PANORAMA ESTATES

AREA STRUCTURE PLAN

IN THE

TOWN OF BLACKFALDS

Prepared for:

Grampian/Waghorn Joint Venture

Prepared By:

WNM Engineering Ltd.
and
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January, 2003

Revised March 2003

Revised May 2003

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AREA STRUCTURE PLAN
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1.0 INTRODUCTION

This Area Structure Plan has been prepared on behalf of Grampian/Waghorn Joint Venture in support of a phased residential subdivision in the S.E. 26-39-27-W4M. The Town of Blackfalds Municipal Development Plan requires the preparation of an Area Structure Plan to guide the expansion of residential lands. The Municipal Government Act enables municipalities to control development of lands through the creation and adoption of Area Structure Plans.

A concept plan for the N.E. 26-39-27-W4M has been provided for illustrative purposes only. An Area Structure Plan for this quarter section will be required as a pre-requisite to redesignation and subdivision approval.

2.0 PLAN LOCATION AND OWNERSHIP

The plan area is located on the east boundary of the Town of Blackfalds. Specifically the site is bounded by South Street on the south, an undeveloped county road (Range Road 27-1 on the east, an undeveloped agricultural quarter on the north and Parkwood Estates on the west (Refer to Figure 1). The site is titled to Speers Painting and Decorating and encompasses 64.7 hectares described as follows:

Meridian 4 Range 27 Township 39, Section 26, Quarter South East
Excepting Thereout All Mines and Minerals
Area: 64.7 Hectares (160 acres) more or less.

3.0 RELEVANT PLANNING DOCUMENTS

a. MUNICIPAL DEVELOPMENT PLAN

The purpose of the Town of Blackfalds Municipal Development Plan is to serve as a common guide for Council, subdivision and development authorities, municipal residents and businesses, and the development community, respecting Blackfalds' land use and development and by doing so promote orderly growth which is appropriate, sustainable and efficient, thus enhancing opportunities for business and the quality of life of residents.

The Municipal Development Plan identifies the subject parcel as suitable for Residential use and provides the objectives and policies for future residential expansion.

b. MASTER PLAN GROWTH AND INFRASTRUCTURE

The Master Plan Growth and Infrastructure study provides engineering and planning information to assist the Town and public and private stake holders in making decisions regarding cost effective future growth and development directions.

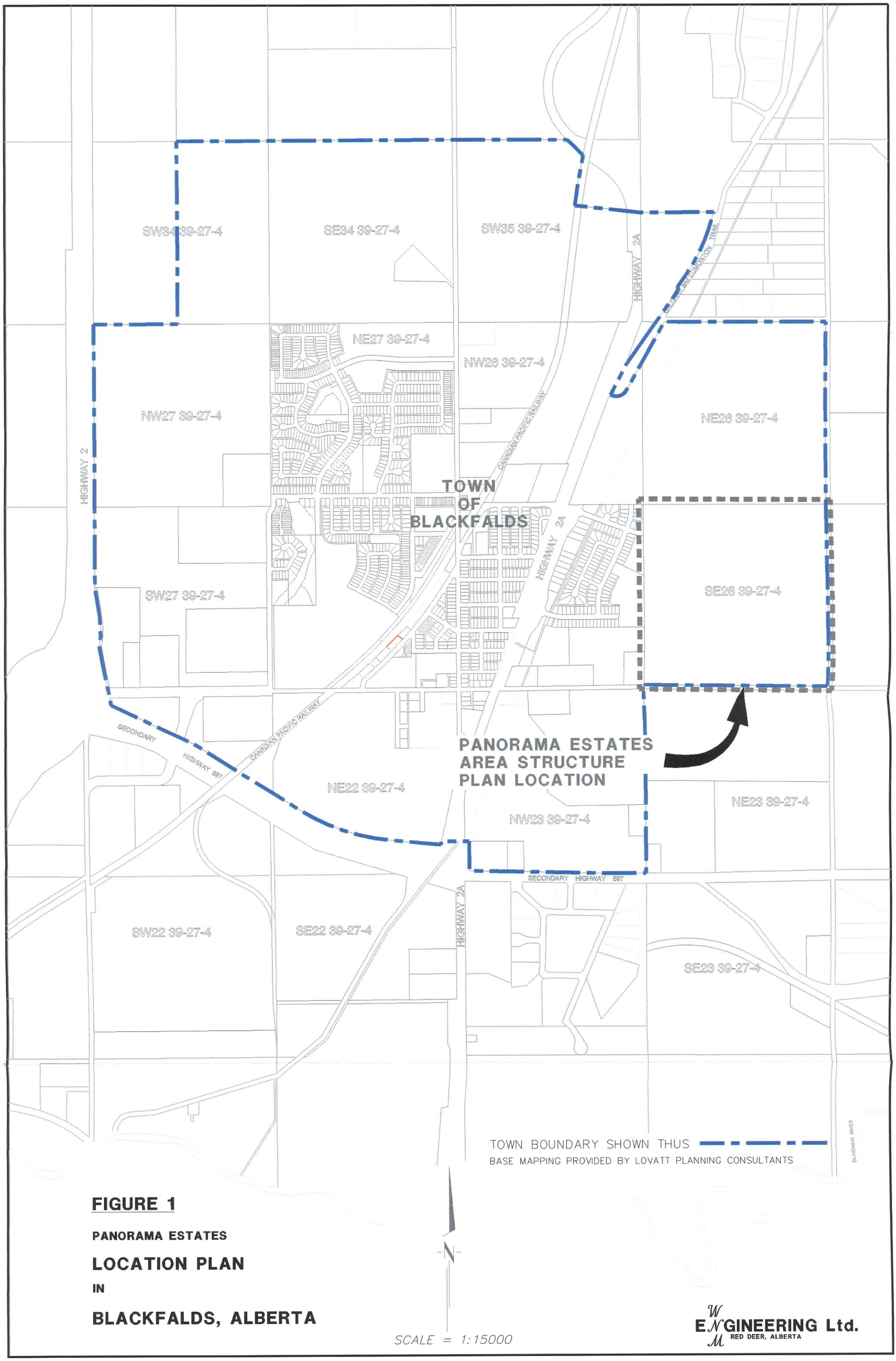


FIGURE 1

PANORAMA ESTATES

LOCATION PLAN

IN

BLACKFALDS, ALBERTA

WM ENGINEERING Ltd.
RED DEER, ALBERTA

c. TOWN OF BLACKFALDS PARKS AND OPEN SPACE MASTER PLAN

The Parks and Open Space Master Plan provides a template to guide the Town in the orderly development of the communities parks, trails, sports fields and green space.

d. TOWN OF BLACKFALDS LAND USE BYLAW

The Land Use Bylaw divides the Town into different land use districts and regulates the use of land and development. The Land Use Bylaw implements the policies and objectives of the Municipal Development Plan and Area Structure Plans.

The subject site is presently designated Urban Reserve District (UR) wherein the purpose is to reserve land for future subdivision and development until an overall plan is prepared and approved by Council. Re-designation to the appropriate Residential Districts will be required before subdivision and development can occur.

4.0 SITE CHARACTERISTICS

The site is characteristically rolling farm land that is presently cultivated for the most part. The south portion of the site is characterized by an east/west ridge of land which slopes to the north and south. This ridge provides an excellent view of the Blindman River Valley to the south and south east. An overhead electric transmission line traverses the property from the south west to the north east and an abandon building site exists in the south central portion of the plan area (Refer to Figure 2).

a. NATURAL FEATURES

The most significant natural features are two low areas, one located in the central portion of the site and one located in the northeast portion of the site, and a ridge which runs in an east/west direction on the south portion of the site. Public lands has advised that neither low area is claimable by the Crown under Section 3 of The Public Lands Act (Refer to Figure 2).

The title to the beds and shores of all permanent and naturally occurring bodies of water and all naturally occurring rivers, streams, watercourses and lakes is vested in the Crown in Right of Alberta under Section 3 of the Public Lands Act.

A Phase I environmental audit has been initiated and will be available prior to presentation of this plan to the public.

b. SERVICING

The site can be serviced with municipal water and sanitary sewer facilities from the west and south. Storm water facilities will be, for the most part, contained entirely within the plan area.

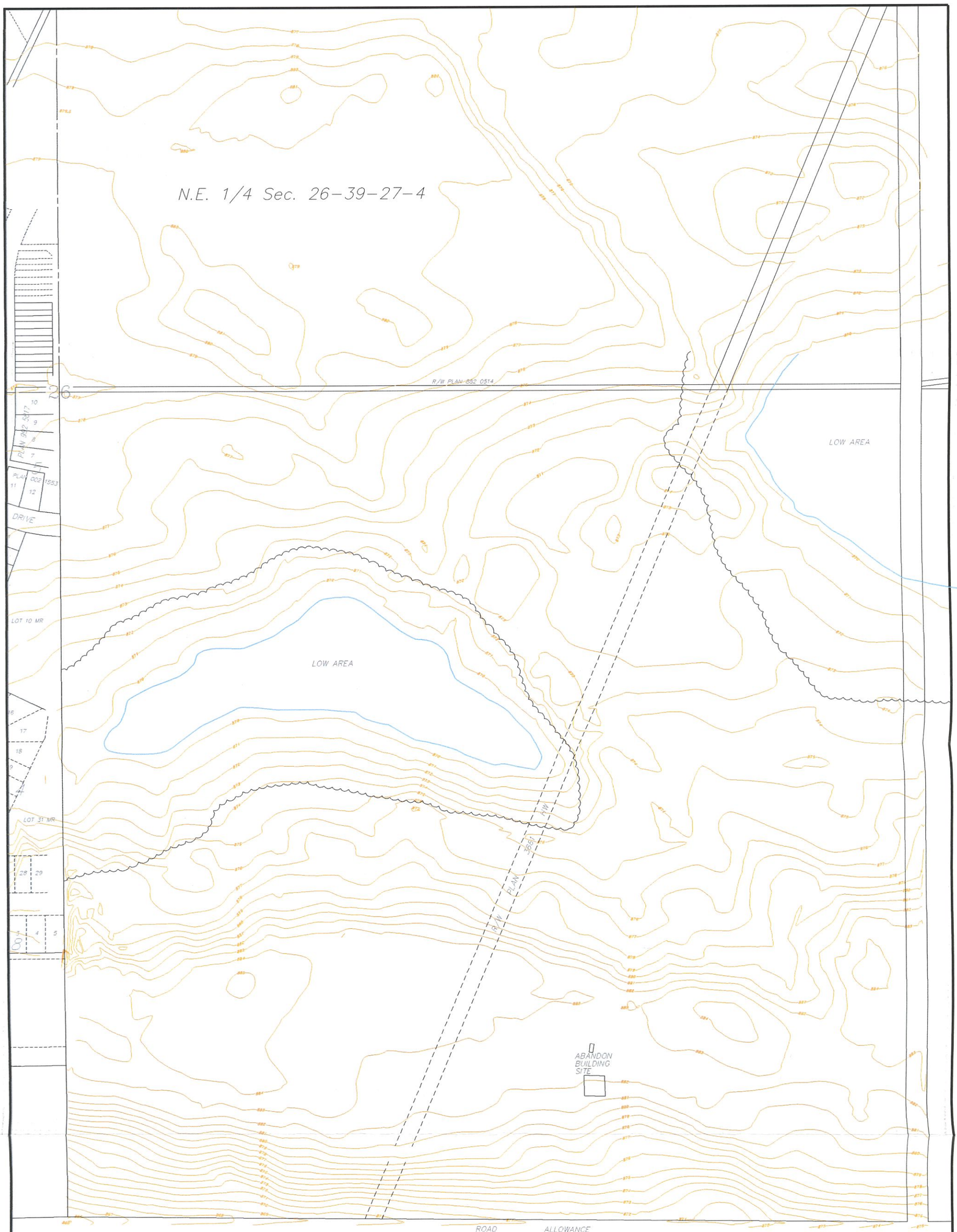


FIGURE 2

PLAN SHOWING

SITE FEATURES

OF ALL OF THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

Bemoco Land Surveying Ltd.
21,7895-49th Avenue
Red Deer, Alberta
Phone No: 342-2611 FILE No: S-105-01

c. ACCESS

Access to the site is available via three collector roads. Panorama Drive provides access from the west in the northwest, Park Street provides access from the west in the southwest and South Street runs in an east west direction along the south boundary. Reid Crowther & Partners Ltd. was retained to complete a Traffic Impact Study as part of the Parkwood Estates Development to the west.

The Traffic Impact Study examined the short and long term affects of the Parkwood Development and future development of surrounding lands. The main conclusions of the study are summarized as follows:

2003 HORIZON (SHORT TERM)

The short-term horizon was identified as 2003 and assumed full development of the subject site and growth in through traffic on Highway 2A. The results confirmed the following:

1. Growth in background traffic to 2003 results in the need to widen Highway 2A so as to accommodate exclusive northbound left turn lanes at Indiana and Park without consideration of site traffic volumes.

2. The addition of site generated traffic results in the need to widen Highway 2A in order to accommodate an exclusive southbound left turn lane at Park/Highway 2A. If Park/Highway 2A is not signalized, then a southbound left turn lane will also be required at Gregg/Highway 2A.

3. Park will need to be four lanes in width on the east side of Highway 2A to accommodate the necessary left turn lanes in both directions. No widening of Park will be necessary on the west side of Highway 2A provided that adequate pavement width (11 metres) continues to be available on the west leg of the Park/Highway 2A intersection (two eastbound lanes and one westbound lane) tapering to one in each direction west of the service road.

4. The addition of site generated traffic does not appear to warrant signalization of either Gregg/Highway 2A or Park/Highway 2A based on traffic volumes alone. Having said this, the need to provide safe pedestrian access across Highway 2A is expected to be significant given the location of the schools west of the highway. To this end, some form of intersection control is required, and while a pedestrian signal is warranted almost immediately upon development of any residential uses east of the highway, a full traffic signal will eventually be required.

As such, it is recommended that either (a) a flashing pedestrian signal be installed concurrent with the commencement of development of the site, and that this be replaced with a traffic signal at some point prior to 2013, or (b) that the intersection be signalized immediately upon commencement of development with an actuated condition for Park so as to provide a green facing for Highway 2A unless traffic is queued on Park. Once signalized, it can be expected that most of the traffic utilizing Gregg and Indiana will relocate to Park to make left turns to and from Highway 2A.

5. The addition of site generated traffic will also result in the need for sidewalks on the north side of Park between Highway 2A and Broadway.

6. If the Park/Highway 2A intersection is not signalized as a result of the addition of site traffic volumes, then left turn movements may continue to be accommodated at Indiana/Highway 2A. However, if Park/Highway 2A is signalized, then an exclusive northbound left turn lane should be provided at Park/Highway 2A that will result in the elimination of all left turn movements at Indiana.

7. The addition of the site generated traffic volume results in the need for northbound right turn deceleration tapers at Park/Highway 2A and at Gregg/Highway 2A.

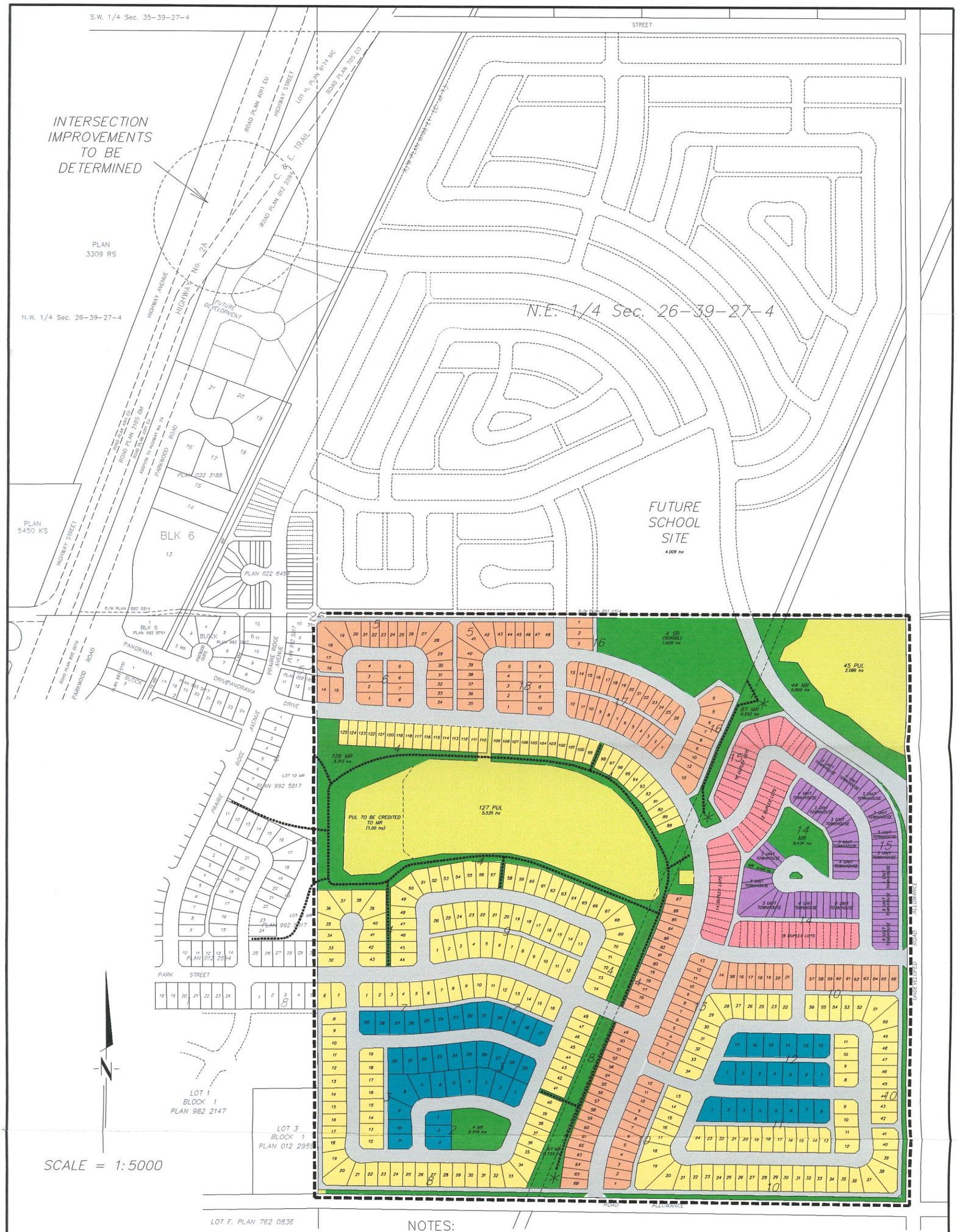
2013 HORIZON (LONG TERM)

The further development of the lands surrounding the site and the growth in through traffic on Highway 2A results in the following preliminary conclusions for the longer-term horizon assumed for the purpose of analysis to 2013. The 2013 horizon assumed that Highway 2A will be widened to four through lanes (two per direction).

1. If not signalized at 2003, the Park/Highway 2A intersection will certainly need to be signalized prior to the 2013 horizon. As a result of this improvement, left turn activity will necessarily be eliminated at Indiana/Highway 2A.

2. Exclusive northbound right turn lanes will be required at Park/Highway 2A, Gregg/Highway 2A and potentially North Access/Highway 2A (further study required).

The recommended improvements to Highway 2A and the intersections with Panorama Drive and Park Street were undertaken as part of the Parkwood Estates Development. The Intersection of Highway 2A and the C & E Trail to the north will require further investigation as part of future development proposals on the N.E. 26-39-27-W4M



NOTES:

- Distances shown are in metres.
- Area dealt with is bounded thus ▬▬▬ and contains 64.88 ha (160.3 Ac.)
- Trail system ····· Rest area ✳

R1L	=	4.29 ha
R1M	=	14.79 ha
R1S	=	8.35 ha
R2 (Duplex)	=	2.36 ha
R2 (Townhouse)	=	2.61 ha
MR	=	7.86 ha
PUL	=	7.66 ha
Roads	=	16.96 ha
Total	=	64.88 ha

FIGURE 3

PLAN SHOWING

LAND USE

OF ALL OF THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

Bemoco Land Surveying Ltd.
21,7895-49th Avenue
Red Deer, Alberta
Phone No: 342-2611 FILE No: S-105-01

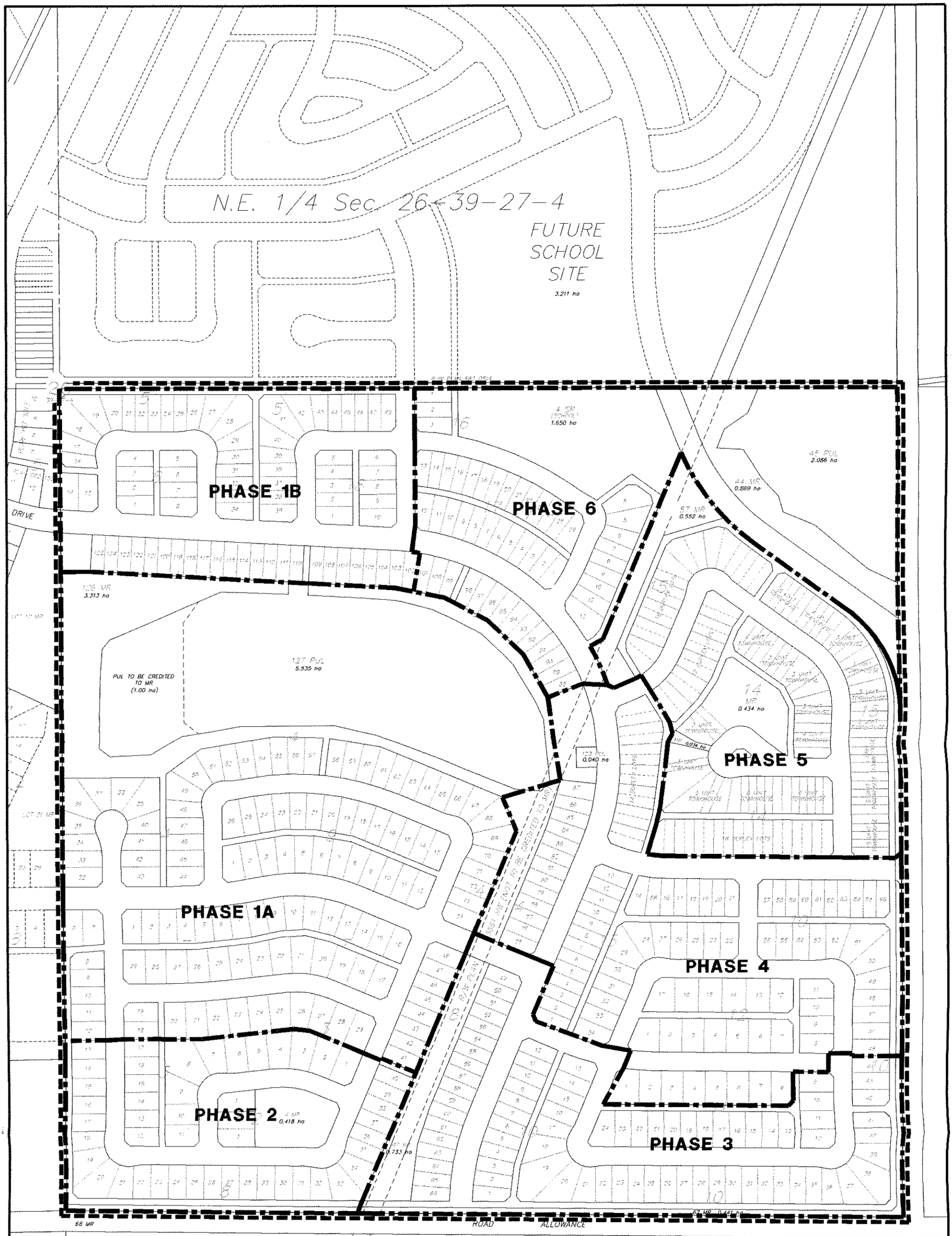


FIGURE 10

PLAN SHOWING

DEVELOPMENT STAGING

IN THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

WESTMAN ENGINEERING Ltd.
RED DEER, ALBERTA

5.0 DEVELOPMENT CONCEPT

5.1 LAND USE DISTRIBUTION

The Land Use and Development Concept is shown on Figure 3. The plan provides for a variety of housing types ranging from single detached to townhouses. The land use distribution for the Plan Area is contained on Table 1.

5.2 RESIDENTIAL

The residential areas will consist of single family detached dwellings and semi detached and multi attached dwellings. The single detached dwellings will consist of R1L, R1M and R1S designations to provide a variety of lot sizes and housing styles. The semi detached and multi detached dwellings will consist of R2 designation to provide for duplex and townhouse development.

5.2.1 SINGLE DETACHED RIL DWELLINGS

The plan proposes R1L designations on the south portion of the site along the ridge. The ridge provides an excellent view of the Blindman River Valley to the south and southeast.

The RIL Designation is proposed to provide a low density residential area. The area in the southwest portion of the plan is proposed as laneless lots with a minimum of 20 metre lot widths. The Municipal Development Plan provides for laneless subdivisions, usually adjacent to parks and natural open spaces. Each laneless residential parcel must be of sufficient width to accommodate a driveway to the rear yard unless an attached front garage is to be provided as part of the residence to be constructed on the parcel.

5.2.2 SINGLE DETACHED R1M DWELLINGS

The RIM Designation is proposed on the south portion of the site and the north perimeter of the Central PUL/MR site. Lanes are proposed unless the lots back onto reserve parcels. An additional walkway will be provided adjacent to proposed lots 32 and 33, Block 4 to the satisfaction of the Town of Blackfalds.

5.2.3 SINGLE DETACHED R1S DWELLING

The R1S Designation is proposed on the north west and east central portion of the site adjacent to the proposed collector street. Lanes are proposed unless the lots back onto reserve parcels.

TABLE 1

AREA STRUCTURE PLAN STATISTICS

Land Use	Area (Acres)	Area (hectares)	Percentage of Total Area	Percentage of Total Dwellings
Residential Single Family Detached Dwellings	67.79	27.43	42.28	84.67
Residential Semi-Detached Dwellings	5.83	2.36	3.64	7.28
Residential Multi-Family Dwellings	6.44	2.61	4.02	8.05
Municipal Reserves	19.42	7.86	12.11	
Public Utility Lots	18.93	7.66	11.81	
Streets & Lanes	31.91	16.96	26.15	
TOTALS	160.30	64.88	100.00	100.00

5.2.4 MULTI DWELLING R2 DISTRICT

The R2 uses are proposed in the north east portion of the plan area. The R2 uses will be a mix of semi-detached and multi attached (townhouses) development. The R2 uses are adjacent to two proposed collector roads and the large open space area in the centre and north east corner of the site. The location also provides for a good pedestrian access link to the proposed school site in the south east corner of the north east of 26-39-27-W4M. In recognition of the higher density proposed at this location the plan proposes a central reserve parcel to be developed as a Neighborhood Park and lanes adjacent to all lots.

5.3 DENSITY

The Municipal Development Plan identifies a design density between 10 residential units per gross developable hectare (4 per gross developable acre +/-) and 12.5 residential units per gross developable hectare (5 per gross developable acre +/-). Based on the design densities cited in the Municipal Development Plan, the plan area can accommodate between 640 and 800 dwelling units. Using an average household size of 2.9 persons per dwelling unit (in accordance with the 2002 Town of Blackfalds Municipal Census) the anticipated population for the area is projected to range between 1,856 and 2,320 persons. The concept provided envisions populations based on the lower density.

5.4 OPEN SPACE

The proposed park and open space areas include a large open space in the centre and northeast corner of the site, two (2) neighborhood parks and a north/south linear park along the Alta Link Right of Way as well as buffer areas paralleling the South Street right-of-way and the undeveloped road allowance to the east of the plan area (Refer to Figure 3).

5.4.1 CENTRAL OPEN SPACE

The proposed central open space is comprised of a low area surrounded by natural tree cover. The open space will function as a storm water detention area and Municipal Reserve. The Municipal Reserve is adjacent to a Municipal Reserve Parcel dedicated as part of the Park Wood Subdivision to the west and should provide a functional area for active recreation (i.e. neighborhood park).

The Municipal Reserve around the perimeter of the proposed Public Utility Lot will allow for the preservation of the natural tree cover and provide the opportunity for a trail system to link to the north/south linear park, the open space in the north east corner and the proposed school site in the south east corner of the north east of 26-39-27-W4M.

The Municipal Development Plan identifies this area as suitable for Environmental Reserve, however the area does not appear to meet the Municipal Government Act criteria for the dedication of Environmental Reserve.

5.4.2 NORTH EAST OPEN SPACE

The north east open area encompasses a low area and natural tree cover. The area will function as a storm water detention facility for both the S.E. 26-39-27-4 and the N.E. 26-39-27-4 and municipal reserve. The Municipal Reserve will provide for the retention of the natural tree cover and a trail system to link to the proposed school site in the southeast corner of the N.E. 26-39-27-W4M and the open space to the southwest.

The Municipal Development Plan identifies this area as suitable for Environmental Reserve, however the area does not appear to meet the Municipal Government Act criteria for the dedication of Environmental Reserve.

5.4.3 NORTH/SOUTH LINEAR PARK

The North/South Linear Park is proposed to encompass the Alta Link right-of-way and a minimum of five (5) metres on each side of the right-of-way. The linear park is intended to provide a north/south pedestrian trail link. The Alta Link right-of-way area has not been included as part of the Municipal Reserve area calculation outlined in the Municipal Government Act.

The buffer areas will be landscaped to Town of Blackfalds standards and are included in the land use statistical breakdown as road widening.

5.4.4 BUFFER AREA

A buffer area is provided adjacent to South Street and Range Road 27-1 along the east boundary of the site. The buffer areas will be landscaped to Town of Blackfalds standards and will form part of the trail system.

5.5 TRANSPORTATION

The proposed circulation pattern recognizes the existing and proposed roadways surrounding the Area Structure Plan area. A future collector road concept has been provided for the N.E. 26-39-27-W4M on Figure 3 for illustrative purposes.

5.5.1 COLLECTOR ROADS

The Area Structure Plan provides collector roads designed as an extension to the collector roads provided in Parkwood Estates to the west.

The plan provides for the continuation of Panorama Drive which accesses Highway 2A to the west and will extend southerly to intersect with South Street. Park Street, which accesses Highway 2A to the west, has been extended easterly to intersect with Panorama Drive. Collector roads have been provided to link to the properties to the north and east.

The proposed collector road extending to the east is intended to provide a link to future residential properties now in Lacombe County. The collector road will be constructed as a dead end roadway, to the satisfaction of the Town, at the easterly boundary of the site. The undeveloped County Road allowance along the east boundary (Range Road 27-1) is not intended to be developed as part the lands included in this area structure plan.

5.5.2 LOCAL ROADWAYS

The system of local roads provides access to the individual lots throughout the plan area.

5.5.3 LANEWAYS

The majority of lots within the plan area back onto lanes with the exception of lots with rear yards abutting reserve parcels and lots in the southwest portion (R1L lots) which will have a minimum width of 20 meters.

5.5.4 PEDESTRIAN AND BICYCLE CIRCULATION

The Municipal Reserve parcels and sidewalks proposed to be developed within the road rights-of-way will link the residential areas to the major open space features and the proposed school site in the south east corner of the N.E. 26-39-27-W4M.

Roadways will be constructed in accordance with current municipal standards and/or recommended cross sections provided by a qualified geotechnical engineer.

5.6 PUBLIC SERVICES

5.6.1 FIRE PROTECTION AND AMBULANCE SERVICES

The Town of Blackfalds Fire Department is composed of twenty (20) volunteer firemen, one (1) Fire Chief, two (2) fire trucks and an emergency rescue vehicle. The Town has indicated that additional volunteers and equipment will be added to their compliment as required to accommodate future growth.

Ambulance service is currently provided on a contractual basis by the Town of Lacombe. Additional growth in the Town of Blackfalds will require negotiation for additional services and, ultimately the Town may require its own ambulance service.

5.6.2 POLICING

Policing services are currently provided to the Town by the Rural Detachment of the Red Deer RCMP. Pursuant to the Police Act the Town's policing requirements are directly impacted when the population reaches the 2,500 and 5,000 person thresholds. The Town is required to reimburse the Provincial Government for policing costs when the population surpasses 2,500 and is required to deal directly with the Federal Government when the population reaches the 5,000 person threshold.

Currently, policing duties have been assigned to one (1) officer of the Red Deer Rural Detachment. Three (3) additional officers can be assigned on an as-needed basis.

Future plans for policing include the addition of two (2) additional RCMP officers on a permanent basis and four (4) additional officers on an as-needed basis. In addition, it is understood that a permanent police station has been proposed and is now being planned.

5.7 SCHOOLS

The Town of Blackfalds is located in the jurisdiction of the Wolf Creek School Division. One (1) K-9 school is currently operating within the Town boundary while high school students from the Town attend at the Lacombe High School.

The Master Growth and Infrastructure Plan has identified two (2) future school sites in the Town of Blackfalds. The first is located in the S.W. 27-39-27-4 and a new K-9 school is scheduled to open in the fall of 2004 at this location. The second site identified as a future school site is located in the N.E. 26-39-27-4 and is immediately north of the plan area.

The Town of Blackfalds has received a request from the Red Deer Catholic School Division to provide a (+/-) 14 acre school site on the east side of Highway 2A. This Area Structure Plan propose a (+/-) 4 acre site on the north boundary to be dedicated as part of a future (+/-) 14 acre site. Approximately (+/-) 10 acres will be provided from the N.E. 26-39-27-W4M with the future subdivision of that quarter section.

6.0 MUNICIPAL SERVICING

Municipal servicing of the plan area can be accomplished in general accordance with the Town of Blackfalds Master Plan Growth and Infrastructure study (May 2000). It is noteworthy that the Growth and Infrastructure study prepared by the Town anticipated growth in the plan area only after the municipal population reached 10,000. As a result, some of the infrastructure improvements identified in the study will be required to accommodate growth in the area or alternative methods of servicing will have to be explored. Some infrastructure improvements identified and of particular interest to the plan area are:

i) Upgrading of the 300mm trunk main east of Highway 2A and south of Park Street immediately and regardless of future growth;
ii) Construction of a 2500 m^3 water reservoir prior to the population reaching 4,800.

6.1 WATER MAINS AND RESERVOIRS

The Panorama Estates Area Structure Plan area can be serviced by the extension of existing water mains from two (2) locations. Existing mains in the Park Street (250mm) and Panorama Drive (200mm) can be extended eastward to service the Panorama Estates plan area.

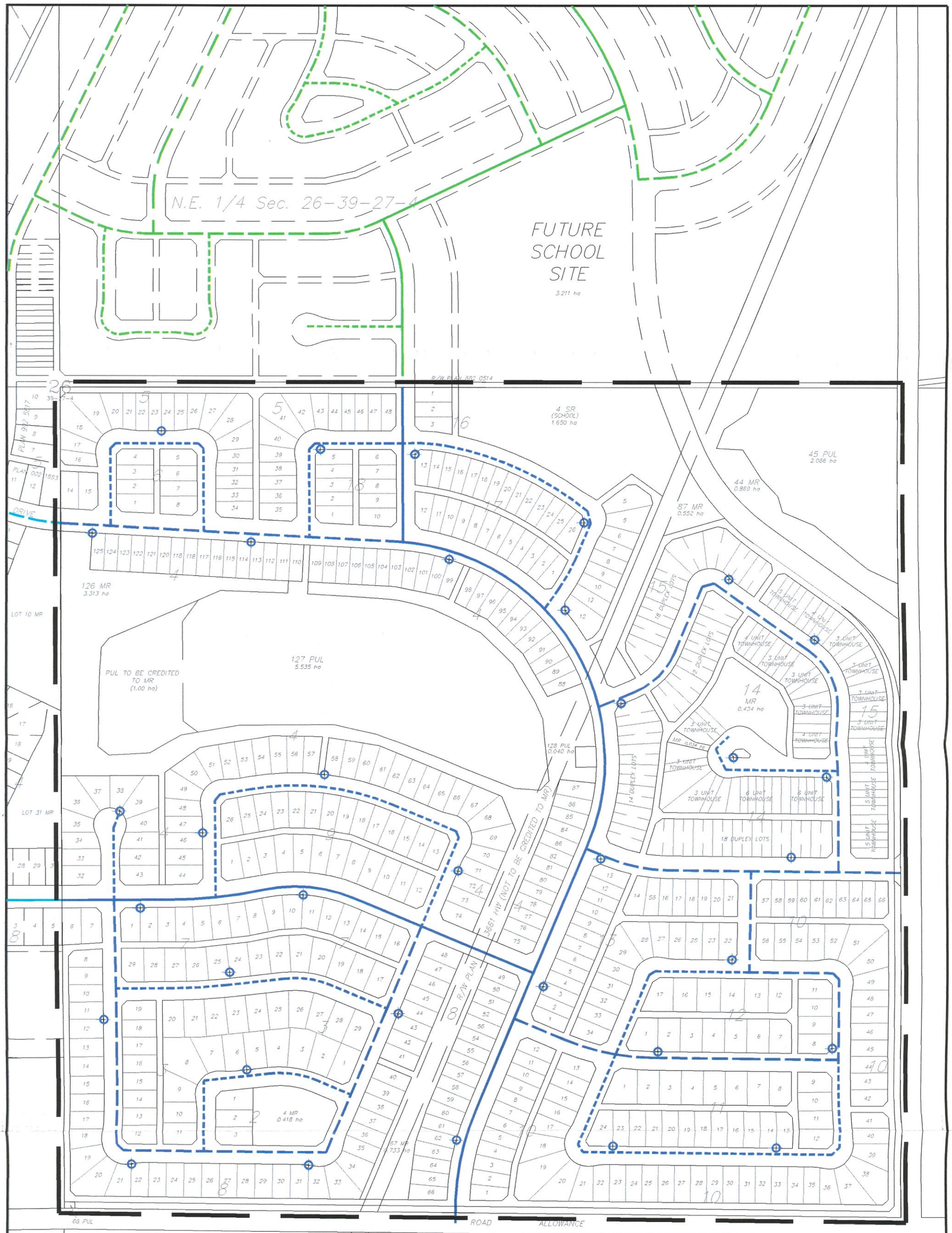


FIGURE 4

PLAN SHOWING

PROPOSED WATER DISTRIBUTION

IN THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

LEGEND

- 150mm WATER MAIN
- 200mm WATER MAIN
- 250mm WATER MAIN
- EXISTING WATER MAIN
- FIRE HYDRANT

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A third feed to the area would be available when the water reservoir and booster station proposed for construction in the north west of the Town is constructed and mains are extended to Panorama Estates from the north. A 250mm main is proposed to extend from the future Reservoir/Booster Station, to be located off Broadway Avenue, and loop through the Panorama Estates plan area southward to a connection with existing facilities in the Park Street right-of-way at the east boundary of Parkwood Estates.

The water distribution network will be designed to accommodate the plan area and provide a 200mm stub to the east and a 250mm stub to the south for future development. Please refer to attached drawings, Figure 4 - Proposed Water Distribution and Fig 5 - Area Water Distribution. Minimum main sizes in the development will be 150mm (6"). Using City of Red Deer design guidelines, maximum day flows for the projected population for the plan area (1,700) can be estimated at about 17 litres per second. Assuming fire flow requirements equivalent to those specified in the Town of Blackfalds Master Plan - Growth and Infrastructure study (135 lps), the area can be serviced with mains having a cross sectional area equal to that of a 300 mm (12") pipe. Consequently, the 250mm (10") main in the Park Street right-of-way and the 200mm (8") main in the Panorama Drive right-of-way have sufficient cross sectional area to service the plan area. When the 250mm (10") main is extended from the planned booster station and reservoir, there will be more than adequate water supply for the proposed development.

The required cross sectional area for mains serving the proposed development have been calculated assuming that main line flow velocities should not exceed 2.5 metres per second during maximum day demand plus fire flow conditions.

As a matter of interest, it can be pointed out that using City of Red Deer design guidelines, a single 250mm (10") feed to the area would be sufficient to ensure adequate water supply. The extra capacity calculated (i.e. the 300mm (12") capacity) is a result of the additional fire flow requirement outlined in the Town of Blackfalds Master Plan - Growth and Infrastructure study. Where the City of Red Deer specifies fire flows equal to 4,500 litres per minute (75 lps), the Growth and Infrastructure study uses 8,100 litres per minute (135 lps).

Computer modeling of the water distribution system for the plan area resulted in conclusions that there is adequate pressure and volume at the eastern boundary of existing development to serve all of the plan area. Pressures at the boundary between existing development and the proposed development area were measured to be about 62 psi. A summary of the modeling completed is included in the appendix.

It has been reported that the present capacity of the existing reservoir is for a population of 4800 (reservoir volume is 2,450 m^3). Although designed to service a population of 5,000, the Town of Blackfalds Master Plan Growth and Infrastructure study has revised the service population to 4,800.

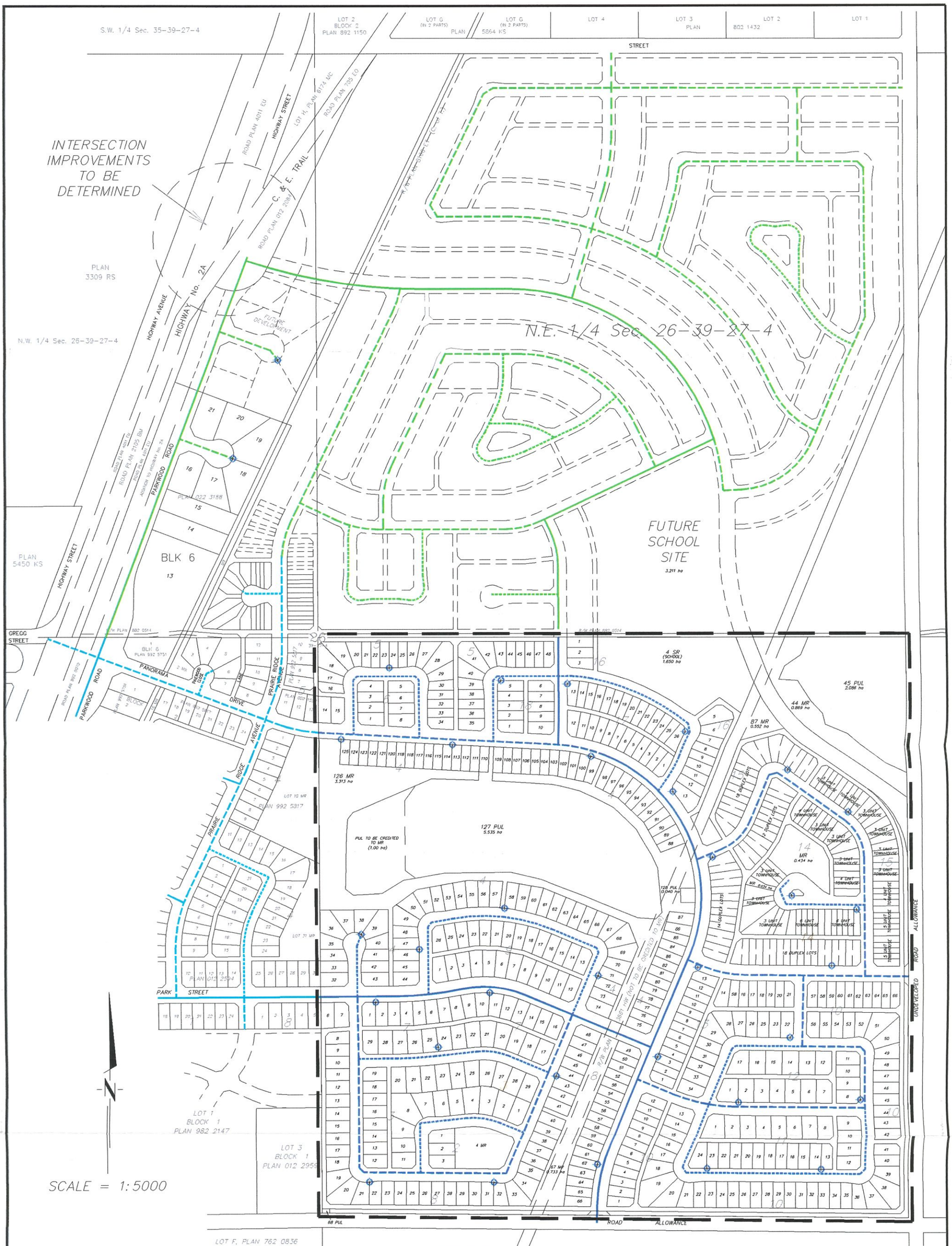

FIGURE 5

PLAN SHOWING

AREA WATER DISTRIBUTION

IN THE

E. 1/2 26-39-27-4

BLACKFALDS, ALBERTA

LEGEND

- 150mm WATER MAIN
- 200mm WATER MAIN
- 250mm WATER MAIN
- EXISTING WATER MAIN
- FIRE HYDRANT

NOTES:

- Distances shown are in metres.
- Area dealt with is bounded thus and contains 64.9 ha (160 Ac.)

WM ENGINEERING Ltd.
RED DEER, ALBERTA

It is noted that the design parameters used to complete the service population estimate are in excess of those parameters used in other municipalities. For example, although the City of Red Deer uses a per capita maximum day demand of 750 litres per day, the analysis completed by the Town in determining the reservoir service population uses a per capita maximum day demand of 900 litres per day.

Also, it is noted that although the average day demand per person has been measured to be approximately 280 litres per day, an average per capita daily demand of 450 litres per day was used in the reservoir analysis. Various design populations can be calculated using different standards and maintaining the fire flow specified in the Master Plan - Growth and Infrastructure study. A summary of "design populations" calculated is presented following.

Given that the population of Blackfalds was reported to be 3,540 in July of 2002, and assuming an average growth rate of 10%, the Town would reach the reported threshold population of 4,800 in three (3) to four (4) years. The additional population of 1,260 people equates to an increase in the number of households of 420, or between 105 and 140 homes per year. If the median threshold population (5,800) calculated herein is used to calculate permitted growth prior to needing the new reservoir, it can be shown that, assuming an average growth rate of 10% per annum, the threshold population would be reached in about five (5) years. The additional population of 2,260 equates to approximately 753 new homes or about 150 new homes per year for each of the next five years.

STANDARD	DESIGN POP.	25% OF MDD (m^3)	15% OF ADD (m^3)	FIRE STORAGE (m^3)	TOTAL STORAGE (m^3)
A	4,800	1,080	324	970	2,374
B	5,800	1,088	391	970	2,449
C	6,350	1,190	286	970	2,446

MDD = Maximum Day Demand
ADD = Average Day Demand

Standard A: 900 litres per capita day maximum day demand; 450 litres per capita day average day demand; 135 litres per second for 2 hours fire flow.

Standard B: 750 litres per capita day maximum day demand; 450 litres per capita day average day demand; 135 litres per second for 2 hours fire flow.

Standard C: 750 litres per capita day maximum day demand; 300 litres per capita day average day demand; 135 litres per second for 2 hours fire flow.

It seems apparent, therefore, that although the need for a new reservoir is pressing, there is some lead time to prepare for its construction. Growth can be accommodated throughout the Town for at least three (3) to five (5) years prior to the requirement for the reservoir becoming critical. It should be remembered that the time frames presented herein are based on a steady growth rate of 10% and that if the growth rate slows, the need for the new reservoir will become less critical. For example, if the growth rate were to slow to an average rate of 5%, the existing reservoir could accommodate up to ten (10) years of growth.

It is also apparent that there are a number of options available to the Town of Blackfalds to achieve the goal of a new reservoir and booster station. These options include:

i) Construction of the reservoir, booster station and mains by the Town of Blackfalds with cost recovery from future developers. As the reservoir and booster station is to service a population of 10,000 to 12,000 it is estimated that costs can be recovered through off-site levies and oversize costs over the next twenty three (23) years (assuming a long term growth rate of 5%);

ii) Construction of the reservoir, booster station and mains by a private developer with cost recovery from other and future developers. It is assumed that the cost could be recovered at rates equal to the off-site levies indicated in the Town's current off-site levy by-laws. In this instance, private developers would not recover all of their investment and the time frame for recovery would be approximately twenty three (23) years (assuming a long term growth rate of 5%);

iii) Construction of a number of smaller individual reservoirs and booster stations by private developers and to a scale which will service their lands only;

iv) Construction of the required reservoir and booster station by private investors with cost recovery based on user fees applied to a lease or lease to own payment made by the Town of Blackfalds.

The Town of Blackfalds has already indicated that it will not undertake construction of the required reservoir and booster station. Further, it is unlikely that a private developer will undertake construction with no possibility of fully recovering his investment, made on behalf of others, in the foreseeable future (23 years).

To accommodate development within the plan area, and with regard to water servicing, it is proposed that:

i) Development proceed in the short term and that growth potential available prior to construction of future reservoirs and booster stations be divided equally between all developers within the Town or be allocated on a first come first serve basis.

ii) If private investors have not been secured prior to the new reservoir and booster station being required, the development in the plan area will proceed with the understanding that a "scaled down" reservoir will be constructed within the plan area to service only the plan area.

6.2 SANITARY SEWER SERVICE

The topography of the subject property requires that the design for sanitary sewer system include lift stations. Figure 6 - Proposed Sanitary Sewer System conceptually shows the proposed network of sanitary sewer mains and lift station locations.

The Panorama Estates plan area will be serviced by sanitary sewer mains which extend from three (3) locations. Gravity service can be extended from the 250mm (10") main constructed to the east boundary of Parkwood Estates in the Park Street right-of-way.

Lots in the northwest corner of the plan area, accessed by an extension of Panorama Drive, will be serviced by a gravity main which drains eastward to a small lift station which will pump sewage back to the west to the existing 200mm main locate at the east boundary of Parkwood Estates. This lift station may become redundant after a second lift station is constructed in a central location (refer to Figure 6 - Proposed Sanitary Sewer System and Figure 7 - Area Sanitary Sewers) to collect sewage from the N.E. 1/4 Sec. 26-39-27-4 and lots located in the central portion of the plan area. The centrally located lift station is to pump sewage to existing mains located in the South Street right-of-way. A force main would be constructed from the proposed centrally located lift station to the existing manhole and syphon in the South Street right-of-way and located immediately north of the sewage treatment lagoons.

A third lift station is proposed to collect sewage from planned lots located on the south side of the ridge characterizing the southern portion of the plan area. The planned lots south of the ridge would be serviced by gravity mains which would drain to a small lift station proposed for construction in the buffer Municipal Reserve paralleling South Street in the south west corner of the plan area. The small lift station serving this area would use the same force main as the centrally located lift station to convey sewage to the sewage treatment lagoons.

It is proposed to construct the force main in the South Street right-of-way to accommodate the additional flows which will result from development of lands to the north of the plan area (N.E. 1/4 Sec. 26-39-27-4). Existing gravity mains within the Parkwood Estates subdivision can adequately handle flows which are expected from the plan area but are not sized to accommodate flows from future development to the north of the plan area. Further, it is apparent that the trunk main constructed to collect sewage from Parkwood Estates, the plan area, future development to the north and the existing Townsite west of Highway 2A requires upgrading. It has been reported in the Town of Blackfalds Master Plan - Growth and Infrastructure study that this trunk main, from the Indiana Street/Parkwood Road intersection, requires upgrading. It is assumed that the upgrade will be completed to accommodate all of the existing Town development, a portion of the future development on the west side of Highway 2A plus the flow anticipated from the Townsite east of Highway 2A.

Three (3) lift stations are proposed to accommodate economical phased development and as a consequence of the topography which makes the area attractive for development.

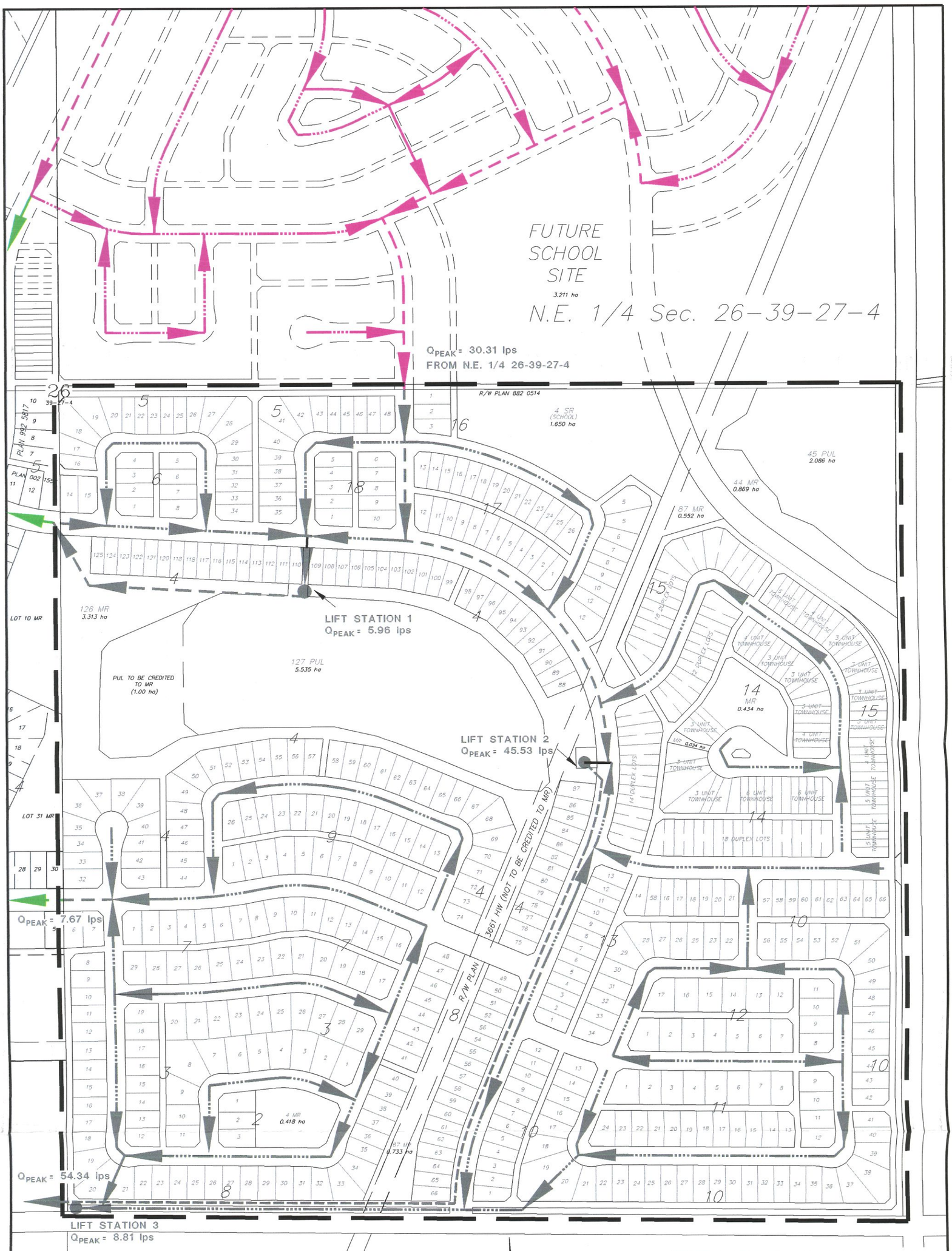

FIGURE 6

PLAN SHOWING

PROPOSED SANITARY SEWER SYSTEM

IN THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

LEGEND

- 200mm GRAVITY MAIN
- 250mm GRAVITY MAIN
- 300mm GRAVITY MAIN
- FORCE MAINS
- EXISTING MAINS
- LIFT STATION

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Servicing of the area using a single lift station in a central location may be possible but the depth of the mains required to service the N.E. 1/4 Sec. 26-39-27-4 and the lots south of the characteristic ridge in the south half of the property would be excessive (please refer to Figure 7A). As Phases 3 and 4, as shown in Figure 10, drain naturally to the south, a lift station is proposed on the south side of the characteristic ridge to lift sewage back to the centrally located lift station or to the siphon located on South Street. The third lift station (located in Phase 1B) is proposed as an economical means of servicing initial stages of developing without constructing the large expensive lift station which will be required to service the balance of the quarter section and the quarter section to the north (N.E. 1/4 Sec. 26-39-27-4).

It is also anticipated that a lift station will be required to service a portion of the lands in N.E. 1/4 Sec. 26-39-27-4. This lift station is required to accommodate sewage flows from, in particular, the north east portion of the quarter section. It should be noted that, if starting with an invert elevation of 9.25 metres below existing grade at the centrally located lift station in S.E. 26-39-27-4, mains constructed at minimum grade will be approximately 1.38 metres below existing ground at the lowest point in the north east portion of N.E. 26-39-27-4. It is also estimated that many of the mains which would be constructed to service the N.E. 26-39-27-4, and extending from the centrally located lift station in S.E. 26-39-27-4, would be constructed at depths of between seven (7) and thirteen (13) metres below existing ground elevations. Although it is possible to service all of the north quarter section with the centrally located lift station, it is probably economically infeasible. In addition, construction of mains at this depth may result in future maintenance problems for the Town.

The extent to which gravity sewer service can be extended from the centrally located lift station will be determined, in consultation with the Town, at the time of detailed design.

Existing sanitary sewer mains in the Parkwood Estates subdivision are of sufficient size to accommodate all flows which can be generated in the plan area. If development in only Panorama Estates (S.E. 1/4 26-39-27-4) was to be accommodated, sufficient capacity exists in the existing sanitary sewers, to the Indiana Street/Parkwood Road junction.

In order to accommodate flows from the N.E. 26-39-27-4, alternative routing of sanitary sewer systems must be considered. Existing sanitary sewer piping north of the Indiana Street/Parkwood Road junction is capable of conveying sewage flow from:

i) planned commercial development in the N.W. 26-39-27-4 (west of Highway 2A);
ii) planned residential development in the N.W. 26-39-27-4 (west of Highway 2A);
iii) future residential development in the N.E. 26-39-27-4 to approximately 150 lots (total flow, including infiltration and peak dry weather flows of about 15 litres per second);
iv) future residential development in the S.E. 26-39-27-4 along the extension of Panorama Drive and to the intersection with the north/south collector which will provide access to the N.E. 26-39-27-4 (total flow, including infiltration and peak dry weather flows of about 6 litres per second);

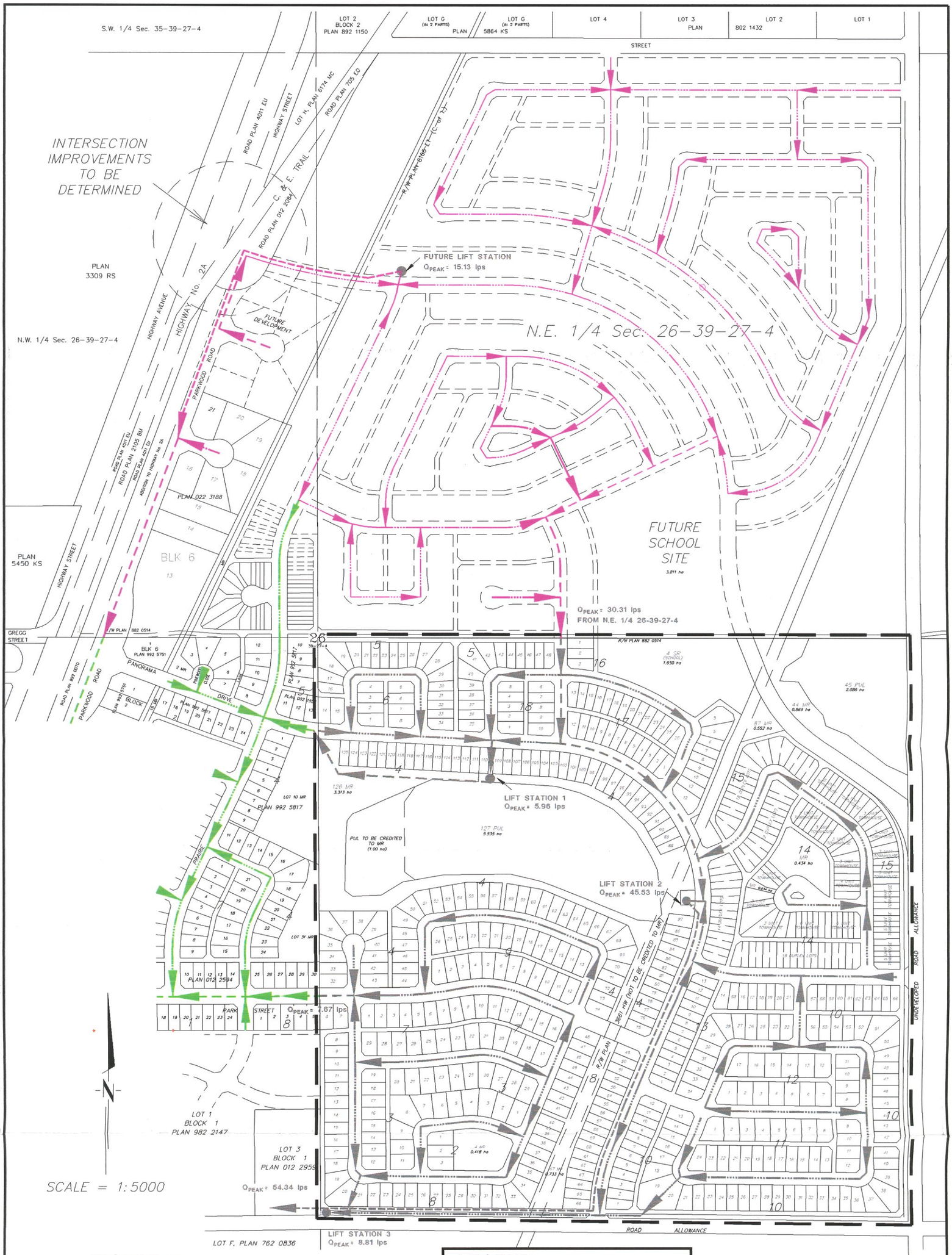

FIGURE 7

PLAN SHOWING

AREA SANITARY SEWERS

IN THE

E. 1/2 26-39-27-4

BLACKFALDS, ALBERTA

LEGEND

- 200mm GRAVITY MAIN
- 250mm GRAVITY MAIN
- 300mm GRAVITY MAIN
- FORCE MAINS
- EXISTING MAINS
- LIFT STATION

NOTES:

- Distances shown are in metres.
- Area dealt with is bounded thus and contains 64.9 ha (160 Ac.)

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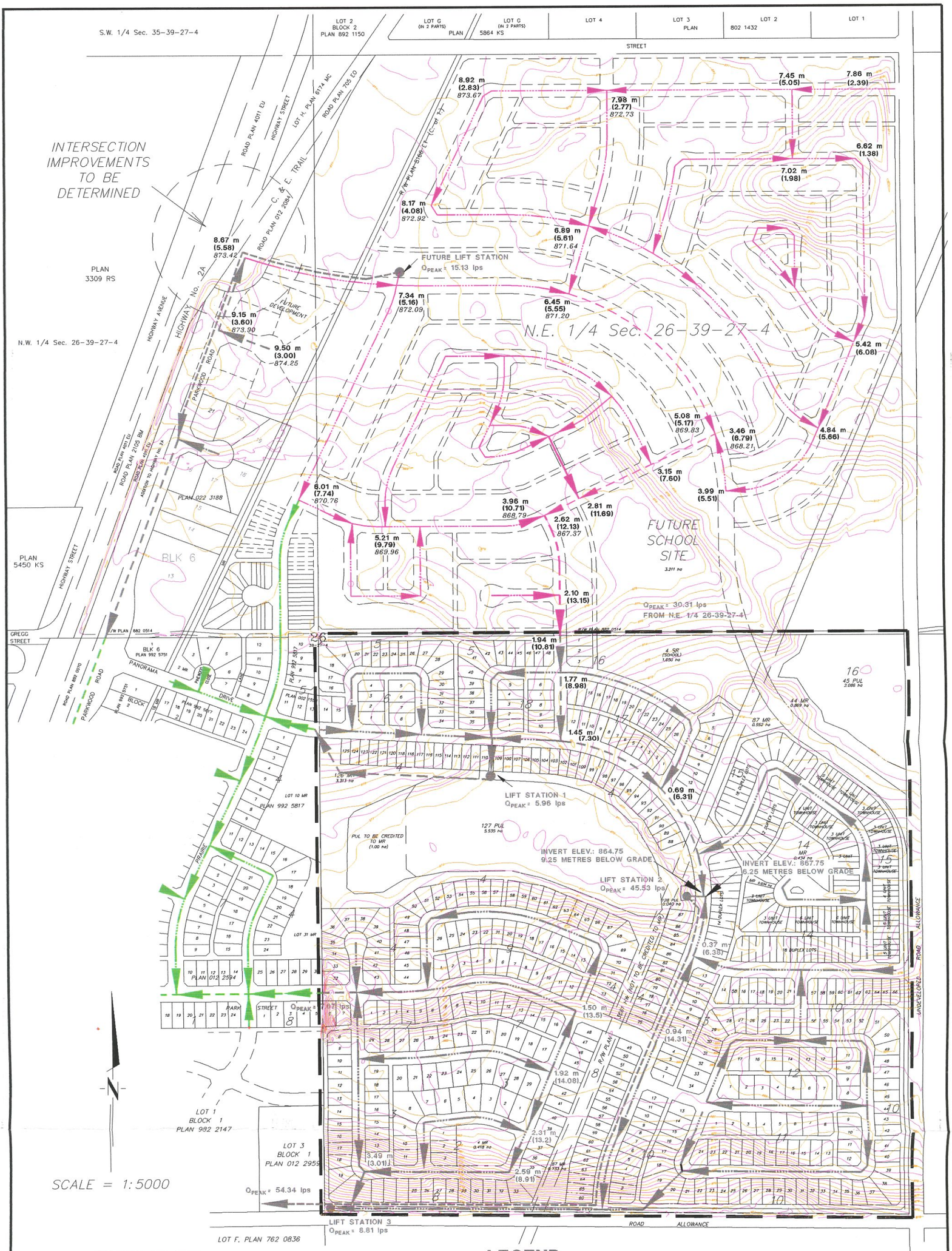

FIGURE 7A

PLAN SHOWING

SANITARY SEWER ELEVATIONS

IN THE

E. 1/2 26-39-27-4

BLACKFALDS, ALBERTA

LEGEND

- 200mm GRAVITY MAIN
- 250mm GRAVITY MAIN
- 300mm GRAVITY MAIN
- FORCE MAINS
- EXISTING MAINS
- LIFT STATION

3.96 m HEIGHT ABOVE LIFT STATION INVERT
(10.71) ESTIMATED DEPTH BELOW EXISTING GRADE
868.79 ESTIMATED INVERT ELEVATION

WESTMAN ENGINEERING Ltd.
RED DEER, ALBERTA

v) future residential development in the S.E. 26-39-27-4 along the extension of Park Street and to the intersection of the north/south extension of Panorama Drive which will serve as the main collector road for the area (total flow including infiltration and peak dry weather flows of about 7.7 litres per second).

Sewage flow from the balance of the N.E. 26-39-27-4 and the plan area (S.E. 26-39-27-4) must be directed to a lift station located centrally in the plan area or, where development is located south of the east/west ridge bisecting the plan area, to a lift station to be constructed in the Municipal Reserve buffer along the South Street right-of-way. Sewage collected in the centrally located lift station must be directed through future force mains to be constructed in the South Street right-of-way. Preliminary calculation of design flows for these areas can be summarized as follows:

i) total flow from the balance of N.E. 26-39-27-4 (including infiltration and peak dry weather flows) is about 30.5 litres per second;

ii) total flow from the balance of the plan area (S.E. 26-39-27-4), including infiltration and peak dry weather flows, is about 15 litres per second.

It should also be noted that a third lift station will be required on South Street to lift sewage from residential lots located on the south side of the east/west ridge. The South Street force main will be required as soon either of the proposed lift stations are required to service the plan area.

It is anticipated that the lift station required to accommodate flows from the N.E. 26-39-27-4 and the sanitary sewer force main from the lift station to the existing gravity main and syphon will be subject to a cost sharing arrangement between the developers of the lands in S.E. 26-39-27-4 and developers of lands in the N.E. 26-39-27-4.

Formulas allocating cost to the respective land owners would be calculated on a proportional basis, using the respective flow rates to calculate the respective proportions. As a result, the cost proportions could be calculated as:

i)	Centrally located lift station:	66% N.E. 26-39-27-4
		34% S.E. 26-39-27-4
ii)	Force main:	66% N.E. 26-39-27-4
		34% S.E. 26-39-27-4

Contributory flow rates for the various system components described herein were calculated using City of Red Deer design guideline parameters. As a result, an infiltration rate of 0.2 litres per second per hectare and an average per capita contribution rate of 320 litres per person per day was used.

Infiltration rates equal to the design rate used may not be realized. Further, the per capita contribution rate used in determining the design flow rates for the various components is higher than the reported water consumption rate.

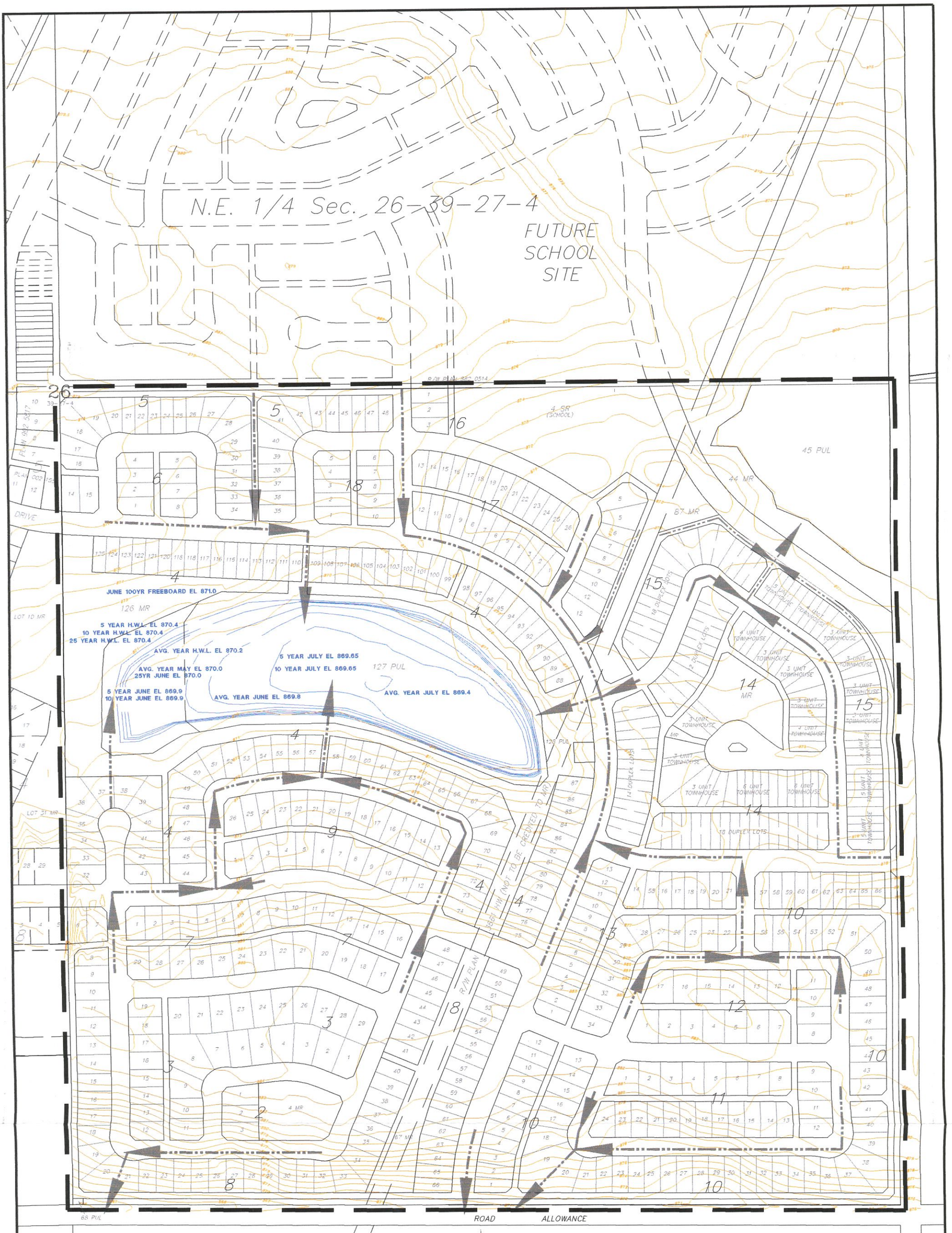

FIGURE 8

PLAN SHOWING

PROPOSED STORM SEWER SYSTEM

IN THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

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RED DEER, ALBERTA

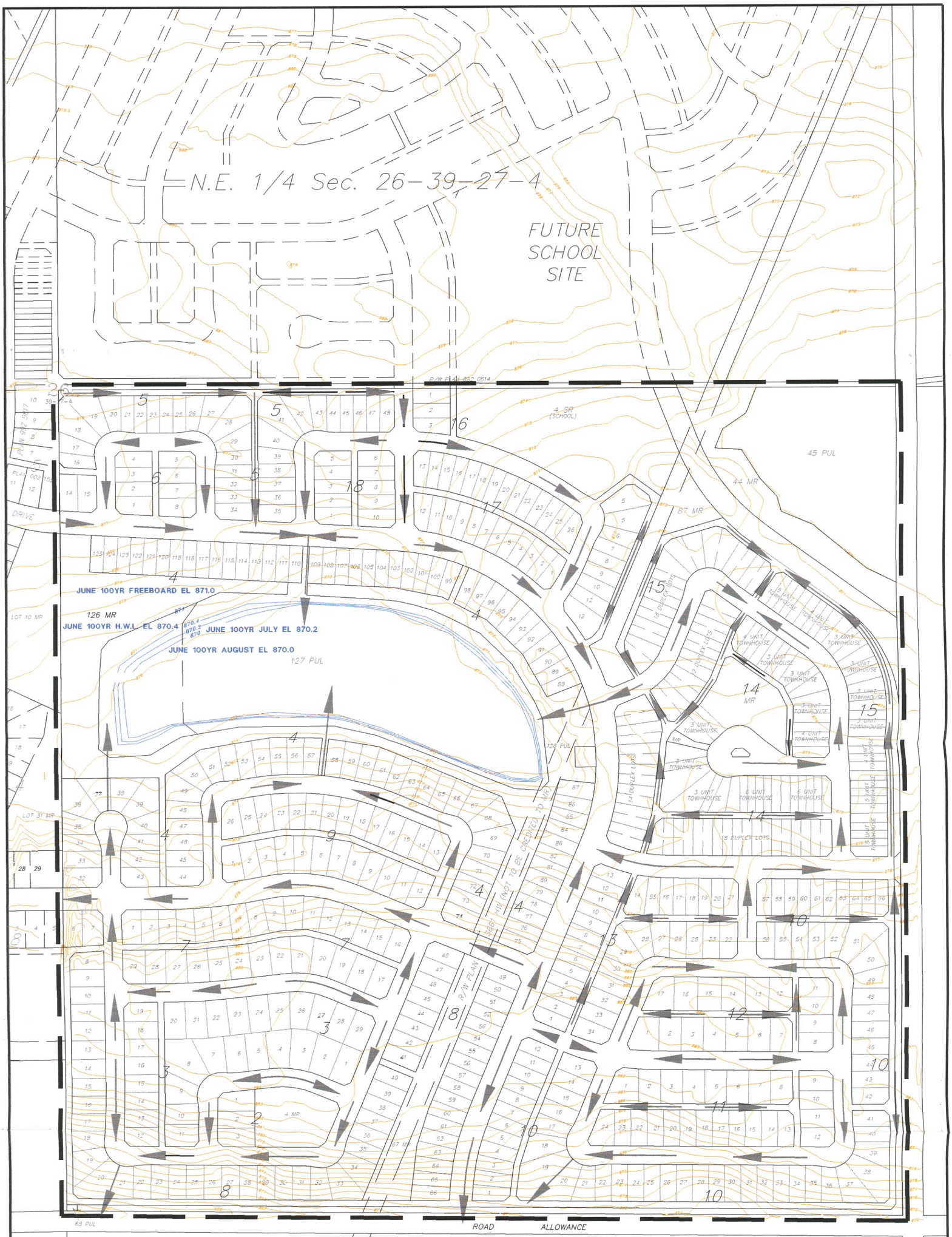

FIGURE 9

PLAN SHOWING

PROPOSED OVERLAND DRAINAGE

IN THE

S.E. 1/4 26-39-27-4

BLACKFALDS, ALBERTA

SCALE = 1:3500

WM ENGINEERING Ltd.
RED DEER, ALBERTA

It is reasonable to assume that the actual contributory rate will not approach the design rate and therefore, actual flows will be less than the design flows. Design flows were estimated based on an assumed population density calculated using 3.0 people per residence. Flows from N.E. 26-39-27-4 were calculated using a population density equal to that in the S.E. 26-39-27-4.

6.3 STORM WATER MANAGEMENT

Pre development and post development drainage models were prepared for the development area. Detailed calculations are presented in the Appendix.

The development area is characterized by low areas which act as storage basins in the Pre Development condition. There are a total of five (5) existing low areas. The majority of the development area sheds to these low areas with the exception of the extreme south portion of the property. The south portion of the plan area drains directly to road ditches along South Street.

In the post development condition the development area is divided into five(5) drainage basins. Three (3) of the five drainage basins drain to low areas that existed in the pre development condition. It is proposed to use two (2) of the existing low areas as storm water management facilities. These areas would be maintained in a natural state, or undergo disturbance during construction and be restored to a near natural state, and operate as evaporation/ infiltration ponds. Storm water run off from the extreme south portion of the property (south of the ridge bisecting the lands) will drain to the South Street road ditches. It is proposed to control flow in the South Street road ditches to ensure pre-development rates are not exceeded. Consequently, the South Street road ditches would be utilized as storage areas.

The evaporation / infiltration ponds are sized to accommodate all run off (snow melt and rainfall) which may accumulate throughout the year. Accumulated run off will dissipate through evaporation, transpiration and infiltration. In addition, it is proposed that each pond will have additional excess capacity so that it will theoretically contain the run off from a 1:100 year event.

As the majority of the run off from the development area drains to localized low areas on site, water generated by snow melt and storm events is now dissipated by evaporation, transpiration and infiltration. Calculations enclosed in the Appendix show that in the post development condition the same water generated by snow melt and storm events will be dissipated by evaporation, transpiration and infiltration.

The centrally located storm water management facility (Lot 127 PUL) has been designed to dissipate collected water through evaporation and infiltration. As a result, water levels in the facility will vary seasonally.

The approximate extent of coverage by water has been shown in Figure 9 given an average year of snow melt and an extreme rainfall event (1:100 year) in the month of June. Figure 8 includes approximated coverage given the 5 year, 10 year and 25 year rainfall event in April, with average snow melt, and the coverage in June and July assuming various storm frequency events. As shown, the area of the PUL lot has been established in an effort to accommodate the extreme event and therefore, much of the PUL lot is usable during most of the year.

6.4 POWER, TELEPHONE AND CABLE VISION

In general, it is anticipated that power, telephone and cable television service will be extended to the plan area from service terminations left at the east boundary of Park Street and Panorama Drive. The developer of the plan area will enter into service agreements and contracts with the respective service suppliers and will be responsible for design and construction of the required facilities.

6.5 NATURAL GAS

Natural gas service will be extended to the plan area from existing mains left at the termination points of Park Street and Panorama Drive. The site is servicable from existing facilities located adjacent to or near the plan area.

7.0 STAGING

Figure 10 depicts the proposed staging plan for the development. The location of existing utilities in large part dictates the initial stages of development. Market conditions and servicing strategies will influence the sequencing of subsequent phases.