

**BATCHELOR HILLS
LAND USE PLAN**

CITY OF KAMLOOPS

NOVEMBER 1997

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1.0 INTRODUCTION

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1.0 INTRODUCTION

1.1 BACKGROUND

The Batchelor Hills area of Kamloops is located on the west bank shore of the North Thompson River, north of Brocklehurst and west of Westsyde Road. Since as early as 1972 the Kamloops *Official Community Plan* has identified this area as a significant growth area for the City. The early 1972 and 1974 plans allocated as many as 20,000 people to this area.

The more recent 1997 *Kamplan* recognized the suitability of the area to accommodate additional growth within the objectives of the plan and designated the area as a Special Development Area.

As a number of issues need to be addressed prior to the development of the area that impact not only the Batchelor Hills area but also the adjacent existing developments, the City decided to undertake a *Land Use Plan*.

1.2 PURPOSE OF PLAN

The Batchelor Hills development strategy represents an opportunity for the City of Kamloops to establish a long term plan for the plan area. This area is recognized as a suitable area to accommodate additional growth. The existing situation of an area partially developed and with increasing recent development interest, has highlighted the need for the preparation of an overall land use and servicing strategy. Existing applications and approvals have taken place without a comprehensive road network or a land use pattern established to maximize development opportunities.

Planning for the future requires a thorough analysis of the site and the preparation of a development and servicing concept plan. This concept plan must be creative in its respect for both site and context and put the City in a leadership role in planning for the area. It should also advance landowner interests, while recognizing issues of servicing, transportation, and public sentiment within a framework of the public interest, a realistic development strategy plan, and an effective planning and implementation process.

The *Terms of Reference* issued by the City clearly indicates project objectives. They are to resolve the overall land use and transportation network issues, ensure the

efficient delivery of services for developable lands, lead to implementation of *Official Community Plan* policies, and to provide a fit with adjacent residential areas and the Lac du Bois plan area.

In order to accomplish this, the development strategy should include a long term general land use, circulation, and transportation concept, a conceptual servicing scheme for major systems, and an outline for future planning and implementation of the plan.

1.3 PLAN AREA

The plan area is shown on the Key Plan on Figure 1.1. and details are shown on Figure 1.2. The B.C. Hydro right-of-way forms the northern boundary of the Batchelor Hills area. Westsyde Road forms the eastern boundary. The west boundary is formed by the Lac du Bois conservation area and is to be defined under this plan.

Best West Realty have developed a 304 unit development in the southern part of the Batchelor Hills area, accessed off Batchelor Drive. Saddleback Hills Developments have proposed a 281 unit development accessed from Batchelor Drive. Westsyde Estates have also proposed a residential development which would be located in the north east quadrant with a new access provided directly onto Westsyde Road.

The Ministry of Environment, Lands and Parks who control the remaining property within the plan area have applied to rezone the property and systematically sell it for development.

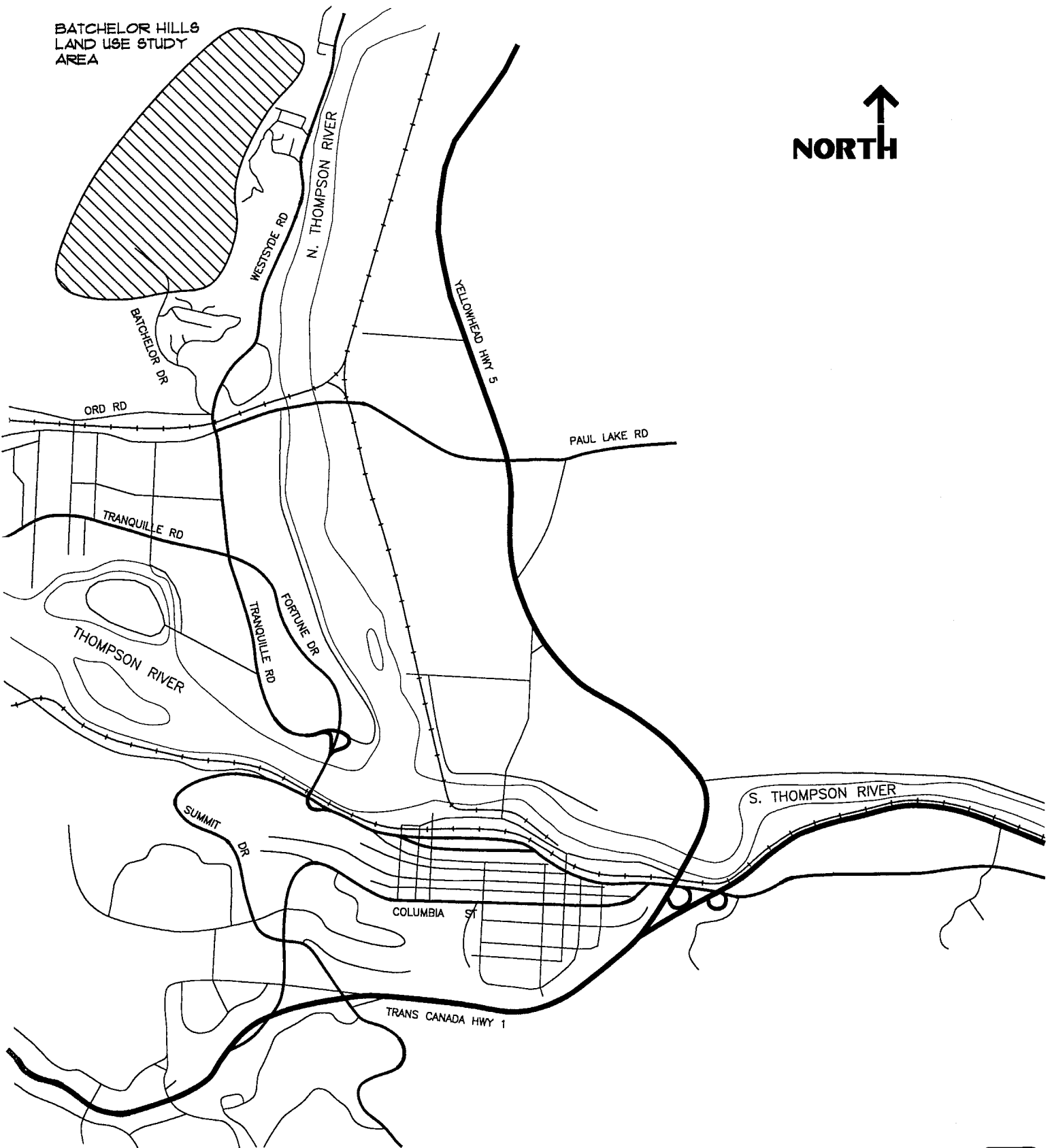
1.4 BASE INFORMATION

At the start of the project, the planning team identified a number of facts that would remain constant throughout the plan. It is important to briefly define these prior to defining the development scenarios which were considered.

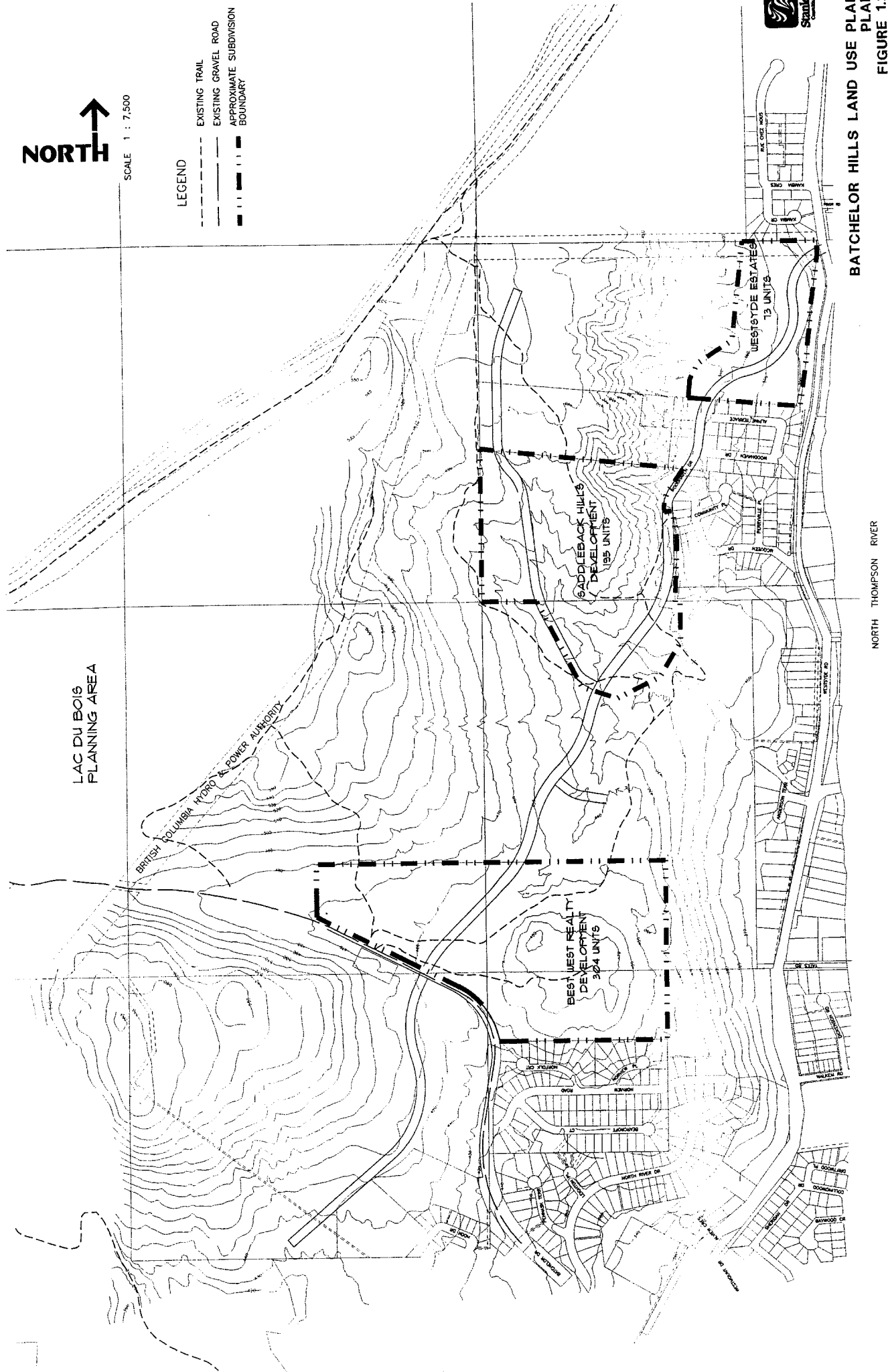
- The 1977 City of Kamloops *Official Community Plan* designated the Batchelor Hills area as a *Special Development Area* and allocated a portion of the City's growth to the year 2020 to the area. As such, the area is intended to be developed.
- The Westsyde Road/Batchelor Drive/Ord Road intersection is unorthodox and dangerous. The City intends to realign this intersection in 1998 regardless of which development scenario is selected.

BATCHELOR HILLS
LAND USE STUDY
AREA

NORTH
↑



BATCHELOR HILLS LAND USE PLAN
KEY PLAN
FIGURE 1.1



- A ±15 ac. school site has been designated within the Batchelor Hills neighbourhood. Discussions with the School District indicate it is unlikely a new school will be built as a result of growth in the area. Existing schools will be utilized first, as capital resources are limited.
- The Lac du Bois range lands will be fenced off from the development area once the preferred scenario is selected. Access points to the range lands will be provided as development proceeds.

1.5 REFERENCE INFORMATION

A considerable number of reports have been prepared addressing servicing and transportation issues arising from the various development proposals. These have been reviewed during the course of this plan and are summarized below:

1. City of Kamloops Zoning Bylaw.
2. City of Kamloops Official Community Plan.
3. City of Kamloops Engineering Division, Design Manual.
4. Kamloops Land and Resource Management Plan.
5. Lac du Bois - Dewdrop Local Resource Use Plan (Draft).
6. RTAC Design Manual 1986.
7. TAC Urban Design Supplement.

Geotechnical

8. Geotechnical Consultation, Proposed Trailer Park McQueen Park, Golder Associates, April 1982.
9. Geotechnical Consultation, Proposed McQueen Road Mobile Home Park, September 1, 1983.
10. Access Road Stability, McQueen Drive Subdivision, Golder Associates, May 31, 1993.
11. Geotechnical Investigation of Road Allowance and Gullies, Proposed McQueen Drive Trailer Court, Golder Associates, July 19, 1993.

12. Geological and Geotechnical Overview Investigation, Proposed Batchelor Hills Subdivision, AGRA E & E, February 13, 1996.

Transportation

13. McQueen Drive Mobile Home Park Traffic Study, IMC Consulting Group Ltd., September 1992.
14. Best West Realty, Batchelor Hills Development, Batchelor Drive, Westsyde Road Intersection Analysis, Urban Systems, March 1996.
15. Traffic Operations Review for the Westsyde Road and Batchelor Road/Ord Road Intersection, Hamilton Associates, September 1996.
16. Supplemental Traffic Operations Review for the Westsyde Road and Batchelor Road/Ord Road Intersection, Hamilton Associates, October 1997.

Servicing

17. Salisbury Development Corporation Mobile Home Park, Stanley Associates Engineering Ltd., May 28, 1993 (Water Services).
18. City of Kamloops, River Street Intake and High Lift Pump Study, Urban Systems.
19. North Shore Water Distribution, Stanley Associates Engineering Ltd., December 6, 1995.
20. Shuswap Landing, Sewage Disposal Via City Systems, Stanley Associates Engineering Ltd., July 1996.
21. Anderson Terrace Drainage Review, Stanley Associates Engineering Ltd., 1996.
22. Best West Realty, Batchelor Hills Subdivision Pre-design Report for the Off-site Water Servicing, Urban Systems, November 1996.

Plans

- Road Alignments, City of Kamloops, 1995.
- Preliminary Design Saddleback Development, Stanley Associates Engineering Ltd., April 10, 1993.
- Best West Realty Conceptual Layout Plan, Urban Systems, July 29, 1996.
- Westsyde Estates, Preliminary Layout, Borrett Engineering Inc., June 1994.
- City of Kamloops, Sanitary Sewer Plans.
- City of Kamloops, North Shore Water Plans.

2.0 SITE CHARACTERISTICS

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2.0 SITE CHARACTERISTICS

2.1 OWNERSHIP

The following legal titles are included in this plan and are shown on the cadastral plan in Figure 2.1.

<u>Legal Description</u>	<u>Ownership</u>
Sec. 24, TP20, R18 W.6M	Unsurveyed Crown Lands
Sec. 25, TP20, R18 W.6M	Unsurveyed Crown Land
Sec. 25, TP20, R18 W.8FRAC	Unsurveyed Crown Land
Plan Number Not Registered	Best West Realty
Lot 2, Plan 8974, Sec. 25	Saddleback Hills Developments Inc.
Lot 1, Plan 8974, Sec. 25	Smith Developments

Saddleback Hills Developments have an option to purchase part of Section 25, Unsurveyed Crown Land once rezoning has been approved.

2.2 TOPOGRAPHY

The plan area is located in the Batchelor midlands and generally consists of rural benchlands with relatively steep valley sides draining through to the valley floor.

Slopes generally steeper than 25% are shown on Figure 2.2. This criterion was used because of its definition as a development limit in the *Official Community Plan*.

A large number of drainage gullies exist throughout the plan area, most of which appear to carry periodic short duration flow only. The principal drainage channel enters the plan area from the west on the north side of Lac du Bois Road and drains the central part of the site before entering a culvert under Westsyde Road. The drainage gullies are shown on Figure 2.2.



SCALE 1 : 7,500

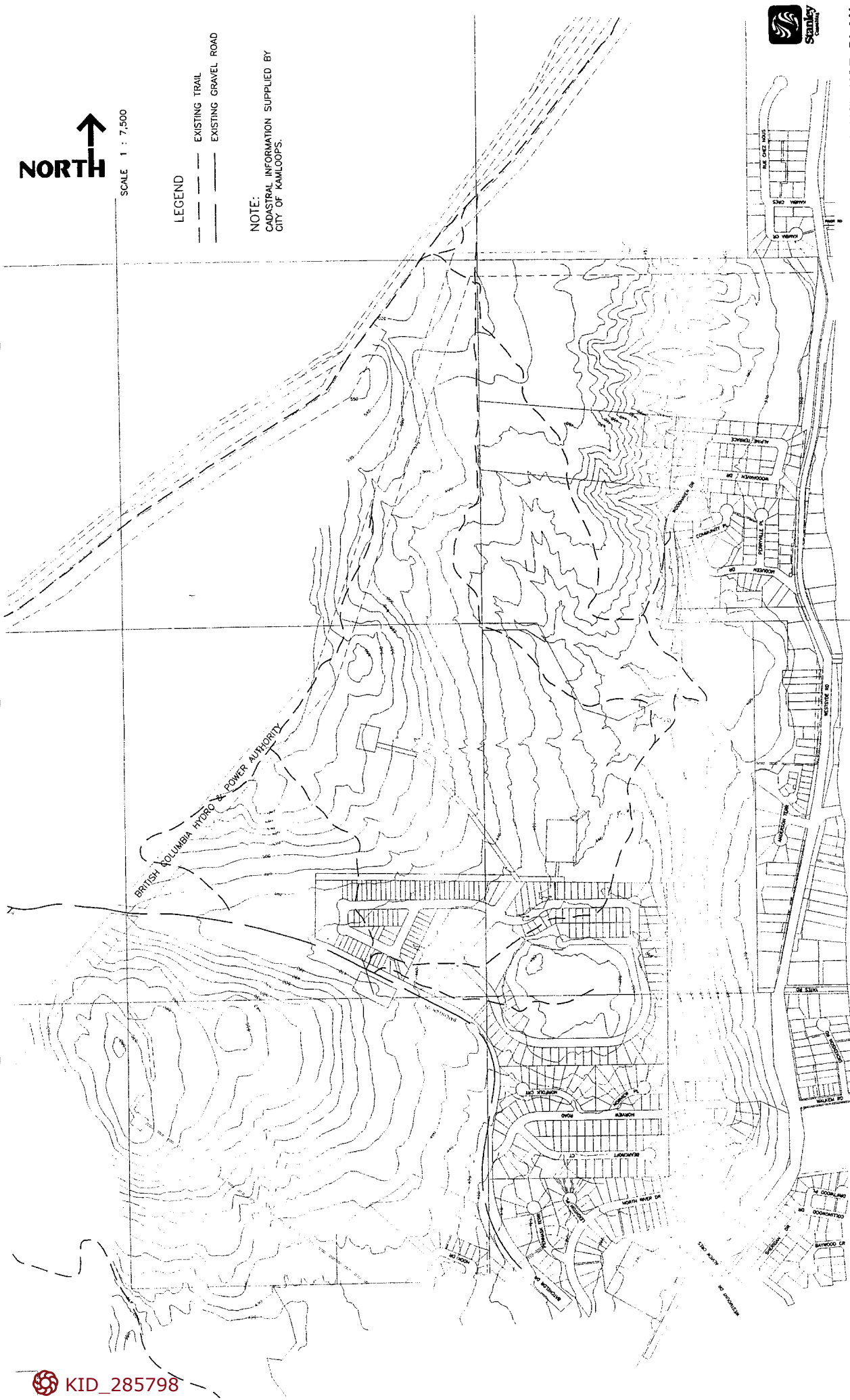
LEGEND

- EXISTING TRAIL
- EXISTING GRAVEL ROAD

NOTE:
CADASTRAL INFORMATION SUPPLIED BY
CITY OF KAMLOOPS.



BATCHELOR HILLS LAND USE PLAN
CADASTRAL PLAN
FIGURE 2.1



NORTH THOMPSON RIVER

NORTH ↑

SCALE 1 : 7,500

LEGEND

— DRAINAGE COURSE
▨ SLOPE > 25%



**BATCHELOR HILLS LAND USE PLAN
STEEP SLOPES & DRAINAGE COURSES
FIGURE 2.2**

BRITISH COLUMBIA HYDRO & POWER AUTHORITY

NORTH THOMPSON RIVER



KID_285798

The ground elevations in the plan area are extremely variable, rising from approximately 356 m in the northeast corner of the plan area to a high point of 581 m in the southeast corner. Along the west boundary, the ground rises to over 550 m.

The proposed Best West Realty development is located on a bench at an elevation between 450 and 460 m. A rocky knoll rising to 483 m is located within the development.

The proposed Saddleback Hills development is partially located on a bench at 400 m which gradually rises to 460 m on the west boundary of the property.

The proposed Westsyde Estates development is founded on the lower bench between approximately 360 and 380 m.

2.3 GEOLOGICAL CONDITIONS

A number of geotechnical investigations have been carried out for the various developments proposed for the plan area and these are referenced in Section 1.4.

The site is underlain by morainal deposits consisting largely of glacial till. Layered deposits of silt are visible in cuts below the site off McQueen Drive. These silts are the remnant portion of a lacustrine silt terrace deposited against the lower portion of the tills up to about mid-slope level approximately 410 m to 430 m (Ref. 8). From test pitting, Golder Associates found that the site of the Saddleback development, which is mostly above 440 m, is generally underlain by about 0.6 m of loose silt followed by variable thicknesses of loose to compact or compact to dense silt, sand and gravel. At depths ranging from 0.6 m to 2.0m, Golder Associates found glacial till.

Additional test pitting was undertaken by Golder Associates in August 1983 (Ref. 9) in the vicinity of a proposed extension to McQueen Drive. Along the lower levels (below approximately 440 m), of the area investigated, organic soils up to 0.3 m thick were found, underlain by a loose to compact stratum of silt varying in thickness between 0.5 m and 2.0 m. In three of five test pits excavated under this investigation, a sandy gravel deposit varying in thickness from 0.3 m to 1.0 m was found below the silty stratum. This was found to be underlain by a stiff to very stiff layered silt. Further up the slope, glacial till was encountered at 0.9 m depth.

Golder Associates undertook a further study in 1993 to review the stability of the access road into the Saddleback development (Ref. 16). It was determined that the

existing trail had been developed by cut and sliver fill. Slopes above the trail were generally found to be in layered lacustrine silts with medium sand overlain with lacustrine silt below.

AGRA Earth and Environmental undertook a geotechnical investigation of the Bilton Development in 1996 and found glacio-lacustrine deposits in the flat bench area immediately north of Lac du Bois Road with colluvium and tills along the north boundary of the proposed development. In the east and southeast quadrant of the subdivision, exposed or shallow bedrock was encountered. An area of talus was also observed, located in the middle of the development on the northwest side of the rocky knoll.

From investigation undertaken by both Golder Associates and AGRA E & E, soil samples taken for soluble sulphate testing indicating a very severe potential for sulphate attack of concrete foundations.

2.4 VEGETATION

Existing vegetation comprises mostly open grazing land with isolated pockets of lodge pole pine in some of the drainage gullies and also on the steep slopes north of Alpine Terrace.

2.5 ENVIRONMENTALLY SENSITIVE AREAS

There are no wetlands or creeks with fisheries values located in the plan area. However, the main gully that drains the upper Transit Drainage Basin to the west of the site discharges into the North Thompson River which has important fisheries values.

Visually, the area provides an attractive backdrop to the existing development along Westsyde Road. The hilltop located south of Lac du Bois Road and the steep valley sides are particularly prominent. Development in these areas could have a significant visual impact as they are visible from great distances.

2.6 EXISTING LAND USE

The plan area lies within the existing grazing reserve managed by the Ministry of Forests.

The area is also used for recreational purposes both during the summer and in the winter. Summer activities include walking and off-road driving while winter activities include cross country skiing and snowmobiling.

The area is readily accessed for recreational purposes from the south, off Batchelor Drive/Lac du Bois Road, and from Westsyde Road on the east via McQueen Drive and Anderson Terrace.

Although vacant, a school and park site has been allocated at the south edge of the plan area.

2.7 EXISTING ACCESS

Vehicular access to the site is via Batchelor Drive and Lac du Bois Road. The asphalt pavement on Batchelor Drive ends approximately 75 m north of Norview Road.

Access is also available off McQueen Drive/Woodhaven Drive via a trail running south. This route is blocked to vehicular traffic.

3.0 LAND USE PLANNING

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3.0 LAND USE PLANNING

3.1 OFFICIAL COMMUNITY PLAN

The City of Kamloops adopted an *Official Community Plan (OCP)* in 1997. **KAMPLAN 1997: A Community Plan for Kamloops** is the City's growth management strategy that sets policy and establishes direction to guide Kamloops City Council and the community into the next century. Some of the key goals of the *OCP* include:

- encouraging infill and intensification;
- discouraging urban sprawl;
- guiding new development to cost effective and pre-serviced areas;
- encouraging a mix of housing types and density in all neighbourhoods;
- encouraging alternate transportation systems; and,
- bringing shopping, work and home closer together.

The *OCP* contains policies for land use, including residential, commercial, and industrial. In general terms, the *OCP* supports development opportunities first, where infill or redevelopment of existing serviced land is proposed; second, where public services and utilities can be provided in an efficient and cost effective manner; and lastly, where development is to occur in *Special Development Areas*.

Future land use is designated in the *OCP* on *Map 1: Generalized Land Use, 1996–2020*. The majority of land in the plan area is designated as *Special Development Area*. Two areas along the western and southern boundary of the plan area are designated as *Agricultural/Resource Land*. A small area, reflecting earlier development proposals, is designated for *Urban Residential* use.

- **Agricultural/Resource Land**

This category includes lands in the Agricultural Land Reserve, other lands outside the ALR that are used for agriculture and grazing or for resource development, Crown lands used for grazing or recreation, and lands which were not contemplated for urban development within the time frame of the plan. None of the land in the plan area is included within the Agricultural Land Reserve. The *OCP* includes a policy which supports the integrated multiple use land management for Crown lands. There is also a policy which requires the City to

attempt to minimize conflicts between agricultural and other uses through such mechanisms as access restrictions, setbacks, fencing requirements for residential adjacent to agricultural operations, and liaison with Provincial Ministries and Crown agencies in the planning of Crown lands.

The intent is that the lands under this designation will not be developed and City utilities and services generally will not be provided to these lands. As such, these lands must be redesignated to an appropriate category before development is considered.

This designation applies to lands within and to the west of the plan area and to the ALR lands immediately north of the plan area.

- **Residential**

The *OCP* includes several general residential goals, including to ensure infill, intensification and full utilization of existing service capacity prior to peripheral expansion; to ensure an adequate range and choice of housing types and locations; to ensure that residential development proceeds in an orderly and cost-effective manner; and to encourage innovation, flexibility, and quality in the provision of housing.

While the City's *OCP* designates some areas for rural or suburban residential development, the City's principal residential designation is '*Urban Residential*' - a category which includes a full range of housing options, including single detached homes, secondary suites, multiple family residential, mobile homes, and duplexes. Densities in this category, on a net basis, will range from five to 150 units/ha depending on location.

The *OCP* contains policies and criteria for urban residential development, such as appropriate locations for multiple housing to encourage their distribution throughout the City. These criteria include, among others, access to arterials and transit routes, urban services, and proximity to shopping and other services. The *OCP* provides for two categories of residential density that may be suitable for multiple housing outside of the downtown. These include low density multiple family (townhouses, patio homes, other cluster housing, etc.) at net densities of about 25 to 50 units/ha. Medium density multiple family includes walk-up apartments and stacked townhouses with net densities from 40 to 100 units/ha.

- **Commercial**

Map 1: Generalized Land Use, 1996 – 2020 in the *OCP* also shows the locations of various kinds of land uses in Kamloops' commercial hierarchy, from the city centre to shopping centres and service/highway commercial districts. The *OCP* recommends the establishment of a new neighbourhood service centre in the plan area. The centre is to service the local neighbourhood with such uses as personal services, convenience/food outlets, and small scale offices. The *OCP* further outlines that new commercial development should be of a high quality and should enhance the urban and natural environments.

A small scale neighbourhood service centre would not require a separate *OCP* designation, and would be permitted in a residential area subject to site specific criteria. These criteria include access and transportation considerations, distances to other facilities, separation from elementary schools, and a scale and size appropriate to the area. Design and development controls should be applied to ensure sensitive integration within the neighbourhood.

- **Park and Open Space**

The *OCP* recommends that outline plans be prepared for all new development areas in order to determine park land and school requirements and to identify specific sites. The *OCP* designates different categories of park land from City-wide parks to neighbourhood parks and open space preserves. Land is to be acquired through the planning/subdivision process to meet these needs. Cash-in-lieu is an alternative where land is not suitable or appropriate for parkland needs.

While the *OCP* does not designate any new park facilities in the plan area, it does designate an existing neighbourhood park in the southern portion of the plan area. The *OCP* has policies for the provision of neighbourhood parks and playgrounds, passive landscaped parks, and athletic and playing fields and linking them, where possible, to other parks and open space preserves. Neighbourhood parks must be of a sufficient size to be useable.

Open space preserves include lands of an environmentally sensitive nature which limits their potential for urban use. This would include lands in the plan area as described below. These lands, at the City's discretion, can be conveyed to the City, but are not included in the required land dedication at the subdivision stage.

- **Special Development Areas**

As noted, the majority of the plan area falls in this category. These are lands which are considered for development within the 25 year term of the *OCP* but which require special study and evaluation prior to designating specific land uses. The *OCP* outlines the City's recommended Growth Management Approach with the following guiding principles affecting the plan area:

- ⇒ Existing zoning commitments for development will be honoured; services will be upgraded on a planned and phased basis to meet demands.
- ⇒ The *TravelSmart Preferred Scenario* will be used as the general guideline for considering levels of development within the Special Development Areas.
- ⇒ Where development proposals are proposed which do not reflect the City's planned phasing, all required infrastructure improvements, including major offsite upgrades, will be the responsibility of the developer.

- **Hazard Lands**

The *OCP* also contains policies with respect to hazard lands. These include areas where surface slopes exceed 25%, which are considered unsuitable for development unless proven-out by engineering studies. Significant portions of the plan area, as noted earlier in this report, are steeper than 25% (see Figure 2.2) and are, therefore, considered undevelopable. *Map 4* of the *OCP* designates the plan area as a fire risk area within the urban/wildland interface. While there is a lack of forest cover in and adjacent to the plan area, new development may require special treatment in response to the threat of wildfire due to the grassland environment.

- **Servicing**

OCP servicing policies are generally consistent with the land use policies. In other words, full services are required for urban areas and the utilization of existing capacity through incremental expansion is favoured over new development areas which require upgrading to existing systems. The *OCP* requires development to provide for necessary off-site services. Specific policies for each major services are as follows:

Water: Extension beyond existing service limits and the '*Special Development Areas*' was not supported in the *OCP*. *Map 6* defines the general plan area as serviceable from the central intake with improvements for increased supply to be required.

Sanitary: The plan area is currently outside of the existing central treatment area, but inclusion of this development area does not require modifications to the waste management permit.

Storm Drainage: The City shall continue to use the existing natural drainage pattern as the primary storm drainage system. The plan area is part of the major basin near the confluence of the Thompson and North Thompson Rivers. Areas adjacent to the plan area are shown as being serviced by major piped systems.

- **Road Network**

With respect to the road network, *Map 8* of the *OCP* designates a proposed arterial extension north from Batchelor Drive through the plan area. Improvements to Lac du Bois Road are shown. These roads would be supplemented in the area by a hierarchical road system of collectors and local roads. Improvements to the Batchelor/Ord/Westsyde road intersection will also be required as a result of growth in the plan area. Increased use of transit is encouraged. Comprehensive pedestrian and bicycle systems are to be pursued.

3.2 ZONING BY-LAW

The *Zoning Bylaw* is intended to regulate the use of land, buildings, and structures in conformance with the *Official Community Plan*.

The majority of lands, as are adjacent areas to the north and south, are zoned A-1 (Agricultural). The purpose of the A-1 zone *is to preserve land for agricultural use and to provide for agricultural and related land extensive uses*. This allows such uses as agricultural, extraction, wildlife reserves, and outdoor recreation. The minimum parcel size is 8 ha. This zoning will have to be changed for those areas which are intended for urban development. This zoning also remains on the Crown grant lands for a school park site on the west side of Batchelor Drive in the south end of the plan area.

A small area, mostly above the steep slopes in the north end of the plan area, is zoned FD (Future Development). This area, also with a minimum lot size of 8 ha, is for

lands with future development potential recognized in the *OCP*. Uses are restricted to those that would not limit future development options. An area just north of the centre of the plan area is zoned MHP (Mobile Home Park) which allows mobile homes at about 20 units/ha.

Those areas already developed in the plan area are appropriately zoned to either RS-1, RS-2, or RT-2 for standard single detached and two family housing. One small park site, zoned P-4 (Public and Quasi-Public Use) is located at the west end of Alpine Terrace.

Re-zoning of the Best West Realty Development has been approved, and includes the following: RS-1 (3.72 ha), RS-4 (4.48 ha), RS-5 (5.46 ha), RM-1 (3.81 ha) and RC-1 (5.74 ha). Other zoning amendments will be needed to implement the plan's policies respecting land use.

3.3 LAC DU BOIS - DEWDROP LRMP

In 1995, the Provincial Government approved the *Kamloops Land and Resource Management Plan (LRMP)* in principle. For an area of almost 2,200,000 ha, this plan provides for a variety of uses from full protection in some areas to a mix of industrial and recreational uses for other areas. Under this plan, grazing currently underway is expected to continue.

The Lac du Bois planning area, a sub area of the *Kamloops LRMP*, encompasses approximately 30,000 ha including most of the undeveloped portions of the plan area. The northeast corner of the plan area is not included with the Lac du Bois planning area. A draft plan was prepared and it was revised in 1996. It provides objectives for smaller sub-areas. The Ord/Halston Zone, including the majority of the plan area, has the objectives to maintain the high values in this area for motorized and non-motorized recreation, cattle grazing, wildlife/waterfowl, agricultural research, future housing development, and aesthetics/visual quality, through integrated resource management.

The plan document notes that the City of Kamloops is planning expansion of development in the Lac du Bois area. As such the boundary should be viewed as somewhat flexible in this area. However, it is important to have a proper transition between future urban development and the Lac du Bois area to minimize conflicts between, for example, the noise from ATV use (in some cases on an event organized

basis) and homes or between cattle grazing and residential use and traffic. Cattle proofing is important.

3.4 AGRICULTURAL LAND RESERVE

The Agricultural Land Reserve forms the northern boundary of the plan area. This should not be viewed as a major constraint to urban development in the plan area as the two uses will be separated by a major power transmission corridor. However, it does limit any additional expansion of urban development north of the plan area.

3.5 DEVELOPMENT AREAS

Potential development areas have been determined primarily using policy parameters (ALR boundaries, Lac du Bois planning objectives, *OCP*, etc.), topographic constraints (slopes over 25%, road grades, etc.), physical constraints (pipelines and power lines), ownership boundaries, and adjacent uses.

For the most part, these boundaries are straight forward. The proposed western boundary for future urban development of the City of Kamloops generally follows the westerly edge of Crown Land along the quarter section line. This is intended as a permanent boundary that can be fenced to separate urban areas from the Lac du Bois area. This boundary excludes some lands to the west of this boundary with less than 25% slope that could be considered for development, but, for the most part, they would be somewhat isolated from the rest of the residential community. Also to the west of this line is an area along Lac du Bois Road that has already been committed for urban development by Crown Lands.

The BC Hydro right-of-way forms the north boundary, Westsyde Road forms the eastern boundary. The south boundary is generally defined by the existing neighbourhood and proposed park/school site. Details are shown on Figure 1.2 in Section 1 of this report.

3.6 PLANNING PRINCIPLES

In suggesting a future development pattern, consideration should be given to the following general design parameters:

Respect for Environment: Steep slopes and major water courses should be protected for their inherent value, as habitat for wildlife, or places for recreation and to avoid hazard particularly related to erosion and property damage. As well, the

aesthetic qualities of these natural areas are invaluable in defining future development so it is seen to 'fit' with its environment, is seen to be visually attractive, and respectful of the larger natural environment of Kamloops "a city in the hills".

Respect for Context: Primarily, this consideration is expressed through the definition of the major land use and transportation network as a logical extension of the city and area system. This is important for roadways and the transit system, as well as a system of bicycle and pedestrian access. Transportation analysis by the City of Kamloops has defined a significant downstream network constraint that limits the population that can be accommodated here (to in the order of about 2500) without adverse downstream impacts. Options with higher population yields were, therefore, rejected as inappropriate for this area.

Respect for Neighbours: Much of the area is adjacent to existing development and this principle requires some degree in consistency in land use and transportation to avoid land use incompatibilities or negative impacts on adjacent areas. This includes the existing residential development and the need to provide a clear and permanent boundary with the Lac du Bois area.

Respect for Policy: The City of Kamloops *OCP* includes policies, such as density, that should be incorporated into the planning and development of Batchelor Hills. Some policies, such as servicing and DCC's, will impact the implementation process, while others define the nature of the future community. These policies, in summary, suggest the preparation of a plan with flexibility and variety in housing types at urban densities. This is consistent with broader goals related to transit orientation. In other words, the policy looks for efficiency in services and an avoidance of 'sprawl'. The plan should also accommodate any development plans that have already been moving through the planning approval process.

Respect for Community: The objective is to develop, in the long run in conjunction with adjacent development, a ‘*complete community*’ that provides for a variety of lifestyles (and housing forms) and those commercial and institutional services (such as parks, churches, local retail stores) which complement and support residential development.

3.7 DEVELOPMENT PLAN

Once the plan area boundaries had been determined and slopes over 25% had been excluded from possible development, the initial determining factors in planning were the already approved development plans, an appropriate location for a park site in conjunction with the open space system, and the access to and through the site. This includes the extension of Batchelor Drive to connect with Lac du Bois Road west through the plan area, the connection of the upper slopes back through the development area to Westsyde Road in the northeast, and a system of interconnected collectors to the north and south that meet geometric requirements (Local road patterns should be defined at the subdivision stage). Drainage courses were also designated for preservation.

With the general development restrictions/requirements defined, two alternative development scenarios were prepared.

- **Scenario One — High Density**

Scenario One was based on optimizing the developable land within the plan area as well as ensuring other *OCP* objectives were achieved. This scenario provided for development of 1550 units.

While this scenario would optimize use of the available land in the area, it was not compatible with the City’s *TravelSmart* goals. These goals are to maintain reasonable mobility levels as the City grows by managing future development patterns. The reason this scenario is not compatible with these goals is that the high traffic volumes generated would downgrade the level of transportation service in the North Shore area below acceptable levels. This, in turn, would likely accelerate the need for the Singh Street Bridge which is estimated at \$50M.

As the future transportation network costs far exceeded the benefits of the larger development, it was decided that Scenario One was unacceptable and needed to be downsized.

NORTH

SCALE 1 : 7,500

LEGEND

- RS-1, 4, 5 SINGLE FAMILY - RESIDENTIAL
- RM-1 MULTI FAMILY - LOW DENSITY
- RC-1 COMPREHENSIVE - RESIDENTIAL
- C-1 NEIGHBOURHOOD COMMERCIAL
- UNDEVELOPABLE AREA AND PARKS



BATCHELOR HILLS LAND USE PLAN
DEVELOPMENT PLAN
FIGURE 3.1



NORTH THOMPSON RIVER

- **Scenario Two — Low Density**

The size of the Scenario Two development was determined by working the *TravelSmart* numbers backwards. It was determined that development in the range of 900 to 950 units could be accommodated within the objectives of *TravelSmart*.

Development of 900 to 950 units could be planned to adhere to the Planning Principles outlined in Section 3.6. Such a development would then be consistent with the City's Growth Management approach of emphasizing infill and intensification of land use in order to make efficient use of existing infrastructure and reduce environmental and financial costs of growth.

Figure 3.1 Development Plan presents the proposed Scenario Two development. This development contains 926 units and provides a range of housing types, including single family residential, single family with suites, low density multifamily and large lots. Figure 3.1 defines the proposed development including the location of the main arterial roadway connecting Batchelor Drive and Westsyde Road as well as the major local road servicing the extremities of the area. Proposed development blocks and zoning are also identified.

A second local park of about 1 ha is included in a relatively central location with connections provided to the larger open space system. To provide neighbourhood level services, a small local commercial centre has been suggested for the intersection of Batchelor Drive with the proposed arterial road as shown on Figure 3.1.

As Scenario Two – Low Density is the most consistent with present *Official Community Plan* objectives, Transportation goals and Infrastructure utilization, it is the recommended development scenario.

3.8 LAND USE STATISTICS

This section presents the development statistics (land use, units, population, student generation, etc.) that, based on the following assumptions, derive from the plan:

- Land use areas are derived from calculations from the plan. Net areas are used for specific uses such as local parks, commercial, and low density multiple housing. Gross single detached housing areas are discounted by a factor of 80% to account for local roads.

- Net density, on a net land basis, is 16 units/net ha for urban single detached (an average of 625 m²/lot. The low density multiple housing yield is based on the detailed development plans for these areas. Low density country residential areas in the northeast section are based on lots of approximately 0.25 ha (Implementation of this will require a Zoning Bylaw amendment).
- Population is calculated based on 2.7 people/unit for all housing. This is consistent with that used by the City of Kamloops for their other planning initiatives.
- The following factors are used to generate the number of students per dwelling:

	<u>K-7</u>	<u>8 - 12</u>
single detached	0.40	0.25
low density multiple	0.30	0.20

The number of units and population are summarized below. The number of units have been based on the numbers shown on Figure 4.1 in Section 4.

Use	Units	People/ Unit	Total Pop.	K-7 Students	8 - 12 Students
Single	702	2.7	1895	280	175
Low	224	2.7	605	67	45
Total	926		2500	347	220

4.0 TRANSPORTATION

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4.0 TRANSPORTATION

4.1 INTRODUCTION

Trip generation and resultant traffic volumes from the Batchelor Hills Land Use Plan area are based on the zoning proposed in the Development Plans shown in Section 3.0. The external traffic to and from Batchelor Hills will access existing City streets and have an impact upon existing traffic operations. This section assesses the trips that could result from full build out of the area and reviews the impacts upon existing and future off-site intersections.

The following key assumptions have been made:

- Lac du Bois Road is not connected to any major rural roads.
- No additional development on the Batchelor Plateau.
- Development accessing Lac du Bois Road is defined in this report.

4.2 LAND USE AND TRIP GENERATION

Trip generation has been based on the proposed land use shown on Figure 3.1. The basic land-use statistics are summarized in Section 3.8.

For this plan, a number of assumptions have been made in order to estimate the number of trips generated from each land use area. The ITE Trip Generation Manual, 5th edition, or the BC Ministry of Transportation and Highways Parking and Trip Generation Rates Manual have been used for the trip generation rate.

The trip generation rates and directional split for each land use assumed for this plan area are summarized below:

Zone	Source	Daily Trip Gen. Rate	Daily Trips In	Daily Trips Out	A.M. Trip Gen. Rate	A.M. Trips In	A.M. Trips Out	P.M. Trip Gen. Rate	P.M. Trips In	P.M. Trips Out
RS-1	ITE 210	9.55	50%	50%	0.76	26%	74%	1.02	64%	36%
RM-1	ITE 220	6.47	50%	50%	0.56	34%	66%	0.69	58%	42%
RM-2	ITE 221	6.59	50%	50%	0.51	20%	80%	0.62	65%	35%
C-7	MOTH Table 7-2	--	--	--	2.9 per 100 m ² G.L.A.	63%	37%	10.4 per 100 m ² G.L.A.	50%	50%
P-2	MOTH Table 7-5	--	--	--	0.16 per 100 m ² G.F.A.	64%	36%	0.44 per 100 m ² G.F.A.	54%	46%

Notes: G.L.A. Gross Leasable Area
G.F.A. Gross Floor Area

4.3 TRIP DISTRIBUTION AND ASSIGNMENT

The estimated trip generation per land use zone is summarized below:

Zoning.	Total A.M.	Total P.M.
Single Family	625	835
Multi-family	55	65
Neighbourhood Commercial & Church	65	225
Total	745	1,125

For trip assignment, assumptions have been made on which route would be used to access existing city streets. From Figure 4.1, it can be assumed that Woodhaven Drive (South), via Batchelor Drive to Westsyde Road, will be the route of choice for a significant majority of the plan area traffic.

It is anticipated that only a small portion of additional traffic will use McQueen Drive to access Westsyde Road.

Woodhaven Drive (North), the northern most connection to Westsyde Road, will be used by a minority of the population as it provides the least direct route to the Central Business District on the North and South shores. It only provides a more convenient access route to the Westsyde area.

The total number of trips per route have been estimated to be as follows:

Route No.	A.M. In	A.M. Out	P.M. In	P.M. Out
Woodhaven (South)	200	470	616	396
Woodhaven (North)	18	42	55	35
McQueen Drive	5	12	14	9

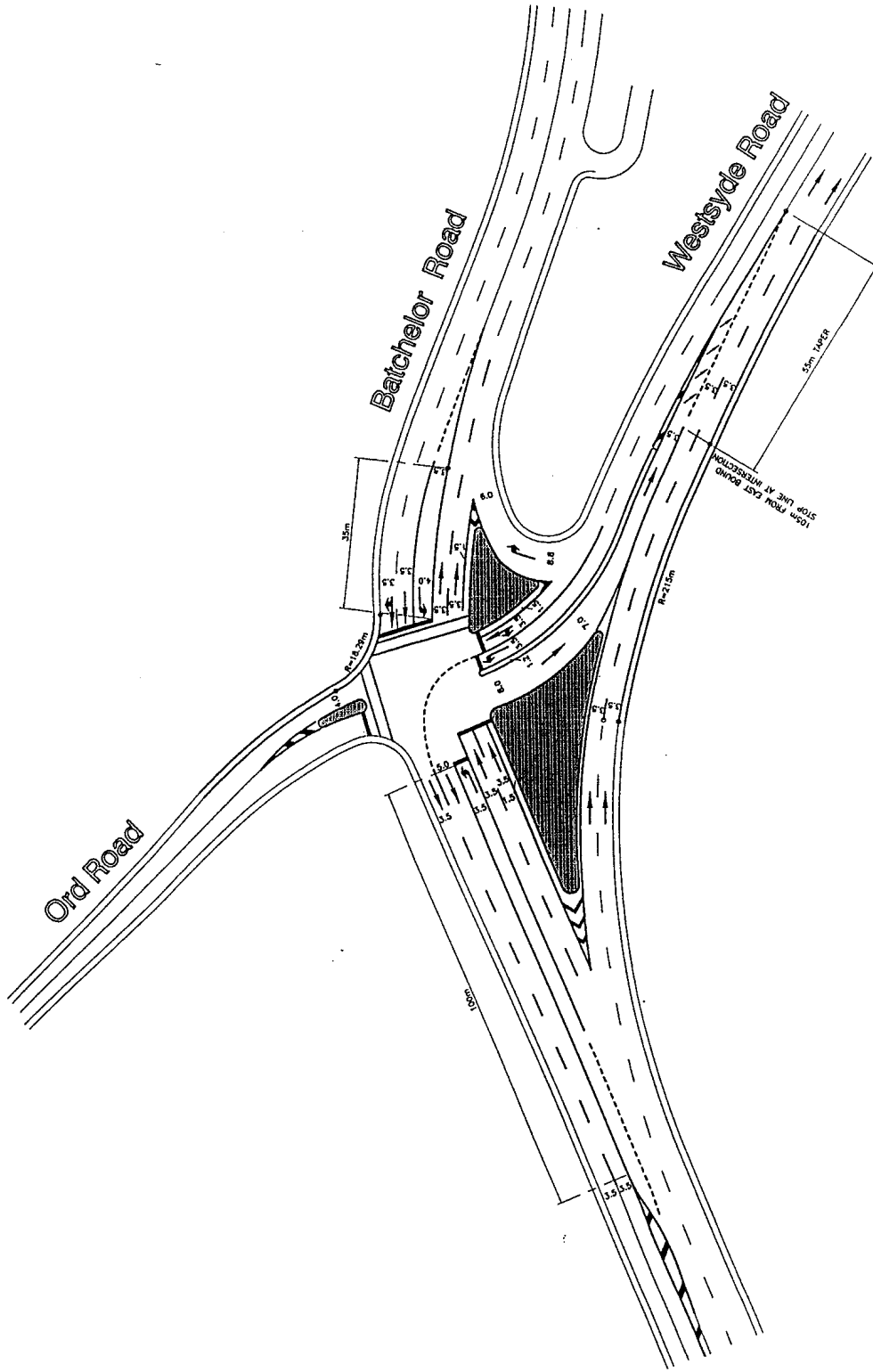
4.4 INTERSECTION OPERATIONS

The ultimate development shown on Figure 3.1 would impact the existing Westsyde Road/Batchelor Drive/Ord Road intersection and require the construction of one additional intersection with Westsyde Road. Care will also have to be taken to minimize any negative traffic impact on the existing McQueen neighbourhood. These issues are briefly discussed below.

- **Westsyde Road/Batchelor Drive/Ord Road Intersection**

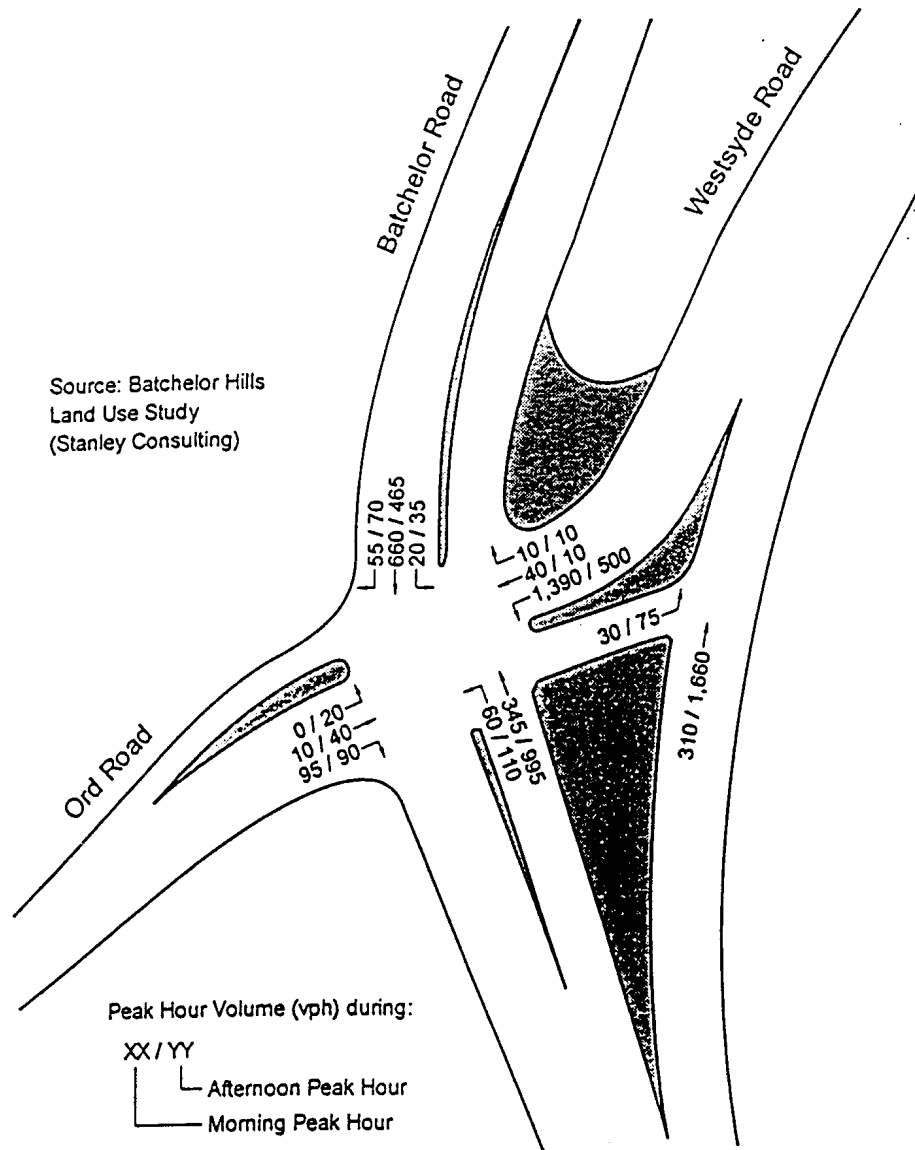
The existing intersection of Westsyde Road/Batchelor Drive/Ord Road has been discussed at length in Hamilton Associates' Report dated October 1997 (Ref. 16). That report recommended that the intersection be simplified by realigning the southbound through movements on Westsyde Road in order to intersect Batchelor Road at a right angle, while the northbound left-turn lanes on Westsyde Road would be aligned with Batchelor Road to form a conventional four leg right-angle intersection. This modification together with signalization would significantly improve operations, particularly for the Westsyde northbound left turn onto Batchelor and the Batchelor southbound left turn onto Westsyde. Figure 4.2 shows the proposed intersection improvement layout.

Projected turning movements with full development in the Batchelor Hills plan area are shown on Figure 4.3 for the A.M. peak hour and P.M. peak hour. The pre-development turning volumes were obtained from Urban Systems report (Ref. 14) and reflect future (100,000 population) traffic volumes estimated using the City of Kamloops *TravelSmart* EMME/2 model. Using the intersection configuration recommended in the Hamilton report, this intersection is projected to operate at Level of Service (LOS) D or better during the peak hours. Figure 4.4 summarizes the



BATCHELOR HILLS LAND USE PLAN
PROPOSED INTERSECTION IMPROVEMENT LAYOUT
FIGURE 4.2

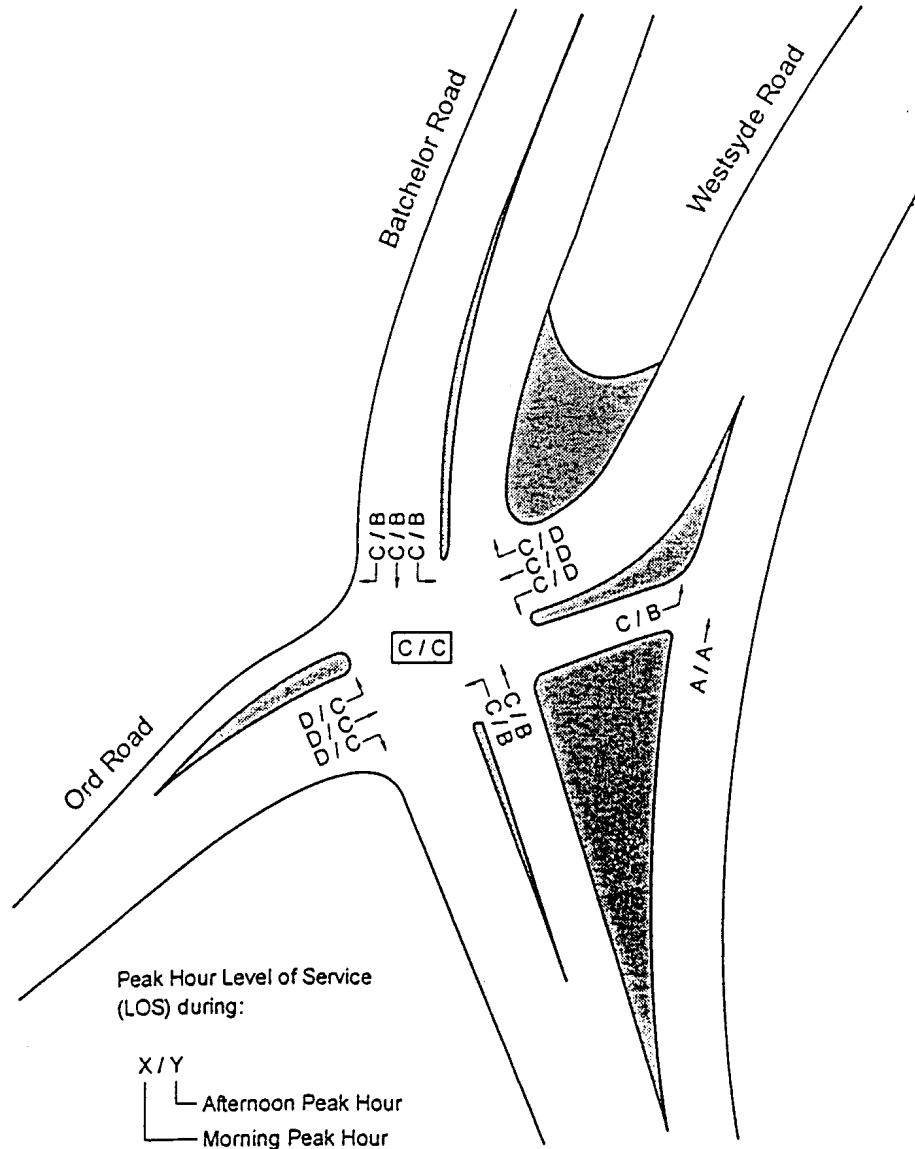
HAMILTON ASSOCIATES



HAMILTON ASSOCIATES



BATCHELOR HILLS LAND USE PLAN
FUTURE PEAK HOUR TRAFFIC VOLUMES
(900 RESIDENTIAL UNITS AND 100,000 POPULATION)
FIGURE 4.3



HAMILTON ASSOCIATES



intersection capacity performance review based on 900 residential units and 100,000 population.

- **Other Westsyde Road Intersections**

For McQueen Drive and the northern most connection with Westsyde Road, projected turning movements are shown on Figure 4.5. Existing background volumes have been based on the IMC Report (Ref. 13) with a 5% per annum increase in volumes applied to bring them to 1996 volumes. Since the long-term growth projections for a population of 100,000 are not available for this section of Westsyde Road, the same percentage increases over existing (1996) volumes used by Urban Systems (Ref. 14) for the Westsyde Road/Batchelor Drive/Ord Road intersection have been applied. These are summarized below:

	Northbound Westsyde Road	Southbound Westsyde Road
% increase over existing 1996 volumes for population with no development:		
A.M. Peak	19%	36%
P.M. Peak	25%	26%

The two intersections (McQueen Drive and the Woodhaven north connection) were analyzed as unsignalized intersections using the Highway Capacity Software - Release 2.1d.

The intersection of Westsyde Road with Woodhaven Drive (North) was determined to operate at LOS C for the northbound left turn in the A.M. Peak and LOS B in the P.M. Peak. The eastbound left turn movement is small in number but would experience significant waiting time due to traffic volumes on Westsyde Road.

- **Existing McQueen Neighbourhood**

The projected peak hour traffic at full development on McQueen Drive is relatively low. Unfortunately, the alignments and grades of the roads in this existing neighbourhood are less than ideal and are susceptible to impact due to increased

traffic. Therefore, care needs to be taken during the planning and phasing of the proposed development to monitor and control the impact on this neighbourhood.

In order to minimize the impact on the existing McQueen neighbourhood several measures are proposed. These are as follows:

1. The short length of arterial road linking the Saddleback Hills Development and Batchelor Drive area to the McQueen neighbourhood should not be opened to the public until the arterial road is constructed all the way to the new intersection on Westsyde Road.

This measure will prevent traffic from the new development area from travelling through the existing McQueen Neighbourhood.

2. When the arterial road linking Batchelor Drive to Westsyde Road is opened, the City should monitor the traffic impacts on the existing McQueen neighbourhood. If the traffic stays on the arterial road all the way to the new intersection with Westsyde Road, then traffic mitigation measures for the existing McQueen neighbourhood may not be required.
3. If the traffic monitoring in Item 2 above confirms that traffic is short circuiting through the neighbourhood and the existing neighbourhood is being adversely impacted, mitigating measures should be defined and discussed with the neighbourhood. Some preliminary ideas are as follows:
 - Close the access to the arterial road from McQueen Drive, Woodhaven Drive and/or Alpine Terrace at the top of each of these roads. This would result in the formation of 1 to 3 cul-de-sacs. See Figure 4.6. (It should be noted that for both this concept and the following right out only concept, careful consideration will have to be given to local traffic circulation concerns during the winter. It is reported that during the winter the residents of Woodhaven Dr. and Alpine Terrace must use McQueen Drive then the north-south leg of Woodhaven Drive to access their homes. The extent of this problem and how it will be overcome if mitigation pressures are required will have to be discussed in detail with the public.)

- Another option may be to limit the traffic flow at each of these three intersections to a right out only. This would prevent flow through traffic while, at the same time, provide a second exit point from each area. See Figure 4.7
- The traffic volumes on the arterial road do not justify the installation of a sound barrier fence. The effectiveness of such a fence would be even further reduced by the number of openings required for access to the existing neighbourhood and/or residences.

4.5 PEDESTRIAN CORRIDORS

Pedestrian circulation corridors within a neighbourhood should provide pedestrian access to local schools, parks, recreational areas, open space and between local development cells. Within the Plan area this will be accomplished by providing sidewalks along all roadways.

Circulation within the neighbourhood is achieved through a series of interconnected local roads which access the main north–south arterial road. This arterial road directly accesses Westsyde Road, Batchelor Drive, the future school site and the proposed central park area. As such, all these key destinations are within reasonable walking distances of all areas included in this plan.

4.6 PUBLIC TRANSIT

One of the City's *TravelSmart Program* objectives is to develop a transportation system and pattern of community development which is amenable to a public transit system.

The configuration of the proposed neighbourhood with relatively short local roads providing direct pedestrian access to a main arterial road linking Westsyde Road and Batchelor Drive supports this objective.

RECOMMENDATIONS

From the preliminary work undertaken to date, it is recommended that the following key points be considered during the development of the Batchelor Hills area:

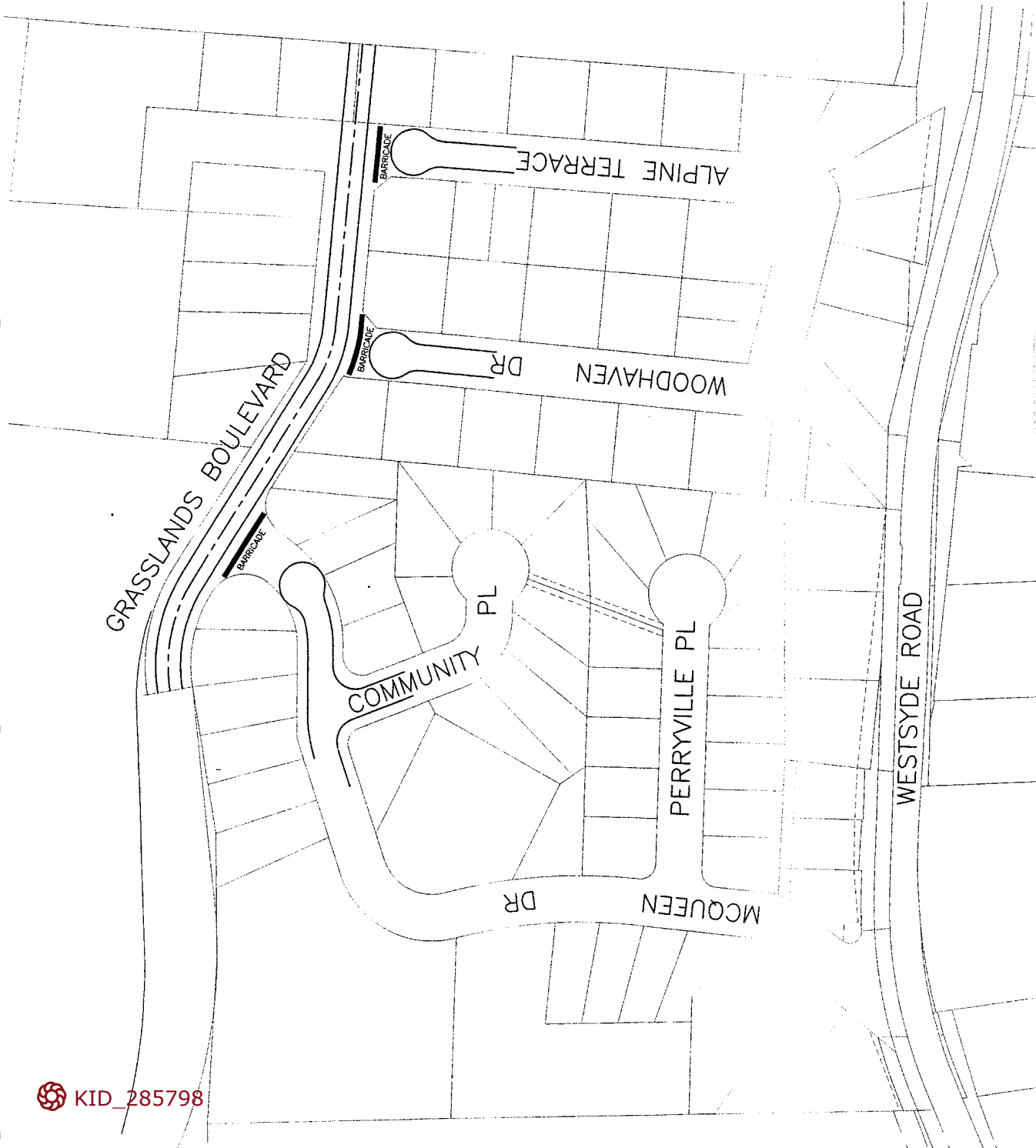
- The existing intersection of Westsyde Road/Batchelor Drive/Ord Road should be reconfigured in accordance with the Hamilton Associates' (Ref. 16) recommendations. Batchelor Drive should also be established as a four lane undivided arterial road through the intersection and north to the new arterial road.
- The three measures proposed earlier in this section to minimize impact on the existing McQueen neighbourhood should be implemented.
- As full build out is approached, the additional intersection along Westsyde Road may require signalization. Traffic movements will require monitoring.
- The arterial road connecting Westsyde Road to Batchelor Drive should be completed as the population of the neighbourhood grows. From a transportation perspective, this road forms a fundamental component of the proposed land use.



- PROS:
- MOST EFFECTIVE MEASURE TO CURTAIL SHORTCUTTING
 - ECONOMICAL AND EASY TO ACHIEVE
- CONS:
- RESTRICTS ACCESS/EGRESS
 - INCONVENIENT TO RESIDENTS
 - CAN BE PROBLEMATIC FOR MAINTENANCE VEHICLES



BATCHELOR HILLS LAND USE PLAN
MCQUEEN NEIGHBOURHOOD TRAFFIC MITIGATION
CLOSURE
FIGURE 4.6





- PROS:
- MAINTAINS ACCESS TO THE NORTH AND THE SOUTH
 - POTENTIAL FOR LANDSCAPING
 - ECONOMICAL AND EASY TO ACHIEVE
- CONS:
- PARTIAL RESTRICTION TO ACCESS/EGRESS
 - DOES NOT FULLY MITIGATE SHORTCUTTING POTENTIAL
 - CAN BE PROBLEMATIC FOR MAINTENANCE VEHICLES



BATCHELOR HILLS LAND USE PLAN
MCQUEEN NEIGHBOURHOOD TRAFFIC MITIGATION
RIGHT TURN EXIT ONLY
FIGURE 4.7



5.0 SERVICING

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5.0 SERVICING

5.1 INTRODUCTION

Servicing for the plan area includes the provision of internal roads, access points to the existing road network, supply and distribution of water, collection of sanitary sewage and the control of storm drainage.

This section discusses the anticipated requirements for each service.

5.2 ROADWAYS

5.2.1 Road Classification

The City of Kamloops road classifications used for this plan are as follows:

<u>Classification</u>	<u>Average Daily Traffic (ADT)</u>
Arterial Street	5,000 to 30,000
Collector Street	1,000 to 12,000
Local Street (Major)	--

Design requirements for these classifications adopted for this plan are based on City of Kamloops standards as follows:

	Arterial (undivided)	Collector	Local (Major)
Design Speed (km/h)	70	60	50
Min. Radius (m)	190	100	65
Max. Superelevation %	6	4	N.C.
Max. Grade %	9 *	9	10
Min. K Value			
Crest	17	10	7
Sag	15	9	6
Basic Lanes	4	2	2
Lane Width (m)	3.75	3.75	2
ROW Width (m)	27	20	20

Note: * See discussion Section 5.2.3

5.2.2 Existing Road Network

Access to the site is via Batchelor Drive/Lac du Bois Road which enters the plan area from the south. Batchelor Drive is presently paved to approximately 75 m north of Norview Road. Lac du Bois Road provides access to a major agriculture and recreational area to the west of the plan area.

Batchelor Drive is constructed to a two lane arterial standard with a 33 m wide right-of-way. The grade exceeds the desirable maximum of 8%.

Along the eastern boundary of the plan area, access to a number of subdivisions is provided, via Anderson Terrace and McQueen Drive off Westsyde Road. McQueen Drive presently dead ends at the eastern boundary of the plan area.

McQueen Drive is constructed to a local road standard. The average grade appears to exceed the desirable minimum of 10%. The intersection angle with Westsyde Road is at approximately 55° which is less than the recommended angle of 70°.

5.2.3 Future Road Network

Several conceptual road network plans were reviewed for the plan area. The layout Figure 5.1 maintains the conceptual road design for the Best West Realty lands. The plan shows the key roads that would be required as part of the overall development plan. A hierarchical system of collectors and local roads would supplement the network shown.

Final alignments would be subject to change as design of each phase commences.

Arterials

Under the plan shown on Figure 5.1, Batchelor Drive would be ultimately upgraded to a 4 lane arterial from the intersection with Westsyde Road to a four leg intersection with the future arterial road extending north through the plan area and back down to Westsyde Road. The grade on Batchelor Drive would be approximately 9%, matching the existing. This would exceed the desirable maximum grade of 8% for an arterial road.

Through discussions with the City, it has been determined that the new arterial road linking Batchelor Drive and Westsyde Road should be constructed to a Collector Road standard at this time. This road is to be within a 23 m right-of-way. Preliminary profiles indicate that the grade on much of this road would be 9%.

This new arterial road would form the main north/south route for access to future subdivisions.

In order to complete this road, the existing north-south leg of Woodhaven Drive will have to be widened and the road upgraded to interim collector standard. This will most likely involve some acquisition of additional right-of-way width and associated property impact mitigation measures such as construction of retaining walls and/or regrading and reconstruction of adjacent driveways and yards.

The proposed alignment will also require the purchase of, in all probability, one existing residence on Alpine Terrace. These properties will be used to extend the arterial alignment through from the existing Woodhaven Drive to the future development on the Smith property.

Local Roads

One local road has been shown on the development plan on Figure 5.1 as it is considered important for the connectivity of the overall scheme.

The arterial road shown in the south west quadrant, intersecting with Batchelor Drive, would form the boundary between the residential units and the future school property. This will form an ultimate connection to Singh Street which is eventually scheduled to be used for a new crossing of the Thompson River. Alignments for this connection have not been investigated in this plan.

A north extension of North River Drive into the Batchelor Hills area would not improve the road network significantly. It would be expensive to construct because of the proximity of the steep slopes to the east side of the road. Any extension would most probably be into a cul-de-sac to provide access into some single family lots immediately to the east of the Best West Realty lands.

5.2.4 Recommendations

The following recommendations should be considered during the subdivision process for this development area:

- Allow for Batchelor Drive to be upgraded to a 4 lane undivided arterial. A grade up to 9% should be considered acceptable.
- Provide for a new arterial connection to Westsyde Road (Woodhaven Drive north) constructed to an interim collector standard.

5.3 WATER

5.3.1 Existing Conditions

From Stanley's report of December 1995 (Ref. 19), it is understood that the water supply to the North Shore and Batchelor Hills area is fed from the 395 zone. The 395 zone water distribution system services Valleyview, North Kamloops, Brocklehurst and Westsyde. The system has evolved from independent systems into an amalgamated network supplied from the River Street Water Treatment Plant (RSWTP).

The 395 zone has reservoirs located in Valleyview, Brocklehurst and North Kamloops. The primary distribution piping to the North Shore consists of a 1050 mm dia. pipeline from the RSWTP to the Overlander Bridge, a 750 mm dia. pipeline along Mission Flats Road and across the South Thompson River, connecting to a 600 mm dia. pipeline along Tranquille, Ollek and Halston. A second loop consists of a 500 mm dia. pipeline across the Overlander Bridge and a 450 mm dia. along Schubert Drive to the North Kamloops Reservoir.

It should be noted that the 1050 mm dia. pipeline between the RSWTP and 2nd Avenue is rated for 100 psi operating pressure. The static pressure in this pipeline is approximately 72 psi, however, friction losses are significant due to the long distance the water is being pumped (7.5 km). This limitation fixes the capacity of the present system.

There are two reservoirs presently located in the plan area. The main reservoir is the North Shore reservoir, located on the west side of Batchelor Drive just north of the intersection with Westsyde Road. It has

a capacity of 10.5 million litres. A small reservoir at 474 m elevation, located off Lac du Bois Road in the plan area is supplied by a booster pump station from the North Shore reservoir.

5.3.2 Future Water Supply

Any analysis of general availability of water to Batchelor Hills must include growth in Westsyde.

The Stanley report (Ref. 19) notes:

1. The 1300 zone distribution system is currently operating at or near its design capacity.
2. The capacity of the system is limited by the pressure rating of the 1050 mm dia. Hyprescon pipeline between RSWTP and 2nd Avenue.
3. If significant development is planned for, then major upgrading of the system will be required.
4. There are currently many unknowns such as where future treatment facilities will be located and whether the City of Kamloops and Kamloops Indian Band (KIB) systems will ever be interconnected. This could be accomplished by constructing a 750 – 900 mm dia. main crossing the South Thompson via either the Yellowhead Highway Bridge or the “Red” Bridge and then running north through KIB lands to the Halston Bridge. This proposal is shown on Figure 5.2.

All analysis should be based on City of Kamloops standards of 2400 l/d/c Maximum Daily Demand. Impact of water saving fixtures can be analyzed to delay upgrading (possibly). Sprinklers for fire protection should not be assumed for in the calculation of water requirements in residential areas.

The remainder of this analysis is based on the fact that the City is aware of the supply limitations to the North Shore and either intends to upgrade this supply or implement water conservation measures to reduce the demand.

5.3.3 Future Demand in Batchelor Hills

The development area will require distribution systems extending through three pressure zones. The 395, 474 and 530 zones presently exist and will service lands up to the 500 m contour.

The approximate demands in each pressure zone can be summarized as follows:

- 395 zone = 196 population
- 474 zone = 681 population
- 530 zone = 1,561 population
- Total = 2,438 population

In order to size the reservoir in the 530 zone shown on Figure 5.3 to service the 530 and 474 m zones (2,242 people), the following assumptions have been made:

ADD = Average Daily Demand

MDD = Maximum Daily Demand

PHD = Peak Hour Demand

ADD = $2,242 \times 900 \text{ l/d/c}$ = $2,018 \text{ m}^3/\text{d}$

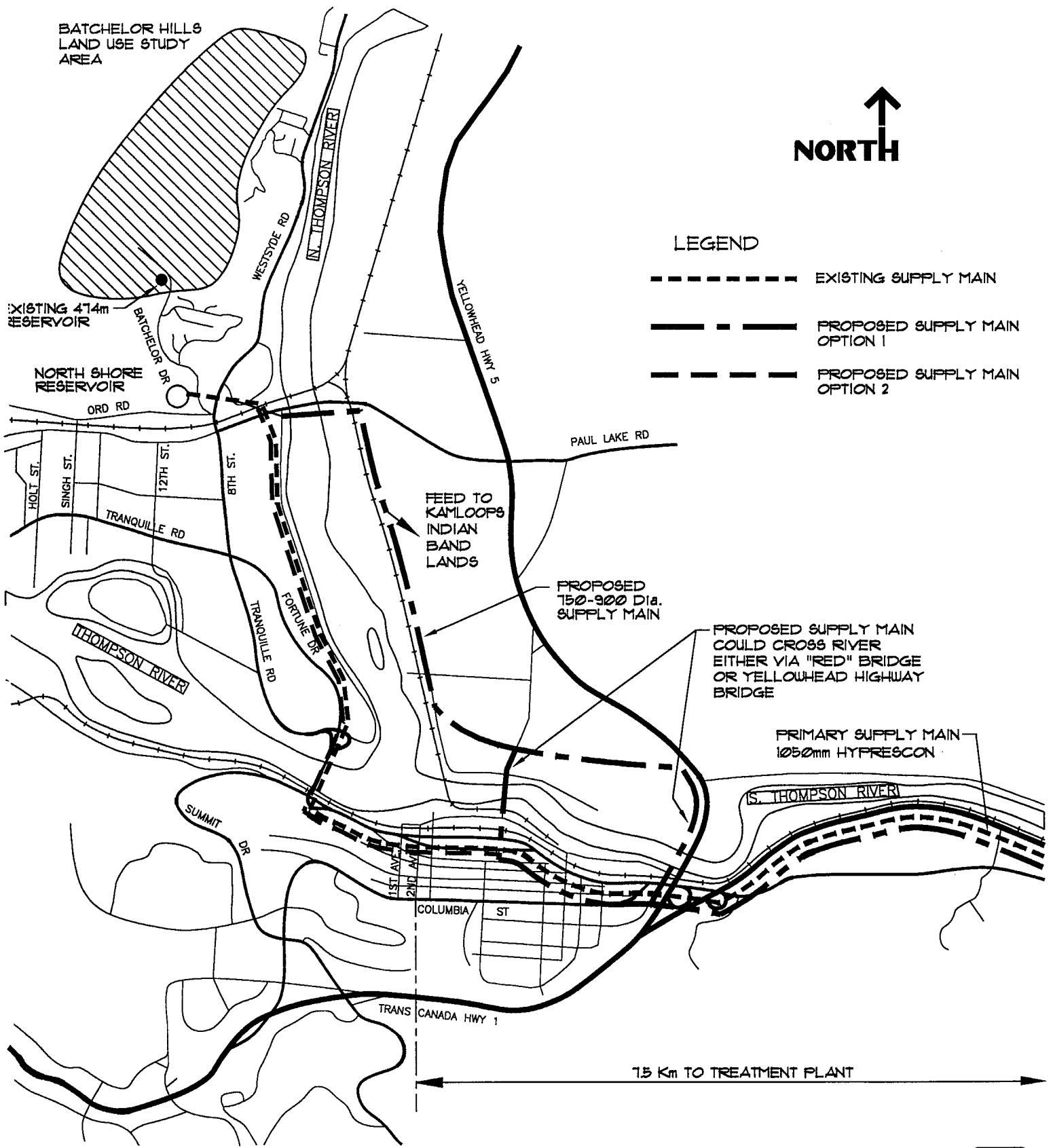
MDD = $2,242 \times 2400 \text{ l/d/c}$ = $5,381 \text{ m}^3/\text{d}$

PHD = $1.5 \times \text{MDD}$ = $8,071 \text{ m}^3/\text{d}$

Reservoir Storage

A fire flow of 120 lps has been selected for the area in anticipation of apartment buildings or a school requiring higher fire flows than residential subdivisions.

- Fire protection 2 hours @ 120 lps = 864,000 l



**BATCHELOR HILLS LAND USE PLAN
WATER SUPPLY
FIGURE 5.2**

NORTH

SCALE 1 : 7,500

BRITISH COLUMBIA HYDRO & POWER AUTHORITY

COLLECTOR

COLLECTOR

ARTERIAL

LOCAL

COLLECTOR

McQUEEN DRIVE

McQUEEN DRIVE

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NORTH THOMPSON RIVER

BATCHELOR HILLS LAND USE PLAN
ROAD NETWORK CONSTRUCTION STANDARDS
FIGURE 5.1



- Operational Storage:
 - 25% of MDD + fire
 - 25% of 5,381 m³/d = 1,463 m³
 - Fire = 864
 - Total = 2.33 million litres

5.3.4 Distribution System

The primary source of supply for the study area is the existing North Shore reservoir at approximately 395 m. In order to convey the water from the North Shore reservoir to the existing Batchelor Hills reservoir, a new 300 mm dia. main and associated pumping station with a capacity of about 80 lps will be required. The North Shore reservoir will require additional supply from the proposed new North Shore main.

Water supply will be required from the existing 474 m reservoir. The relatively small additional demand in the 474 zone will not likely compromise the operation of this reservoir.

A new 50 lps booster station has recently been constructed to supply water to a new 1.3 million litres 530 zone reservoir. This reservoir will ultimately have to be expanded to 2.33 million litres as the development grows.

The attached plan, Figure 5.3, indicates connections and PRV's between the zones to complete the looping of the zones. This interconnection will alleviate the pressure problems in the Alpine Terrace area.

At the time of development the City should consider continuing to operate a 430 zone to better service McQueen/Woodhaven Drive and the Smith Properties. A PRV reducing pressure to the 395 zone to the south on Westsyde Road will then be required.

5.4 SANITARY SEWER

5.4.1 Existing Conditions

City of Kamloops sanitary sewer plans and Stanley Associates' letter of July 1996 (Ref. 20) have been used to identify existing sanitary sewer services. The Tranquille Road Trunk Sewer is the major collector serving North Kamloops and Brocklehurst. It was constructed in 1972 using reinforced concrete sewer pipe. The diameter of pipe section used are:

- 600 mm dia. from 12th Street to west of Kelly Drive;
- 750 mm dia. from Kelly Drive to past Desmond Street; and
- 900 mm dia. west of Desmond Street to its terminus at the Airport Lift Station.

The wastewater is then pumped under the Thompson River to the Kamloops wastewater treatment plant facilities west of Mission Flats.

The east end of the Tranquille trunk sewer receives all of its wastewater from lift stations.

The capacity of the trunk sewer can be compared to flows at the critical section of 600 mm main west of 13th Street.

Flow From:	Est. Flow - l/s
McArthur Island Lift Station	190
MacKenzie Avenue Lift Station	60
Oak Hills	<u>70*</u>
	320
Main Capacity(600 dia. @ 0.34%)	380
Estimated Available Capacity	60 (15.8%)

- * The Oak Hills Lift Station is designed using pumps with a rated capacity of 85 l/s. Eventually, two units operating together may be required. However, the existing forcemain from Oak Hills along Westsyde Road has a diameter of 250 mm for most of its length. This limits the effective present pumping capacity to 70 l/s.

This estimate suggests that the Tranquille Trunk Sewer has some excess capacity at present.

5.4.2 Projected Flows

For the proposed development, projected sanitary sewer flows have been based on the following criteria:

Batchelor Hills

Residential:

915 units at 1200 l/unit	1,098.0 m ³ /day
Commercial 0.22 at 20,000 l/ha	4.4 m ³ /day
Average Day	1,102.4 m ³ /day
x 2.5 for Peak Use	2,756 m ³ /day
Total Flow	32.0 l/sec
Flow from Kamloops Indian Band (Ref. 19)	30.0 l/sec *
TOTAL	62.0 l/sec

- * The City has signed a sanitary sewer agreement with the Kamloops Indian Band. This figure represents one possible development scenario for the Band land and is preliminary in nature. Further confirmation is required when the detailed development scenario is finalized.

Gravity flow from the Batchelor Hills area into existing trunk sewers can be readily achieved. The catchment boundaries are shown on Figure 5.4.

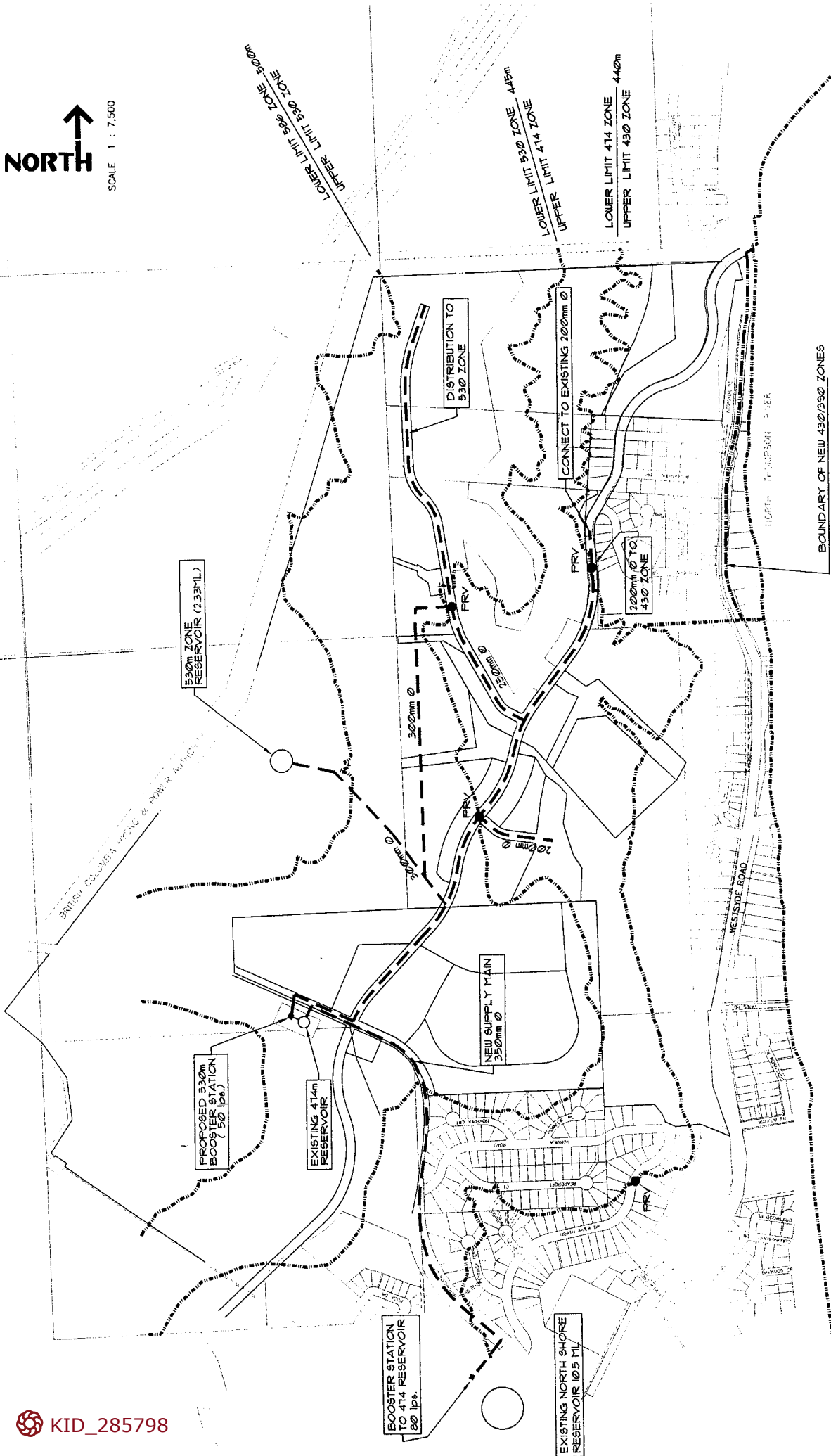
These figures indicate that the 600 mm dia. Tranquille trunk west of 13th Street would likely be able to handle these additional flows.

However, it is understood that surcharging is being experienced along 12th Street in the gravity mains leading to McArthur Island Lift Station. As growth in Batchelor Hills adds to this system, this condition will worsen.

The proposed solution to this problem is to divert all the sewer flows from the high ground north of the Best West Realty development into the Westsyde (Oak Hills) forcemain. This will relieve the gravity system and reduce the pumping energy needed at McArthur Island Lift Station.



SCALE 1 : 7,500



BATCHELOR HILLS LAND USE PLAN
WATER SERVICING PLAN
FIGURE 5.3

NORTH THOMPSON RIVER

It should be noted that the proposed RS-1 property located south of Batchelor Drive cannot easily be connected into the Westsyde forcemain. It is more practical to connect this area into the 12th Street sewers. As this sewer is already at or near capacity, the developer will have to confirm whether or not this system has available capacity to accommodate the proposed development. If insufficient capacity is available, one alternative may be to divert all or part of the pumped flow presently entering the 12th Street system from the Best West Realty development into the proposed gravity system north of the Best West Realty development and, ultimately, into the Westsyde forcemain. This would free up additional capacity in the 12th Street sewer for the property south of Batchelor Drive.

The portion of the Westsyde forcemain south of Halston was constructed in 1992 using 350 mm dia. PVC pipe capable of transporting 15,000 m³/day or 175 l/s of sewage, equivalent to servicing 12,000 to 15,000 population. However, as noted previously, the existing section of 250 mm forcemain can accommodate some additional flow at the expense of restricting the flow from the Oak Hills lift station. Discussions with the City operational staff indicate that combined, the pumps at the Oak Hills lift station presently run on average of 7.4 hrs. per day (Nov. 7 to 17, 1997) at peak flow. It is anticipated that the addition of the Batchelor Hills sewage (19 l/s) into the forcemain will restrict the flows such that these pumps will operate an additional three hours per day (maximum). As this still allows for substantial growth in Westsyde, it is not anticipated that this section of common main will have to be replaced in the near future.

This capacity of 175 l/s includes:

Area:	l/s
• Batchelor Hills	32
• Oak Hills	70
• Shuswap Landing	30
• Growth in Oak Hills	<u>15</u>
• Total	147
• Spare Capacity	28

However this flow could not be imposed on the Tranquille trunk sewer simultaneously with the MacKenzie and McArthur Island flows.

Flow From:	l/s
• McArthur Island	190
• MacKenzie Avenue	60
• Westsyde Forcemain	<u>147</u>
• Total	397
• Capacity Available	380
• Shortfall	17

When the Batchelor Hills area and Shuswap Landing come on stream and the combined flows exceed the reserve capacity of 60 l/s, the critical section of the trunk sewer will require twinning to provide an additional 20 l/s of capacity.

From earlier work (Ref. 20) it appears that the remainder of the Tranquille trunk sewer west of Singh Street has a total capacity to pass 450 to 500 l/s. No upgrading of this system is therefore considered necessary.

This relief sewer would not be needed until the present capacity is taken up. However, a route should be defined and easements obtained before land development between 13th Street and Singh Street, north of Tranquille Road constrain available routes.

5.4.3 Short Term Improvements

Some short term improvements to defer the construction of a relief main include:

- flow reduction at existing lift stations;
- flow equalization or peak flow reduction at new source points, the City is not in favour of this option; and

- temporary surcharging of the critical sections of the main trunk. At present the City operates the main in a surcharge condition during maintenance operations and, as such, this is not a preferred option.

Pump Station Flow Reduction

Frequently, pump stations are equipped with pumps which are larger than present flows require. Such lift stations have short pump runs and long wet well fill times. The peak rate flow can sometimes be reduced without impacting on the pump efficiency.

Additional detailed review of the McArthur Island and MacKenzie Avenue Lift Stations, their flow rates and capacities may indicate this strategy might be of benefit.

Similarly, control of maximum speed of the Oak Hills Lift Station pumps may also be effective.

Temporary Surcharging of Tranquille Trunk Sewer

The Tranquille trunk sewer flow capacity under a surcharge condition may be substantially greater than the full capacity under gravity flow.

A preliminary calculation indicates that a 30% increase in flow (approximately 100 l/s) would only generate a 0.5 m head in the critical portion of the main.

However, a more rigorous analysis is needed to confirm this option.

5.4.4 Recommendations

For the sanitary sewer servicing of the Batchelor Hills area, the following should be taken into account:

- Provision of sanitary sewers for the internal servicing should be by a gravity system making full use of the available grades across the development area.

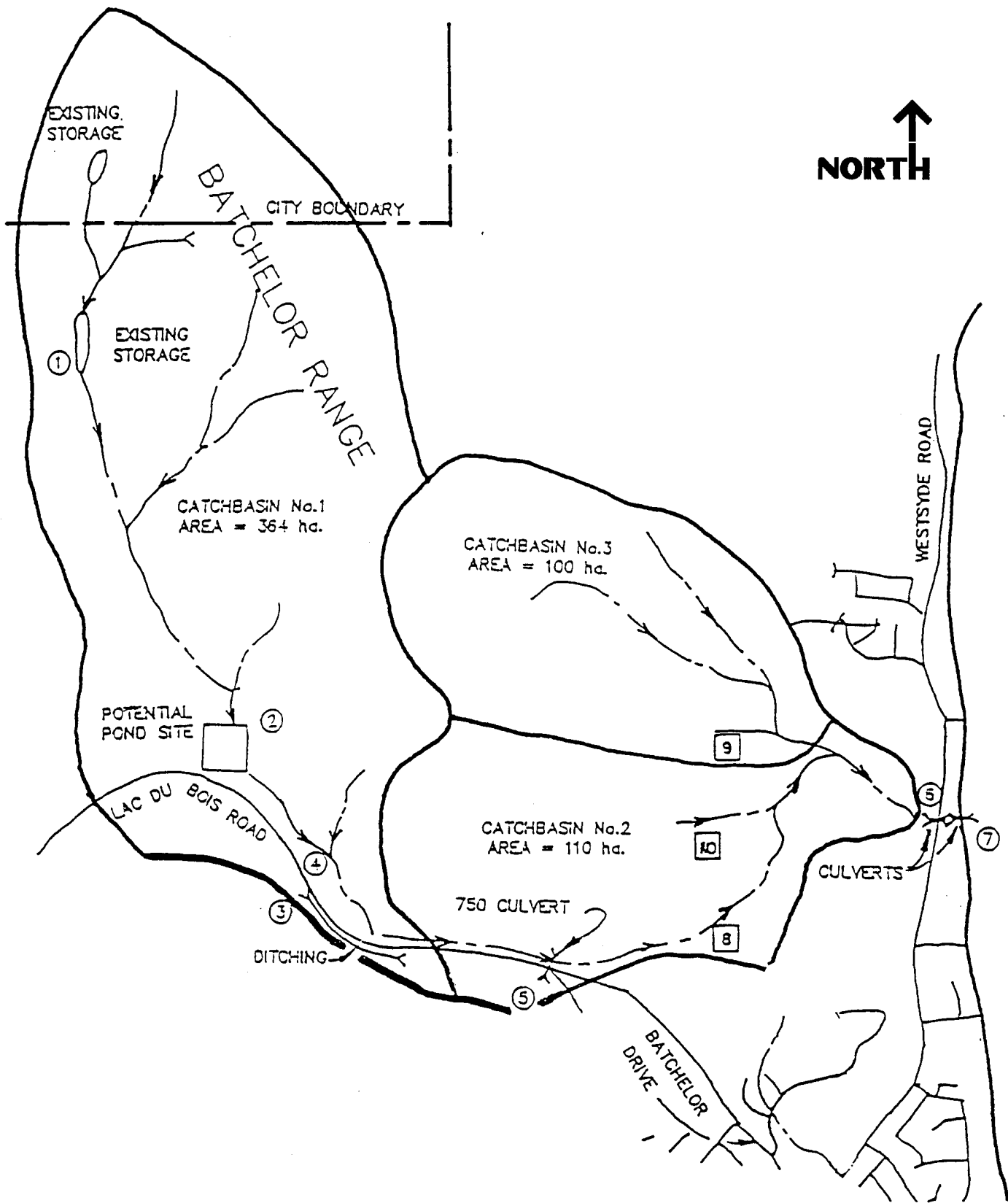
- The catchment boundaries should be in general agreement with those shown on Figure 5.4 in order to reduce surcharging in the existing trunk in the 12th Street area.
- Upgrading or twinning of the Tranquille Road Trunk Sewer will be required in the critical 600 mm dia. main west of the 13th Street.
- Confirmation of projected flows from Oak Hills and Shuswap Landing will be required. Timing of construction of these developments will require coordination of the off-site improvements.
- Servicing the two RS-1 parcels south of Batchelor Drive will require detailed engineering analysis to confirm available capacity in the 12th Street sewers.

5.5 STORMWATER

5.5.1 Existing Conditions

The Batchelor Hills Land Use plan area comprises part of a large catchment area which presently discharges into the North Thompson River adjacent to Anderson Terrace. The catchment area, which was referred to as the Anderson Terrace drainage area, comprises a total of approximately 574 ha. The area generally consists of rural benchlands with relatively steep valley sides which drain to and through the valley floor. A large number of sub-basins exist which contribute to the flow regime. The area is characterized by alluvial deposits on the valley floor, terraced gravels and moraine deposits on the valley floor, terraced gravels and moraine deposits on the valley sides and with bedrock outcropping at higher elevations. The Anderson Terrace Drainage study (Ref. 21) subdivided the catchment area into three large catchment areas as shown on Figure 5.5.

- Catchment No. 1 - Upper Transit Basin (364 ha)
- Catchment No. 2 - Lac du Bois Basin (110 ha)
- Catchment No. 3 - McQueen Basin (100 ha)



**BATCHELOR HILLS LAND USE PLAN
ANDERSON TERRACE DRAINAGE PLAN
FIGURE 5.5**

The Batchelor Hills Land Use area identifies development primarily in the Catchment No. 2 and No. 3 areas. However, the Smith property located north of Alpine Terrace and the 2 proposed RS-1 properties located south of Batchelor Drive are part of adjacent drainage basins and are dealt with independently.

Estimated discharges through the Anderson Terrace drainage area were estimated for existing conditions as follows:

- 2 year peak rainfall - $1.9 \text{ m}^3/\text{s}$
- 25 year peak rainfall - $4.1 \text{ m}^3/\text{s}$
- 100 year peak rainfall - $6.0 \text{ m}^3/\text{s}$
- 100 year peak snowmelt - $1.5 \text{ m}^3/\text{s}$

5.5.2 Future Conditions

The Batchelor Hills Land Use plan proposes development of approximately 45 ha of area which presently lies within the Anderson Terrace drainage area. The effect of developing these 45 ha would result in the following estimated discharges out of the Anderson Terrace Drainage area if stormwater control measures were not implemented:

- 2 year peak rainfall - $2.2 \text{ m}^3/\text{s}$
- 25 year peak rainfall - $5.5 \text{ m}^3/\text{s}$
- 100 year peak rainfall - $7.3 \text{ m}^3/\text{s}$

In addition to the area within the Anderson Terrace catchment area, development will take place outside the catchment boundaries to the north and south. Approximately 7 ha are to be developed south of Lac du Bois Road and west of Batchelor Drive. Most runoff from this area will be directed to the Batchelor Drive system.

Approximately 11 ha of land will be developed north of the Anderson Terrace area. Flows from this area will be directed to a series of culverts which cross Westsyde Road.

Proposed flood routing is shown on Figure 5.6.

SCALE 1 : 7,500

LEGEND

FORCE MAIN

GRAVITY MAIN

CATCHMENT AREA

OAK HILLS PUMPSTATION
RATED AT 85 lps BUT LIMITED
BY MAIN CAPACITY TO 70 lps

**BACHELOR HILLS LAND USE PLAN
SANITARY SEWER SERVICING PLAN
FIGURE 5.4**

NORTH THOMPSON RIVER

EXISTING WESTSIDE 250mm Ø FORCEMAIN HAS 70 lps CAPACITY
TOTAL ADDITIONAL FLOW IN WESTSIDE FORCEMAIN = 26 lps

TOTAL ADDITIONAL FLOW
TO FORCEMAIN SOUTH OF
HALSTON AVENUE FROM
BACHELOR HILLS
= 30 lps

NORTH

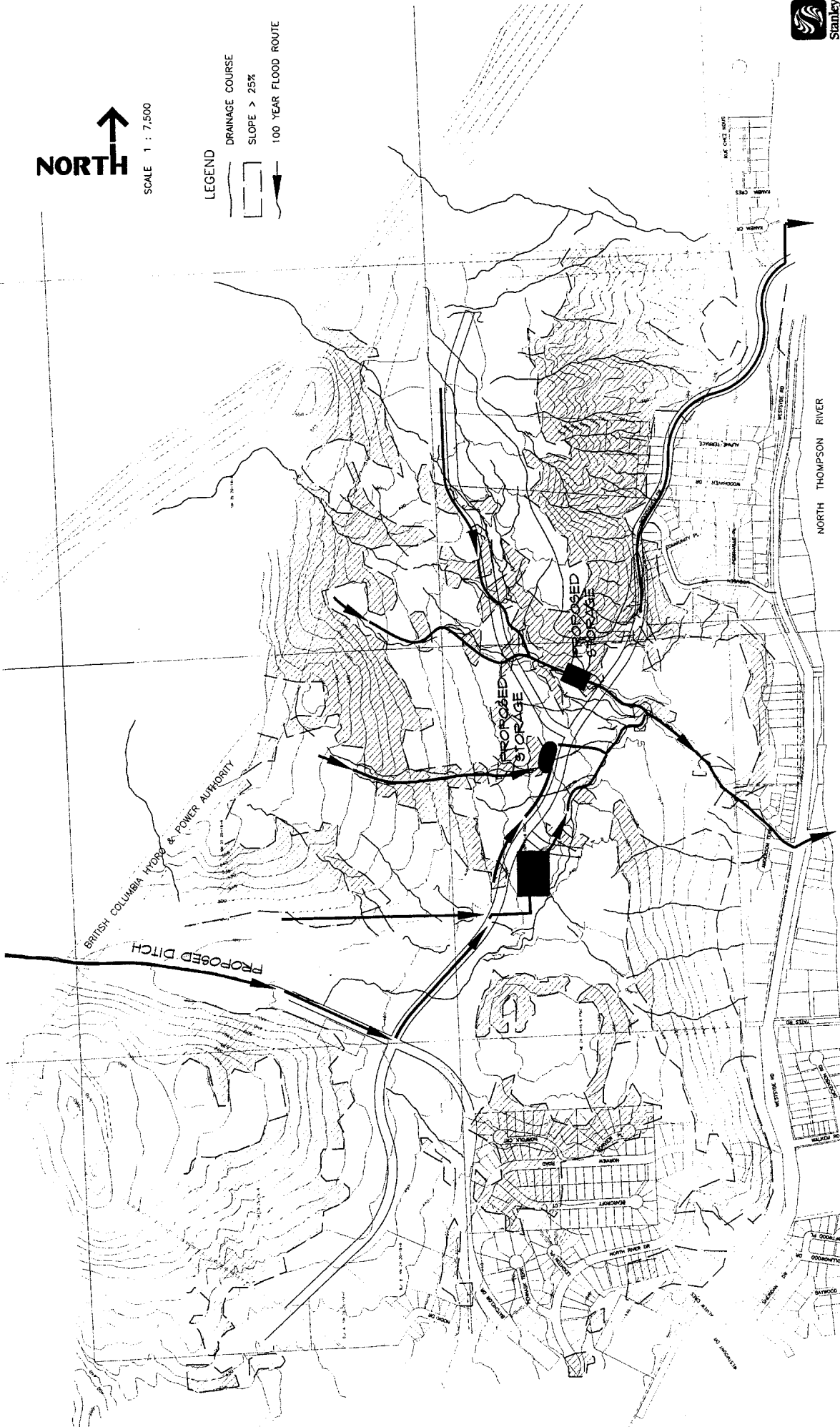
SCALE 1 : 7,500

LEGEND

DRAINAGE COURSE

SLOPE > 25%

100 YEAR FLOOD ROUTE



**BATCHELOR HILLS LAND USE PLAN
STORM DRAINAGE
1:100 YEAR FLOOD ROUTING
FIGURE 5.6**

5.5.3 Stormwater Management Guidelines

In developing a stormwater servicing concept for the Batchelor Hills area, the following Stormwater Management guidelines were considered:

City of Kamloops Design Criteria:

- Zero percent increase in peak post development flows over pre-development flows.
- Minor systems, consisting of localized areas of development shall be designed to accommodate a minimum five year return period.
- Major systems, consisting of trunk mains, natural drainage channels and detention facilities shall be designed for a 100 year return period.

Ministry of Environment / Fisheries and Oceans Guidelines:

- Limit post development 1:2 storm off-site runoff rate to the pre-development 1:2 year rate.
- Maintain, as closely as possible, the pre-development flow pattern and water quality in the receiving water course.

5.5.4 Recommended Stormwater Management (Anderson Terrace Drainage Area)

- Construct a detention pond north of Lac du Bois Road. Construction of a detention pond of 18,000 m³ or greater will provide sufficient storage to contain a 100 year rainfall event. Controlled drainage of the pond can take place after peak flows in the lower catchment areas have subsided.
- Each development shall restrict discharges to a flow rate equivalent to the 1:2 year pre-development rate.
- Each development shall provide storage in the magnitude of 80 m³/ha developed. This would be sufficient to reduce 25 year peak flows to 2.0 m³/s at the Anderson Terrace discharge.
- Each development shall provide flood routing for storms which exceed the 1:25 year event.

- Overland flow routes for major mains or channels should be designed for 1:100 year storm events. Proposed routes are shown on Figure 5.6. To accommodate this flow, capacity improvements will have to be implemented to convey runoff through Anderson Terrace, across Westsyde Road and into the North Thompson River.
- Construct a detention pond north of Lac du Bois Road. Construction of a detention pond of 18,000 m³ or greater will provide sufficient storage to contain a 100 year rainfall event. Controlled drainage of the pond can take place after peak flows in the lower catchment areas have subsided.

By implementing the above strategy, the following estimated post development peak discharge rates would be expected at the Anderson Terrace outlet:

- 2 year peak rainfall - 1.4 m³/s
- 25 year peak rainfall - <2.0 m³/s
- 100 year peak rainfall - 6.1 m³/s
- The Best West Realty Development must make provisions to allow passage of runoff from the catchment area below the proposed Lac du Bois pond. Peak flows from this area are estimated at 0.7 m³/s for a 25 year event and 1.2 m³/s for a 100 year event.

5.5.5 Stormwater Management (Property South of Batchelor Drive)

Runoff from the proposed development cell located south of Batchelor Drive presently runs down the hillside onto Batchelor Drive and adjacent properties. As Batchelor Drive contains a storm sewer system, the 1 to 25 year stormwater management requirements will be the same as those for the main development area. These are:

- The development shall restrict discharges to a flow rate equivalent to the 1:2 year pre-development rate.

- The development shall provide storage in the magnitude of $80 \text{ m}^3/\text{ha}$ developed. This would be sufficient to reduce 25 year peak flows to 2 year pre-development flows.

The difficulty in this area is dealing with the additional runoff created by storms which exceed the 1:25 year event. The Anderson Terrace drainage basin has well defined, undeveloped drainage channels through which runoff from the larger storms will be channeled. This is not the case in this area as all the land located downhill of the proposed development area is developed. The problem is further complicated by the fact that several major arterial roadways converge below the area.

The most immediate overland flood route would be Batchelor Drive. Unfortunately, Batchelor Drive would spill this flood water into an important major intersection whose operation must not be compromised in a large storm event. As such, this would be an unacceptable route.

A more appropriate option is to convey the flow to the Singh Street retention pond. However, the impact of this on the operation of the pond would have to be carefully studied prior to this option gaining approval.

In the absence of obvious overland floor routing, it is recommended at this time that:

- The development shall restrict ALL discharge to a flow rate equivalent to the 1:2 year pre-development rate unless further engineering evaluation can demonstrate that alternative relief capacity is available to reduce the storage requirement for storms that exceed the 1:25 year event.

5.5.6 Stormwater Management (Smith Property)

Runoff from the Smith Property currently flows down the hillside through the silt bluff ravines and either into the existing McQueen neighbourhood or onto Westsyde Road. A 900 mm diameter culvert under Westsyde Road exists at the north boundary of the Smith

Property. As such, the 1 to 25 year stormwater management requirements will be the same as those for the main development area defined in Section 5.5.4.

Westsyde Road is all that separates this development area from the North Thompson River. Since the future arterial road crossing the property is proposed as a 1:100 overland flow route, the modifications to Westsyde Road which are necessary to pass this flow to the river should be undertaken at the time the intersection is constructed.

The steep slope separating the upper and lower benches of this property appears to be susceptible to erosion. As such, development of the upper bench will require protection of the ravine through which the 100 year overland flow will be channeled to the arterial below.

6.0 PUBLIC INPUT

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6.3 LAC DU BOIS PLANNING TEAM	6.1

6.0 PUBLIC INPUT

6.1 INTRODUCTION

Once the draft Batchelor Hills Land Use Plan was complete a public open house was held. The purposes of this open house were to present the findings of the study and recommended development scenario to the public and provide them with an opportunity to ask questions and make comments regarding the plan. During the course of the evening, it is estimated that between 150 and 200 people attended. The open house was held at Westmount Elementary School, which is central to the existing neighbourhoods, on October 23, 1997 between 4:00 p.m. and 8:00 p.m.

6.2 RESULTS

The general feeling that the public left with the presenters can be summarized as: *“Acknowledgement that sooner or later the Batchelor Bench was going to be developed. With this in mind, general acceptance of the low density scenario with concerns regarding: the lack of an actual school in the neighbourhood; increased traffic on Batchelor Drive and the impact this will have on the dangerous Westsyde Road/Batchelor Drive/Ord Road intersection; increased traffic on McQueen Drive; and drainage through the Anderson Terrace area.”*

All of these concerns are addressed in the preceeding report with the exception of the school for which a site is designated but construction of the actual building is up to the Provincial Government and School District.

Based on the feedback received from the public at the open house, it is recommended that the City proceed with implementation of the Batchelor Hills Land Use Plan.

6.3 LAC DU BOIS PLANNING TEAM

The draft Land Use Plan was also presented to the Lac du Bois Planning Team who were pleased to hear that the area proposed for development was going to be fenced off from the adjacent Range Lands. They also were in general acceptance of the low density scenario.

7.0 IMPLEMENTATION

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7.3 SERVICING	7.3

7.0 IMPLEMENTATION

In order to bring these lands to development, a coordinated series of planning, engineering, marketing, and management activities are required. This section briefly describes the major activities required.

7.1 PLANNING

While this report outlines a broad land use approach, considerable detailed planning must be carried out over the long term. The general sequence of activities, suggested are as follows:

- The overall land use and transportation network should be adopted as a guide for further planning. This will include any appropriate OCP amendments.
- Individual land owners could then proceed with specific rezoning and subdivision applications which are consistent with the development strategies contained in this plan.

7.2 ENGINEERING

Provided that the servicing issues identified in this report are addressed, there are no outstanding issues that should prevent the City from proceeding with rezoning of the Batchelor Hills area. However, the City should keep in mind that they are making a commitment to upgrade the Westsyde Road/Batchelor Drive/Ord Road intersection.

Detailed engineering review should be undertaken to further define the timing and selection of options to address overall City system issues, as stated previously in this report and outlined briefly below.

7.2.1 Roads

The Westsyde Road/Batchelor Drive/Ord Road intersection is unorthodox and dangerous. The City needs to:

- undertake the required realignment and signalization which they have already defined.

7.2.2 Water

Water demand is nearing the capacity of the water supply system to the North Shore. In the near future the City should:

- develop a strategy to reduce demand (i.e., universal water metering) or increase water supply by upgrading service to the North Shore;
- define funding strategies for the preferred option.

7.2.3 Sanitary

Once Batchelor Hills is fully developed, the City will be nearing the capacity of the existing North Shore trunk mains. The following work is therefore recommended:

- undertake an in-depth study of the existing sanitary trunk taking into account proposed upstream development at Oak Hills, on the Kamloops Indian Reserve, and other areas on the North Shore. Identify critical areas, pre-design upgrading work and prepare cost estimates; and
- establish source of funding through development cost charges.

7.2.4 Storm Drainage

Earlier reports have identified the requirement for detention facilities to control existing pre-development flows. Further work is now recommended, as follows:

- design and construct the detention pond in the Lac du Bois planning area.
- design and construct facilities for conveyance of the 100 year runoff event through Anderson Terrace and across Westsyde Road.

7.3 **SERVICING**

A number of servicing issues should be taken into account as design of specific phases of the Batchelor Hills development proceed:

7.3.1 Roads

Access to and from existing arterials is the main servicing requirement. The following steps are considered key to the servicing of Batchelor Hills:

- Once the new arterial road is open, monitor the traffic impacts on the McQueen neighbourhood and assess potential requirements for traffic calming.
- Once the new arterial road is open, monitor the intersection of Westsyde Road and the north connection of Woodhaven Drive and assess the requirements for signalization.

7.3.2 Water

Review the need to increase the trunkmain size from the North Shore reservoir to the Batchelor Hills reservoir and review the provision of additional pumping and reservoir storage for the 530 zone.

7.3.3 Sanitary Sewer

There is residual capacity in the existing sanitary sewer trunks which can be utilized before upgrading is required. Suggested steps for sanitary servicing are outlined below:

- Confirm availability of surplus capacity in 12th Street sewer to accommodate flow from the development area located south of Batchelor Drive.
- Permit staged development to maximize existing sewer capacity;

7.3.4 Storm Drainage

Upgrade storm routing and construct storm drainage as development proceeds.



Stanley
Consulting

Corporate Authorization

This document entitled:

“BATCHELOR HILLS LAND USE PLAN”

was prepared by *Stanley Consulting Group Ltd.*



Signature

November 1997

Date