situ* relative compactness / consistency of the soils.

A sandpipe piezometer was installed in borehole BH24-01 to a depth of 30.5 m below ground surface to observe the depth of groundwater. The monitoring well was protected with a flush mounted cover.

The approximate locations of the boreholes conducted on the site are shown on the attached Figure 1 in Appendix A.

The soil and groundwater conditions encountered at the boreholes were logged in the field by a member of our geotechnical staff. Disturbed soil samples were collected from the boreholes for visual classification and laboratory testing purposes. The boreholes were backfilled with the borehole cuttings and bentonite immediately upon completion of logging of the soils. The boreholes were patched with cold-mix asphalt patch, with the exception of the monitoring well where a flush-mount cover was installed.

Selected samples were submitted to our laboratory for moisture content, particle size distribution analysis testing and Atterberg Limits testing. Select samples were also submitted to an analytical laboratory for water-soluble sulfate content testing.

Detailed descriptions of the soil and groundwater conditions encountered at the boreholes are provided on the attached soil logs in Appendix B. The borehole logs also graphically illustrate the moisture content of disturbed soil samples collected from the boreholes, the percent fines (material passing the 0.075 mm sieve) for the samples on which particle size distribution analyses by sieve or hydrometer were conducted, and the plastic and liquid limits for the samples on which Atterberg Limits tests were conducted. The results of the particle size distribution analyses and Atterberg Limits tests are attached to this report in Appendix C. The UTM Northings and Eastings of the borehole locations, as determined on site by hand-held GPS device, are recorded at the top of each soil log.

A summary discussion of the soil and groundwater conditions at the boreholes is provided in the following section of this report. The attached borehole logs should be used in preference to the general summary of soil conditions provided below.

3 SOIL AND GROUNDWATER CONDITIONS

3.1 SURFICIAL GEOLOGY

A review of the surficial geology conditions of the site was conducted using a map produced by the Geological Survey of Canada[1]. According to the map, the deposits at the Site are fan deposits, characterized by poorly sorted gravel, sand, silt, and clay.

3.2 GROUNDWATER WELL LOGS

No historical groundwater well drill logs were found for the Site or immediately adjacent properties.

3.3 SOIL CONDITIONS

The deposits encountered at the WSP boreholes were consistent with the description provided on the surficial geology map. The general soil deposits encountered at the boreholes were as follows:

- Asphalt;
- Natural granular deposits; and
- Natural fine-grained deposits.

At the surface of all the boreholes about 25 to 50 mm of asphalt was encountered.

Beneath the asphalt surface, natural granular deposits generally consisting of interlayered mixtures of sands and gravels with variable fines content were encountered. These granular deposits extended to about 4.6 to 5.8 m below existing grade in BH24-01 and BH24-02 respectively, and to the bottom of the hole at about 19.8 m below existing grade in BH24-03. Layers of natural granular deposits were also encountered in BH24-01 at about 21.3 to 21.5 m and at about 28.4 to the bottom of the hole at about 30.5 m. The natural granular deposits were judged to range from compact to very dense with a loose zone near the surface of BH24-03, based on SPT blow counts and drilling effort.

Underlying the natural granular deposits in BH24-01 and BH24-02, natural fine-grained deposits consisting of layers of silt and lean clay were encountered. These natural fine-grained deposits extended to the bottom of the hole at about 9.8 m below existing grade in BH24-02 and to about 28.4 m below existing grade in BH24-01. The silts ranged from non-plastic to low plasticity, and the lean clays were low plasticity. The non-plastic silts were judged to range from compact to very dense based on SPT blow counts, and drilling effort. The cohesive silts and lean clays were judged to range from stiff to hard with a roughly 0.6 m thick firm layer in BH24-02 between a depth of 7.0 to 7.6 m, based on SPT blow counts, pocket penetrometer readings, and drilling effort.

[1] Geological Survey of Canada; Department of Energy, Mines and Resources; Map 1394A, “Kamloops Lake”, 1974.

Particle size distribution analyses were conducted on 9 samples collected from the boreholes. The particle size distribution analysis results are summarized in the following Table 3.1:

Table 3.1 Particle Size Distribution Analyses

SAMPLE	GRAVEL CONTENT	SAND CONTENT	*FINES CONTENT
BH24-01, GS4 (2.4 – 2.6 m)	46.7%	49.0%	4.3%
BH24-01, GS6 (4.3 – 4.4 m)	50.3%	40.1%	9.6%
BH24-01, GS8 (5.2 – 5.3 m)	2.2%	7.6%	90.2%
BH24-01, GS35 (29.0 – 29.1 m)	0.0%	62.5%	37.5%
BH24-02, GS2 (1.1 – 1.2 m)	56.4%	39.1%	4.5%
BH24-02, GS6 (4.0 – 4.1 m)	46.5%	48.0%	5.5%
BH24-02, GS15 (8.2 – 8.34 m)	0.0%	2.2%	97.8%
BH24-03, GS6 (2.7 – 2.9 m)	45.9%	44.7%	9.4%
BH24-03, GS22 (14.6 – 14.8 m)	0.0%	61.0%	39.0%

**Fines is material passing the 0.075 mm sieve.*

Atterberg Limits tests were conducted on two samples collected from the boreholes. The Atterberg Limits results are summarized in the following Table 3.2:

Table 3.2 Atterberg Limits

SAMPLE	PLASTIC LIMIT	LIQUID LIMIT	PLASTICITY INDEX
BH24-01, GS9 (5.9 - 6.1 m)	27%	43%	16%
BH24-01, GS25 (19.5 - 19.7 m)	36%	24%	12%

Water-soluble sulfate content in soils tests were conducted by an analytical laboratory on three sample collected from the boreholes anticipated to be near the proposed foundation grades to assess the potential for attack on concrete. The results of the water-soluble sulfate tests are summarized in the following Table 3.3:

Table 3.3 Water-Soluble Sulfate Contents

SAMPLE	MATERIAL	WATER-SOLUBLE SULFATE CONTENT
BH24-01, GS9 (5.9 - 6.1 m)	Lean Clay	<0.050%
BH24-02, GS6 (3.9 - 4.1 m)	Sand with silt and gravel	<0.050%
BH24-03, GS5 (1.9 - 2.1 m)	Gravel with silt and sand	<0.050%

3.4 GROUNDWATER CONDITIONS

Groundwater was inferred in BH24-01 during drilling at a depth of about 24 m below existing grade. Groundwater was not encountered in BH24-02 or BH24-03 during drilling. Groundwater was measured in the standpipe piezometer at BH24-01 at a depth of about 29.2 m below existing grade on May 9, 2024 and at a depth of about 30.0 m below existing grade on May 15, 2024. We expect that the depth to groundwater fluctuates on a seasonal basis and during extended periods of wet weather or snow melt.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 GENERAL GEOTECHNICAL CONSIDERATIONS

Based on the information from the WSP boreholes, it is our opinion that the Site is suitable for the proposed residential development, from a geotechnical engineering perspective. It is also our opinion that the type of building proposed (up to five-storey, wood-frame multi-unit residential) can be supported on strip and pad footings and a grade-supported floor slab, subject to the recommendations provided in the following sections of this report.

Groundwater was encountered on the site at one borehole / monitoring well at depth of about 24 to 30 m below existing grade. Therefore, it is anticipated that from a geotechnical perspective, a buried basement parkade would be feasible.

Once the design has been finalized, the site grading, architectural, and structural engineering drawings should be forwarded to WSP for review so that we may update and modify our recommendations, if deemed necessary.

4.2 FROST CONSIDERATIONS

The local climate normals between 1981 and 2010 are provided by Environment Canada. The weather monitoring station nearest to the project site with relevant recorded data is located in Kamloops. The weather station reports that the area experiences an annual average temperature of about 9ºC, about 35 days with maximum temperatures below freezing, and a freezing index of about 330ºC-days. We estimate a potential frost penetration depth of about 0.9 m based on the available climate data.

Natural granular deposits were encountered beneath the asphalt surface at the boreholes and extended to at least 4.6 m below the existing grade, well below the 0.9 m estimated depth of frost penetration. The granular soils above the estimated depth of frost penetration consisted of poorly-graded sand with gravel, well-graded gravel with sand, and poorly-graded sand with silt and gravel, Unified Soil Classification System (USCS) SP, GW, and SP-SM respectively. Based on the US Corps of Engineers the granular soils would generally be classified as frost group F2 and have moderately low susceptibility to frost heave.

4.3 SUBGRADE PREPARATION

Based on the boreholes, it is anticipated that nominal stripping depths of about 25 to 50 mm would be required within building and hardscaped areas to remove asphalt and expose natural inorganic subgrade soils but may vary across the site. Deeper stripping might be required to remove buried structures, existing building foundations, uncontrolled fills, or other subsurface obstructions if encountered.

Within the driveway / parking lot areas the exposed subgrade should be compacted with a large, ride-on smooth-drum vibratory roller, and proof-rolled under the review of the geotechnical engineer prior to placing engineered fill or pavement structure fills. Areas that rut or deflect excessively would require further excavation and replacement with compacted engineered fill. Where excavation deeper than the proposed pavement structure subgrade depth is required, engineered fill as described in Section 4.6 (Engineered Fill) should be placed.

Assuming an excavation depth of about 4 m for the one level underground parkade, within building foundation areas we expect excavation will be such that natural granular soils will be exposed on the north side of the site and natural granular and fine-grained soils may be exposed on the south side of the site depending on the depth of the buried parkade footings. The exposed granular subgrade within the building footprint should be compacted with a large,

ride-on smooth-drum vibratory roller, and proof-rolled under the review of the geotechnical engineer prior to placing engineered fill. Areas that rut or deflect excessively would require further excavation and replacement with compacted engineered fill. Where fine-grained silt and clay deposits are exposed following excavation, we recommend that the subgrade be protected with a layer of at least 300 mm of engineered fill placed atop a non-woven geotextile separator placed on the subgrade. Where excavation deeper than the proposed footing depth is required, engineered fill as described in Section 4.6 (Engineered Fill) should be placed.

The geotechnical engineer should review the prepared subgrade under foundations, slabs, and exterior hard-surfaced areas prior to placing engineered fill, pavement structure fills or foundations.

4.4 PETERSON CREEK SET BACK

Peterson Creek runs roughly south the north along the east side of the site. Based on survey information available to us, we understand the banks of Peterson Creek are on the order of 2 to 3 m high adjacent to the site area. The creek bank area directly adjacent to the creek is generally well-vegetated including mature trees.

As a preliminary guideline for building foundations on the site, we recommend a set-back from the creek bank slope crest of at least three times the depth of the creek from a geotechnical perspective. Therefore, it is expected that a minimum set-back on the order of at least 9 m from the slope crest would be required, but the depth to the bottom of the creek should be surveyed adjacent to the proposed building area to confirm a set-back of at least three times the depth of the creek is achieved. We also understand there is a riparian set-back from Peterson Creek that is on the order of 15 m from the top of bank. The riparian set-back provides a suitable set-back from Peterson Creek from a geotechnical perspective. The greater of the recommended geotechnical and riparian set-backs should govern the proposed building location.

Our scope of work did not include assessment of Peterson Creek flood levels in relation to the subject site.

4.5 TEMPORARY EXCAVATIONS AND DEWATERING

4.5.1 TEMPORARY UNSUPPORTED EXCAVATIONS

Temporary excavations that are more than 1.2 m deep and require worker access should be conducted in accordance with WorkSafe BC regulations. An allowable inclination of 1.3 Horizontal:1 Vertical (1.3H:1V) or flatter is considered appropriate for unsupported temporary excavations in the soils encountered in the boreholes. Recommendations to reduce the inclination of temporary excavations may also be given by the geotechnical engineer at the time of construction if loose/soft soils and/or groundwater seepage is encountered. All temporary excavations steeper than recommended above should be approved in writing by a Geotechnical Engineer prior to workers entering the excavation or approaching the edge the excavation in such areas.

Cobbles, boulders or other large debris that may be exposed at the face of temporary excavation slopes could become dislodged and strike workers in the excavation. Such objects should be removed by other methods prior to worker entry. In addition, stockpiles of material or machinery should be set back from the crest of the slope a horizontal distance equal to or greater than the depth of excavation.

4.5.2 TEMPORARY SUPPORTED EXCAVATIONS

Depending on the depth of buried foundations, for temporary excavations in close proximity to neighbouring properties or other settlement-sensitive structures such as existing buildings that remain on site, temporary excavation shoring may be required. Generally, compact to very dense granular soils are anticipated to depths of at least 4.6 m below existing grade, overlying stiff to hard fine-grained deposits on the south portion of the site or compact to very dense granular deposits on the north side of the site. Groundwater is not expected to be

encountered in excavations, but water seepage could be encountered perched atop the fine-grained deposits at least 4.6 m below existing grade subject to seasonal changes and prevailing weather conditions. If temporary excavation slopes outlined above are not achievable, consideration could be given to installation of a temporary shoring system such as soil nails and shotcrete, soldier piles with lagging, or sheet piles. Detailed shoring design can be provided once the project is at detailed design stage.

4.5.3 TEMPORARY EXCAVATION DEWATERING

We anticipate that groundwater will not be encountered in excavations on the site. In such excavations, minor seepage from surface water, could be adequately managed by pumping from properly filtered sumps.

4.6 ENGINEERED FILL

Engineered fill is defined in this report as fill soils and aggregates required to support foundations, slabs, sidewalks and pavements. Imported engineered fill should consist of 75 mm minus pit run or crushed aggregate sand and gravel containing less than 8 percent fines by weight. It should be placed in discrete lifts a maximum of 300 mm in thickness and be compacted to not less than 100 percent of the material's Standard Proctor Maximum Dry Density (SPMDD).

In-place soil density testing and visual review should be conducted on the engineered fill by the Geotechnical Engineer, as it is being placed and compacted, to confirm that adequate compaction is achieved.

Engineered fill below foundations should extend horizontally beyond the foundations a distance at least equal to its thickness below the foundations.

It is our opinion that the natural granular site soils encountered at the boreholes within about 4.6 to 8.8 m of the existing ground surface are suitable for re-use as engineered fill, provided particles larger than 150 mm nominal diameter are removed, they do not contain organic soils, they are not mixed with unsuitable soils, and they are moisture conditioned to a moisture content suitable for compaction (i.e. to within 2 percent of their optimum moisture content). However, the underlying fine-grained silt and clay soils and granular soils containing greater than 15 percent fines (material passing the 0.075 mm sieve) are judged unsuitable for re-use as engineered fill due to anticipated difficulties controlling their moisture content at a level suitable for compaction. The suitability of any soils considered for use as engineered fill should be reviewed and confirmed by the Geotechnical Engineer.

4.7 SEISMIC CONSIDERATIONS

The soils encountered at the boreholes generally consist of natural granular deposits overlying fine-grained deposits. The natural granular deposits and non-plastic silts encountered in the boreholes were generally judged to range from compact to very dense, based on SPT blow counts and drilling effort. The cohesive silts and lean clays were generally judged to range from stiff to hard, based on SPT blow counts, pocket penetrometer readings, and drilling effort. Groundwater was encountered in one of the borehole at a depth of about 24 to 30 m below existing grade at the time of our investigation.

For design purposes, Site Class "D" is assigned to this site based on the above interpretation of the site stratigraphy including the DCPT blow counts and groundwater conditions. Based on our assessment, the site soils would be resistant to liquefaction during a design seismic event (i.e., 1 in 2475 year event).

Under the 2020 National Building Code seismic hazard calculation for the site coordinate, the seismic hazard values for use in determining F(T) values are obtained from the interactive website maintained by Natural Resources Canada. These values for the site area that pertain to the design earthquake event defined by the 2020 National Building Code of Canada values presented below in Table 4.1 are for a reference site with Site Class 'D'.

Table 4.1 2020 Seismic hazard values for earthquake with 2% probability of occurrence in 50 years

PGA (g)	Sa (0.2)	Sa (0.5)	Sa (1.0)	Sa (2.0)	Sa (5.0)	Sa (10.0)
0.112	0.269	0.257	0.199	0.143	0.0689	0.0339

4.8 FOUNDATIONS

Following the site preparation as discussed in the previous sections of this report, foundations for the proposed building that are consistent with our assumptions can consist of continuous strip and pad footings constructed on Geotechnical-Engineer approved subgrade comprising compact to very dense natural granular soils, compacted engineered fill placed over natural compact to dense granular soils or at least 300 mm of engineered fill placed over natural stiff to hard fine-grained soils.

It is our opinion that the site soil and groundwater conditions are such that a serviceability limit state (SLS) soil bearing resistance of 166 kPa and a factored ultimate limit state (ULS) soil bearing resistance of 250 kPa can be used for strip and pad shallow foundation design. These bearing resistance values assume the footings are placed in accordance with the recommendations provided in this report. Strip footings should be at least 0.5 m wide and pad footings should be at least 1 m by 1 m wide. The Geotechnical Engineer should review the soil conditions at foundation grade prior to the installation of foundation formwork to confirm that the bearing resistances provided above are appropriate.

Footings should be stepped at no steeper than 2H:1V. The underside of footings should be located below a 2H:1V influence line taken up from the base of the adjacent natural slopes, excavations for other footings, utilities, etc. or the SLS and factored ULS soil bearing resistances provided above may have to be reduced. In addition, the underside of foundations should be located at least 0.9 m below finished interior and exterior grade for frost protection and confinement purposes.

It is judged that total post-construction settlement of footings constructed in accordance with the recommendations provided in this report will not exceed 25 mm under static loading during the design life of the building. Differential post-construction settlement is not expected to exceed 19 mm over a 10-m horizontal distance. These settlement estimates are based the SLS soil bearing resistance provided herein and assume site grade increases of less than 1 m. The settlement estimates may need to be revised based on the final design grade of the structure and actual building loads. The Structural Engineer or Client should advise WSP of design changes that could affect the building foundation settlement estimates, such as foundation elevations or changes to surface grades outside of the building footprint.

4.9 LATERAL EARTH PRESSURES

We understand that a buried basement parkade is proposed for the building such that the building will require below-grade foundation walls that would be sufficiently restrained from movement to prevent the active or passive conditions from developing. At-rest earth pressure coefficients under both static and seismic loading are presented below, based on the following assumptions:

- Foundation wall backfill is as described in Section 4.11 below.
- The wall backfill extends horizontally about 1 m at the heel then rises at an incline of 1H:1V away from the wall such that the existing fill and loose to compact natural soil do not influence the earth pressure on the wall.
- Wall backfill is fully drained, including an effective perimeter drain at the wall heel that is discharged to a suitable location away from the foundation wall.
- The wall-soil interface friction can be neglected.
- Ground surface of the retained soil is horizontal (or gently sloping away from the building).

- The exterior foundation wall face is vertical.
- Wall movements are impeded at the top and bottom of the walls.

Static Earth Pressures

Design parameters provided below can be used to calculate the lateral earth pressures acting on the foundation wall constructed per the assumptions listed in the preceding subsection:

- Bulk Unit Weight: 20.0 kN/m^3
- At-rest earth pressure coefficient, K_0: 0.5

The foundation walls that are non-yielding (i.e., constrained from rotating or translating sufficiently to develop the active or passive conditions) should be designed using at-rest pressure coefficients. Soil above the frost penetration depth should be neglected in calculations where it provides resistance against destabilizing pressures.

Static lateral earth pressures acting on retaining walls can be assumed to act horizontally, having a triangular distribution with zero pressure at the ground surface, increasing linearly with depth.

Surcharge loads can be applied using a rectangular pressure distribution over the depth of the retained soil. Compaction-induced lateral earth pressures should be included in the surcharge assuming the surcharge contribution from compaction effort is 10 kPa.

Hydrostatic and frost pressures should be considered unless adequate drainage measures are incorporated into the design and construction of the wall.

Pseudo-static (Seismic) Earth Pressures

Seismic lateral earth pressures acting on non-yielding retaining walls can be estimated using pseudo-static methods proposed by Mononobe Okabe. For retaining walls that do not allow lateral yielding, the horizontal seismic coefficient, k_h, used in the calculation of the seismic lateral earth pressure coefficient, is taken as 1.5 times the site-specific Peak Ground Acceleration (i.e. $k_h = 0.17$). The horizontal seismic earth pressure coefficient is also dependent on the vertical component of the earthquake acceleration, k_v. For this report, $k_v = 0$. Accordingly, the maximum pseudo-static earth pressure coefficient, K_{AE}, is estimated as 0.39. These values are based on the PGA value under the 2020 National Building Code PGA value was utilized.

The earthquake-induced pseudo-static pressure distribution calculated using these coefficients forms an inverted triangle with maximum pressure at the top of the wall and minimum pressure at its heel. The resultant force is generally assumed to act an elevation above the heel equal to 60% of the wall height.

A factored coefficient of friction of 0.4 may be used to estimate the sliding resistance along the soil-footing interface where the foundation is constructed on compacted natural granular or engineered fill soils.

4.10 FOUNDATION DRAINAGE

At this preliminary stage, we anticipate that below-grade foundations may be proposed, therefore we recommend that a perimeter foundation drainage system be installed on the exterior of the building foundation. The drainage system should consist of a rigid, perforated PVC pipe surrounded by drain rock. The invert of the pipe should be located at least 300 mm below the slab-on-grade elevation. The pipe should be covered with a minimum of 150 mm of drain rock. The drain rock should be completely surrounded with a non-woven geotextile. The pipe should drain by gravity flow or be pumped, as required, to a suitable disposal location such as the municipal storm sewer (if available).

Exterior grade adjacent to the building should be sloped to direct surface water away from the foundations and foundation backfill should be compacted to reduce settlement as described in Section 4.11 (Foundation Wall Backfill) below. Roof rainwater leaders should not be connected to the perimeter drainage system and should be directed via non-perforated piping to a suitable storm water disposal location.

4.11 FOUNDATION WALL BACKFILL

Foundation wall backfill should comprise engineered fill as described in Section 4.6 (Engineered Fill) of this report. It should be placed in discrete lifts with a maximum thickness of 300 mm and compacted to not less than 100 percent of the material's SPMDD directly adjacent to building foundations and beneath settlement sensitive features such as sidewalks, patios, slabs, pavements, etc., and to not less than 98 percent of the material's SPMDD in landscaped areas to limit post-construction settlement.

The natural granular site soils encountered at the boreholes within about 4.6 to 8.8 m of the existing ground surface are judged to be suitable for re-use as foundation backfill, provided particles larger than 200 mm are removed, they do not contain organic soils, they are not mixed with unsuitable soils, and they are at a moisture content suitable for compaction. However, the underlying fine-grained soils and granular soils containing greater than 15 percent fines and will be prone to frost heaving. Frost heave will likely result in serviceability concerns at building entrances and perimeter sidewalks and could increase lateral soil pressures on foundation walls. As such, these site soils are considered unsuitable for re-use as foundation wall backfill. We recommend that any soils considered for use as backfill be reviewed by the Geotechnical Engineer to assess and confirm their suitability.

4.12 SLAB-ON-GRADE

The interior slab-on-grade of the proposed building should be constructed on an underslab drainage layer consisting of a minimum of 150 mm of 25 mm minus crushed sand and gravel which contains less than 5 percent fines by weight (material passing the 0.075 mm sieve). The drainage layer should be compacted to at least 98 percent of the material's SPMDD. If required, open graded drain rock, "radon rock", would also be considered as a suitable material for use as underslab fill.

The slab-on-grade should be provided with cross-cut joints to control slab cracking and should be kept structurally separate from foundation walls.

We recommend that polyethylene sheeting be provided below the interior slabs-on-grade to inhibit moisture migration through the concrete.

4.13 CONCRETE EXPOSURE CLASS

Water-soluble sulfate content testing was conducted by an analytical laboratory on selected soil samples collected from the boreholes. The water-soluble sulfate content for the samples tested were all below the detection limit of 0.05% percent. Table 3 of the CSA Group Standard Practices[2] "Additional Requirements for Concrete Subjected to Sulphate Attack" indicates that the degree of exposure is considered "moderate" for sulphate concentrations of 0.1 to 0.2 percent, and "severe" for concentrations of 0.2 to 2.0 percent. The test results indicate a negligible degree of exposure to sulfate attack on concrete in contact with the soils tested.

4.14 ON-SITE DRAINAGE

The natural granular soils encountered in our boreholes within roughly 4.6 m of the existing grade had variable fines contents but in our opinion are anticipated to be suitable for on-site stormwater infiltration.

[2] CSA Group (2019). "Concrete materials and methods of concrete construction / Test methods and standard practices for concrete – A23.1-19 / A23.2-19." CSA Group.

Table 4.2 Soil Hydraulic Conductivity

SAMPLE	D10	SOIL DESCRIPTION
BH24-01, GS4 (2.4 - 2.6 m)	0.21 mm	Poorly graded sand with gravel
BH24-01, GS6 (4.3 – 4.2 m)	0.08 mm	Well graded gravel with silt and sand
BH24-01, GS8 (5.2 – 5.3 m)	0.001 mm (estimated)	Silt
BH24-01, GS35 (29.0 - 29.1 m)	0.015 mm	Silty sand
BH24-02, GS2 (1.1 – 1.2 m)	0.29 mm	Well graded gravel with sand
BH24-02, GS6 (4.0 – 4.1 m)	0.23 mm	Poorly graded sand with silt and gravel
BH24-02, GS15 (8.2 - 8.4 m)	0.0015 mm	Silt
BH24-03, GS6 (2.7 – 2.9 m)	0.088 mm	Well graded gravel with silt and sand
BH24-03, GS22 (14.6 - 14.8 m)	0.017 mm	Silty sand

The following unfactored hydraulic conductivity rates can be assumed for the natural soils encountered in our boreholes based on the D10 size (i.e. 10% of particles are finer and 90% of particles are coarser) and the compactness of the soils.

- Very dense poorly graded sand with gravel, loose to very dense poorly graded sand with silt and gravel, or compact well graded gravel with sand: 1×10^{-4} m/s
- Dense to very dense well graded gravel with silt and sand: 1×10^{-5} m/s
- Compact to very dense silty sand: 1×10^{-6} m/s
- Stiff to hard / compact to very dense silt: 1×10^{-8} m/s

A hydraulic conductivity rate of 1×10^{-9} m/s can be assumed for the natural very stiff to hard lean clay soil encountered in our boreholes.

We do not recommend disposing of stormwater within fill soils, or within 5 m of structural elements such as foundations.

We recommend the site surface grade be sloped to direct water away from driveway and building areas.

4.15 ON-SITE PAVEMENT STRUCTURE

Recommendations for site preparation for on-site asphalt pavements are provided above in Section 4.3 (Subgrade Preparation).

Where subgrade fill is required to establish the desired pavement grades, it should consist of engineered fill as described in Section 4.6 (Engineered Fill). It should be placed in discrete lifts a maximum of 300 mm in thickness and be compacted to not less than 100 percent of the material's SPMDD, as confirmed by in-place soil density testing.

The subgrade should be compacted and proof-rolled under the review of the Geotechnical Engineer prior to placement of subgrade and/or subbase fill or base course fill.

For asphalt-surfaced on-site driveway and parking areas constructed as part of the proposed development, we recommend a pavement structure following the design guideline for an urban paved lane or urban local road provided on drawing number DGR13 or DGR7 of the City of Kamloops Subdivision and Development Control Bylaw No. 4-33, 2012, Section 6.0 Roads, as follows.

- 50 mm of hot-mix asphaltic concrete, underlain by
- A minimum of 75 mm of 25 mm minus crushed gravel base course, underlain by
- A minimum of 300 mm of 75 mm minus crushed granular sub-base course, underlain by
- Geotechnical Engineer approved inorganic subgrade or compacted subgrade fill placed atop the approved inorganic subgrade.

For areas subject to heavy truck traffic, such as driveway areas and refuse bin pads, we recommend the asphalt thickness be increased to 75 mm.

We recommend that the granular sub-base and base courses conform to the specifications for these materials contained in Articles 31 05 17 2.8 and 31 05 17 2.10.1S of the MMCD Volume II (Platinum Edition) and City of Kamloops amendment to the MMCD Platinum Book – Volume II - 2009 respectively.

The granular sub-base and base courses should be placed in discrete lifts and be compacted with vibratory equipment to not less than 100 percent of their SPMDD, as confirmed by in-place soil density testing.

4.16 WINTER AND WET WEATHER CONSTRUCTION

Construction that occurs during periods of cold or wet weather may encounter difficulties when preparing the foundation subgrades or compacting fill where long-term settlement control is expected. Frozen soils, fill containing snow, or subgrade surfaces that are snow-covered or frozen could experience excessive post-construction settlements when the frozen soil thaws or the snow melts. Likewise, excessively wet subgrade or fill surfaces could experience excessive post-construction settlements upon draining. Considerations for managing winter construction and wet weather are provided below:

- Keep subgrade surfaces free of frost before, during, and after construction by using sacrificial lifts of fill or other means to reduce exposure.
- Keep fill free of snow, ice, and other deleterious materials and avoid placing fill on frozen or snow-covered surfaces.
- Cover fill stockpiles with tarpaulins to protect them from precipitation and to manage the soil water content.
- Place fill on surfaces that are free of standing water and that are not excessively wet (relative to the optimum water content for compaction purposes).
- Reduce standing water on exposed surfaces where fill or foundation elements will be placed by using an appropriate water management plan during construction, and/or by using sacrificial lifts of fill or other means to reduce exposure.
- Pour concrete on ground that is not frozen. Protect the concrete and the subgrade from freezing until permanent frost protection is in place.

4.17 GEOTECHNICAL REVIEW

When available, site grading, structural, architectural and landscape design drawings should be provided to WSP for review so that we can confirm that they incorporate the recommendations provided in this report, or so that we can provide additional recommendations as necessary to meet the actual project requirements.

If applicable, the Geotechnical Engineer should be retained to provide a detailed temporary excavation shoring design.

The Geotechnical Engineer should be retained to review the following during construction:

1. Subgrade preparation for the footings and slab-on-grade;
2. All sources of engineered fill, slab-on-grade fill, and foundation backfill;
3. Compaction of engineered fill, slab-on-grade fill, and foundation backfill; and

4 Subgrade preparation and pavement structure fill selection and compaction for exterior slabs and on-site driveway / parking areas.

5 CLOSURE

The statement of limitations following the signature page of this report forms an integral part of this geotechnical report.

We trust this meets your immediate requirement. If you have any questions or require further information, please contact our office.

APPENDIX

A FIGURE 1 – SITE PLAN

NOTE: BASE IMAGE RETRIEVED FROM https://maps.kamloops.ca/citymap/ MAY 24, 2024

700-1631 Dickson Ave, Kelowna, BC, V1Y 0B5
T 250-980-5500 | www.wsp.com

PROJECT NO: CA0014660.3828

SCALE:	AS SHOWN
DATE:	2024-05-27
DESIGNED BY:	ML
DRAWN BY:	BPK
CHECKED BY:	ML

PROJECT: HOUSING DEVELOPMENT
523 COLUMBIA STREET, KAMLOOPS, BC

CLIENT: BC HOUSING MANAGEMENT COMMISSION

TITLE: SITE PLAN

DRAWING: 01

APPENDIX

B SOIL LOGS

RECORD OF BOREHOLE: BH24-01

CLIENT:	BC Housing	DATE:	May 07, 2024	ELEVATION:	Data Not Available
PROJECT:	Housing Development			COORDINATES:	N: 5616553.0 m E: 688703.0 m
PROJECT NO:	CA0014660.3828	INCLINATION:	90.0°	COORD SYS:	UTM Zone 10N
LOCATION:	523 Columbia Street, Kamloops, BC	CONTRACTOR:	Mud Bay Drilling Ltd.	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT	GRADATION %: GRAVEL	SAND	FINES	DYNAMIC PENETRATION RESISTANCE, BLOW/0.3m	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
0			ASPHALT (50 mm).			0.00	1	SS	38	4-55/83	57					20 40 60 80			Pipe Stickup: 0.00 m
			(SP) Poorly-graded SAND with gravel, trace silt, subrounded to angular gravel, non plastic fines; brown; moist, very dense.			0.05													Pipe Elev: 0.00 m
1				SP			2	GS											
2							3	SS	43	8-23-32	55						2.13 - 2.21 m: dry		
										52/83mm									
3			- 3.05 to 4.11 m: With cobbles up to 125mm diameter, subrounded to angular.				4	GS					47	49	4				0.30 - 5.49 m bgs: Cuttings
							5	SS	38	23-72-60-60	132								
4																			
			(GW-GM) Well-graded GRAVEL with silt and sand, fsubrounded to angular, few silt, non plastic fines; brown; moist, dense.	GW-GM		4.11	6	GS					50	40	10				
5			(ML) SILT, few sand, trace gravel, low plasticity; brown; w ~ PL, stiff to hard.	ML		4.57	7	SS	4	4-4-5-6	9					287			
							8	GS					2	8	90				
6			(CL) Lean CLAY, low plasticity, trace sand; brown; cohesive, w>PL, very stiff to hard.	CL		5.78	9	GS								359 431	5.94 - 6.10 m: Water-soluble sulfate test <0.050%		
			- 6.10 m: Occasional rust mottling.				10	SS	100	4-6-9-9	15					287 287			
7							11	GS								287 287			
8							12	SS	100	2-6-9-11	15					263 239			
							13	GS								287 287			
9			- 8.99 to 9.14 m: Few sand.				14	GS								335 287 287			
							15	SS	100	3-6-11-12	17								
10							16	GS								239 239 239			
11							17	GS								192 192 287			
12							18	SS	100	3-8-10-10	18					263 383 287	12.19 - 12.80 m: w<pl		
13							19	GS								263 215 239			
14							20	GS								263 263 239			
15			- 15.24 to 15.85 m: Fine sand seams.				21	SS	100	4-11-15-20	26					407 311 192			
16																			

Continued on Next Page

DEPTH SCALE: 1:80

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Hannah Thomsen DATE: May 07, 2024

CHECKED: ML DATE: Jul 11, 2024

RECORD OF BOREHOLE: BH24-01

CLIENT: BC Housing
PROJECT: Housing Development
PROJECT NO: CA0014660.3828
LOCATION: 523 Columbia Street, Kamloops, BC
DATE: May 07, 2024
INCLINATION: 90.0°
CONTRACTOR: Mud Bay Drilling Ltd.
ELEVATION: Data Not Available
COORDINATES: N: 5616553.0 m E: 688703.0 m
COORD SYS: UTM Zone 10N
HORZ DATUM: NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT	GRADATION % GRAVEL	SAND	FINES	DYNAMIC PENETRATION RESISTANCE, BLOW/0.3m	ADDITIONAL OBSERVATIONS	GROUNDWATER OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
17			(CL) Lean CLAY, low plasticity, trace sand; brown; cohesive, w>PL, very stiff to hard.	CL			2	G S								239			Pipe Stickup: 0.00 m Pipe Elev: 0.00 m 5.49 - 26.97 m bgs: Bentonite Chips 2
							2	G S								263			
																431			
							2	G S								115			
18							3									211			
																263			
																335			
							24	SS	100	12-20-25	45					383	18.29 - 18.90 m: w<pl 18.82 m: grey		
19										31						287			
																335			
																192			
							2	G S								335			
20							5									383			
							2	G S								383			
							6									431			
							2	G S								335			
21							7									431			
			(SM) SILTY SAND, fine to medium, sand non-plastic fines; brown; moist to wet, very dense.	SM		21.34	28 A												
			(ML) SILT, non plastic, trace fine to medium sand; brown to grey; moist to wet, very dense.	ML		21.56	28B	SS	100	18-22-32	54								
22							36												
							2	G S											
23		Sonic Drilling	- 22.86 to 28.35 m: Changes to grey colour.				9												
							3	G S									23.77 - 24.38 m: moist to wet		
24							0												
							31	SS	100	20-26-32	58								
25										36									
							3	G S											
26							2												
							3	G S											
27							3												
							34	SS	100	15-23-36	59						27.74 - 28.04 m: wet		
28										39									
			(SM) Silty SAND, fine; grey; moist, very dense. - 28.35 to 30.48 m: Interlayered varying silt content.	SM		28.35	3	G S					0	62	38			15May24 13:00 09May24 08:00	26.97 - 30.48 m bgs: Silica Sand 27.43 - 30.48 m bgs: Screen Interval
29							5												
30			- 30.18 to 30.33 m: (CL) lean CLAY seam.				3	G S											
							6												
			End of hole at 30.48 m.																
31																			
32																			

WATER CONTENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic; 0 20 40 60 80 100

DYNAMIC PENETRATION RESISTANCE, BLOW/0.3m: 20 40 60 80; Nat Vane (kPa); Rem Vane (kPa); Pocket Pen (kPa); Q; U; 0 100 200 300 400 500

DEPTH SCALE: 1:80
HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Hannah Thomsen
CHECKED: ML

DATE: May 07, 2024
DATE: Jul 11, 2024

RECORD OF BOREHOLE: BH24-02

CLIENT:	BC Housing	DATE:	May 08, 2024	ELEVATION:	Data Not Available
PROJECT:	Housing Development			COORDINATES:	N: 5616610.0 m E: 688685.0 m
PROJECT NO:	CA0014660.3828	INCLINATION:	90.0°	COORD SYS:	UTM Zone 10N
LOCATION:	523 Columbia Street, Kamloops, BC	CONTRACTOR:	Mud Bay Drilling Ltd.	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT: Plastic & Liquid Limits (%); Water Content (%); NP Nonplastic	GRADATION %: GRAVEL	SAND	FINES	DYNAMIC PENETRATION RESISTANCE, BLOW/0.3m: Nat Vane (kPa); Rem Vane (kPa); Pocket Pen (kPa); Q; U	ADDITIONAL OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
0			ASPHALT (25 mm).	SP-SM		0.00	1	SS	38	4-6-5-6	11							
			(SP-SM) Poorly-graded SAND with silt and gravel, few silt, subrounded to angular gravel, medium to coarse sand, non plastic fines; dark brown; moist, compact.			0.02												
1			(GW) Well-graded GRAVEL with sand, trave silt, fine to coarse subrounded to angular gravel; brown; moist to dry, compact. Occasional cobbles up to 100mm diameter.	GW		0.46	2	G/S					56	39	4		0.91 - 1.52 m: dry	
			(SP-SM) Poorly-graded SAND with silt and gravel, few silt, subrounded to angular, medium to coarse sand, non plastic fines; brown; dry, very dense. With cobbles up to 100mm diameter.			1.52	3	SS	32	59/127mm	m						1.52 - 2.13 m: SPT refusal.	
2							4	G/S										
3		Sonic Drilling		SP-SM			5	SS	67	53/127mm	m						3.05 - 3.28 m: SPT refusal.	
4							6	G/S					46	48	6		3.96 - 4.11 m: Water-soluble sulfate test <0.050%	
							7	SS	60	48-51-60/80mm								
5			(SM) SILTY SAND, some fine to coarse subrounded to subangular gravel; brown; moist, very dense.	SM		5.03	8	G/S										
			(GW) Well-graded GRAVEL with sand, few silt, fine to coarse subrounded to angular gravel; brown; moist to dry, very dense.	SP-SM		5.49	9	G/S									5.49 - 5.79 m: Occasional cobbles up to 100mm diameter.	
6						5.79	10	G/S										
			(ML) SILT, trace sand, non plastic, fine sand; brown; moist, compact.	ML			11	SS	75	6-11-14-13	25							
7							12	G/S										
			(CL) Lean CLAY, low plasticity, trace fine sand; brown; w ~ PL to w < PL, firm. Rust mottling.	CL		7.01	13	G/S										
			(ML) SILT, trace sand, non plastic, fine sand; brown; moist, compact to dense.			7.62	14	SS	90	2-7-8-13	15							
8				ML			15	G/S					0	2	98			
9							16	G/S										
							17	SS	75	6-17-16-19	33							
			End of hole at 9.75 m.															
10																		
11																		
12																		
13																		
14																		
15																		
16																		

DEPTH SCALE: 1:80

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Hannah Thomsen DATE: May 08, 2024

CHECKED: ML DATE: Jul 11, 2024

RECORD OF BOREHOLE: BH24-03

CLIENT: BC Housing
PROJECT: Housing Development
PROJECT NO: CA0014660.3828
LOCATION: 523 Columbia Street, Kamloops, BC
DATE: May 08, 2024
INCLINATION: 90.0°
CONTRACTOR: Mud Bay Drilling Ltd.
ELEVATION: Data Not Available
COORDINATES: N: 5616653.0 m E: 688738.0 m
COORD SYS: UTM Zone 10N
HORZ DATUM: NAD83

DEPTH (m)	DESCRIPTION	USCS	ELEV. DEPTH (m)	NUMBER	TYPE	REC %	BLOWS	N-VALUE	GRAVEL	SAND	FINES	ADDITIONAL OBSERVATIONS
0	ASPHALT (50 mm).		0.00									
	(SP-SM) Poorly-graded SAND with silt and gravel, subrounded to angular gravel, non plastic fines; dark brown to brown; moist to dry, loose to very dense. - 0.05 to 1.22 m: Moist. - 1.22 to 1.52 m: Dry.	SP-SM	0.05	1	SS	12	4-3-5-8	8				0.91 - 1.52 m: With cobbles up to 125mm diameter. 1.83 - 3.05 m: With cobbles up to 100mm diameter. 1.98 - 2.13 m: Water-soluble sulfate test <0.050%
				2	GS							
				3	GS							
				4	SS	75	16-21-27-20	48				
	(GW-GM) Well-graded GRAVEL with silt and sand, few silt, fine to coarse subrounded to angular gravel; brown; moist to dry, very dense.	GW-GM	1.98	5	GS							
				6	GS				46	45	9	
				7	SS	75	51-53-45-47	98				
				8	GS							
				9	SS	50	19-54-37-16	91				
	(SP-SM) Poorly-graded SAND with silt and gravel, subrounded to angular gravel, few non plastic fines; brown; moist, dense. - 6.71 to 7.01 m: Little silt.	SP-SM	5.49	10	GS							
				11	SS	50	8-21-19-27	40				
				12	GS							
				13	GS							
				14	SS	50	12-16-24-25	40				
	(SM) SILTY SAND, fine to medium sand, non plastic fines; brown; moist, dense.	SM	8.84	15	GS							
				16	SS	62	12-20-21-24	41				
				17	GS							
	(GW-GM) Well-graded GRAVEL with silt and sand, few silt, fine sand; light brown; dry, compact to dense.	GW-GM	10.67	18	GS							
	(SM) SILTY SAND, fine to medium, and non plastic fines; brown; moist, compact to dense.	SM	11.89	19	GS							
	(GW-GM) Well-graded GRAVEL with silt and sand, few silt, fine to coarse sand; brown to grey; moist to dry, very dense.	GP-GM	12.34	20B	SS	62	24-30-20-24	50				12.19 - 12.34 m: SPT-20A 12.34 - 12.65 m: SPT20-B 12.65 - 12.80 m: SPT-20C
	(SM) SILTY SAND, and fine SAND, trace gravel; brown; moist to dry, very dense. - 13.72 to 19.81 m: Dense.	SM	12.65	21	GS							
				22	GS				0	61	39	
				23	SS	88	10-15-21-23	36				

Drill Rig: Sonic Drilling
Drill Method: Sonic Drilling

Continued on Next Page

DEPTH SCALE: 1:80
HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Hannah Thomsen
CHECKED: ML

DATE: May 08, 2024
DATE: Jul 11, 2024

RECORD OF BOREHOLE: BH24-03

CLIENT:	BC Housing	DATE:	May 08, 2024	ELEVATION:	Data Not Available
PROJECT:	Housing Development			COORDINATES:	N: 5616653.0 m E: 688738.0 m
PROJECT NO:	CA0014660.3828	INCLINATION:	90.0°	COORD SYS:	UTM Zone 10N
LOCATION:	523 Columbia Street, Kamloops, BC	CONTRACTOR:	Mud Bay Drilling Ltd.	HORZ DATUM:	NAD83

DEPTH (m)	DRILL RIG	DRILL METHOD	MATERIAL PROFILE: DESCRIPTION	USCS	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	REC %	BLOWS	N-VALUE	WATER CONTENT (Plastic & Liquid Limits (%), Water Content (%), NP Nonplastic)	GRADATION % GRAVEL	SAND	FINES	DYNAMIC PENETRATION RESISTANCE, BLOW/0.3m (Nat Vane (kPa), Rem Vane (kPa), Pocket Pen (kPa), Q, U)	ADDITIONAL OBSERVATIONS	CONSTRUCTION AND INSTALLATION DETAILS
17		Sonic Drilling	(SM) SILTY SAND, and fine SAND, trace gravel; brown; moist to dry, very dense.	SM			2	GS										
18			- 17.37 to 18.29 m: Light brown.				3	GS										
19			- 18.29 to 18.90 m: Interlayered varying silt content. - 18.29 to 19.81 m: Dark brown, moist.				26	SS	62	9-16-24-27	40							
							4	GS										
20			End of hole at 19.81 m.															
21																		
22																		
23																		
24																		
25																		
26																		
27																		
28																		
29																		
30																		
31																		
32																		

DEPTH SCALE: 1:80

HAMMER TYPE: Automatic, 140lb, 30" drop

REV: 0

LOGGED: Hannah Thomsen DATE: May 08, 2024

CHECKED: ML DATE: Jul 11, 2024

APPENDIX

C LABORATORY WORK

PARTICLE SIZE DISTRIBUTION

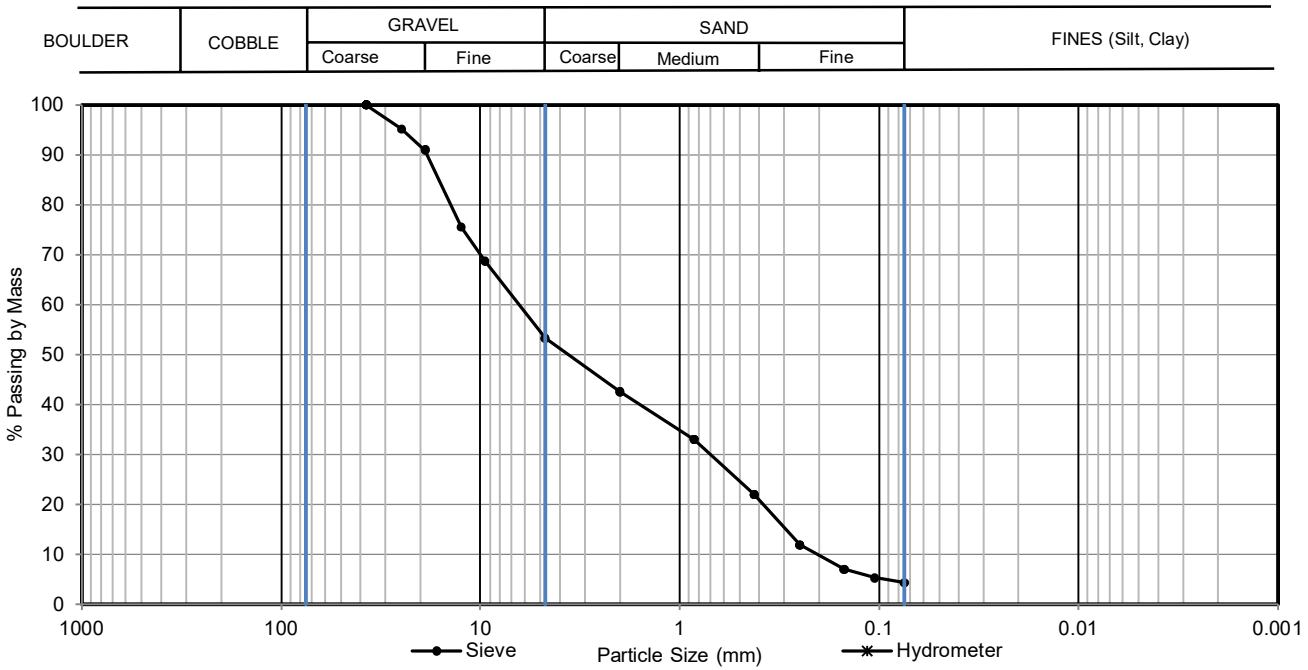
ASTM D6913

Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	4
Soil Description:		Type:	GS
		Depth (m):	2.44 - 2.59

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 46.7 49.0 4.3



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
1 1/2"	37.5	100.0		
1"	25	95.2		
3/4"	19	91.0		
1/2"	12.5	75.5		
3/8"	9.5	68.7		
#4	4.75	53.3		
#10	2	42.6		
#20	0.85	33.0		
#40	0.425	22.0		
#60	0.25	11.9		
#100	0.15	7.0		
#140	0.106	5.3		
#200	0.075	4.3		
			0.005 mm	
			0.002 mm	
			D60	6.42
			D30	0.70
			D10	0.21
			Cu	31.00
			Cc	0.38

Notes:

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Tested by: KSingh **Date:** 27-May-24 **Checked by:** KSingh **Date:** 29-May-24 **Reviewed by:** JStotz **Date:** 30-May-24

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PARTICLE SIZE DISTRIBUTION

ASTM D6913

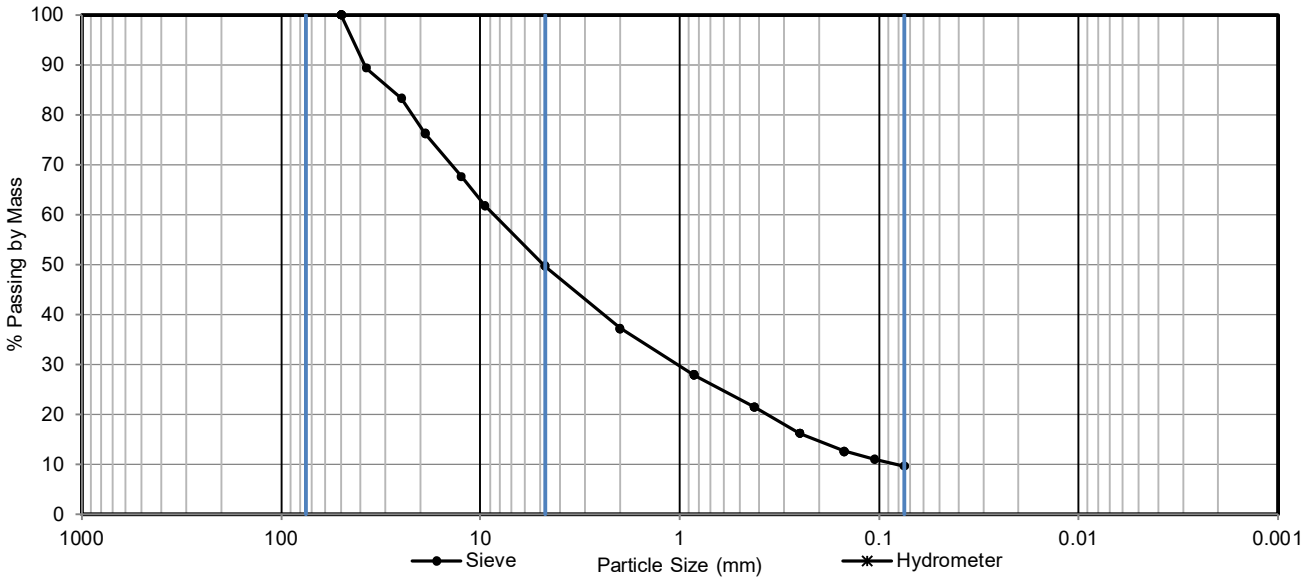
Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	6
Soil Description:		Type:	GS
		Depth (m):	4.27 - 4.42

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 50.3 40.1 9.6

BOULDER | COBBLE | GRAVEL (Coarse, Fine) | SAND (Coarse, Medium, Fine) | FINES (Silt, Clay)



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
2"	50	100.0		
1 1/2"	37.5	89.4		
1"	25	83.3		
3/4"	19	76.3		
1/2"	12.5	67.7		
3/8"	9.5	61.8		
#4	4.75	49.7		
#10	2	37.2		
#20	0.85	27.9		
#40	0.425	21.5		
#60	0.25	16.2		
#100	0.15	12.6		
#140	0.106	11.0		
#200	0.075	9.6		
			0.005 mm	
			0.002 mm	
			D60	8.57
			D30	1.03
			D10	0.08
			Cu	100.00
			Cc	1.50

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PARTICLE SIZE DISTRIBUTION

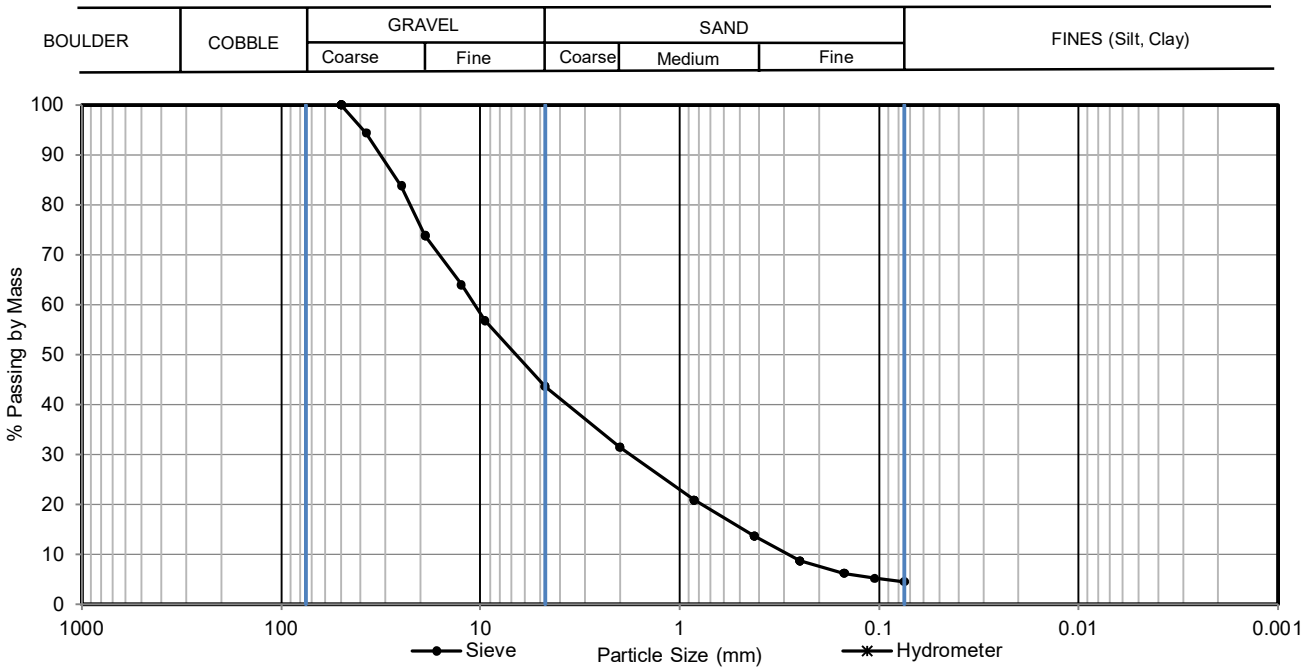
ASTM D6913

Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-02
Source:		Sample No.:	2
Soil Description:		Type:	GS
		Depth (m):	1.07 - 1.22

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 56.4 39.1 4.5



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
2"	50	100.0		
1 1/2"	37.5	94.4		
1"	25	83.8		
3/4"	19	73.8		
1/2"	12.5	64.0		
3/8"	9.5	56.8		
#4	4.75	43.6		
#10	2	31.4		
#20	0.85	20.9		
#40	0.425	13.7		
#60	0.25	8.7		
#100	0.15	6.2		
#140	0.106	5.2		
#200	0.075	4.5		
			0.005 mm	
			0.002 mm	
			D60	10.70
			D30	1.78
			D10	0.29
			Cu	37.00
			Cc	1.00

Notes:

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PARTICLE SIZE DISTRIBUTION

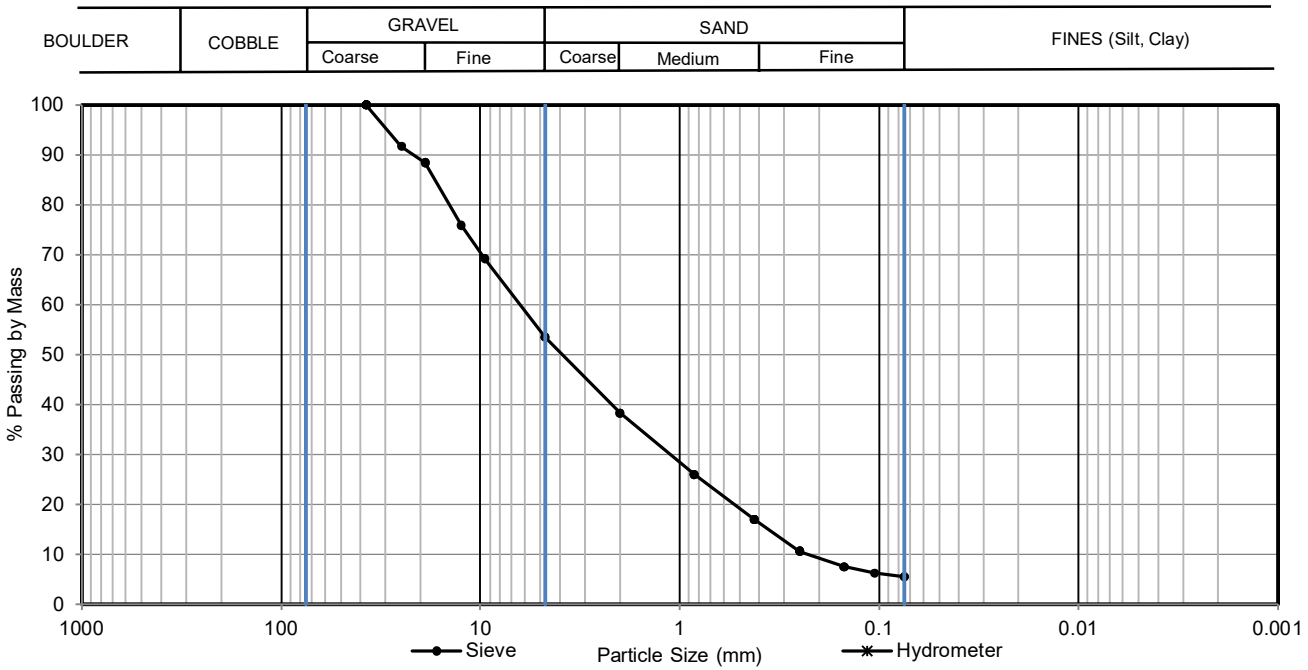
ASTM D6913

Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-02
Source:		Sample No.:	6
Soil Description:		Type:	GS
		Depth (m):	3.96 - 4.12

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 46.5 48.0 5.5



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
1 1/2"	37.5	100.0		
1"	25	91.7		
3/4"	19	88.5		
1/2"	12.5	75.9		
3/8"	9.5	69.2		
#4	4.75	53.5		
#10	2	38.3		
#20	0.85	26.0		
#40	0.425	17.0		
#60	0.25	10.6		
#100	0.15	7.5		
#140	0.106	6.3		
#200	0.075	5.5		
			0.005 mm	
			0.002 mm	
			D60	6.33
			D30	1.12
			D10	0.23
			Cu	28.00
			Cc	0.88

Notes:

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PARTICLE SIZE DISTRIBUTION

ASTM D6913

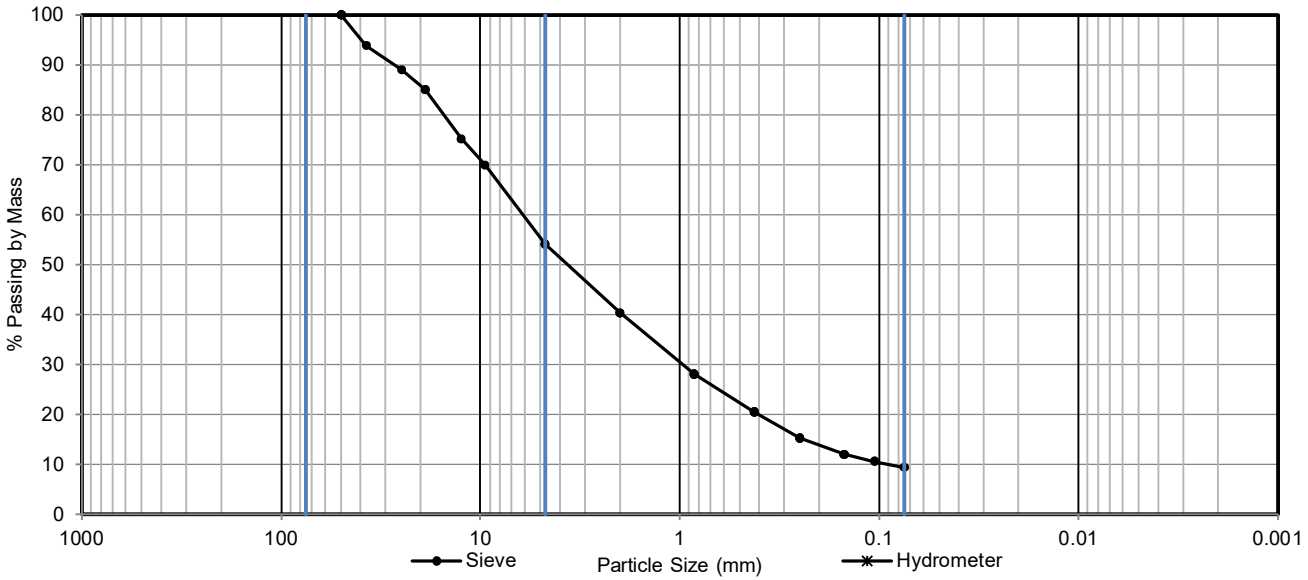
Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-03
Source:		Sample No.:	6
Soil Description:		Type:	GS
		Depth (m):	2.74 - 2.90

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%)

BOULDER	COBBLE	GRAVEL		SAND			FINES (Silt, Clay)
		Coarse	Fine	Coarse	Medium	Fine	
			45.9		44.7		9.4



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
2"	50	100.0		
1 1/2"	37.5	93.9		
1"	25	89.1		
3/4"	19	85.1		
1/2"	12.5	75.2		
3/8"	9.5	70.0		
#4	4.75	54.1		
#10	2	40.4		
#20	0.85	28.1		
#40	0.425	20.5		
#60	0.25	15.2		
#100	0.15	12.0		
#140	0.106	10.6		
#200	0.075	9.4		
			0.005 mm	
			0.002 mm	
			D60	6.14
			D30	0.97
			D10	0.09
			Cu	69.00
			Cc	1.70

Notes:

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PARTICLE SIZE DISTRIBUTION

ASTM D6913 and ASTM D422

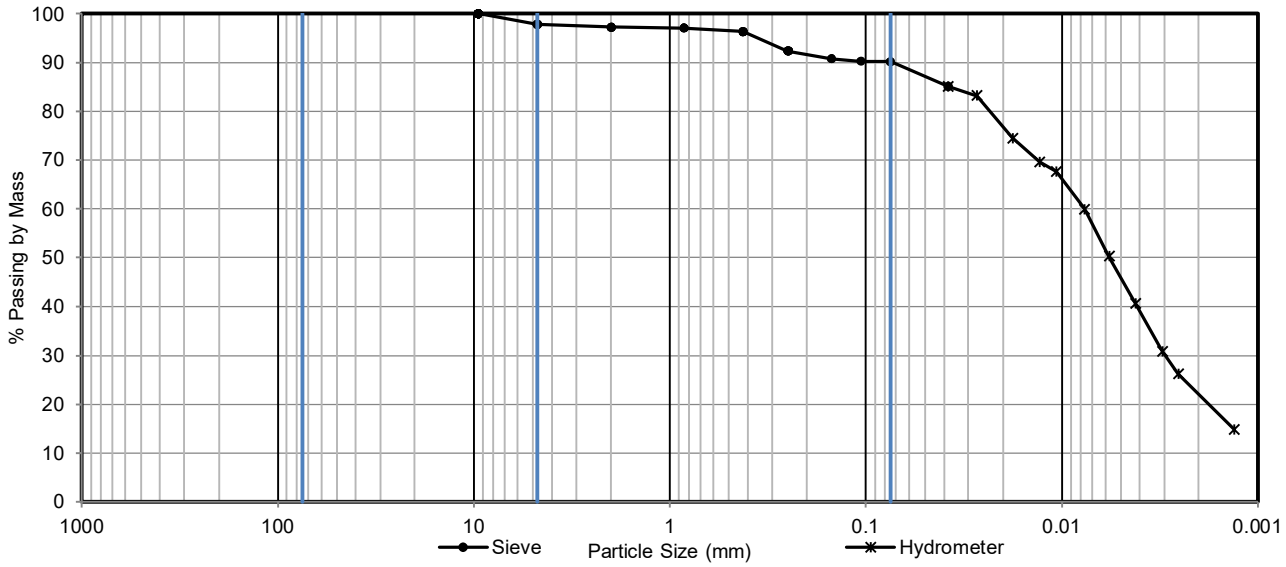
Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	8
Soil Description:		Type:	GS
		Depth (m):	5.18 - 5.33

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%)

BOULDER	COBBLE	GRAVEL		SAND			FINES (Silt, Clay)
		Coarse	Fine	Coarse	Medium	Fine	
		2.2		7.6			90.2



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
3/8"	9.5	100.0	0.0380	85.1
#4	4.75	97.8	0.0271	83.2
#10	2	97.2	0.0179	74.5
#20	0.85	97.0	0.0130	69.6
#40	0.425	96.3	0.0107	67.6
#60	0.25	92.4	0.0077	60.0
#100	0.15	90.7	0.0057	50.3
#140	0.106	90.2	0.0042	40.6
#200	0.075	90.2	0.0031	30.9
			0.0026	26.2
			0.0013	14.8
			0.005 mm	46.00
			0.002 mm	22.00
			D60	0.01
			D30	0.00
			D10	
			Cu	
			Cc	

Notes:

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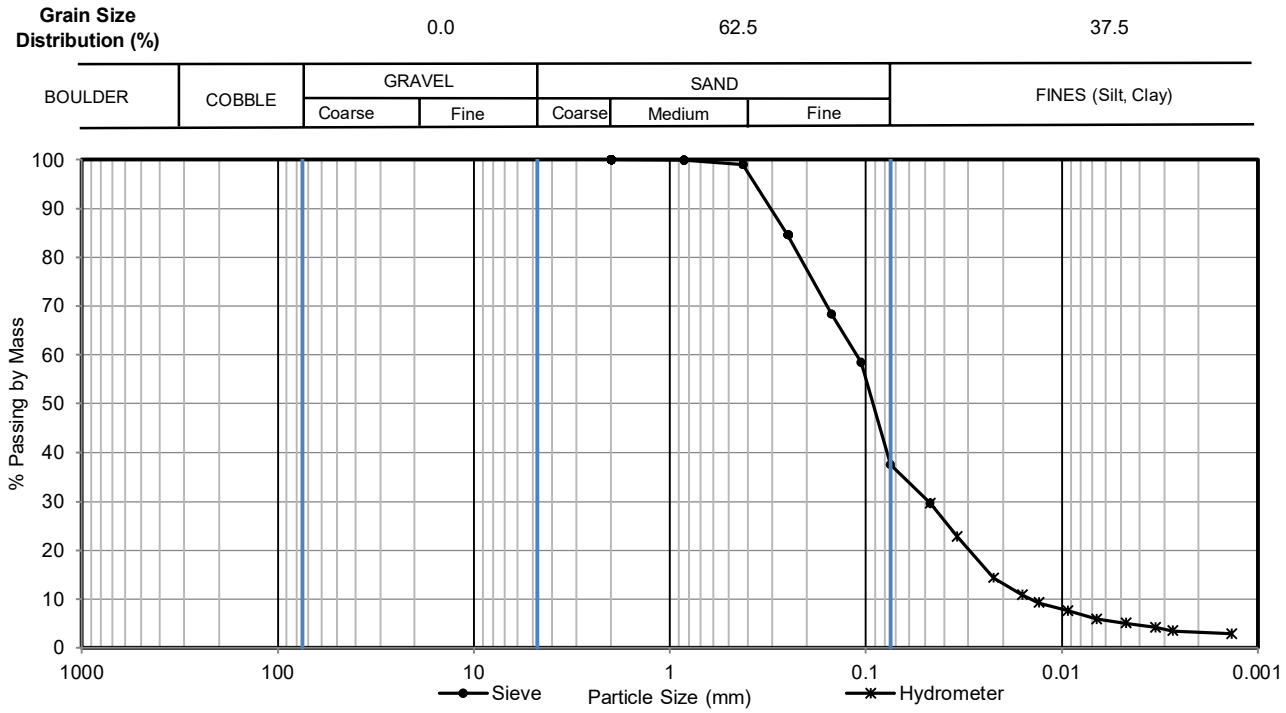
PARTICLE SIZE DISTRIBUTION

ASTM D6913 and ASTM D422

Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	35
Soil Description:		Type:	GS
		Depth (m):	28.96 - 29.11

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
#10	2	100.0	0.0471	29.6
#20	0.85	99.9	0.0342	22.8
#40	0.425	99.0	0.0223	14.3
#60	0.25	84.5	0.0160	10.9
#100	0.15	68.3	0.0131	9.3
#140	0.106	58.5	0.0093	7.6
#200	0.075	37.5	0.0066	5.9
			0.0047	5.1
			0.0033	4.2
			0.0027	3.5
			0.0014	2.9
			0.005 mm	5.20
			0.002 mm	3.20
			D60	0.11
			D30	0.05
			D10	0.01
			Cu	7.80
			Cc	1.50

Notes:

Disclaimer:

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PARTICLE SIZE DISTRIBUTION

ASTM D6913 and ASTM D422

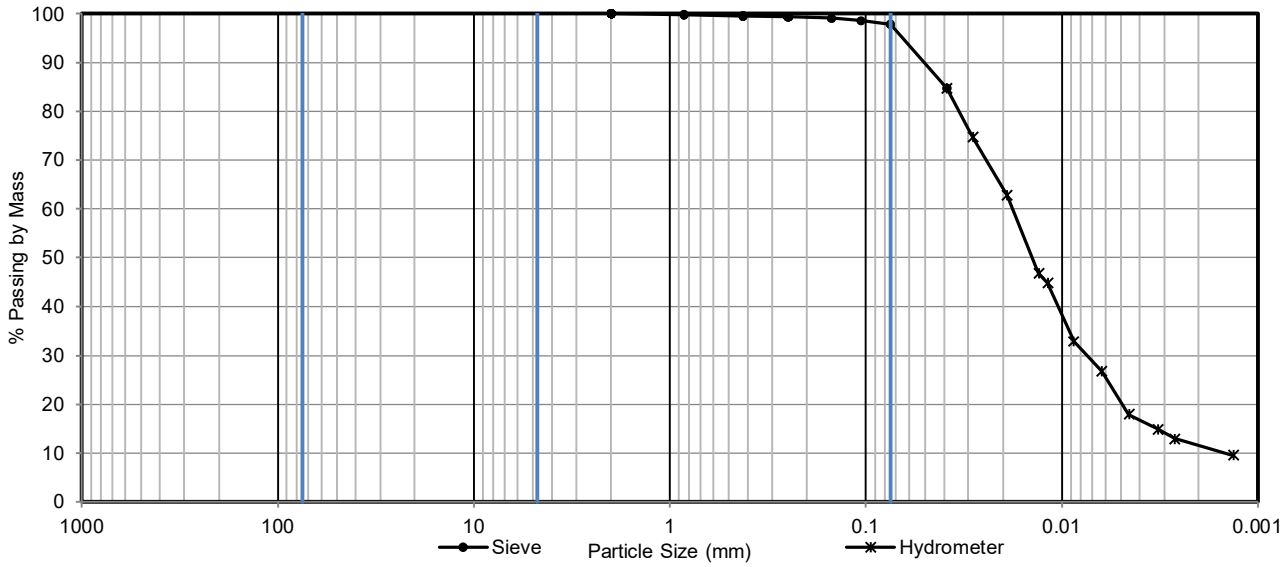
Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-02
Source:		Sample No.:	15
Soil Description:		Type:	GS
		Depth (m):	8.23 - 8.38

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 0.0 2.2 97.8

BOULDER | COBBLE | GRAVEL (Coarse, Fine) | SAND (Coarse, Medium, Fine) | FINES (Silt, Clay)



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
#10	2	100.0	0.0385	84.7
#20	0.85	99.8	0.0286	74.7
#40	0.425	99.5	0.0190	62.8
#60	0.25	99.3	0.0131	46.8
#100	0.15	99.1	0.0118	44.8
#140	0.106	98.6	0.0087	32.8
#200	0.075	97.8	0.0063	26.8
			0.0046	17.9
			0.0032	14.9
			0.0027	12.9
			0.0013	9.5
			0.005 mm	20.50
			0.002 mm	11.50
			D60	0.02
			D30	0.01
			D10	
			Cu	
			Cc	

Notes:

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PARTICLE SIZE DISTRIBUTION

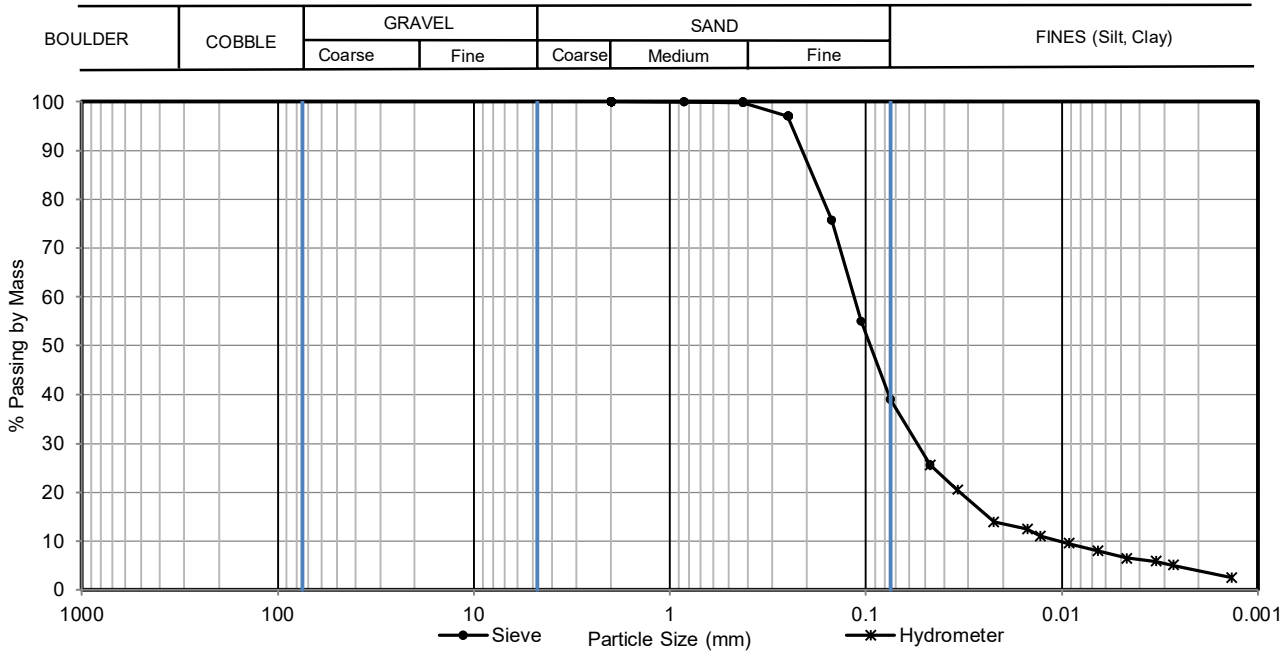
ASTM D6913 and ASTM D422

Method B

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-03
Source:		Sample No.:	22
Soil Description:		Type:	GS
		Depth (m):	14.63 - 14.78

Specimen Reference	NA	Specimen Depth (m):	NA	Date of Test	5/27/2024
Specimen Description	NA				

Grain Size Distribution (%) 0.0 61.0 39.0



Sieve			Hydrometer Sedimentation	
Sieve No.	Particle Size mm	% Passing	Particle Size mm	% Passing
#10	2	100.0	0.0471	25.6
#20	0.85	100.0	0.0341	20.5
#40	0.425	99.9	0.0222	13.9
#60	0.25	97.0	0.0150	12.5
#100	0.15	75.7	0.0129	11.0
#140	0.106	55.0	0.0092	9.5
#200	0.075	39.0	0.0066	8.0
			0.0047	6.5
			0.0033	5.8
			0.0027	5.1
			0.0014	2.5
			0.005 mm	6.80
			0.002 mm	4.00
			D60	0.12
			D30	0.05
			D10	0.01
			Cu	11.00
			Cc	2.50

Notes:

Disclaimer:

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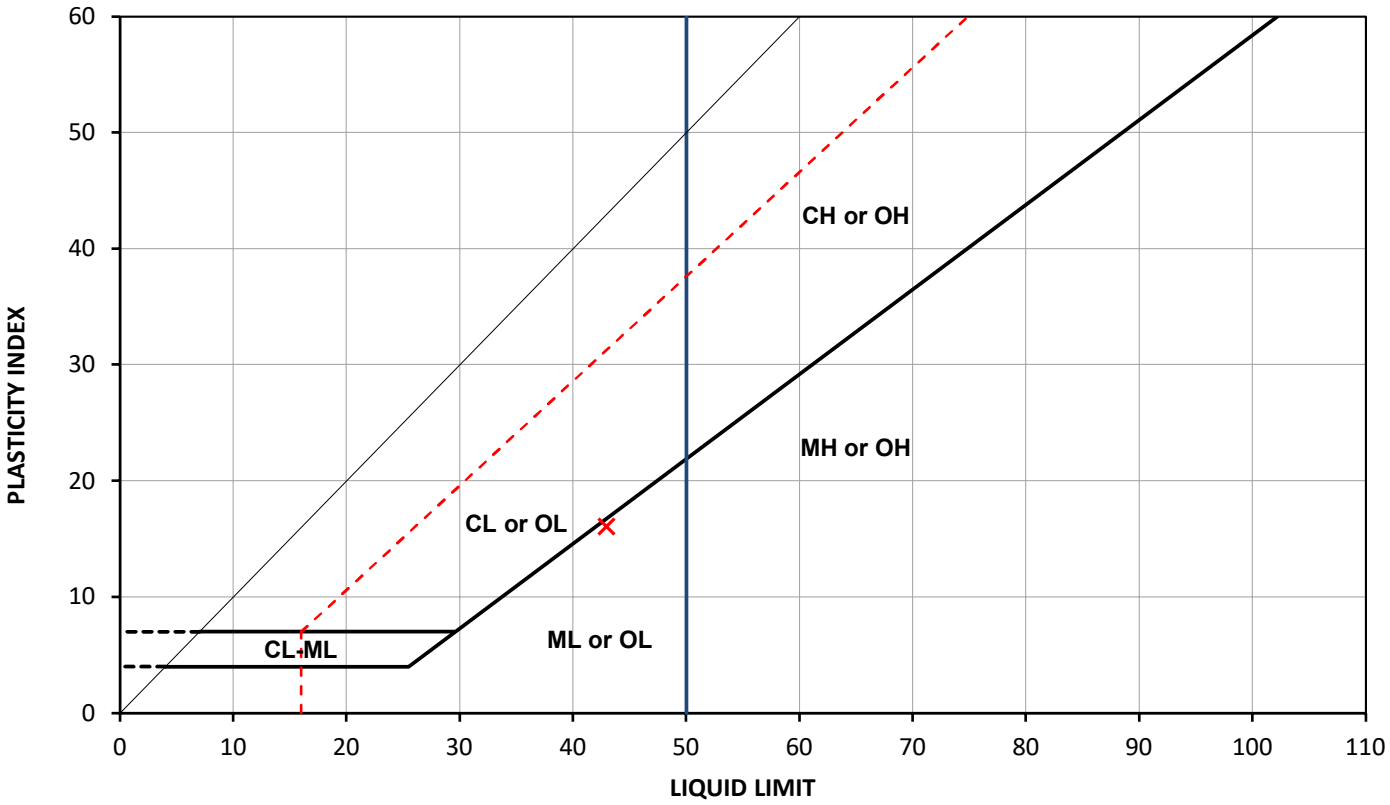
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

ASTM D4318

Method A - Multipoint Test

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	9
Soil Description:		Type:	GS
		Depth (m):	5.94 - 6.10

Specimen Reference	NA	Specimen Depth	NA	Date of Test	29 May 2024
Specimen Description	NA				



Legend
A-Line
U-Line

Sample Location	Sample / Specimen Number	Top Depth (m)	Base Depth (m)	Percent Passing #40 Sieve	Natural Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index
BH24-01	9	5.94	6.10	100	40.4	43	27	16	0.84

NP = Non-Plastic
ND = Not Determined

Test Preparation
Dry Preparation Tested after >425um removed

Notes:

Disclaimer:
The laboratory testing services reported herein have been performed in accordance with the terms of a contract with WSP's client, and with the recognized standards indicated in this report, or local industry practice. This laboratory testing services report is for the sole use of WSP's client, relates only to the sample(s) tested and does not represent any (actual or implied) interpretation or opinion regarding specification compliance or materials suitability for any specific purpose.

Tested by: KSingh **Date:** 29 May 2024
Checked by: KSingh **Date:** 29 May 2024
Reviewed by: JStotz **Date:** 30 May 2024

WSP Canada Inc.
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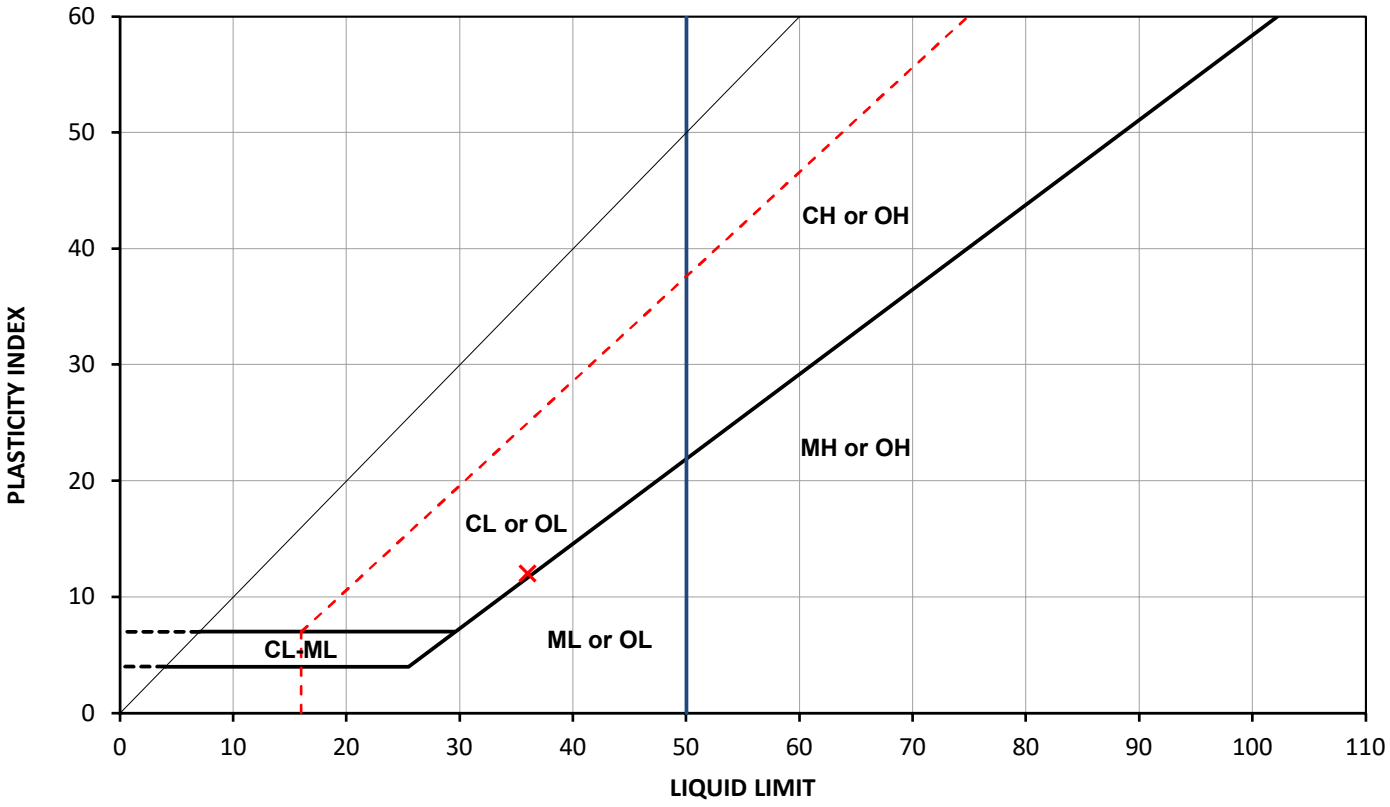
LIQUID LIMIT, PLASTIC LIMIT AND PLASTICITY INDEX

ASTM D4318

Method A - Multipoint Test

Test Request #	K24-042	Project Number:	CA0014660.3828 (04)
Client:	BC Housing Management Commission	Project Location:	523 Columbia Street, Kamloops, BC
Project Name:	Housing Development	Sample Location:	BH24-01
Source:		Sample No.:	25
Soil Description:		Type:	GS
		Depth (m):	19.51 - 19.66

Specimen Reference	NA	Specimen Depth	NA	Date of Test	29 May 2024
Specimen Description	NA				



Sample Location	Sample / Specimen Number	Top Depth (m)	Base Depth (m)	Percent Passing #40 Sieve	Natural Water Content (%)	Liquid Limit	Plastic Limit	Plasticity Index	Liquidity Index
BH24-01	25	19.51	19.66	100	30.3	36	24	12	0.53

NP = Non-Plastic
ND = Not Determined

Test Preparation
Dry Preparation Tested after >425um removed

Notes:

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CERTIFICATE OF ANALYSIS

REPORTED TO	WSP Canada Inc. - Kelowna 108-3677 Highway 97N Kelowna, BC V1X 5C3		
ATTENTION	Marisa Loude	**WORK ORDER**	24E1284
PO NUMBER		**RECEIVED / TEMP**	2024-05-09 12:32 / 21.7°C
PROJECT	CA0014660.3828/523 Columbia Street, Kamloops	**REPORTED**	2024-05-16 17:13
PROJECT INFO	523 Columbia Street, Kamloops	**COC NUMBER**	No Number

Introduction:

CARO Analytical Services is a testing laboratory full of smart, engaged scientists driven to make the world a safer and healthier place. Through our clients' projects we become an essential element for a better world. We employ methods conducted in accordance with recognized professional standards using accepted testing methodologies and quality control efforts. CARO is accredited by the Canadian Association for Laboratories Accreditation (CALA) to ISO/IEC 17025:2017 for specific tests listed in the scope of accreditation approved by CALA.

Big Picture Sidekicks

You know that the sample you collected after snowshoeing to site, digging 5 meters, and racing to get it on a plane so you can submit it to the lab for time sensitive results needed to make important and expensive decisions (whew) is VERY important. We know that too.

We've Got Chemistry

It's simple. We figure the more you enjoy working with our fun and engaged team members; the more likely you are to give us continued opportunities to support you.

Ahead of the Curve

Through research, regulation knowledge, and instrumentation, we are your analytical centre for the technical knowledge you need, BEFORE you need it, so you can stay up to date and in the know.

By engaging our services, you are agreeing to CARO Analytical Service's Standard Terms and Conditions outlined here: https://www.caro.ca/terms-conditions

If you have any questions or concerns, please contact me at hhannaoui@caro.ca

Authorized By:

Hanane El Hannaoui
Junior Account Manager

TEST RESULTS

REPORTED TO	WSP Canada Inc. - Kelowna	**WORK ORDER**	24E1284
PROJECT	CA0014660.3828/523 Columbia Street, Kamloops	**REPORTED**	2024-05-16 17:13

Analyte	Result	RL	Units	Analyzed	Qualifier
BH24-01.GS-09 (5.9m-6.1m) (24E1284-01) | Matrix: Soil | Sampled: 2024-05-07					
General Parameters					
Sulfate, Water-Soluble	< 0.050	0.050	%	2024-05-16	
BH24-02.GS-06 (3.9m-4.1m) (24E1284-02) | Matrix: Soil | Sampled: 2024-05-08					
General Parameters					
Sulfate, Water-Soluble	< 0.050	0.050	%	2024-05-16	
BH24-03.GS-05 (1.9m-2.1m) (24E1284-03) | Matrix: Soil | Sampled: 2024-05-08					
General Parameters					
Sulfate, Water-Soluble	< 0.050	0.050	%	2024-05-16	

APPENDIX 1: SUPPORTING INFORMATION

REPORTED TO	WSP Canada Inc. - Kelowna	**WORK ORDER**	24E1284
PROJECT	CA0014660.3828/523 Columbia Street, Kamloops	**REPORTED**	2024-05-16 17:13

Analysis Description	Method Ref.	Technique	Accredited	Location
Sulfate, Water-Soluble in Soil	CSA A23.2-3B / CSA A23.2-2B	Extraction (HCl) / Gravimetry (Barium Sulfate Precipitation)		Richmond

Glossary of Terms:

RL	Reporting Limit (default)
%	Percent
<	Less than the specified Reporting Limit (RL) - the actual RL may be higher than the default RL due to various factors
CSA	Canadian Standards Association Chemical Test Methods

General Comments:

The results in this report apply to the received samples analyzed in accordance with the Chain of Custody document. This analytical report must be reproduced in its entirety. CARO is not responsible for any loss or damage resulting directly or indirectly from error or omission in the conduct of testing. Liability is limited to the cost of analysis. Caro will dispose of all samples within 30 days of sample receipt, unless otherwise agreed.

Results in **Bold** indicate values that are above CARO's method reporting limits. Any results that are above regulatory limits are highlighted **red**. Please note that results will only be highlighted red if the regulatory limits are included on the CARO report. Any Bold and/or highlighted results do not take into account method uncertainty. If you would like method uncertainty or regulatory limits to be included on your report, please contact your Account Manager:hhannaoui@caro.ca

Please note any regulatory guidelines applied to this report are added as a convenience to the client, at their request, to help provide some initial context to analytical results obtained. Although CARO makes every effort to ensure accuracy of the associated regulatory guideline(s) applied, the guidelines applied cannot be assumed to be correct due to a variety of factors and as such CARO Analytical Services assumes no liability or responsibility for the use of those guidelines to make any decisions. The original source of the regulation should be verified and a review of the guideline(s) should be validated as correct in order to make any decisions arising from the comparison of the analytical data obtained to the relevant regulatory guideline for one's particular circumstances. Further, CARO Analytical Services assumes no liability or responsibility for any loss attributed from the use of these guidelines in any way.

APPENDIX 2: QUALITY CONTROL RESULTS

REPORTED TO	WSP Canada Inc. - Kelowna	**WORK ORDER**	24E1284
PROJECT	CA0014660.3828/523 Columbia Street, Kamloops	**REPORTED**	2024-05-16 17:13

The following section displays the quality control (QC) data that is associated with your sample data. Groups of samples are prepared in “batches” and analyzed in conjunction with QC samples that ensure your data is of the highest quality. Common QC types include:

- **Method Blank (Blk)**: A blank sample that undergoes sample processing identical to that carried out for the test samples. Method blank results are used to assess contamination from the laboratory environment and reagents.
- **Duplicate (Dup)**: An additional or second portion of a randomly selected sample in the analytical run carried through the entire analytical process. Duplicates provide a measure of the analytical method's precision (reproducibility).
- **Blank Spike (BS)**: A sample of known concentration which undergoes processing identical to that carried out for test samples, also referred to as a laboratory control sample (LCS). Blank spikes provide a measure of the analytical method's accuracy.
- **Matrix Spike (MS)**: A second aliquot of sample is fortified with a known concentration of target analytes and carried through the entire analytical process. Matrix spikes evaluate potential matrix effects that may affect the analyte recovery.
- **Reference Material (SRM)**: A homogenous material of similar matrix to the samples, certified for the parameter(s) listed. Reference Materials ensure that the analytical process is adequate to achieve acceptable recoveries of the parameter(s) tested.

Each QC type is analyzed at a 5-10% frequency, i.e. one blank/duplicate/spike for every 10-20 samples. For all types of QC, the specified recovery (% Rec) and relative percent difference (RPD) limits are derived from long-term method performance averages and/or prescribed by the reference method.

Analyte	Result	RL	Units	Spike Level	Source Result	% REC	REC Limit	% RPD	RPD Limit	Qualifier
General Parameters, Batch B4E2697										
Blank (B4E2697-BLK1)				Prepared: 2024-05-14, Analyzed: 2024-05-16						
Sulfate, Water-Soluble	< 0.050	0.050	%							
Duplicate (B4E2697-DUP1)			**Source: 24E1284-03**	Prepared: 2024-05-14, Analyzed: 2024-05-16						
Sulfate, Water-Soluble	< 0.050	0.050	%		< 0.050				19	
Matrix Spike (B4E2697-MS1)			**Source: 24E1284-03**	Prepared: 2024-05-14, Analyzed: 2024-05-16						
Sulfate, Water-Soluble	0.633	0.050	%	1.00	< 0.050	63	63-117			