Town of Milk River

Infrastructure Master Plan

1440-029-00

January 2007

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Town of Milk River
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240 Main Street NE
Milk River, AB
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January 12th, 2007
File: 14\40\029\R01

Attention: Chief Administrative Officer

Dear Sir/Madame:

Re: Town of Milk River
Infrastructure Master Plan

We are pleased to submit ten (10) final copies of the above noted study. We have incorporated all modifications to the study as per the last project meeting.

We appreciate the opportunity to complete this most important study and look forward to assisting you in implementing your short, medium, and long term priorities.

Yours truly,

MPE ENGINEERING LTD.

Peter Brouwer, P.Eng.
Project Manager

JS:mw

Acknowledgements

The assistance of Mr. Travis Peter, Chief Administrative Officer, and Mr. Larry Liebelt, Town Foreman, is appreciated and gratefully acknowledged.

Abstract

The Infrastructure Master Plan provides an assessment of the four major infrastructure elements: roads; water supply, treatment and distribution; sewage collection and treatment; and storm water management. Upgrades and improvements have been recommended and preliminary cost estimates prepared in association with the proposed construction works.

The existing road network, including curb and gutters and sidewalks was analysed and required repairs and improvements were identified. The requirements range from crack sealant maintenance to significant repairs of the road structure. Some of the required repair work can be completed in conjunction with other infrastructure projects in order to make the most efficient use of funds.

The current water supply and treatment is providing high quality potable water. Recommended upgrades to the current system will allow for the Town to meet the new *2006 AENV Standards & Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems* with respect to cryptosporidium. The upgrades will also allow for better operational control and redundancy in the system. The Town's distribution system functions relatively well and maintains adequate pressures during various demands for the current and long term scenarios. However, the system is not equipped to deliver proper fire flows and lacks redundant looping. These issues are addressed with various water main upgrades and new construction.

The sewage collection and treatment system can handle the current dry weather flow; however the system experiences high amounts of inflow/infiltration during wet weather conditions which cause several manholes to surcharge. Upgrades for the sewage collection system are presented which include various piping and lift station upgrades. The sewage treatment system has adequate capacity to handle the existing sewage but is nearing capacity and an increase in storage volume is required in approximately five years.

The Town generally relies on surface drainage for storm water management through the use of curb and gutters, swales and ditches. The Town has a rudimentary underground storm drainage system which runs south along the lane east of Main Street, from 5th Avenue North to 1st Avenue South. The storm management system is relatively effective and only minor issues of local ponding have been reported. The requirement for storm retention ponds to store and release runoff water from new developments is also discussed and preliminary locations identified.

The Capital Plan identifies and prioritizes the required infrastructure improvements along with their respective costs. The Capital Plan shows that the total infrastructure commitment by the Town amounts to $13.360 million, of which approximately $6.225 million may be offset with provincial grants and funding and the remaining $7.135 million will need to be funded through the Town's regular budget process.

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1.0 Introduction

1.1 Purpose

The Town of Milk River retained MPE Engineering Ltd. to complete an evaluation of the infrastructure currently owned and maintained by the Town, with a view to identifying deficiencies and developing plans for any required upgrades. Further, the evaluation was to consider potential growth of the community and the resulting impacts on infrastructure. It is the Town's intention to make application to Alberta Infrastructure and Transportation under the Alberta Municipal Infrastructure Program for funding support of upgrades that are described in this report.

1.2 Scope of Work

The various tasks addressed herein include:

- Evaluation of the major infrastructure systems, including: roads; water supply, treatment and distribution; sewage collection and treatment; and storm water management,
- Identification of deficiencies, both current and projected, in each of the infrastructure systems,
- Develop upgrade strategies to address the deficiencies, including timelines for implementation,
- Prepare cost estimates for the proposed upgrades,
- Prepare an overall plan for the Town's to address all major infrastructure issues over the 20-year planning horizon.

In addition to these main study tasks, each component of the evaluation has its individual specific tasks, which are addressed in each section of the report. Appendix A contains the terms of reference for each component of the evaluation.

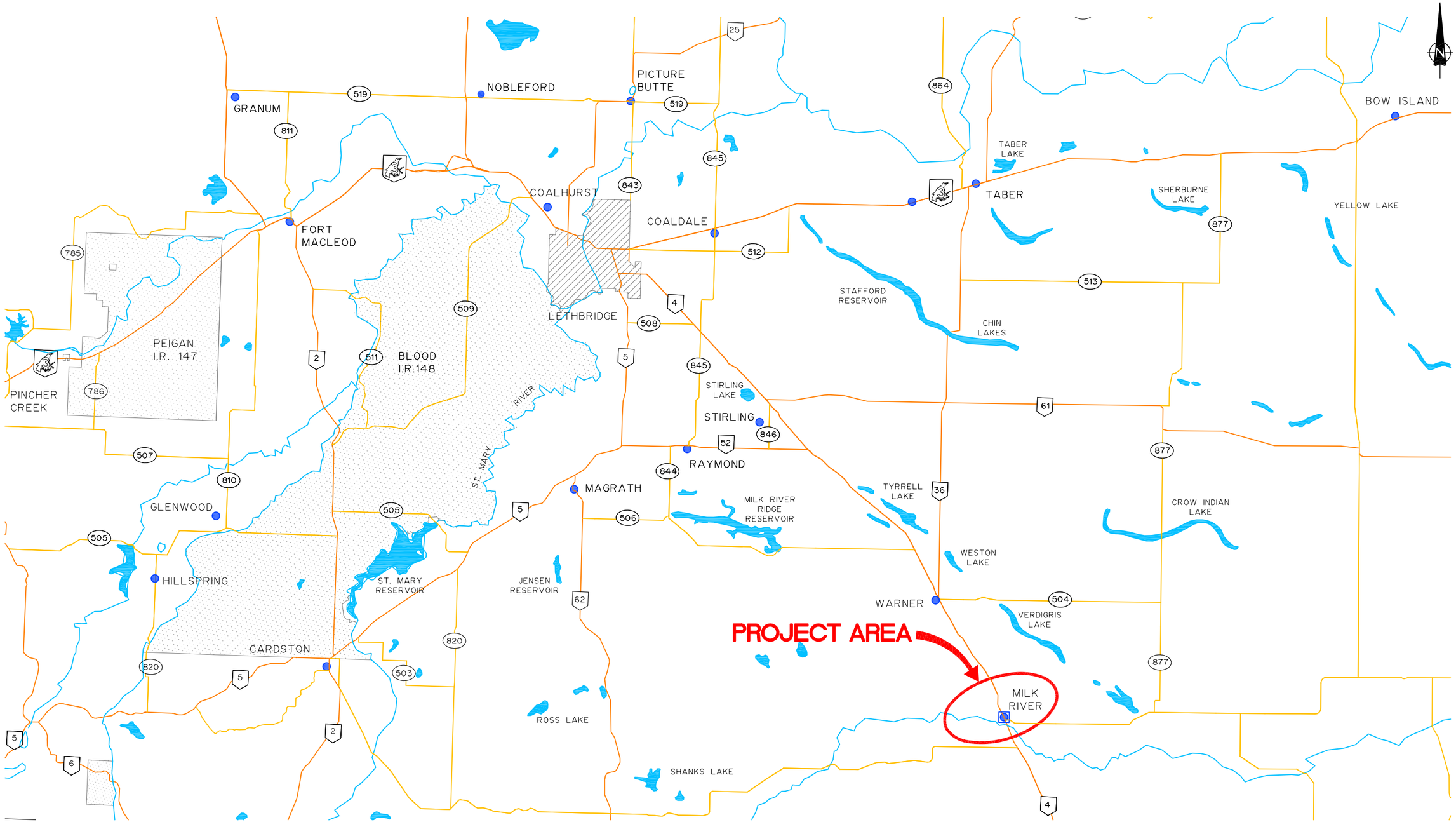
1.3 Study Area

Figure 1.1 is a location plan showing the Town of Milk River in relation to other communities in southern Alberta. Figure 1.2 illustrates the study area included in the infrastructure evaluation. The study area includes all lands within the Town of Milk River boundary and also outlines the areas of possible future development and expected population densities.

1.4 Site Investigations

As an integral part of this study, a number of site visits were undertaken by MPE personnel. The site visits, with Town personnel, were conducted to familiarize ourselves with existing infrastructure and issues associated. The site visits were used to gather documents from the Town for reference and input to the evaluations.

Selected topographic surveys were undertaken of key infrastructure components, particularly with reference to the gravity fed distribution zone, sanitary sewer collection system and storm runoff drainage patterns. Additional geo-referenced information was made available by the Oldman River Regional Services Commission (ORRSC).



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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
LOCATION PLAN

SCALE: 1:500 000	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 1.1

LEGEND

TOWN BOUNDARY

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Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
STUDY AREA

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 1.2

2.0 Background

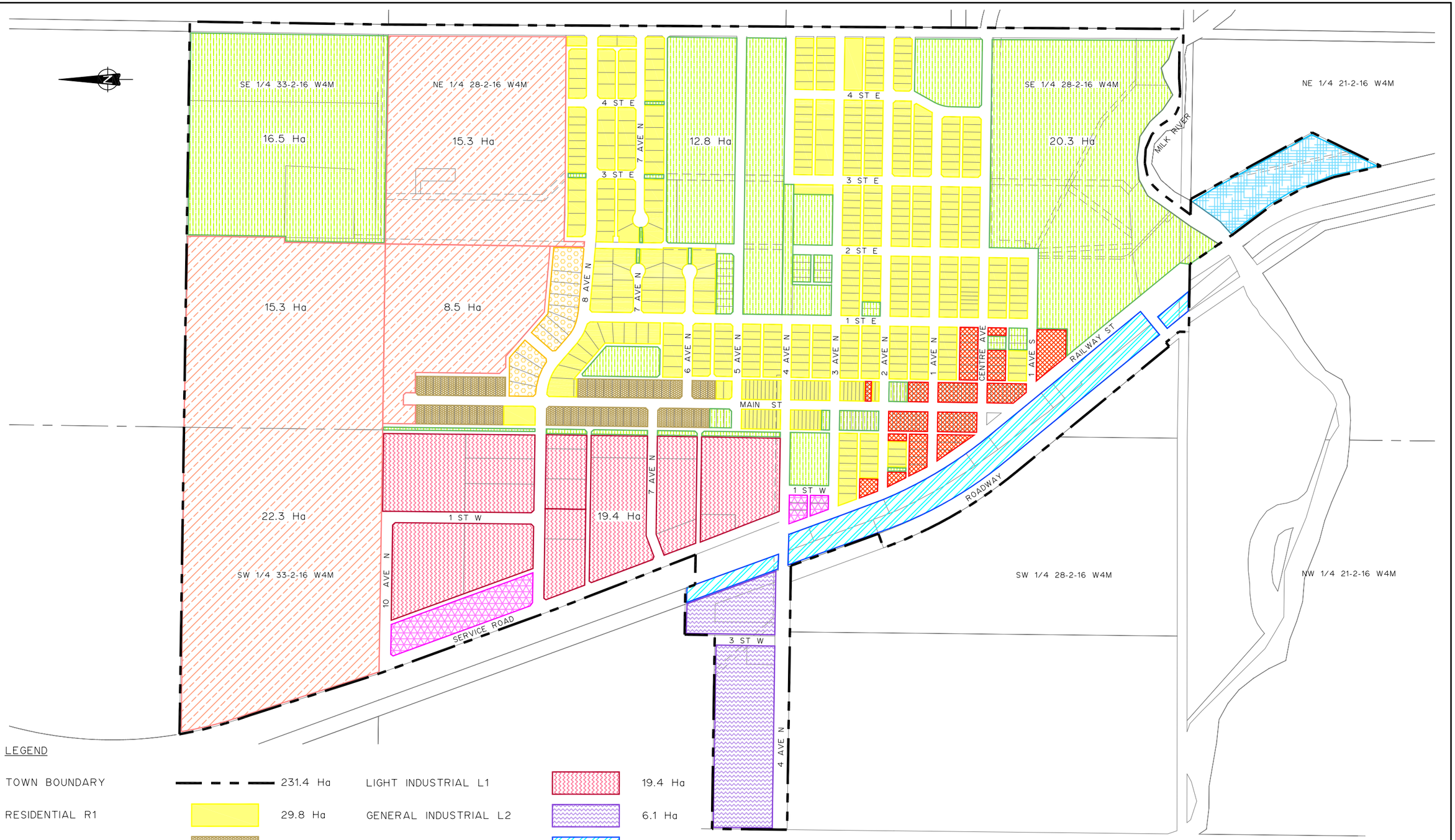
2.1 General Description

The Town of Milk River is a community located 85 kilometres south of Lethbridge along Highway 2. Milk River's current population is approximately 925 people.

2.2 Land Use

The Town of Milk River's current boundary contains a total land area of 231.4 hectares (572 acres). The majority of the land area is designated for residential use. However, along both sides of Highway 2, there is approximately 25.5 hectares of land designated for industrial land use. The Town also has 5.5 hectares of land designated for commercial use. Much of this is located in downtown area of Milk River. Land where schools, swimming pools, arenas, the water treatment plant, the library, and other public buildings are situated has been designated as public and institutional. Approximately 52.9 hectares have been appropriated as this designation. The remaining land within the Town's boundary is zoned as urban reserve. This land has been identified for possible future residential, commercial, and industrial development. There is approximately 61.4 hectares classified as urban reserve and is located mainly in the north and northwest portion of Town. Of the 61.4 hectares, 15.3 hectares of urban reserve located directly south of the water treatment plant contains a de-commissioned sanitary landfill. It is expected that this land will not be able to be developed as residential, commercial, or industrial areas for many years to come.

Although there is a large amount of undeveloped land within the boundaries of the Town, there has been some discussion of annexing land on the east of Milk River. There is also discussion of returning land on the west side of the existing Highway 2 back to the County of Warner. The purpose of returning land west of Highway 3 is that currently it is zoned general industrial with no tax base. The idea of annexing land on the east of Town is for possible future development. Currently the Town owns the land to the east. Figure 2.1 shows the various current land uses in Milk River.



LEGEND

TOWN BOUNDARY	231.4 Ha		LIGHT INDUSTRIAL L1		19.4 Ha
RESIDENTIAL R1	29.8 Ha		GENERAL INDUSTRIAL L2		6.1 Ha
MOBILE HOME RESIDENTIAL R2	3.5 Ha		RAILWAY RY		6.1 Ha
LARGE LOT RESIDENTIAL R3	1.9 Ha		PUBLIC AND INSTITUTIONAL PI		52.9 Ha
CENTRAL COMMERCIAL C1	3.3 Ha		URBAN RESERVE UR		61.4 Ha
DRIVE-IN COMMERCIAL C2	2.2 Ha		DIRECT CONTROL DC		2.6 Ha

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
CURRENT LAND USE

SCALE: 1:7500 | DATE: DECEMBER 2006 | JOB: 1440-029-00 | FIGURE: 2.1

2.3 Population Growth and Projections

Historic population figures were obtained from Statistics Canada and population projections were provided by ORRSC. Due to the fact that the population has decreased between 1996 and 2001, the population projection as provided by ORRSC has predicted negative growth over the next twenty years. Statistical information for Milk River is located in Appendix B.

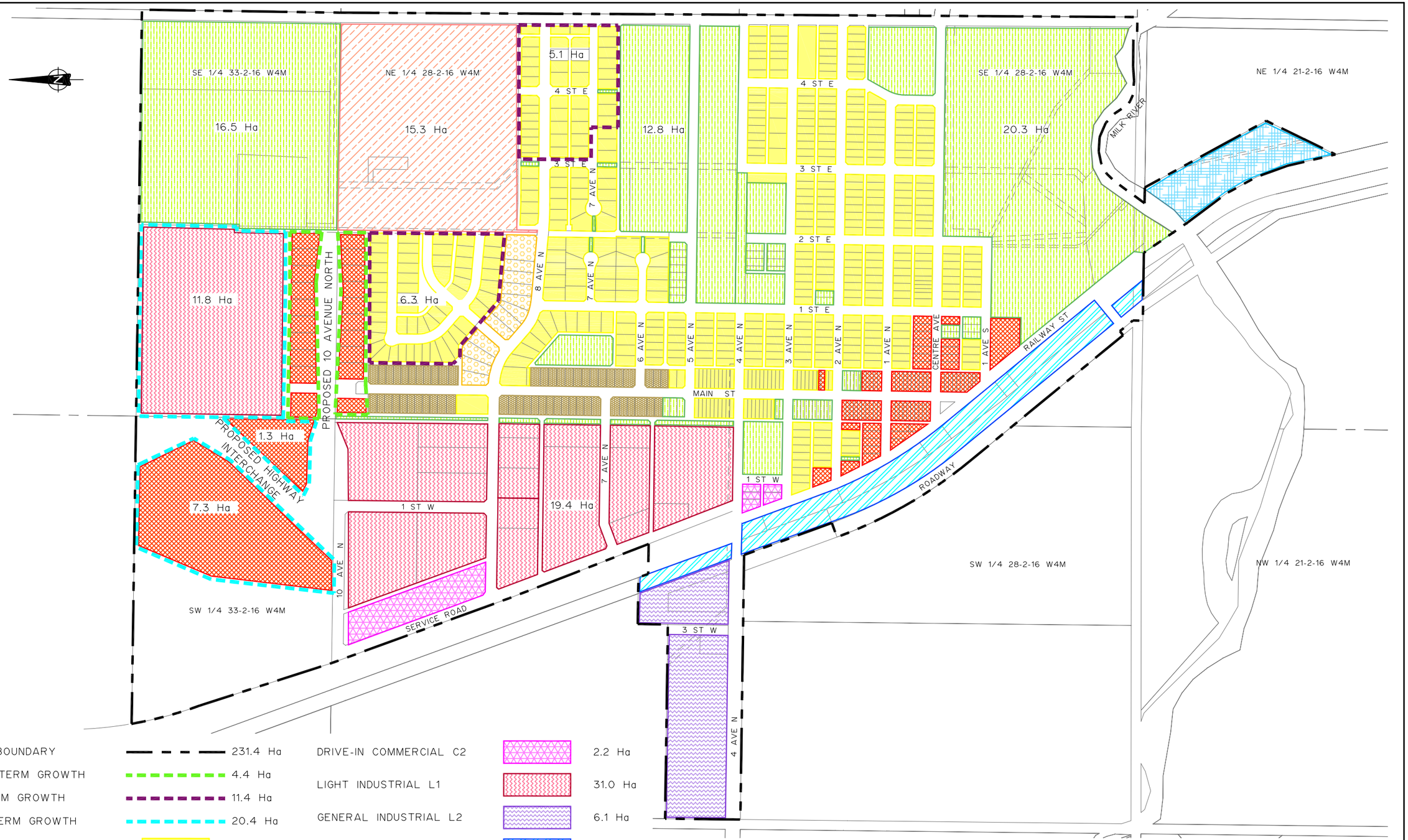
Since many factors can be involved in the growth of a smaller community, it is somewhat difficult to predict what the growth will be from census to census. For instance, Milk River has found itself growing as of late as many farmers from the surrounding have been retiring in Milk River. Due to these factors, a modest growth rate of 1% is used to project future populations. These projections are used throughout this infrastructure study.

The current (2006) population used in subsequent analysis and discussion is assumed to be 924 people. The population projected for the year 2026 is 1,127 people. Table 2.3 includes historic and projected populations for Milk River.

Table 2.3 - Milk River Population Projections

	Growth Rate Projection	Historical Population							
Town	%/yr	1991	1996	2001	2006	2011	2016	2021	2026
Milk River	1.00%	926	929	879	924	971	1,020	1,073	1,127

In assigning projected population to proposed development areas, assumptions were made with respect to population density. For typical urban residential development, a value of 30 people per hectare was adopted for planning and analysis. A density of 15 people per hectare is used for commercial/industrial and a density of 20 people per hectare is used for large lot residential developments. Future development includes the filling of 43 remaining residential lots in a subdivision on the east side of Town, a new large lot residential subdivision with 50 lots on the north side of Town, a commercial development on 10 Ave North, and zoning for light industrial on the northern limits of Milk River. Figure 2.2 illustrates areas within the Town of Milk River slated for new development.



LEGEND

TOWN BOUNDARY	231.4 Ha		DRIVE-IN COMMERCIAL C2		2.2 Ha
SHORT-TERM GROWTH	4.4 Ha		LIGHT INDUSTRIAL L1		31.0 Ha
MID-TERM GROWTH	11.4 Ha		GENERAL INDUSTRIAL L2		6.1 Ha
LONG-TERM GROWTH	20.4 Ha		RAILWAY RY		6.1 Ha
RESIDENTIAL R1	36.1 Ha		PUBLIC AND INSTITUTIONAL PI		52.9 Ha
MOBILE HOME RESIDENTIAL R2	3.5 Ha		URBAN RESERVE UR		15.3 Ha
LARGE LOT RESIDENTIAL R3	1.9 Ha		DIRECT CONTROL DC		2.6 Ha
CENTRAL COMMERCIAL C1	16.3 Ha				

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
FUTURE LAND USE

SCALE: 1:7500 | DATE: DECEMBER 2006 | JOB: 1440-029-00 | FIGURE: 2.2

3.0 Roads

3.1 Existing Road Network

The Town of Milk River road network consists of an arrangement of local and collector, undivided urban roadways. The road network was developed in a grid pattern with roads running primarily north-south and east-west. The local road network also utilizes a series of cul-de-sacs which have been incorporated into the zoning scheme. A network of lanes allows residential access to the rear of properties. The town is primarily accessed from Highway 4 on the west and from Highway 501 on the east. The main accesses on Highway 4 are 8th Avenue N. in the north and Centre Avenue in the south. At the southeast corner of the town limits Highway 501 transitions into Centre Avenue. The primary north-south collector roads are Main Street and 1st Street E. The primary east-west collector roads are 8th Avenue N., 3rd Avenue N. and Centre Avenue. Land use adjacent to the town boundary is of an agricultural setting and the outlying road network generally consists of a series of rural, local undivided gravel roadways. The urban road development of the town incorporates the original township-section road allowance layout typical of the Alberta Legal Land Survey.

3.2 Purpose and Scope

The purpose of this evaluation was to gather the following existing road information:

- Geometrical alignment data (legal survey drawings, record drawings and air photos).
- Summarize as-built data (dates constructed/repaired, road widths, curb/gutter/sidewalk types, road structural data, and road lengths).
- Conduct field inspections to identify and outline extent of required road repair/upgrading work.
- Establish a road condition rating system and rate the condition of each road.
- Make recommendations for repairs and enhancement work.

- Prepare cost estimates for the recommended work.
- Prioritize the required repair and enhancement work.

The Town of Milk River is in the process of integrating town infrastructure data into the Municipal Infrastructure Management System (MIMS). It is expected that the Town will be able to incorporate much of the roads information gathered here into their MIMS.

3.3 Field Work

The field work for this evaluation was carried out during October 2006. The scope of the field evaluation was to:

- Complete a visual inspection of the existing roadways.
- Locate and document existing road problems.
- Quantify required repair and enhancement work.
- Field measure and confirm as-built data obtained from the record drawings.

3.4 Existing Roadway Structural Data

The majority of the roads within the town boundary are paved with hot mix asphalt, with the exception of three sections of the road system that have either gravel or cold milled asphalt surfaces. Town record drawings and recent road repair work revealed the following general pavement structures:

1) Paved road constructed prior to 1990:
   - 65mm to 100mm of hot mix asphalt concrete.
   - 100mm to 200 mm of granular materials.
2) Paved roads constructed after 1990:

- 80mm of hot mix asphalt concrete.
- 250 mm to 300 mm of granular material.
- Prepared subgrade.

3) Asphalt Overlays:

- 50mm hot mix asphalt overlay - 1981
- 75mm hot mix asphalt overlay - 1996

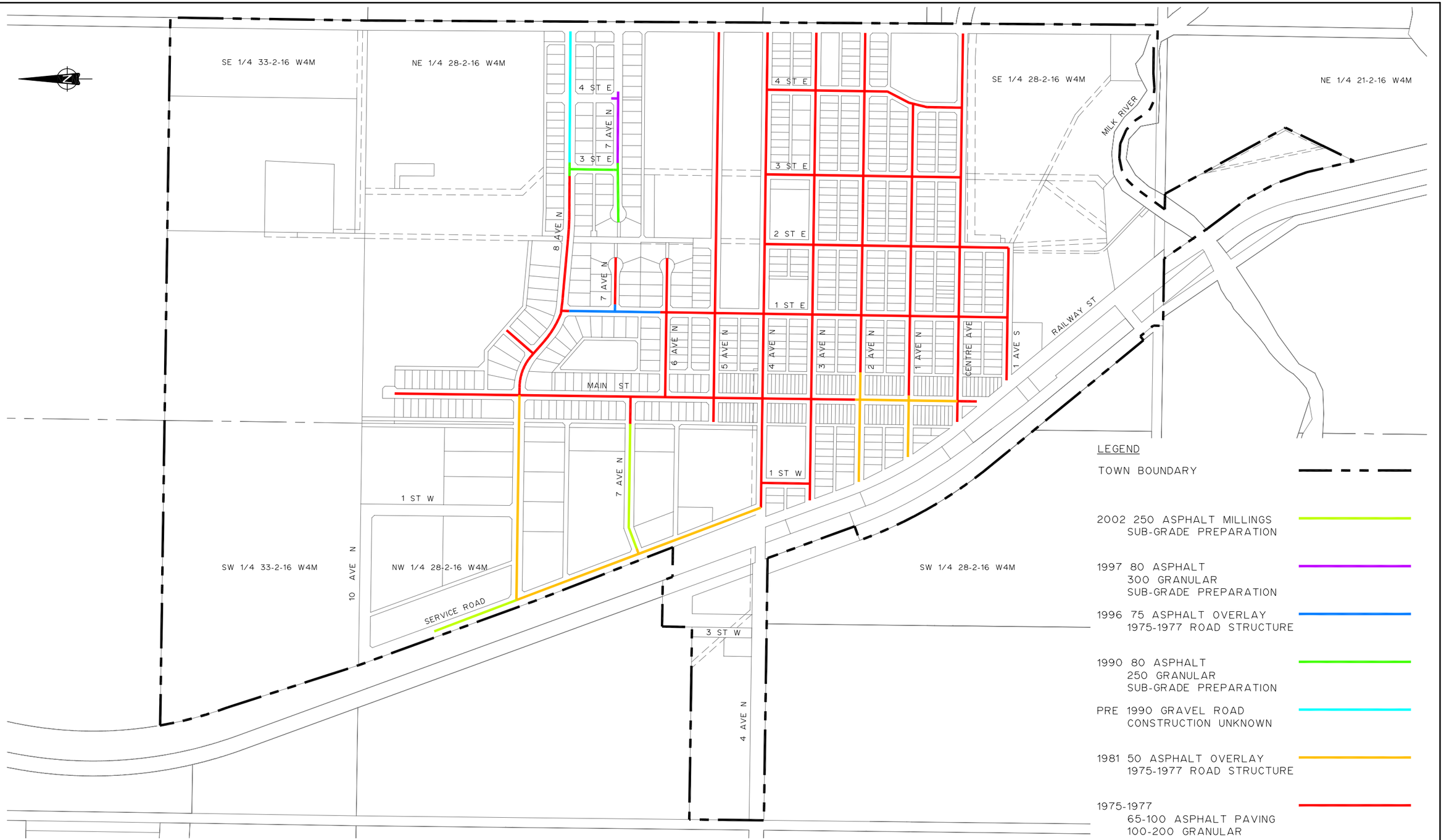
In 2002, two section of road were constructed with 250mm of cold mill asphalt on a prepared subgrade. The sections of cold milled asphalt road are located on 7th Avenue N. between the highway service road and Main Street and the highway service road north of 8th Avenue N.

The only gravel road in the Milk River road system is located on 8th Avenue N. between 3rd Street E. and the town boundary to the east. The gravel road was constructed prior to 1990 and its structural section is unknown.

The available existing road structural data has been outlined and presented in Figure 3.1. General assumptions were made for the pre 1990 road structural data since there was limited record information available. Further testing will be necessary to determine the actual road structure for road constructed prior to 1990.

3.4.1 Construction and Repair History

The date of road construction and enhancement work for each section of roadway has been noted in Figure 3.1. The original construction completion dates are unknown for roads constructed prior to 1990 and further research would be required to determine the exact date of road construction\repair\enhancement work.



NOTES:

1. HISTORICAL INFORMATION FOR ROAD INFRASTRUCTURE IS LIMITED. THE INFORMATION SHOWN IS COMPILED FROM LIMITED RECORD INFORMATION AND APPROXIMATE DATES PROVIDED BY THE TOWN FOREMAN.

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Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD CONSTRUCTION HISTORY

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 3.1

3.4.2 Existing Roadway Alignment Data

The existing roadway horizontal alignment data was initially obtained from ORRSC in the form of cadastral base maps and air photos. This data was then confirmed in the field. All road lengths have been measured from intersection to intersection. There are no road horizontal geometrical alignment deficiencies to note at this time.

3.4.3 Existing Roadway Cross Sectional Data

The compiled roadway data revealed varying road widths and several different types of curb & gutter and sidewalks can be found throughout the town. Generally, most paved roads have curb & gutter and/or monolithic sidewalk which serve to define the town's drainage. Several sections of the road system utilize an open ditch drainage system alongside of the roadway instead of curb & gutter or monolithic sidewalk. A curb & gutter and separate sidewalk or monolithic sidewalk systems are typical found in the roadways south of 6th Avenue N. The roadways north of 6th Avenue N. typically have curb & gutter system with no sidewalks.

Several types and sizes of curb & gutter and sidewalks structures were noted through out the Town. The following concrete structures were encountered:

1) Curb & gutter types:

- rolled curb & gutter – regular and low profile – 0.6m wide
- standard curb & gutter - 0.5m wide
- concrete swales – 0.6m to 1.0m wide

2) Sidewalk types:

- standard curb monolithic sidewalk – 1.5m to 2.4m wide
- rolled curb monolithic sidewalk – 1.2m to 2.2m wide
- separate sidewalk – 1.2m wide

Details of the different roadway cross sectional elements are noted in the Road Component Evaluation spreadsheet found in Appendix C.

3.4.4 Field Measurement, Evaluation and Overall Rating of Roadway Components

All roadway components (roads, curb & gutters, swales and sidewalks) were identified, field measured and evaluated on a block basis. The measurements and evaluations were used to determine an overall rating for each of the roadway components found on each block.

Field measurements and evaluations notes for the curb & gutter and sidewalk components are detailed on letter size "Road Evaluation" drawings prepared for each block. The drawings can be found in Appendix C.

The different roadway components were evaluated on a condition scale of 1 to 5, with a rating of 1 being the best and 5 being the worse. The evaluation rating and condition description employed were: 1 - sound physical condition; 2 - acceptable physical condition; 3 - deterioration evident; 4 - short term failure; 5 - failure imminent.

The curb & gutters, swales, and sidewalks components on each block received an overall condition rating of either: good, fair or poor. A good condition rating indicated less than 15% of the total quantity of roadway component had an evaluation rating of 3, 4 and 5. A fair condition rating indicated more than 15%, but less than 40% of the total quantity of roadway component had an evaluation rating of 3, 4 and 5. A poor condition rating indicated more than 40% of the total quantity of roadway component had an evaluation rating of 3, 4 and 5.

The road component on each block received an overall condition rating of either: good, fair or poor. A good condition rating indicates the road was evaluated at a 1 or 2, a fair condition rating indicates the road was evaluated at a 3 and a poor condition rating indicates the road was evaluated at a 4 or 5.

Refer to Appendix C for the measurement, evaluation rating and overall rating details of the various roadway components that have been compiled in a Road Evaluation Spreadsheet.

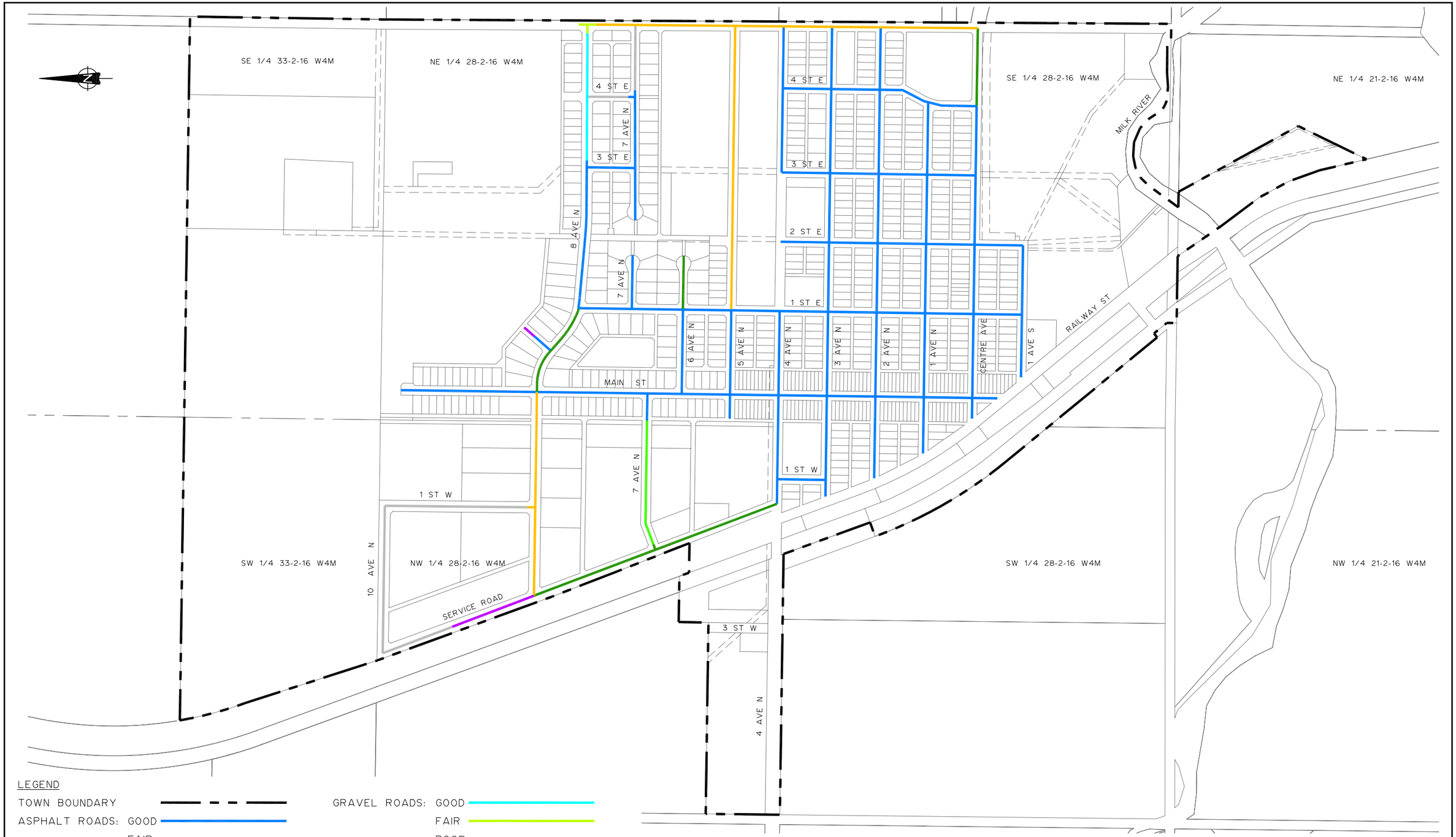
3.5 Summary of Evaluation Comments

The roadway inspection and evaluation revealed that the majority of the roadway components are in relatively good condition requiring some repair work in the mid to long term, however a minor portion of the roadway components require repair work in the short term. Much of the repair work identified in the evaluation can be attributed to the age of the existing roadway components.

Milk River has approximately 150,000 square metres of paved, cold milled asphalt and gravel road surfaces. The majority of the pave roads are in good condition due to the annual maintenance performed by Town forces. A large part of the overall good condition of the paved road system is a result of the crack sealing program. The evaluation identified 2,781 square metres (1.9%) of paved road that are in poor condition requiring localized patching and localized reconstruction in the short term. There are 20,773 square metres (13.6%) of the pave roads with a poor or fair condition rating that will require total road construction in mid to long term infrastructure plans. The evaluation also identified 123,560 square metres (81.0%) of the paved roads are currently in good condition, however they will require asphalt overlay improvements in the mid to long term. The overlays will address the cracking, oxidization and open surface exhibited by the aging pavement. A significant amount of paved roads are 30 years old and their pavement life cycle can be extended with structural and surface overlays while the pavement structure is still in good condition. As general rule of thumb, overlays improvements are typically undertaken around the 25 years of service, which indicates a large portion of the Milk River's paved roads are due for an overlay.

There are approximately 7,022 square metres (4.6%) of cold milled asphalt road in the Milk River roadway system, which have been evaluated to be in fair to good condition. Regular grading and pothole maintenance should sustain the roads until development requires an upgrading to a pave road structure.

Approximately 6,900 square metres of new road construction have been identified in Milk River for upgrading existing gravel roads to paved roads and for residential roadways in the northeast corner of the Town when development occurs. Refer to Figure 3.2 for an overview of the road system and the overall condition of the roads.



LEGEND

TOWN BOUNDARY

ASPHALT ROADS: GOOD

FAIR

POOR

ASPHALT MILLINGS ROADS: GOOD

FAIR

POOR

UNDEVELOPED ROADS

GRAVEL ROADS: GOOD

FAIR

POOR

NOTES:

1. OVERALL RATING IS BASED UPON:
   - GOOD - ROAD EVALUATED AT 1 OR 2
   - FAIR - ROAD EVALUATED AT 3
   - POOR - ROAD EVALUATED AT 4 OR 5
2. ROADS RATING ON A BLOCK BASIS.

mpe ENGINEERING LTD.

Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD CONDITION OVERVIEW

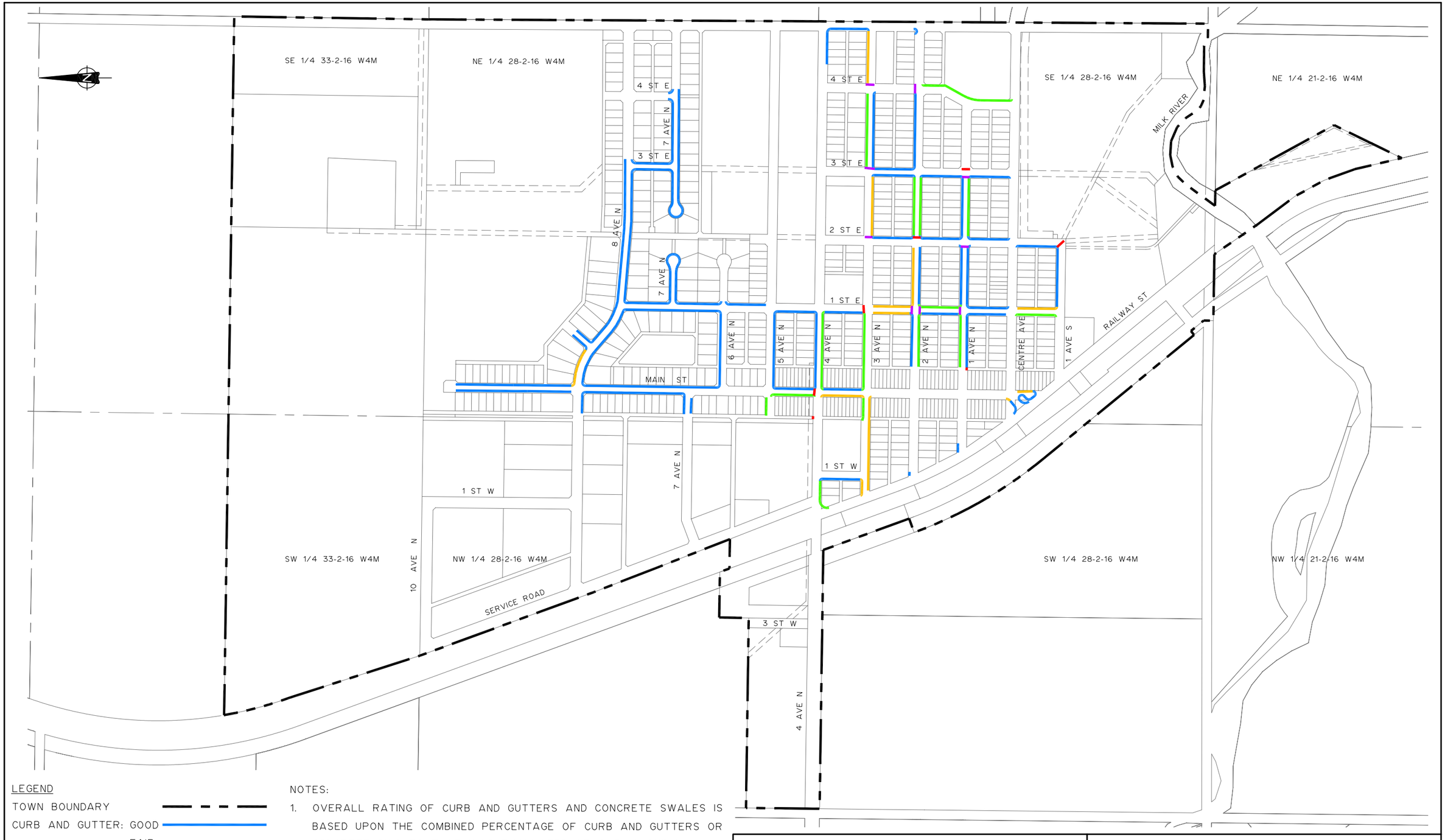
SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 3.2

Milk River has 9,556 lineal metres of concrete curb & gutter with 143 metres (1.5%) having a condition rating of 4 or 5 and another 1,130 metres (11.8%) having a condition rating of 3. The remaining 8,282 metres (86.7%) of curb & gutter has a condition rating of 1 or 2. A condition rating of 4 or 5 indicated a section of curb & gutter was either missing or destroyed and the component was not functioning in the roadway system requiring repairs in the short term. Curb & gutter with a condition rating of 3 indicates the component is still functioning in the roadway system, however is showing noticeable signs of deterioration requiring repairs in the medium or long term.

Approximately 270 meters of concrete swale was found in Milk River with 25 meters (9.2%) having a condition rating of 4 or 5 and another 107 meters (39.5%) having a condition rating of 3. The remaining 139 meters (51.4%) of swale has a condition rating of 2. A condition rating of 4 or 5 indicated a section of swale is required, missing or destroyed and the component is not functioning in the roadway system requiring repairs in the short term. Swales with a condition rating of 3 indicates the component is still functioning in the roadway system, however is showing noticeable signs of deterioration requiring repairs in the medium or long term. Figure 3.3 illustrates the overall condition of the concrete curb & gutters and swales.

There are 6,428 square meters of concrete separate sidewalk in Milk River and 281 square metres (4.3%) have a condition rating of 4 or 5 requiring repairs in the short term. Another 2,074 square meters (32.3%) of sidewalk has a condition rating of 3 and will require repairs in the mid to long term. The remaining 4,073 square meters (63.4%) of sidewalk has a condition rating of 1 or 2. A condition rating of 4 or 5 typically indicates a missing section of sidewalk, a tripping hazards and/or severely deteriorated structure. Separate sidewalks with a condition rating of 3 might exhibit noticeable signs of deterioration, minor vertical and/or horizontal displacement, exposed surface, cracked surface and/or minor distortion.

Throughout Milk River there are 10,947 square meters of concrete monolithic sidewalk with 551 square meters (5.0%) having a condition rating of 4 or 5 and another 3,191 square meters (29.1%) with a condition rating of 3. The remaining 7,205 square meters (65.8%) of sidewalk have a condition rating of 1 or 2. A condition rating of 4 or 5 typically indicates a missing



LEGEND

TOWN BOUNDARY

CURB AND GUTTER: GOOD

FAIR

POOR

CONCRETE SWALE: GOOD

FAIR

POOR

NOTES:

1. OVERALL RATING OF CURB AND GUTTERS AND CONCRETE SWALES IS BASED UPON THE COMBINED PERCENTAGE OF CURB AND GUTTERS OR CONCRETE SWALES THAT WAS EVALUATED AT A 3, 4 AND 5:
   - -GOOD < 15%
   - -15% < FAIR <40%
   - -40% < POOR
2. CURB AND GUTTERS RATING ON A BLOCK BASIS.
3. CONCRETE SWALES RATING ON A SWALE BASIS.

mpe ENGINEERING LTD.
Lethbridge, Alberta

TOWN OF MILK RIVER

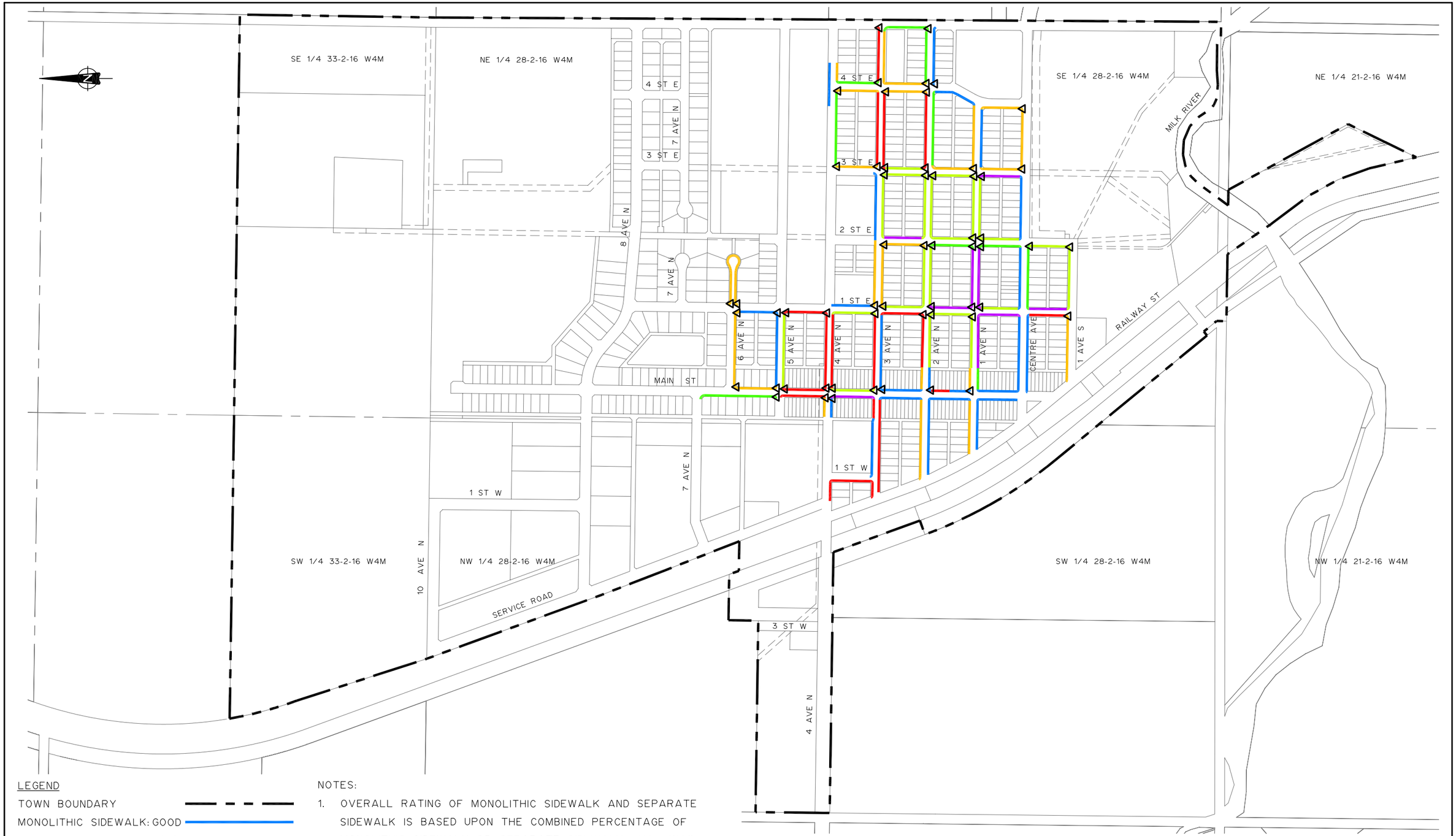
INFRASTRUCTURE MASTER PLAN
CURB AND GUTTER AND CONCRETE SWALE CONDITION OVERVIEW

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 3.3

section of sidewalk, a tripping hazards and/or severely deteriorated structure requiring repair in the short term. Separate sidewalks with a condition rating of 3 might exhibit noticeable signs of deterioration, minor vertical and/or horizontal displacement, exposed surface, cracked surface and/or minor distortion that will require repair in the mid to long term.

The evaluation identified 58 intersection corners that require either new or replacement wheelchair ramps to access the roadway sidewalk system. The new and replacement wheelchair ramps need to be incorporated into the short, mid and long term improvements.

Refer to Figure 3.4 for an illustration of the overall condition of the concrete sidewalks and for the locations of where wheelchair ramp improvements are needed. Also, refer to the Road Component Evaluation spreadsheet in Appendix C for more details.



LEGEND

- TOWN BOUNDARY
- MONOLITHIC SIDEWALK: GOOD
- FAIR
- POOR
- SEPARATE SIDEWALK: GOOD
- FAIR
- POOR
- WHEELCHAIR RAMP REQUIRED

NOTES:

1. OVERALL RATING OF MONOLITHIC SIDEWALK AND SEPARATE SIDEWALK IS BASED UPON THE COMBINED PERCENTAGE OF MONOLITHIC SIDEWALK OR SEPARATE SIDEWALK THAT WAS EVALUATED AS A 3, 4 AND 5:
   - -GOOD < 15%
   - -15% < FAIR <40%
   - -40% < POOR
2. MONOLITHIC SIDEWALK OR SEPARATE SIDEWALK RATING ON A BLOCK BASIS.

mpe ENGINEERING LTD.
Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
MONOLITHIC SEPARATE SIDEWALK
CONDITION OVERVIEW

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 3.4

3.6 Cost Estimates

A summary of the capital road work priorities and cost is shown in Table 3.6, and the details of the unit pricing have been included in Appendix D. The required repair and enhancement recommendations are further detailed in the Road Component Evaluation spreadsheet. In order to determine the best course of action the repair cost and associated priority rating for each road should be further reviewed by the Town within the context of other infrastructure upgrades that may be suggested in this document.

Table 3.6 – Summary of Capital Road Work Priorities and Costs			
Roadway Components	**Short Term (1- 5 years) (Quantity @ Unit Price)**	**Medium Term (5 - 10 years) (Quantity @ Unit Price)**	**Long Term (10+ years) (Quantity @ Unit Price)**
Curb & Gutters	$31,500 (143m @ $220 / m)	$124,300 (565m @ $220 / m)	$124,300 (565m @ $220 / m)
Swales	$10,700 (25m @ $435 / m)	$23,100 (53m @ $435 / m)	$23,100 (53m @ $435 / m)
Monolithic Sidewalks	$79,900 (280$m^2$ @ $285 / m^2)	$454,600 (1,595$m^2$ @ $285 / m^2)	$454,600 (1,595$m^2$ @ $285 / m^2)
Separate Sidewalks	$140,500 (551$m^2$ @ $255 / m^2)	$264,400 (1,037$m^2$ @ $255 / m^2)	$264,400 (1,037$m^2$ @ $255 / m^2)
Wheelchair Ramps	-- --	$46,400 (29 @ $1,600 each)	$46,400 (29 @ $1,600 each)
Localized Road Patching	$65,300 (1,632$m^2$ @ $40/$m^2$)	-- (--)	-- (--)
Localized Road Reconstruction	$114,900 (1,149$m^2$ @ $100/$m^2$)	-- (--)	-- (--)
Road Overlays	-- (--)	$1,853,400 (61,780$m^2$ @ $30/$m^2$)	$1,853,400 (61,780$m^2$ @ $30/$m^2$)
Total Road Reconstruction	-- (--)	$727,100 (10,387$m^2$ @ $70/$m^2$)	$727,100 $124,300
Total Term Costs	**$442,800**	**$3,493,300**	**$3,493,300**

** Note: Costs are in 2007 construction dollar and do not include GST.

3.7 Conclusions & Recommendations

We recommend the town utilize the condition rating system to prioritize and implement the roadway component repairs and replacement work. Generally, those components with a condition rating of 4 or 5 should be incorporated into the short term infrastructure management plan (IMP). Components with a condition rating of 3 should be incorporated into the mid and long term road infrastructure repair and replacement strategy. Components with a condition rating of 1, 2 and 3 should be re-evaluated bi-annually with their condition rating and priority updated as required. Short term is defined as work to be performed within 5 years, mid term is work to be performed in 5 to 10, and long term has been defined as work to be performed in 10 years and beyond.

Even though the majority of the paved roads have a condition rating of either 1 or 2, we recommend the town implement an asphalt overlay program for the mid and long term road infrastructure management strategy. Due to the age of the most paved roads, it would be prudent to undertake structural and surface pavement improvements while the roads are still capable of receiving an asphalt overlay. In a worse case scenario, not implementing an asphalt overlay program in a timely fashion would result in total reconstruction of the roads. To better define the timing and scope of the asphalt overlays required to extend the life cycle of the paved roads, the town should secure the opinion of a geotechnical consultant.

For the planning of Capital Road Work projects we recommend the following strategy to undertake the repair and replacement of the roadway components. In the short term, all localized patching and re-reconstruction on paved roads should be completed along with the replacement of concrete components with a condition rating of 4 and 5. The mid and long term strategy would see 10% replacement of concrete components with a condition rating of 3, 10% of the road re-construction work, and 10% of the asphalt overlay work completed each year.

In addition, we strongly recommend the Town continue to spend $8,000 to $10,000 annually on its road crack sealing program. The Town's Public Works Department has implemented an excellent crack sealing program which is a significant contributing factor to the overall good condition of the paved roads. The sealing program has limited damage to the road structure by minimizing saturation of the road structure and subgrade.

The Town should consider investing in a geotechnical study to determine subsurface conditions, existing road structures, structural requirements for asphalt overlays and road structures for new road construction. Data obtained from a geotechnical study will be necessary to implement correct design and repair measures. Existing road structure data for a portion of the Town is required. For estimation purposes, when record information could not be obtained, assumptions regarding the existing road structure have been made. Verification of the existing road structures is needed for confirmation of the required works.

Recent advances in Ground Penetrating Radar (GPR) systems can provide a non-obtrusive and relatively inexpensive method of obtaining subsurface road structure information and should be considered by the Town. The advantage of GPR data is that it provides a continuous structural profile of the existing roadway. Data obtained from conventional borehole analysis is time consuming, may not represent the continuous road profile and requires a repair of each bore hole.

Existing road problems relating to health and safety liability issues should be addressed immediately. These problems include ponding areas which can be potential ice-slip hazards and raised sidewalk control joints which can be potential tripping hazards.

4.0 Water Supply, Treatment, and Distribution

4.1 Background

The Town of Milk River has a typical water supply, treatment and distribution system that includes a river infiltration gallery from the Milk River, a treatment facility that utilizes two slow sand filters, chlorine gas and fluoride feed systems, and Ct and treated water storage. The Town has a piped distribution system where 80% of the system has pressure supplied by gravity from the treated water reservoir while the remaining 20% of the system has pressure supplied from a pressure boosting pump station. Historically, the Town has been meeting current water quality standards with ease. The Town also has enough treatment capacity to last for at least the next twenty years.

4.2 Water Demand

4.2.1 Data collection

Physical data for the distribution system was collected from record drawings, as made available from the Town of Milk River. Historical records were also obtained from the Town of Milk River in order to help assess the water treatment and distribution system. The Town is required to record information on a daily, weekly, or monthly basis by Alberta Environment. The main years of interest for data review were from 2000 to 2005. Information regarding the water treatment plant was acquired from our site tour, Operation and Maintenance Manuals, and information directly transcribed from equipment.

4.2.2 Historic water consumption

Monthly records and annual reports for the years of 2000 through to 2006 were reviewed to determine historical water demands in the Town of Milk River. Table 4.2.2 provides a summary of the water consumption record.

TABLE 4.2.2 - Milk River Historical Water Demands							
Month	**Average Day Flows**						
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**Average**
	(m^3)	**(m^3)**	**(m^3)**	**(m^3)**	**(m^3)**	**(m^3)**	**(m^3)**
January	505	421	417	425	499	461	455
February	439	426	423	419	501	438	441
March	443	451	444	430	440	432	440
April	509	467	507	499	706	544	539
May	1,162	1,188	454	743	701	1,022	878
June	1,168	1,069	632	1,001	819	694	897
July	2,008	1,693	1,084	1,771	1,185	1,569	1,552
August	1,886	1,387	808	1,640	1,018	1,188	1,321
September	934	906	660	852	663	832	808
October	491	583	472	592	503	579	537
November	434	442	450	463	434	534	460
December	427	434	425	488	426	520	453
Total Year Usage	318,628	289,332	206,566	284,902	241,076	269,311	268,146
Population	892	879	888	897	906	915	
Avg Day (m^3)	873	793	566	781	660	738	735
Avg Day (lpcd)	979	902	637	871	729	807	821
Max Day (m^3)	2,863	2,203	1,501	2,677	1,997	2,188	2,863
Max Day (lpcd)	3,210	2,506	1,691	2,985	2,205	2,392	3,210
Avg to Max Ratio	3.28	2.78	2.65	3.43	3.02	2.97	3.43

Based on these historical demands, the following quantities have been adopted as the basis of assessment:

- **Average Day Demand** is 821 litres per capita per day (lpcd)
- **Maximum Day Demand** is 3,210 lpcd
- **Maximum Day to Average Day Ratio** is 3.43
- **Peak Hourly Demand** is 4,815 lpcd or 1 ½ times Maximum Day Demand

4.2.3 Forecast water consumption

Based on historic water demands, population projections from Section 2.3, and the assumption that per capita use will stay generally the same, the Average Day demand in Milk River is

projected to be to be 925 m^3/day in 2026, and the Maximum Day Demand is expected to be 3,618 m^3/day. Table 4.2.3 summarizes the current and projected water demands for the Village.

Table 4.2.3 - Current and Projected Water Demands

	Current Water Demand					Projected Water Demand (Year 2026)			Current Treatment Capacity (m^3/day)
	Population 2006	Average Day (m^3/day)	Avg Day Per Capita Usage (l/day/capita)	Max Day (m^3/day)	Max Day Per Capita Usage (l/day/capita)	Population	Average Day (m^3/day)	Max Day (m^3/day)	
Municipality									
Milk River	924	735	821	2,863	3,210	1,127	925	3,618	4,932

All water treatment processes are typically designed for the twenty maximum day demand. In Milk River's case, the water treatment facility will be assessed based are a maximum day demand of 3,618 m3/day (41.9 l/sec). The distribution system will be assessed based on the peak hourly demand of 5,427 m3/day (62.8 l/sec) or 1 ½ times the maximum day demand.

4.3 Treatment Process and Current Infrastructure

The Town of Milk River currently operates a slow sand filter water treatment system to meet its potable water needs. The existing infiltration gallery, raw water pump station, raw water line, and slow sand filters were constructed in 1975. In 1984, a booster station was added to provide adequate pressure at higher elevations in the community. In 1997, Ct detention tank/treated water reservoir and booster station were added to the system. The Town has also completed an upgrade to its infiltration gallery and raw water pump station in 2005. Milk River acquires its raw water supply from the Milk River.

The current water supply and treatment system consists of:

- An infiltration gallery within the Milk River,
- Raw water pump station at the Milk River,
- Raw water pipeline and copper sulphate injection system,
- Sedimentation basin adjacent to the slow sand filters,

- Two slow sand filters,
- Chlorine gas disinfection system,
- Fluoride injection system,
- 1400 m^3 Ct detention tank and treated water reservoir, and
- Two centrifugal high lift booster pumps that services approximately 20% of the distribution system housed in a separate building.

Figure 4.1 provides a schematic drawing of the current water supply and treatment system for the Town of Milk River. The following sections are a detailed assessment of each component of the water supply and treatment system.

4.3.1 Raw Water Storage and Pumping

The Town of Milk River draws its supply of raw water from the Milk River via an infiltration gallery. The newly upgraded infiltration gallery and raw water pump station has been designed to draw up to 6,000 m^3 per day (69.4 l/s) of raw water from the Milk River.

Water flows by gravity through the infiltration gallery and into the raw water pump station situated on the bank of the Milk River. The pump station contains two 75 hp Peerless vertical turbine pumps. Each pump has a capacity of 47.6 l/sec (740 USgpm) at 80 m of Total Dynamic Head (TDH). The raw water pipeline consists of 200 mm diameter asbestos cement. At the twenty year maximum day flow of 3,618 m^3, velocities in the pipe will increase to 1.29 m/s (4.2 ft/s). It is recommended that velocities in pipelines do not exceed 1.83 m/sec (6 ft/sec).

Raw water is discharged into a 32,000 m^3 sedimentation basin. Raw water flows over a weir and into a splitter box that feeds one or both filters.

FILTER 2
5000m³/DAY
58L/SEC. @ 0.1m/hr
FSL 1087.20

FILTER 1
5000m³/DAY
58L/SEC. @ 0.1m/hr
FSL 1087.20

TO FLOOR DRAIN

TBS 201 | TBI 201 | TBT 201

BUV 201

SV 201

FS 201

PI 201 | PS 201

LLP2
10HP
58.1L/SEC.

VFD

CHV 201

FI 101 | FT 101

PI 202

BUV 202

BUV 203

FI 301 | FT 301

INJECTION POINT

BUV 301

BUV 302

BUV 304

BUV 303

BUV 305

RESERVOIR OVERFLOW

OVERFLOW

1400m³ CT AND TREATED WATER RESERVOIR

FS 101

PI 101 | PS 101

BUV 201

SV 101

TBS 101 | TBI 101 | TBT 101

LLP1
10HP
58.1L/SEC.

CHV 101

PI 102

BUV 102

BUV 103

TO FLOOR DRAIN

PS 101 | PS 101

BUV 306

RESERVOIR DRAIN AND OVERFLOW

POST CHLORINE INJECTION

BAV 308 NC

BAV 307 | SV 301 | BAV 306

BAV 303

BAV 304

CHV 301

CHV 302

DP 301

DP 302

BAV 301

BAV 302

FS 301

BAV 300

FT 301

CP 101

FLUOROSILIC ACID

CL 101 | FT 301

REGULATOR

AUTOMATIC SWITCH OVER VALVES

GAS CHLORINATION

PS 302 | PI 302

PTK1 PTK2

BACKUP POWER GENERATOR

150φ

50HP

DIESEL MOTOR

100φ

100φ

7.5HP

10HP (VFD)

50φ

75φ

PS

PT

PI

150φ

WATER TREATMENT PLANT

DISTRIBUTION AND BOOSTER PUMP STATION

SEDIMENTATION BASIN
FSL 1087.80
32 000m³

VFD | VFD

75HP
46.7L/SEC

75HP
46.7L/SEC

RAW WATER PUMP STATION

MILK RIVER INFILTRATION GALLERY

MIXER

MIX 301

COPPER SULPHATE FEED SYSTEM
(Cu SO4)
CP 102

HOSES AND REELS

INLINE HOT WATER HEATER

SINK | SINK

VENT OPENING AT ROOF

FLOOR DRAIN

FLOOR DRAIN

WATER TREATMENT PLANT

ABANDONED FILTERS
1078.75

PRESSURIZE ZONE 1
MILD RIVER
DISTRIBUTION SYSTEM

PRESSURIZE ZONE 2
MILK RIVER
DISTRIBUTION SYSTEM

mpe ENGINEERING LTD.
Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
EXISTING WATER TREATMENT SYSTEM

SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 4.1

4.3.2 Filtration

Milk River utilizes two slow sand filters for filtration. The filters were upgraded in 1997. Each slow sand filter has an approximate area of 2,100 m^2 and has been designed for a loading rate of 0.10 $m^3/m^2/hr$. With one filter operating at a time, a production rate of 4,932 m^3/day (57 l/sec) can be achieved. With both filters operating, a total of 9,964 m^3/day (140 l/sec) of potable water can be produced. According to Alberta Environment, the maximum daily design loading rate for slow sand filters may vary between 0.1 and 0.4 $m^3/m^2/hr$. Alberta Environment also recommends that when one filter is out of service, the other filter's loading rate should not exceed a loading rate greater than 0.4 $m^3/m^2/hr$. Ultimate capacity of the plant is considered to be 4,932 m^3/day since there must be 100% redundancy should a filter be shut down for cleaning, ripening, or repair.

Two 10 Hp Cornell end suction centrifugal pumps are used to draw water from the filters to the Ct detention reservoir. One pump is allocated for each filter. The capacity of each pump is rated at 58.3 l/sec (5,000 m^3/day) at 9 meters Total Dynamic Head. By varying the speed of the low lift pump using a variable frequency drive, the loading rate for each filter can be controlled. The pumps operate based upon the level of water in the Ct detention reservoir. There are also control valves in place to allow the ripening of the filters. Water is diverted to the sedimentation basin until the biological layer or Schumzdecke has developed and the turbidity of the treated water has decreased to an appropriate level.

Overall, Milk River's filtration system has enough capacity to provide for the maximum day demand in twenty years at a loading rate of less than 0.1 $m^3/m^2/hr$.

4.3.3 Disinfection

Milk River uses chlorine gas for primary and secondary (residual) disinfection. Chlorine is effective at oxidizing pathogens such as bacteria, viruses, and Giardia. However, it has little effect against cryptosporidium. Control of cryptosporidium is typically performed by filtration and ultraviolet (UV) disinfection.

Primary disinfection requires a minimum contact time for chlorine to react with pathogens in the filtered water before being delivered to the first consumer. Chlorine is usually dosed high enough so a free chlorine residual remains in the water after the initial contact time. This free residual allows for protection from pathogens that may be encountered within the distribution system. Chlorine is added to the filtered water prior to entering the Ct detention reservoir. The free chlorine residual leaving the plant is maintained between 0.6 mg/L and 1.0 mg/L. Milk River has recently fitted the chlorine gas feed system with a new automatic chlorine gas regulating system.

4.3.4 Ct (Contact Time) Disinfection

Chemical inactivation of Giardia and viruses is a function of disinfectant concentration and contact time. The contact time required to inactivate a microorganism is dependant on temperature, pH, type of disinfectant, species viability, and presence of other suspended organic matter. In general, contact time (Ct) is defined as:

Ct = concentration (mg/L) x time (minutes)

By using standard tables, pathogen reduction can be determined. Pathogen reduction is usually expressed in terms of log inactivation. For example, if 99.9% of a pathogen is inactivated, then that is considered to be 3.0 log reduction, 99.99% inactivation is 4.0 log reduction, and so forth.

Alberta Environment stipulates that all surface water treatment plants shall ensure a minimum 3.0 log reduction in Giardia and crypotosporidium. This is based on a raw water source with less than 1 giardia cyst/100L and less than 7.5 cryptosporidium oocysts/100L. If the concentration of Giardia cysts and cryptosporidium oocysts are higher, then an increased log reduction is required. In addition to log reduction of Giardia, Alberta Environment also requires a 4.0 log inactivation of viruses. Since Ct disinfection of Giardia is much more difficult than Ct disinfection for viruses and Ct disinfection of both take place concurrently, storage allocated for Ct disinfection for Giardia inactivation is generally more than enough for virus inactivation.

For a slow sand filtration plant, Alberta Environment allows a 3.0 log reduction credit for Giardia and cryptosporidium and 2.0 log reduction credit for viruses attributable to the filtration process. Milk River, theoretically, should achieve its log reduction of giardia and cryptosporidium through filtration alone and only a 2.0 log reduction of viruses by Ct disinfection is necessary. However, it is prudent for the municipality to have a multi-barrier approach to pathogen removal and therefore reservoir design and operation should allow for a 1.0 log reduction of Giardia through Ct disinfection. All Ct disinfection must occur prior to serving the first customer. In the case of Milk River, all Ct disinfection must take place in the treated water reservoir prior to being distributed. For an increased log removal of cryptosporidium, UV disinfection would be the most practical method for achieving this.

Since Milk River uses chlorine for both primary and secondary disinfection, all Ct storage calculations are based on using chlorine. When designing a storage facility to include allowance for Ct disinfection, historical data such as water temperature, pH and typical chlorine residual is heavily relied upon. Storage calculations are usually based on the worst-case scenario by using the coldest temperatures, the highest pH, and the lowest chlorine residual encountered over the year. Required contact time decreases with a decrease in pH, an increase in temperature, or an increase in chlorine residual.

The flow pattern throughout a treated water reservoir is critical when determining Ct storage requirements. The ideal flow pattern is plug flow where all flow is laminar and all water spends an equal amount of time in the reservoir. This pattern of flow occurs in pipelines and in long rectangular channels with high length to width ratios. To create plug flow-like conditions in a reservoir, baffles are constructed to ensure a similar path length for all water flowing through the reservoir. Plug flow is the benchmark and is assumed to have a baffling coefficient of 1. Since it is unlikely that a baffling coefficient of 1.0 will be achieved in a reservoir, it is necessary to calculate the actual baffling coefficient for a reservoir so that the minimum amount of time water spends in the reservoir is equal to the required detention time for proper Ct disinfection.

The baffling coefficient, also known as the T_{10}/t Ratio, is the ratio of actual detention to theoretical detention. For example, if the theoretical detention time that must be spent in the

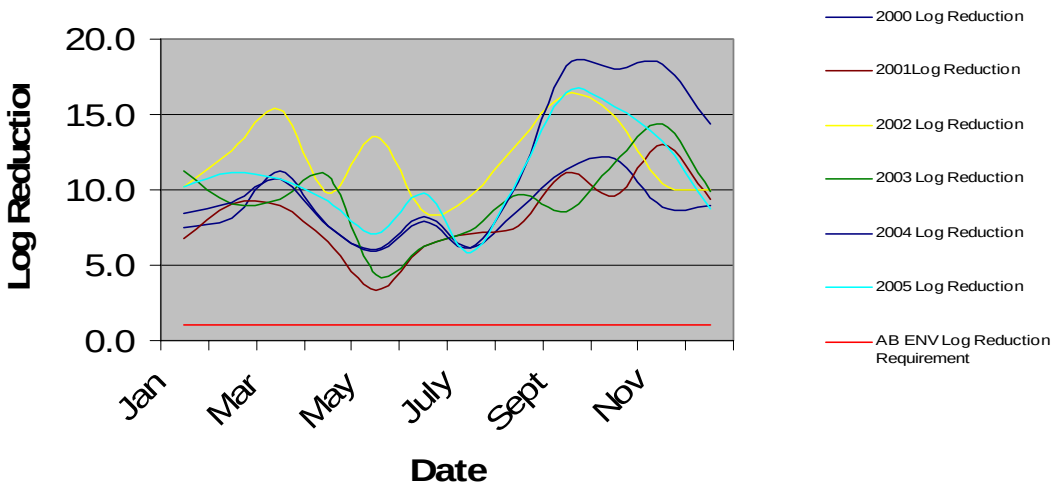
reservoir to achieve a certain amount of Ct disinfection is 70 minutes and the baffling coefficient is 0.7, the reservoir should be sized for 100 minutes of hydraulic retention time. The Ct disinfection tank and reservoir at Milk River has a capacity of 1,400 m^3 and is baffled so that water must travel through the reservoir in a serpentine manner. The baffles prevent short-circuiting of the reservoir and assure that all water remains in the reservoir for a uniform period of time. In addition, the inlet and outlet pipes have diffusers allowing for uniform distribution and collection within the Ct chamber. For the purposes of this study, it is assumed that the Ct and Treated Water Reservoir at Milk River has superior baffling conditions with a baffling coefficient of 0.7.

4.3.4.1 Historical Log Reduction of Giardia

In the past, Milk River has achieved the minimum Ct values required by Alberta Environment and required log reduction of Giardia. In the year 2026, to achieve the required 1.0 log reduction of Giardia a treated water storage volume of 463 m3 will be required at Milk River. A minimum operating level of 30% of the Ct and Treated Water Reservoir would have to be set to ensure proper Ct disinfection. Notwithstanding the above, the reservoir may have to be kept at a higher level than the minimum required for Ct due to the requirements for equalization, emergency, and for fire protection.

Figure 4.3.4.1 illustrates the log reduction historically achieved on a daily basis by the Town of Milk River treated water storage reservoir. The log reduction is based on peak day flows for the month and an average temperature and pH. The graph illustrates that the Town is meeting its Ct disinfection requirements on a daily basis. Figure 4.3.4.1 assumes that the level of water is the reservoir was maintained at a minimum of 30% at all times.

Fig 4.3.4.1 - Milk River Historical Log Reduction of Giardia



4.3.4.2 Log Reduction of Viruses

In addition to inactivation of Giardia, Alberta Environment also requires a 4.0 log inactivation of viruses. A slow sand filtration plant is given a 2.0 log inactivation of viruses credit. Since Ct disinfection of Giardia is much more difficult than Ct disinfection for viruses and Ct disinfection of both take place concurrently, storage allocated for Ct disinfection for Giardia inactivation is generally more than enough for virus inactivation.

4.3.5 Treated Water Storage & Fire Protection

According to Alberta Environment's Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems, treated water storage required for any licensed community where a water treatment plant can only provide the maximum daily design flow is determined as follows:

Fire Protection	→	as deemed necessary by the municipality.
Equalization Storage	→	25% of Maximum Day Demand
Emergency Storage	→	15% of Average Day Demand

Ct Disinfection → as determined by historical data

Total Treated Water Storage Required = (A) + (B) + (C) or (D), whichever is greater

Table 4.3.5 illustrates the storage requirements for Milk River. The following sections describe in detail the basis of each storage calculation.

Table 4.3.5 - Municipal Storage Requirements

	Current Storage	Future Treated Water Storage Requirements						Additional Storage Required for 20 year Max Day Demand
	Total Storage Available	Equalization Storage	Emergency Storage	Fire Storage	Ct Storage (1.0 log inactivation of Giardia with superior baffling condition)[1]	Total Projected Storage Requirements[2] (excluding fire protection)	Total Projected Storage Requirements[2] (including fire protection)	Surplus/(Deficit)
	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Municipality								
Milk River	1,400	905	139	1,176	463	1,043	**2,219**	**(819)**

Assumptions:

1) Baffling coefficient is estimated to be 0.7 due to superior baffling conditions.
2) Total storage required is equal to the sum of equalization, emergency, and fire storage or Ct storage for 1.0 log inactivation, whichever is greater.

Storage requirements for equalization, emergency use, and fire protection are 905 m^3, 139 m^3, and 1176 m^3 respectively for a total of 2219 m^3, which is greater than the amount required for Ct Disinfection, 463 m^3. Milk River is therefore short 819 m^3 of treated water storage for the twenty year design.

4.3.5.1 Equalization Storage

Equalization storage for a water treatment system that can provide only the maximum daily design flow is equal to 25% of the maximum daily design flow. This storage allows a buffer of storage for the distribution system to operate off of. This buffer allows for the minimization of equipment cycling similar to the way a pressure tank minimizes pump cycles.

4.3.5.2 Emergency Storage

Emergency storage for a water treatment system that can provide only the maximum

daily design flow is equal to 15% of the average daily design flow. This storage is allows additional storage in the case of an emergency.

4.3.5.3 Fire Protection

Fire storage and fire flow requirements have been calculated as per the guidelines of the *Fire Underwriters Survey (1999)* for each municipality. Fire fighting requirements were based on the largest building in the community, typically a school. Information on building sizes was acquired from the Alberta Infrastructure web site including the area and construction type of schools in each community.

The recommended storage for fire protection at Milk River is 1176 m^3. Calculations were based on Erle Rivers High School as being the largest building located within the community. The school has an area of 3 504 m^2 and does not have a fire sprinkler system. Based on this information the current required fire flow for Milk River is 13 000 liters per minute for two hours, which equates to a storage requirement of 1 176 m^3. The Town currently has minimal fire pumping capabilities.

4.3.6 Distribution Pumping and Pressure Supply

As discussed previously, there are two pressurized distribution zones in Milk River. Currently about 20% of the Town system is supplied with potable water from the pressure boosting pump station that draws water from the treated water reservoir. Distribution pressure in the zone that utilizes the booster station range from 50 to 90 psi. To achieve this pressure in the zone, potable water at the booster station is pressurized to 40 psi. The booster pump station consists of one 10 HP and one 7.5 HP Peerless inline centrifugal pumps with the lead 10 HP pump controlled by a variable frequency drive. The speed of the pumps is paced off of a pressure transmitter on the discharge manifold. The booster station is also fitted with a diesel driven split-case PACO centrifugal pump that operates during power outages and low distribution pressure as in the case of a fire. The diesel driven pump must be manually shut off once it has started. In addition to mechanical upgrades, the booster pump station building itself requires upgrades to bring up to current standards.

4.3.7 Proposed Upgrades

The majority of Milk River's water treatment system infrastructure will be able to provide high quality potable water for the next twenty years. There are, however, some upgrades that are required to meet the *2006 Alberta Environment Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems*. These upgrades are as follows:

- The sedimentation basin will require sediment removed in the immediate future.
- The Town is currently short of treated water storage. It is recommended that the Town construct a new treated reservoir adjacent to the existing Ct Reservoir. The new reservoir should have a minimum capacity of 820 m^3.
- In order to increase the protection of the Town's water supply from crypotosporidium and to provide additional protection from other pathogens such as giardia cyst and viruses, the integration of an ultraviolet (UV) disinfection system is recommended. UV reactors could be located directly downstream of the slow sand filter pumps. Implementation of UV disinfection will help the Town meet future standards.
- The new AENV standards require online monitoring and suggest monitoring and alarming take a more predominant role in water treatment. To enable the Town to have more effective control and data acquisition, it is recommended the Town install new Programmable Logic Controllers (PLC) in the water treatment plant and the booster pump station. This will also allow the implementation of a Supervisory Control and Data Acquisition (SCADA) system. If PLC's were added to the other facilities such as the raw water pump station, booster station, and lift station, these facilities could be integrated into the SCADA system where the Operator could review their operation from a remote location such as a desktop computer at the public works shop or water treatment plant. A SCADA system has the ability to monitor all events occurring in the water treatment and distribution system. If an alarm condition arises, the SCADA system can dial out to the Operator and give notification of the event. The SCADA system for the Town could also be accessed from locations from far away via the internet if required. Items recommended for the implementation of a full SCADA system are listed in the cost estimate located within Appendix E.
- It is also recommended to implement automatic control through a SCADA system of the

raw water pump station so the Operator can define pump run times, pump speed, and sedimentation basin level control.

- The Booster Pump Station requires upgrades to meet future water demands. The existing inline pumps will eventually have to be replaced with 15 HP pumps. Field devices for pump control and for possible SCADA integration will also have to be upgraded. Finally, the booster pump station building requires upgrades to bring it up to current standards.

Figure 4.2 provides a schematic drawing of proposed upgrades to the current water supply and treatment system for the Town of Milk River.

FILTER 2
5000m3/DAY
58L/SEC. @ 0.1m/hr
FSL 1087.20

FILTER 1
5000m3/DAY
58L/SEC. @ 0.1m/hr
FSL 1087.20

TO FLOOR DRAIN

TBS 201 TBI 201 TBT 201

BUV 201

SV 201

FS 201

PI 201

PS 201

LLP2
10HP
58.1L/SEC.

VFD

FI 101

FT 101

CHV 201

PI 202

BUV 202

UV REACTOR

BUV 203

UV

UV REACTOR

BUV 103

FI 301

FT 301

INJECTION POINT

BUV 301

BUV 302

BUV 304

BUV 303

BUV 305

RESERVOIR OVERFLOW

OVERFLOW

1400m3 RESERVOIR

800m3 TREATED WATER RESERVOIR

COLLECTION PIPE

RESERVOIR DRAIN AND OVERFLOW

BUV 306

PS 101

FS 101

PI 101

BUV 102

PI 102

TBS 101 TBI 101 TBT 101

LLP1
10HP
58.1L/SEC.

CHV 101

TO FLOOR DRAIN

SEDIMENTATION BASIN
FSL 1087.80
32 000m3

POST CHLORINE INJECTION

BAV 308 NC

BAV 307

SV 301

BAV 306

BAV 303

BAV 304

CHV 301

CHV 302

DP 301

DP 302

BAV 301

BAV 302

BAV 300

FT 301

CP 101

FLUOROSILIC ACID

CL 101

REGULATOR

AUTOMATIC SWITCH OVER VALVES

GAS CHLORINATION

PS 302

PI 302

PTK1 PTK2

BACKUP POWER GENERATOR

SCADA SYSTEM

150φ

50HP

DIESEL MOTOR

100φ

15HP (VFD)

50φ

PS

PT

PI

WATER TREATMENT PLANT

DISTRIBUTION AND BOOSTER PUMP STATION

VFD

75HP
46.7L/SEC

RAW WATER PUMP STATION

MILK RIVER INFILTRATION GALLERY

MIXER

MIX 301

COPPER SULPHATE FEED SYSTEM
(Cu SO4)
CP 102

INLINE HOT WATER HEATER

HOSES AND REELS

SINK

VENT OPENING AT ROOF

FLOOR DRAIN

ABANDONED FILTERS
1078.75

PRESSURIZE ZONE 1
MILK RIVER
DISTRIBUTION SYSTEM

PRESSURIZE ZONE 2
MILK RIVER
DISTRIBUTION SYSTEM

mpe ENGINEERING LTD.
Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED WATER TREATMENT SYSTEM

SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 4.2

4.3.8 Cost Estimates

A preliminary cost estimate has been prepared for the proposed upgrades to the water treatment system. The estimated cost, including contingencies and engineering, is $1.27 million. The estimated cost to upgrade the Booster Pump Station, including contingencies and engineering, is $199,000. These upgrades will ensure that Milk River will continue to provide high quality potable and meet regulatory requirements for years to come. A complete breakdown of proposed upgrade costs are provided in Appendix E.

4.3.9 Conclusions & Recommendations

The water supply and treatment system has adequate capacity to produce high quality potable water for the next twenty years. A number of upgrades are recommended for the system. These include adding a UV disinfection system for added protection from giardia, cryptosporidium, and viruses, constructing an additional 820 m3 of treated water storage, installing PLC's in the water treatment plant and the boosting pump station, and implementing a SCADA system for increased Operator control and system optimization. An upgrade to the distribution booster pump station is also recommended.

Based on current funding provincial funding structures, it would be recommended to design and tender a water treatment system upgrade project in order to implement all recommendations at once since all are eligible for funding under the Alberta Municipal Water and Wastewater Program.

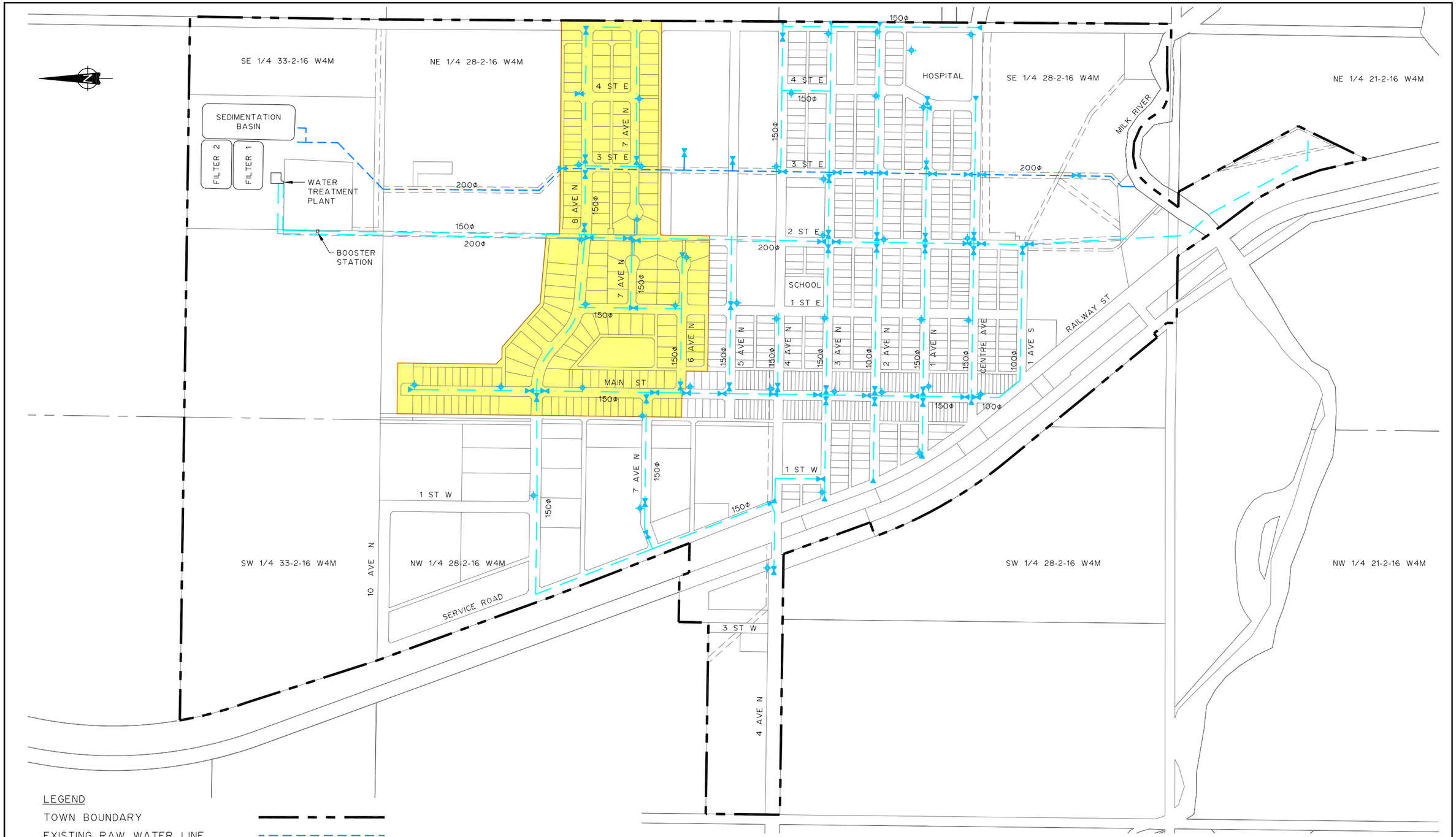
It is recommended that upgrades to the water treatment system occur within the next 5 – 10 years while the Booster Pump should be upgraded within the next 5 years to accommodate future population growth.

4.4 Potable Water Distribution

The treated water distributions system for the Town of Milk River consists of two pressure zones. The first is a gravity fed system that serves the lower elevations of the town. This consists of approximately 80% of the distribution system and includes the downtown core, the elementary and high schools, the hospital, and industrial and residential areas of the Town. The other pressure zone is supplied by a booster station tied to the gravity distribution system. The booster station provides increased pressure to the residential subdivision located in the higher elevations of the Town.

Figure 4.3 displays the existing water distribution system, including pipe size and pipe material. The system consists of 150 mm (6 inch) and 200 mm (8 inch) asbestos-cement (AC) and poly-vinyl chloride (PVC) water lines. All recent water line construction has made use of PVC pipe. The location of valves and fire hydrants are also shown.

It should be noted that pipe redundancy is lacking in both the gravity and pressure system. There is only one water line that supplies the gravity fed system and one line that supplies water from the booster station. This represents a potential liability to the Town that should be addressed as budget allows.



LEGEND

- TOWN BOUNDARY
- EXISTING RAW WATER LINE
- EXISTING GRAVITY WATER LINE
- EXISTING PUMPED WATER LINE
- EXISTING HYDRANT
- EXISTING VALVE
- EXISTING PLUG
- PUMPED ZONE

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
CURRENT WATER DISTRIBUTION SYSTEM

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 4.3

4.4.1 Distribution System Analysis

The hydraulic analysis of the water distribution system was completed using WaterCAD, version 7.0 software. Data relevant to the water distribution system was assembled from available records. Data included pipe materials, diameters, pipe length and locations, interconnections, elevations, valves, hydrants, patterns of water usage, water production records, etc. Scenarios were developed for both current and future populations and for the various demands placed on the system (i.e. Average Daily Demand, Maximum Daily Demand, Peak Hourly Demand and Max Day plus Fire Flow Demand). Where the distribution system did not meet the required level of service standards, the computer model was modified (e.g. pipes added or upsized) to address the situation.

Based on industry standards, Average Day and Maximum Day demands, pressure should be maintained between 50 psi (345 kPa) and 90 psi (620 kPa) at all points in the system, and Peak Hour Demand, pressure should be no less than 40 psi (276 kPa). The standard for fire flow analysis is to impose a fire flow when the system is experiencing Maximum Day Demand (i.e., MDD + fire flow) and the resulting residual pressure anywhere in the system should be no less than 20 psi (138 kPa).

Demand was allocated by reviewing the Town's total water usage and taking into account population distribution. For future projections, the additional population was allocated to areas slated for future development.

Standards for fire flow as set out in the Fire Underwriter's Survey "Water Supply for Public Fire Protection" were reviewed. Typical values are 3,400 L/min for residential areas and 4,500 L/min for light industrial and commercial areas. The area serviced by the pressure system is mainly residential. The fire pump in the booster station has therefore been sized for residential fire flow. The largest fire demand is assigned to the high school at 13,025 L/min (3,440 USgpm), due to its size, construction and occupancy. The school is located within the gravity system. Fire flow analysis was performed for the school based on both current and future growth demands.

4.4.2 Hydraulic Analysis Results

Under current conditions the hydraulic model indicates lower than recommended pressures in the zone that is gravity fed, yet still meets Alberta Environment standards. The current distribution system is unable to meet fire flow demands and the situation will be exacerbated by future demands from increased population.

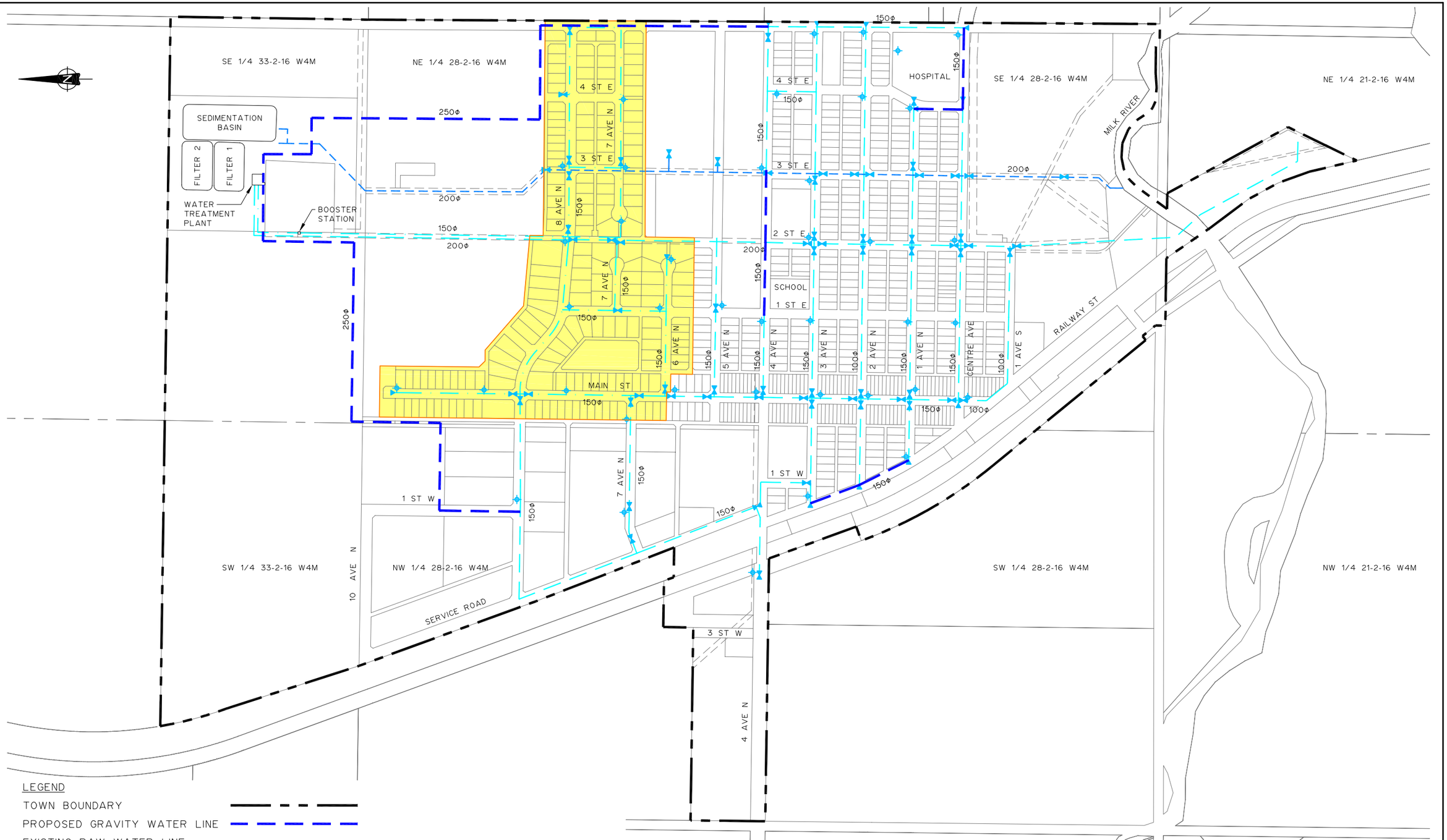
For the current (2006) population, including the Average Day and Max Day Demand, pressures fall below 50 psi (345 kPa) at some locations in the Town. Typically the extremities and the dead-end lines in the system are affected. At Peak Hour Demand, pressures fall below 40 psi (276 kPa) at certain locations, again at the extremities and at dead-ends.

The addition of three trunks will alleviate current and future deficiencies of the distribution system by increasing pressure to the extremities and meeting fire flow demand. Detailed results of the hydraulic model are included in Appendix D.

4.4.3 Proposed Upgrades

The following upgrades are recommended for the Gravity Fed Zone (see Figure 4.4):

- 250 mm “Trunk Main” from the treated water reservoir to the existing water main at the intersection between 1st Street West and 8th Avenue North.
- 250 mm “Trunk Main” from the treated water reservoir to the existing water main at the intersection between 5th Street East and 4th Avenue North.
- 150 mm water main on Centre Avenue and 4th Street East along the south and west sides of the hospital.
- 150 mm water main along Railway Street from 1st Avenue North and 3rd Avenue North.
- 150 mm water main along 4th Avenue North from 1st Street East and 3rd Street East.



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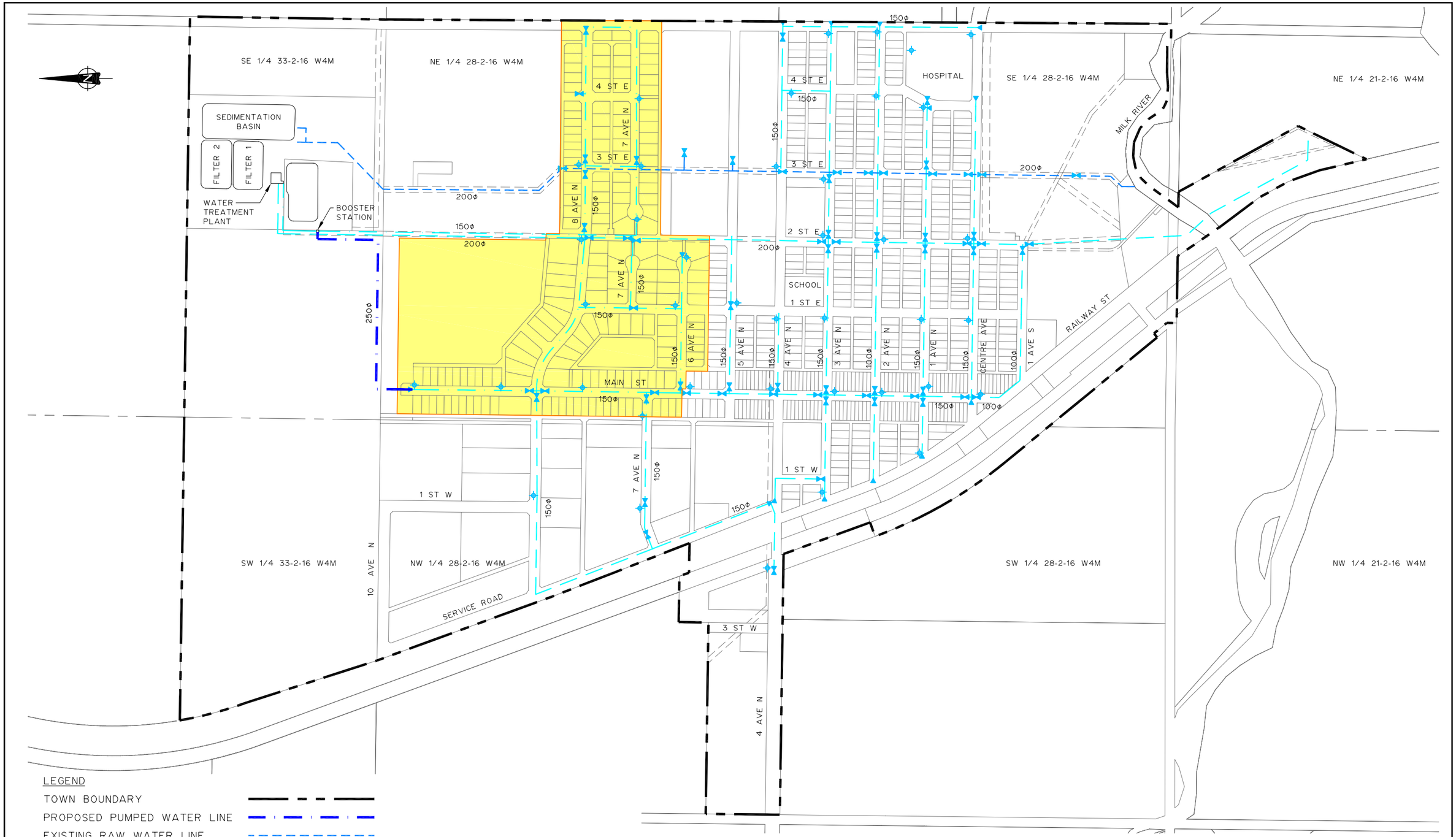
TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED GRAVITY DISTRIBUTION
SYSTEM UPGRADE

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 4.4

The following upgrades are recommended for the Pressure Zone (see Figure 4.5):

- 250 mm “Trunk Main” from the booster station to the north end of the existing water main along Main Street.



LEGEND

- TOWN BOUNDARY
- PROPOSED PUMPED WATER LINE
- EXISTING RAW WATER LINE
- EXISTING GRAVITY WATER LINE
- EXISTING PUMPED WATER LINE
- EXISTING HYDRANT
- EXISTING VALVE
- EXISTING PLUG
- PUMPED ZONE

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED PUMPED DISTRIBUTION
SYSTEM UPGRADE

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 4.5

4.4.4 Cost Estimates

Detailed cost estimates have been prepared for the proposed upgrades to the existing water distribution system. The suggested upgrades will also improve conditions for future development. Table 4.4.4 indicates that the total cost to complete all work is approximately $3,333,000, including contingencies and engineering. These improvements should be incorporated into the Town's infrastructure enhancement plans. Details of the cost estimates are included in Appendix D.

Table 4.4.4 – Distribution System Upgrade Cost Estimates

Description	Cost
Railway Street Loop	$293,000
4th Ave N Loop	$353,000
Centre Ave Loop	$244,000
4th Street E Loop	$193,000
Supply Line for Pressure Zone	$640,000
West Supply Line for Gravity Fed Zone	$633,000
East Supply Line for Gravity Fed Zone	$977,000
Total	**$3,333,000**

4.4.5 Conclusions & Recommendations

Based on the results of the modelling, the water distribution system in the Town of Milk River can be expected to function satisfactorily under current and expected long-term demands. However, the current system is unable to attain the recommended fire flows for residential areas as well as for the high school, hospital, and the downtown core. The recommended upgrades, specifically the three trunk mains, will increase pressure to the extremities and improve fire flows such that the minimum required fire flow required can be achieved throughout the Town. The required fire flows for the high school are also met once the upgrades are completed. Even with improvements, the east end of 4th Avenue North has lower than ideal pressures, but still meets Alberta Environment standards.

It is recommended that these upgrades be incorporated into the Town's infrastructure improvement plans to be completed in conjunction with other infrastructure works that the Town proposes (i.e., roadwork, sanitary sewer projects) to ensure minimal construction costs.

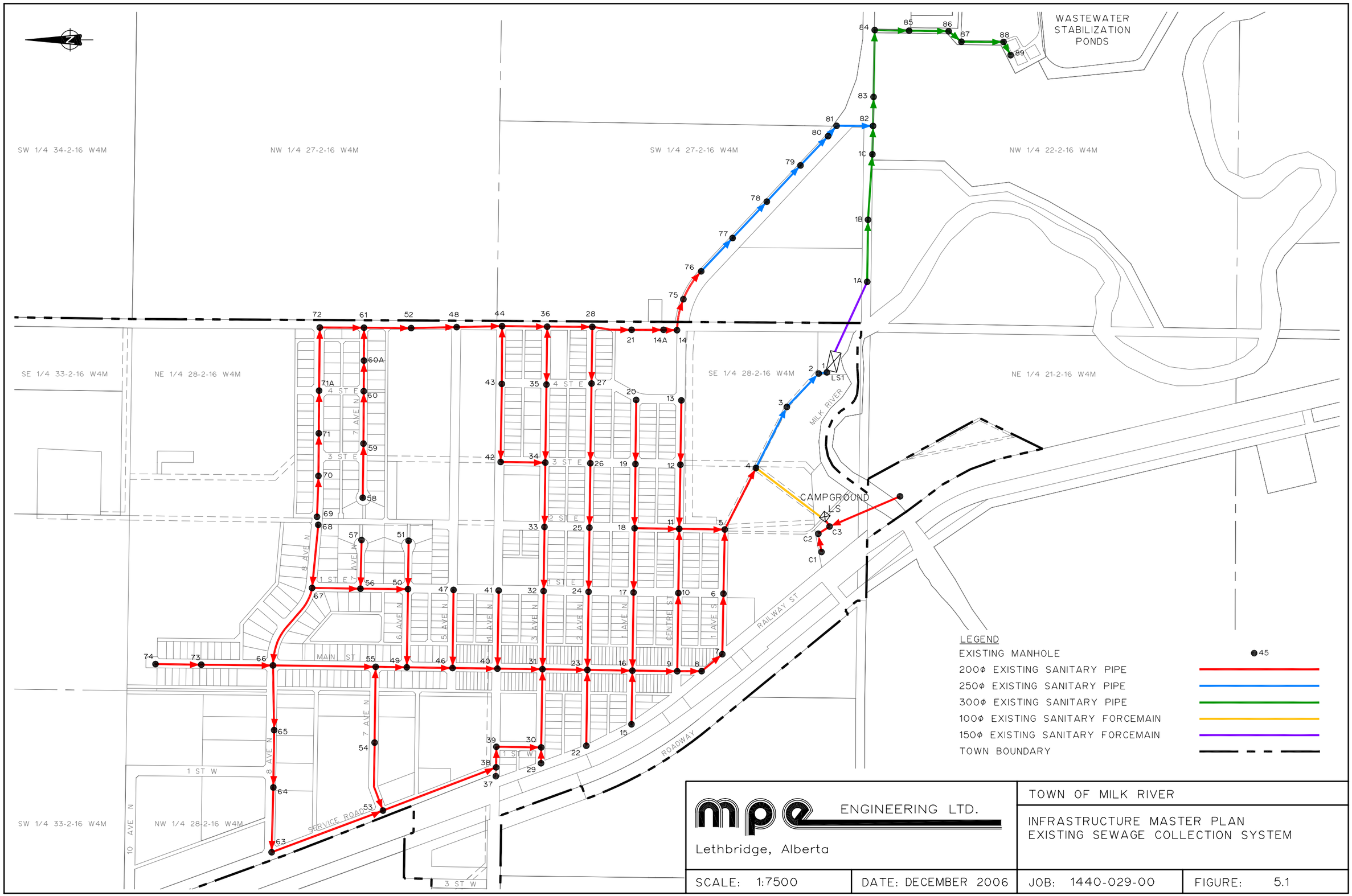
5.0 Sanitary Infrastructure

5.1 Sewage Collection

The sanitary sewage collection system in the Town of Milk River consists of a network of gravity flow pipes, a main lift station located near the Milk River, and a smaller lift station located in the Town's campground. Most sanitary flows from the north of the Town drain toward the main lift station (Lift Station No.1) that is located at the south end of 5th Street West near the river. The east side of Milk River is serviced by a gravity trunk that continues to a collection manhole that combines the Town's gravity sewer with flows from Lift Station No. 1. Lift Station No. 1 pumps into a 150 mm diameter forcemain that runs along the Milk River to a manhole located at the highest point on the Town's sanitary force main right of way. The sanitary flows then continue east and south by gravity toward the treatment lagoons where the flows enter the collection manhole that combines with the gravity sanitary flows from the east side of Milk River. From this manhole all of the Town's sanitary flows are diverted to the treatment lagoons. Most of the sewage collection network consists of 200 mm (8 inch) diameter pipe, with approximately 400 m of 250 mm (10 inch) pipe located upstream of the treatment lagoons. The older portions of the sanitary collection system are vitrified clay tile (VCT) while the newer pipes are polyvinyl chloride (PVC).

The general experience in Milk River is that the collection system has adequate capacity to carry the current dry weather flows (DWF), which are the normal daily sewage flows during non-precipitation periods. However, during wet weather flow (WWF) significant quantities of inflow/infiltration (I/I) enter the sewage collection system as a result of rainstorm events. These excess flows have caused manholes to surcharge and sanitary services to back-up on a number of occasions in the past years. The Town has recently undergone a major cleaning of sewers where all sewers were inspected by camera and were cleaned out by pressure washing. This maintenance has seemed to alleviate some of the problem of manhole surcharging. However, the bottleneck in the system now seems to be the main lift station. During major rainfall events, the lift station can barely and sometimes cannot keep up with all submersible pumps running. During these events, the Town has had to pump out of manholes prior to the lift station to keep

the sewer system from backing up and to prevent Lift Station No. 1 from flooding. The existing sewage collection system is illustrated in Figure 5.1.



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Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
EXISTING SEWAGE COLLECTION SYSTEM

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.1

5.1.1 Historical Data Review

5.1.1.1 Data Collection

Physical data for the sanitary sewage collection and treatment system was obtained from record drawings provided by the Town, topographic surveys conducted by MPE to collect pipe invert and manhole rim elevations, and data provided by camera inspections performed by Thuro Inc.

5.1.1.2 Historical sewage flows

The Town meters sanitary flow from Lift Station No. 1 as well as records pump run-times. The gravity system is not metered and therefore sewage flows had to be estimated. This was done by counting of the number houses on the current system, estimating the number of people that lived in these houses and then assigning a sewage flow to each person. The sewage flows assigned to each person was based on data from Lift Station No.1. The number of people serviced by Lift Station No. 1 was determined by subtracting the number of people serviced by the gravity system. Based on these assumptions, average day flow, dry weather flow, and wet weather flow was determined. The gravity system also provides sanitary service for the 25 bed Milk River hospital. An assigned sewage flow of 900 litres per day per bed was assumed. The estimated combined sewage flow from the gravity system and Lift Station No. 1 was then compared to the annual water demand records from the water treatment plant. The results illustrated that the sewage flows were within 1% of the water demand during dry weather periods. It was therefore determined that the gravity system in Milk River contributed to approximately 9% of the total flow to the treatment lagoons.

5.1.2 Current and Projected Sewage Flows

The sewage flow data from Lift Station No. 1 during the dry weather periods, typically the fall and winter months, were used to determine the average dry weather sewage flows (DWF). From the data, it was determined that the average DWF is approximately 525 litres per capita per day (Lpcd). The average day sewage flow was determined to be 582 lpcd. Based on a major rainfall event that occurred in June of 2006, the wet weather flows were calculated to be approximately 2,966 lpcd. Therefore the resulting average I/I for the Town is 2,441 lpcd. Table 5.1.2.1 depicts historical average day sewage flow, dry weather sewage flow, wet weather sewage flow, and I/I.

TABLE 5.1.2.1 - Milk River Adjusted Historical Sewage Flows							
Month	**Average Day Flows**						
	2000 (m^3)	**2001 (m^3)**	**2002 (m^3)**	**2003 (m^3)**	**2004 (m^3)**	**2005 (m^3)**	**Average (m^3)**
January	497	377	345	553	500	480	459
February	449	379	341	522	510	457	443
March	458	384	350	520	472	426	435
April	512	382	364	554	467	450	455
May	494	387	449	681	576	431	503
June	525	412	1,209	663	632	717	693
July	512	407	874	627	565	679	611
August	512	418	756	652	555	653	591
September	496	390	692	626	531	661	566
October	428	400	663	555	504	618	528
November	414	382	637	525	476	559	499
December	412	368	586	519	449	525	477
Total Year Usage	174,166	142,599	221,304	212,978	190,205	202,612	190,484
Population	892	879	888	897	906	915	
Avg Day Flow (m^3)	476	391	606	584	520	555	**522**
Avg Dry Flow (m^3)	453	382	469	535	483	502	**471**
Max Wet Weather (m^3)	916	561	2,634	787	1,009	828	**2,634**
Avg Day Flow (lpcd)	533	444	683	651	574	607	**582**
Avg Dry Flow (lpcd)	508	434	529	597	533	549	**525**
Wet Weather Flow (lpcd)	1,027	638	2,966	878	1,114	905	**2,966**
I/I (lpcd)	519	203	2,438	281	581	356	**2,441**

Future sewage flows were calculated based on population projections presented in Section 2.2. Population was assigned to that portion of the collection system closest to the probable tie-in point for any new development, and average and peak flows were re-calculated. It was assumed that the per capita sewage generation rate would remain constant for future developments. The areas of the Town serviced by the sewer system were divided into catchments or collection areas. Within each catchment area the number of residential, commercial and industrial lots were compiled and used as the basis for deriving sewage flow. Based on an average density of 2.17 people per existing residential lot (determined from data provided by Statistics Canada), 20 people per gross hectare for future large lot residential areas, and 15 people per gross hectare for commercial/industrial areas, total flows were calculated.

When projecting sewage flows into the future, the maximum daily flows were calculated based on the peaking factor derived from the Harmon equation:

$$\text{Harmon's Peaking Factor} = 1 + 14 / (4 + P^{1/2})$$

where: P = design contributing population in thousands

Assuming that Milk River's population in 2026 is 1,127, the Harmon's Peaking Factor will be equal to 3.766. Table 5.1.2.2 illustrates current and project sewage flows in 2006.

Table 5.1.2.2 - Current and Projected Flows from Sewage Collection System

Current Sewage Flow						Projected Sewage Flow (Year 2026)					
Population 2006	Harmon Peaking Factor	Average Day Flow (m^3/day)	Avg Dry Weather Flow (m^3/day)	Infiltration / Inflow (m^3/day)	Wet Weather Flow (m^3/day)	Population	Harmon Peaking Factor	Average Day Flow (m^3/day)	Avg Dry Weather Flow (m^3/day)	Infiltration / Inflow (m^3/day)	Wet Weather Flow (m^3/day)
924	3.822	522	471	2,255	4,109	1,127	3.766	656	592	2,357	4,586

Note:

1) Based on the number of houses and the Milk River hospital, an average day flow for the gravity system was determined to be 52 m3 per day. Lift Station No. 1 equates to approximately 90.63% of total sewage flows.
2) Avg Day Flow = 582 lpcd
3) Avg Dry Weather Flow = 525 lpcd
4) Wet Weather Flow = 2966 lpcd
5) I/I_{2006} = 2441 lpcd
6) $I/I_{\text{New Development}}$ = 500 lpcd

It should be noted that the current wet weather flow (WWF) based on the Harmon's peaking factor on Figure 5.1.2.2 (4,109 m^3/day) is substantially higher than the current WWF determined by using the records from Lift Station No. 1 magnetic flow meter form Figure 5.1.2.1 (2,634 m^3/day). This is most likely due to the fact that during major rainfall events the Town must pump sewage directly out of manholes upstream of Lift Station No.1 to prevent the collection system from backing up and to prevent the lift station from flooding. This sewage bypasses the lift station and is therefore not metered. For analytical purposes, the assessment of the sewage collection and treatment system is based on the WWF determined by the Harmon's Peaking factor.

5.1.2.1 Estimation of Inflow/Infiltration

The large amounts of I/I are generally attributed to the fact that the majority of homes have their weeping tile foundation drains connected directly to the sanitary system, downspouts connected to the weeping tile, and lot grades do not always provide positive drainage away from the building's foundation. This is a common problem shared by many municipalities in southern Alberta. As a result many communities have passed bylaws prohibiting this practice in new developments.

The data collected from the lift station included the time period during which there was a major storm. This storm data was particularly useful in determining the amount of inflow and infiltration (I/I), which occurs in the collection system. An analysis of the data previously revealed I/I was approximately 2,441 Lpcd. I/I was determined using a large storm event. I/I in other years have been determined to be substantially lower. Therefore, in the creation of a sanitary sewage model, an I/I of 2,441 Lpcd was used in subsequent analysis and discussion as it is conservative with respect to sizing of infrastructure. For new residential developments within the Town, it was assumed that foundation tile drains are not connected to the sanitary sewer and therefore I/I of 500 Lpcd was used for the analysis of these areas. An I/I of 500 lpcd is a typically value based on current design assumptions residential development.

5.1.3 Collection System Analysis

Hydraulic analysis of the sanitary sewage collection system was undertaken using SewerCAD version 5 computer modeling software. The purpose of the analysis was to recreate the flows in the system for both dry and wet weather flow conditions. Dry and wet weather scenarios were developed for both the current (2006) and future (2026) conditions. The dry weather flow scenarios include only sewage flow based on the average per capita sewage generation rate. The wet weather scenarios include the dry weather sewage flows of 525 Lpcd, and the inflow/infiltration flows of 2440 Lpcd for existing areas and 500 Lpcd for new developments.

The existing sanitary collection system can handle the current (2006) dry weather flow conditions; however the trunk from manhole 4 to manhole 5 is very close to capacity and flows nearly full during peak periods. When the future (2026) dry weather flows are imposed on the

system the lack of capacity in the trunk along 1st Avenue South to Lift Station 1 becomes more apparent and minor surcharging occurs in manholes 5 and 6. The remaining mains throughout the Town have capacity to handle the future (2026) dry weather flows.

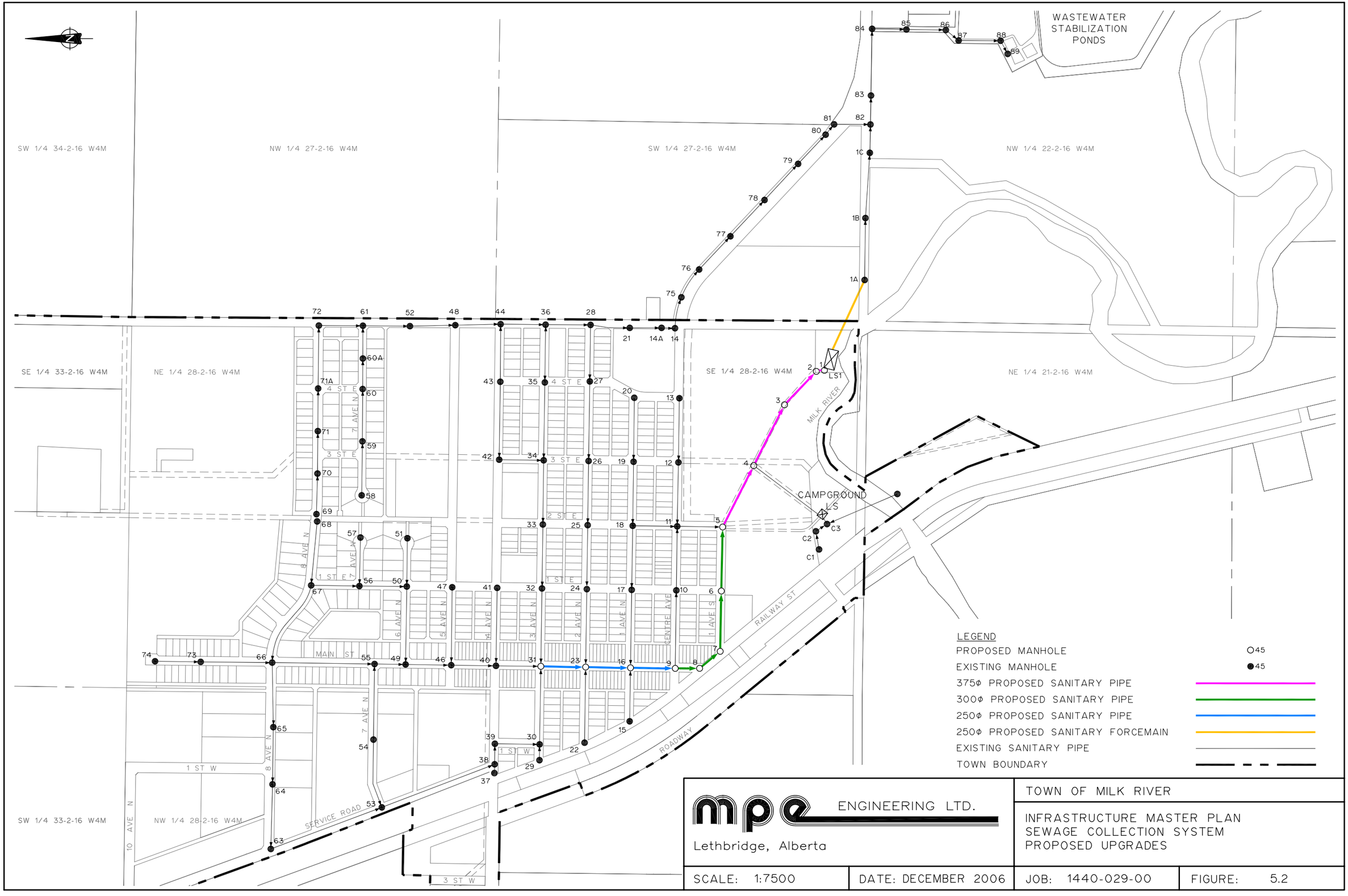
Most communities have few problems conveying dry weather flows, however many of these communities have severe problems with inflow and infiltration during heavy rainfalls and Milk River is no different. The existing collection system is incapable of handling current or future wet weather flow conditions. During wet weather conditions the lack of capacity in the trunk along 1st Avenue South and along Main Street leads to severe surcharging and daylighting in several manholes upstream of Lift Station 1. The majority of the mains throughout the Town can handle the flows during the future (2026) wet weather conditions however many of these pipes experience backups due to the lack of capacity along Main Street, 1st Avenue South and the trunk leading to Lift Station 1.

The detailed hydraulic modelling of the sewage collection system and the model outputs are included in Appendix H.

5.1.4 Proposed Upgrades

Various piping upgrades were analysed to determine the best method to alleviate the capacity issues which exist in the current sanitary collection system. It was determined that an upgrade of the sanitary pipes upstream of Lift Station 1 along 1st Avenue North and Main Street as shown in Figure 5.2 is required. The trunk from Lift Station 1 to manhole 5 at the intersection of 2nd Street East and 1st Avenue S should be upgraded to a 375 mm (15 inch) diameter pipe. Further, the sanitary main heading west from manhole 5 along 1st Avenue South to manhole 7 and then north along Main Street to manhole 9 located at Centre Avenue requires an upgrade to a 300 mm (12 inch) diameter pipe. It is also necessary to upgrade the sanitary main along Main Street from manhole 9 to manhole 31 at 3rd Avenue North to a 250 mm (10 inch) main. These upgrades will alleviate the surcharging that occurs during wet weather flows and also provides capacity for future growth of the Town, particularly for commercial development expected to occur along 10th Avenue North. These pipe improvements could be completed in phases to accommodate budgetary constraints. As with all infrastructure projects outlined in this report these upgrades

should be coordinated with other work that the Town proposes (i.e., roadwork, water distribution projects) to ensure an efficient construction effort.



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Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
SEWAGE COLLECTION SYSTEM
PROPOSED UPGRADES

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.2

5.1.5 Cost Estimates

Preliminary cost estimates have been prepared for the proposed upgrades to the sewage collection system. The costs have been separated into three phases: Phase 1 - upgrade from Lift Station 1 to manhole 5; Phase 2 - upgrade from manhole 5 to manhole 9; Phase 3 - upgrade from manhole 9 to manhole 31. The estimated costs of Phase 1, Phase 2, and Phase 3 including contingencies and engineering, are $314,000, $519,000, and $460,000 respectively. Further detail is provided in Appendix I.

5.1.6 Conclusions and Recommendations

The sewage collection system is near capacity when carrying current dry weather flows and with future growth this capacity will be exceeded. During large rainstorm events the system experiences severe surcharging caused by inflow/infiltration. Based on the results of the computer modeling, system upgrades have been identified to adequately address the surcharging and provide capacity for future growth. It is recommended that these upgrades be completed in the near future.

In order to free up capacity for primarily sewage rather than storm water it is recommended that the Town consider development controls to limit the connectivity of foundation tile drains and sump pumps to the sanitary system in new developments, and provide incentives for residents to disconnect their existing connections.

5.2 Sewage Pumping

5.2.1 Sewage Pumping Infrastructure

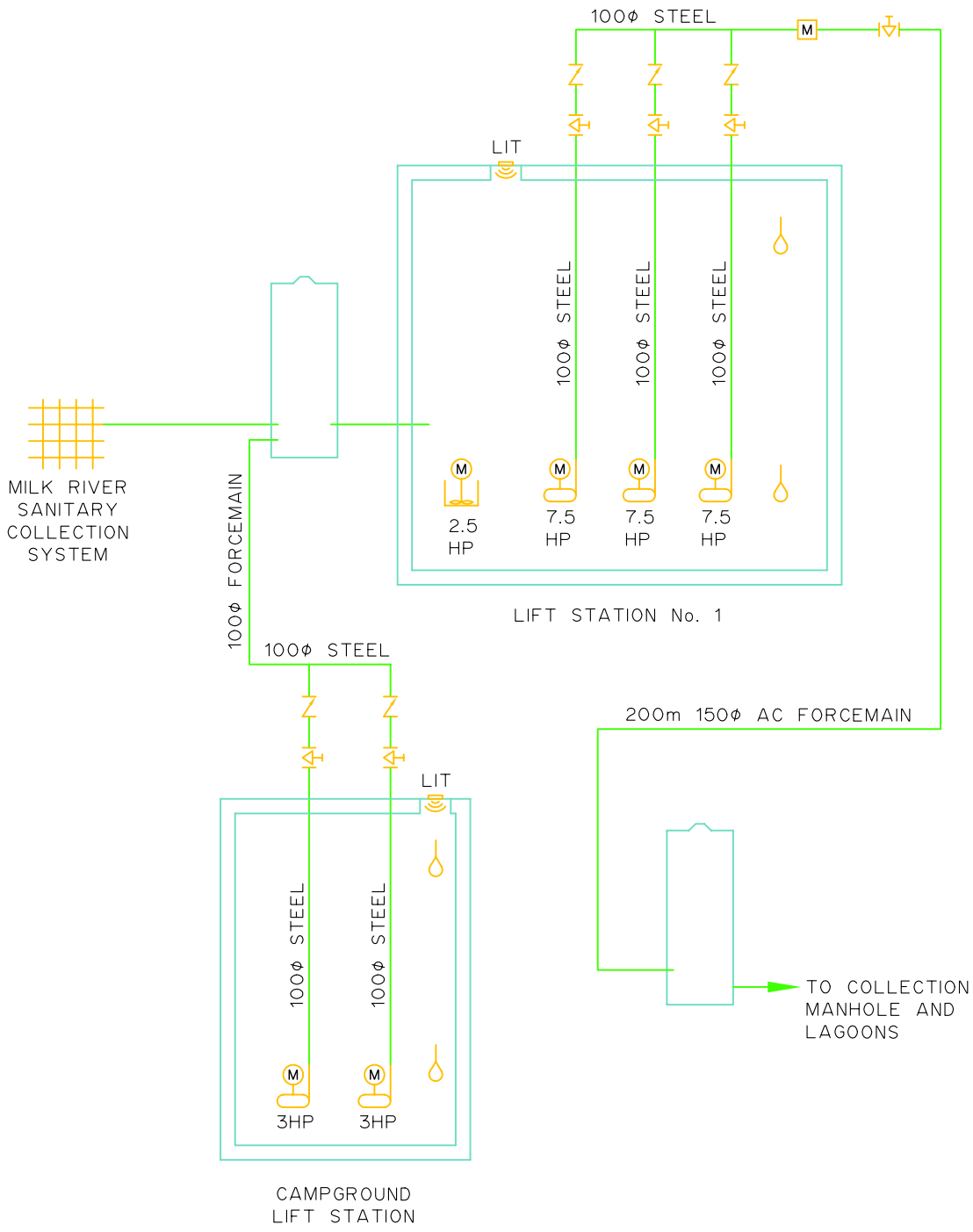
The Town of Milk River has two sanitary lift stations. About 90% of Milk River's existing collection system is serviced by Lift Station No.1. The other 10% is serviced by a gravity system that drains directly to the lagoon treatment system. The Town other lift station is located near the Town's campground and pumps to a manhole upstream of Lift Station No. 1.

The current maximum pumping capacity of Lift Station No.1 is approximately 30 l/sec (2,592 m^3/day) with all three pumps operating. This is less than the current wet weather flow of 47.6

l/sec (4,109 m3/day) thus explaining the reason manholes upstream of the lift station must be pump out of to prevent the lift station from flooding.

Lift Station No. 1 was originally built in 1984. It is fitted with three 7.5 HP Flygt C 3127 submersible pumps and a 2.5 HP Flygt C-3130 submersible mixer. The pumps are controlled by a level indicating transmitter and two level switches. The 100 mm diameter pump header includes pump isolation and check valves for each pump as well as a magnetic flow meter to measure flow and totalize sewage volumes pumped through the lift station. Finally, the pump header is connected to an older 150 mm diameter asbestos cement force main. The force main was constructed in the early 1960's. The latest upgrade to the lift station was approximately five years ago when a submersible mixer was added to the lift station wet well and a level transmitter was installed to control pump staging. The mixer prevents solids from settling, keeps them in suspension for pumping and thereby decreasing the amount of odour that comes from the lift station. The lift station itself is a metal building complete with ventilation, potable water supply, and generator. The electric service for Lift Station No. 1 is 208VAC, 3 phase, 60 Hz, and 200 Amp. There are two separate rooms in the lift station with access to each room from only the outside. The mechanical room is over the lift station wet well and therefore contains the submersible pumps, valves, header, magnetic meter, and wet well access hatches. The electrical room contains the MMC, generator, and magnetic meter indicator and totalizer. The foundation beneath the electrical room is slab on grade. The floor slab elevation in the electrical room is higher as compared to the mechanical room. Therefore if the lift station were to flood, sewage would dump out an overflow in the mechanical room sparing the electrical room from flooding.

The Town's other lift station in the campground is much smaller. It is currently fitted with two 3 HP submersible pumps and is controlled with a level indicating transmitter and two level switches. The Town has built a wooden structure over the existing wet well. The building is approximately 2.5 metres by 2.5 metres. There is little room in the building making maintenance somewhat difficult. This lift station pumps into a 100 mm diameter force main that discharges into a manhole 40 metres upstream of Lift Station No. 1. The electric service for campground lift station is 208VAC, 3 phase, 60 Hz, and 40 Amp. Figure 5.3 illustrates lift Station No.1, the campground lift station, and their respective forcemains.



mpe ENGINEERING LTD. Lethbridge, Alberta		TOWN OF MILK RIVER INFRASTRUCTURE MASTER PLAN EXISTING SEWAGE PUMPING SYSTEM	
SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.3

5.2.2 Proposed Upgrades

Lift Station No. 1 will require a major upgrade in the immediate future. The current submersible pumps cannot handle wet weather flows during major rainfall events. All three pumps must operate in order to accommodate wet weather flow during normal precipitation events. According to the AENV "Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems", the lift station must be designed so that with the largest pump down, the remaining pump(s) can achieve the maximum design flow rate.

In order to upgrade Lift Station No.1 so that it can handle the 20 year wet weather flow of 53 l/sec (4,586 m^3/day), the following is recommended:

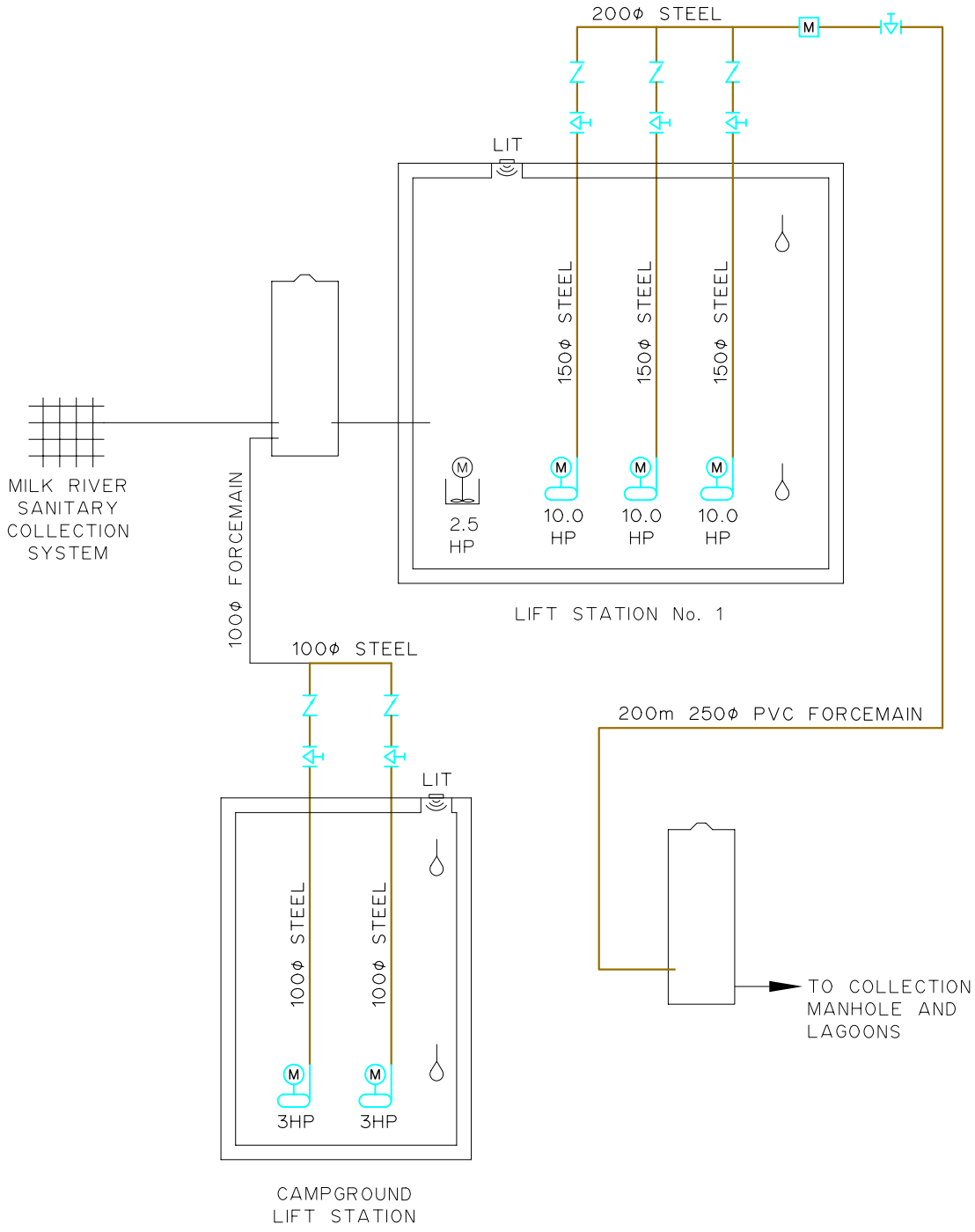
- Upgrade the 7.5 HP submersible pumps to 10 HP submersible pumps
- Replace the 100 mm diameter riser and valves with 150 mm diameter riser and valves
- Upgrade the 100 mm diameter header to a 200 mm diameter header
- Replace existing the 100 mm diameter magnetic meter with a 200 mm diameter magnetic meter
- Replace the existing 150 mm diameter force main with a 250 mm diameter PVC force main
- Upgrade the electrical service as required
- Add a PLC for pump control and incorporate Lift Station No. 1 into the proposed SCADA system
- Add building alarms to incorporate into the proposed SCADA system
- Add automatic control for the generator intake and exhaust louvers

The campground lift station will require the following upgrades:

- Upgrade the existing submersible pumps to 3 HP submersible pumps

- Replace the existing risers and valves
- Upgrade the electrical service as required
- Add an I/O radio to incorporate the lift station into the proposed SCADA system
- Add building alarms to incorporate into the proposed SCADA system
- Add a manual transfer switch and receptacle in the case that temporary power is required
- Upgrade building ventilation

With these upgrades, the sewage pumping system will be brought up to current standards. Figure 5.4 illustrates the proposed upgrades to Lift Station No.1 and the campground lift station.



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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED SEWAGE PUMPING SYSTEM

SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.4

5.2.3 Cost Estimates

A preliminary cost estimate has been prepared for the proposed upgrades to the sewage pumping infrastructure. The estimated cost for the upgrades to Lift Station No.1 and the campground lift station, including replacing the Lift Station No. 1 forcemain, PLC and SCADA implementation at both stations, contingencies and engineering, is $400,000. These upgrades will ensure that Milk River has a reliable sewage pumping system that meets current design standards. A complete breakdown of proposed upgrade costs are provided in Appendix J.

5.2.4 Conclusions and Recommendations

The existing sewage pumping system operated by the Town of Milk River has just enough capacity to handle wet weather flows in normal precipitation events. Lift Station No.1 and its force main will require an immediate upgrade in order for it to handle further development and higher than average precipitation events. The campground lift station has adequate capacity but will require an upgrade in the future due to age and condition of equipment.

5.3 Sewage Treatment

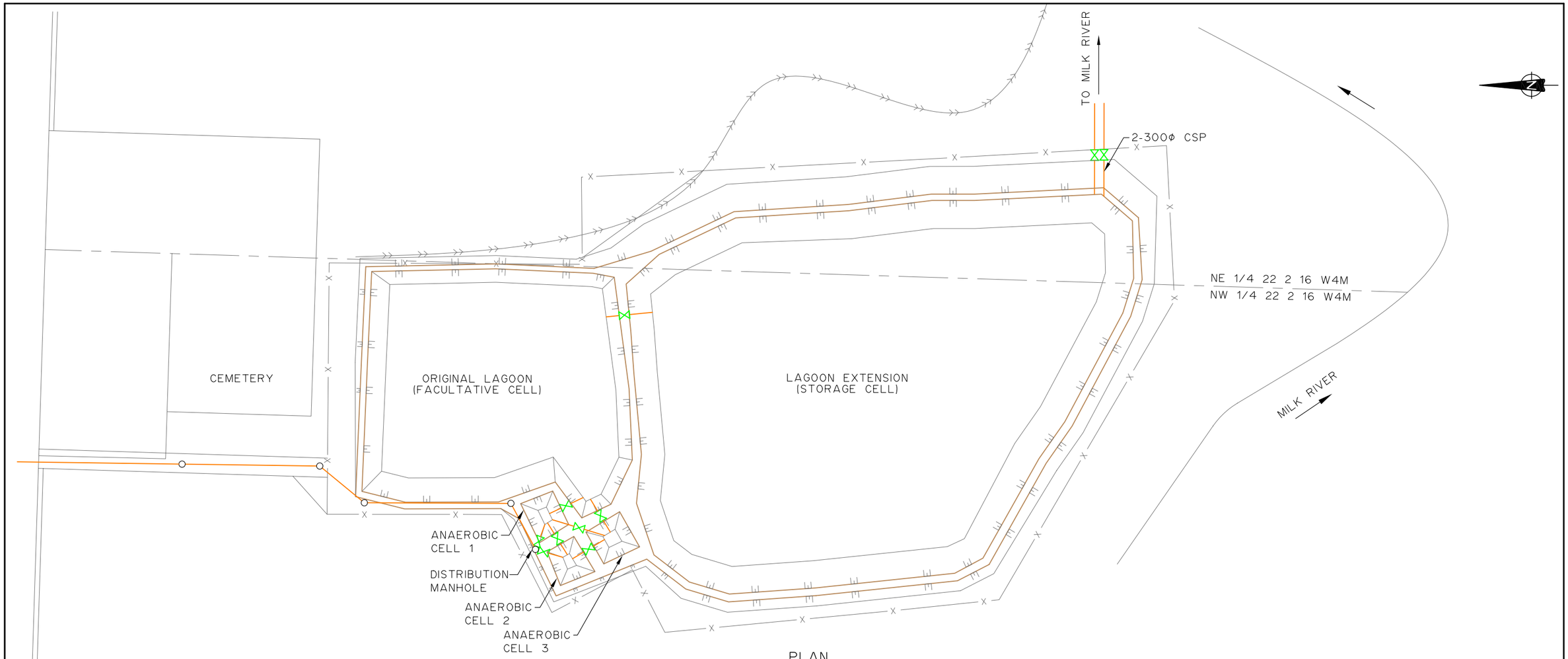
5.3.1 Treatment Process and Infrastructure

The Town of Milk River utilizes wastewater stabilisation ponds for treatment of its sewage. The sewage lagoons are located on N Section 22 Township 2 Range 16 West of the 4th Meridian just east of the Town boundary. The treatment system consists of three (3) anaerobic cells, one (1) facultative cell, and one (1) storage cell. Under the current code of practice, the Town is allowed to release effluent twice per year in the spring and fall. The treated effluent can be discharged to the Milk River.

The sewage treatment system was first constructed in the early 1960's with one (1) stabilization pond. In 1972 the system received an upgrade which included the addition of three (3) anaerobic cells and a storage cell. The original lagoon was converted into a facultative cell. The cells are interconnected with a series of siphons that allow the transfer of wastewater from one cell to another. Wastewater in a cell reaches a certain level where the transfer of fluid begins. When the level drops to a certain point, a vacuum breaker (stand pipe) allows air into the pipeline to

cease the flow of wastewater. According to comments by the Operator, once the level reaches a certain point in the facultative cell, fluid is transferred to the storage cell and does not stop until the facultative cell is almost empty. This is indicative of the vacuum breaker failing to allow enough air into the piping to stop the flow of wastewater. The flow does not stop until air is drawn into the main piping or when the wastewater levels in the two cells are equal. In any case, operating the facultative cell in this manner is undesirable as the sudden change in level upsets biological and physical processes occurring in the cell. The quality of effluent from the facultative cell entering the storage cell is therefore much lower than it should be and if an annual discharge is required, the quality may then exceed the limits placed on the municipality by Alberta Environment.

The existing treatment process is illustrated by Figure 5.5.



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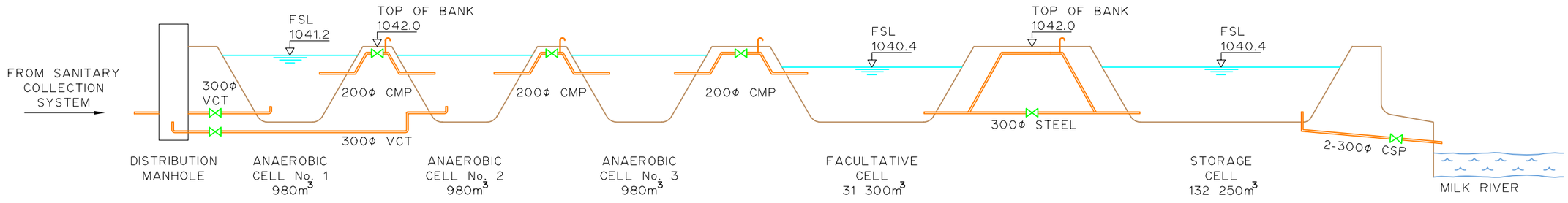

HYDRAULIC PROFILE

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
EXISTING LAGOON TREATMENT SYSTEM
PLAN AND HYDRAULIC PROFILE

SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.5

5.3.2 Standards and Guidelines

Alberta Environment's "Standards and Guidelines for Municipal Waterworks, Wastewater and Storm Drainage Systems" (2006), gives the following minimum standards for wastewater lagoons: anaerobic cells shall operate at a minimum depth of 3.0 m and retain influent for a 2-day period based on average daily design flow (ADDF); facultative cells shall operate at a maximum depth of 1.5 m and retain influent wastewater for at least 60 days based on ADDF; Storage cells shall operate at a maximum depth of 3.0 m and shall retain influent wastewater for a minimum retention period of 12 months based on ADDF.

Milk River's wastewater water treatment system is currently regulated under Alberta Environment's *Code of Practice for Wastewater Systems Using a Wastewater Lagoon*. The Code outlines operating and reporting requirements for municipal wastewater lagoons. According to the Code, Milk River is allowed to discharge to the Milk River between April 1st and November 30th. The lagoon should not be discharged at a frequency exceeding the designed frequency of discharge. Since the Town has little data for the lagoons, it is assumed that the designed discharge frequency is the maximum discharge frequency as specified in the previous Alberta Environment Approval 17432-01-00 of once per year. Each discharge must be completed within a period of three consecutive weeks.

5.3.3 Evaporation and Precipitation

Evaporation and precipitation rates for Milk River were determined by using data compiled by Environment Canada from 1971 – 2000 for the Lethbridge region.

Table 5.3 - Historical Evaporation & Precipitation

Month	Avg. Vap.Pres. (kPa)	Avg Temp	Wind Speed (km/hr)	Evaporation (mm/Month)	Precipitation (mm/Year)	Net Change (mm/Year)
January	0.3	-7.8	19.8	0.0	17.6	17.6
February	0.3	-4.6	19.0	0.0	11.6	11.6
March	0.4	-0.2	18.3	115.5	24.0	-91.5
April	0.5	6.0	19.1	126.9	31.3	-95.6
May	0.7	11.3	18.9	143.6	53.5	-90.1
June	1.0	15.5	18.2	182.4	63.0	-119.4
July	1.2	18.0	15.3	219.7	47.5	-172.2
August	1.1	17.7	14.3	212.4	45.8	-166.6
September	0.8	12.6	16.0	154.8	39.6	-115.2
October	0.6	7.0	18.9	126.6	18.9	-107.7
November	0.4	-1.5	19.5	111.1	16.9	-94.2
December	0.3	-6.1	21.2	0.0	16.7	16.7
Annual				**1393.1**	**386.4**	**-1006.7**

Table 5.3 above illustrates monthly average precipitation and evaporation rates for the years 1971 -2000. The 30 year net evaporation average is approximately 1000 mm. This table is used in adjusting the amount of storage available in the lagoon treatment system. According to the Alberta Environment *Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems*, lagoon volume adjustment using net evaporations is allowed where historical climatogy data shows that average evaporation exceeds the average precipitation. The minimum free board under this scenario, however, must be increased to accommodate additional flows during wet years. The free board for the facultative and storage cells is one metre above the full supply level.

5.3.4 Treatment Capacity

The capacity of the existing sewage lagoon treatment system was calculated based on survey data performed by MPE and lagoon record drawings provided by the Town of Milk River. The net evaporation/precipitation was previously calculated and has been added to the storage volumes. Cell retention time was calculated using the average daily design flow (ADDF). The retention times were determined for both the current flow of 522 m^3 per day and the 20 year projected flow of 656 m^3 per day. The existing sewage lagoon treatment system has a capacity of 525 m^3 that will meet Alberta Environment requirements for retention with one discharge per year. Current sewage treatment operation has seen no releases in least a decade.

Table 5.4 - Sewage Lagoon Treatment System

Treatment Cell	Volume (m^3)	Net Annual Evap (-)/Precip (+) (m^3)	Adjusted Cell Volume (m^3)	Retention Time (days)		
				Current (2006)	20 Year (2026)	Alberta Environment Requirement
Anaerobic Cells (3)	2,940	-1927	4867	9	7	2
Facultative Cell	31,300	-22202	53502	103	82	60
Storage Cell	132,250	-61542	193792	371	295	365
Total	**166,490**	**-85,671**	**252,161**	**483**	**384**	**427**

According to the survey performed by MPE and record drawings provided by the Town, the sewage treatment system has adequate capacity to handle the current sewage flows. When analyzing the lagoon treatment system compartments, the capacity for the anaerobic cells will meet Alberta Environment's required 2 day retention time for the current and the 20 year projected sewage flows. The facultative cell currently meets the required retention time of 60

days and will continue to meet retention requirements for the projected 20 year sewage flow. The main shortfall in the lagoon treatment system for the 20 year projected sewage flow is the storage cell where the cell will only be able to retain treated sewage for 295 days. Alberta Environment requires the storage cell on a lagoon treatment system to retain treated sewage for a minimum of 365 days. Since the lagoon treatment system is almost at capacity, any future additional loading on the lagoon system will require adding additional storage to the lagoon treatment system.

With the survey pointing towards a conclusion that the Town should be releasing treated sewage at least once per year and the current lagoon treatment system operation has not seen a release in over ten years; it may be concluded that lagoon leakage is occurring. It is possible that the lack of an annual release could be attributable to a higher evaporation rate in Milk River as compared to Lethbridge. The precipitation and evaporation rates were determined using Lethbridge data since Environment Canada does not have detailed climate records for Milk River. However, it is more likely that the lack of releases is due to lagoon leakage.

The Town has been monitoring the groundwater up gradient and down gradient of the lagoon. The monitoring is being performed by EBA Engineering Consultants Ltd. and according to their conclusions from the *2005 Annual Groundwater Monitoring Report*, the down gradient wells had an elevated concentration of fluoride as compared to the background fluoride concentration in the up gradient wells. Since the Town of Milk River adds fluoride to potable water as a measure of community dental protection, it is highly probable that the elevated levels of fluoride in the down gradient wells are an indicator of lagoon leakage. The study also went on to indicate that even if there is lagoon leakage occurring, it is not having a noticeable impact on the groundwater near the Milk River and that there is no evidence that the lagoons are having a negative effect on the Milk River itself.

In regards to maintenance of the lagoon, the treatment cells have not been desludged since there original construction over thirty years ago. The build up of sludge reduces the capacity and therefore retention time available of the lagoons. This was especially noticeable with the three anaerobic cells.

5.3.5 Proposed Upgrades

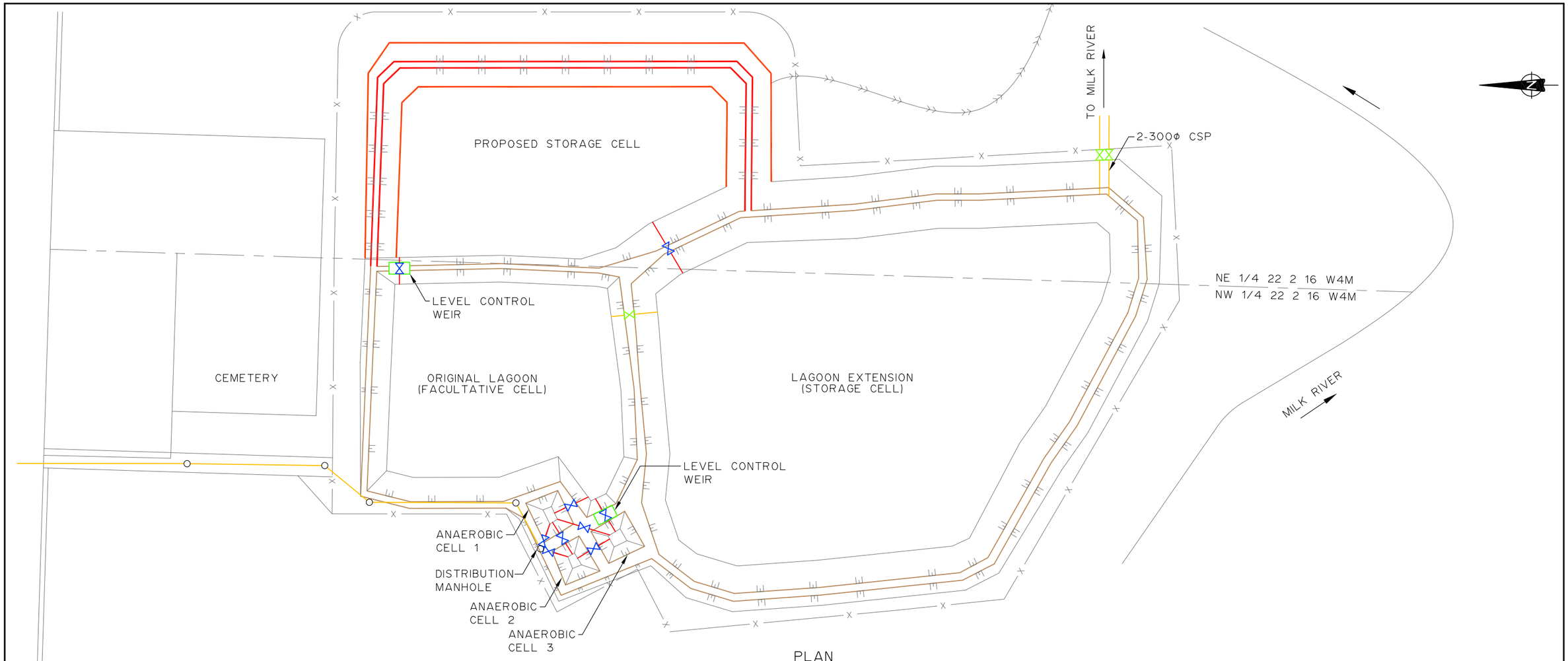
Minor upgrades proposed for the Milk River lagoon treatment system include de-sludging of the anaerobic cells to increase operating depth to a minimum of three metres for better operation. The facultative and storage cells should also be cleaned to allow for better operation. Also proposed is the replacement of the 200 diameter anaerobic cells interconnecting piping with 300 mm diameter piping and the replacement of the existing piping that is used to control level in the anaerobic and facultative cells with level control weirs that will allow the Operator to control and vary the level of the cells.

Sewage flow through the facultative and storage cells should be monitored daily so that it can be determined if and where the lagoons are leaking. Once leakage is determined, the leaking cell should be rehabilitated with either in-situ material (if the material is acceptable for use as a liner) or a PVC liner.

Finally, a second storage cell will need to be added to achieve the retention time required by Alberta Environment. For the 20 year design projected sewage flow, a storage cell with a volume of 45,000 m^3. This second cell could be located east of the existing facultative cell and would require approximately 2.8 hectares of land. This upgrade would require various modifications to the interconnecting pipes. Figure 5.6 provides a schematic of the proposed sewage treatment process. Preliminary costs for the upgrades are provided in Appendix E.

5.3.6 Cost Estimates

A preliminary cost estimate has been prepared for the proposed upgrades to the sewage treatment system. The estimated cost, including contingencies and engineering, is $1,357,000 for new interconnecting piping, level control weirs, and a 45,000 m^3 storage cell. These upgrades will ensure that Milk River meets current regulatory standards and that highest quality of effluent is achieved. A complete breakdown of proposed upgrade costs are provided in Appendix J.



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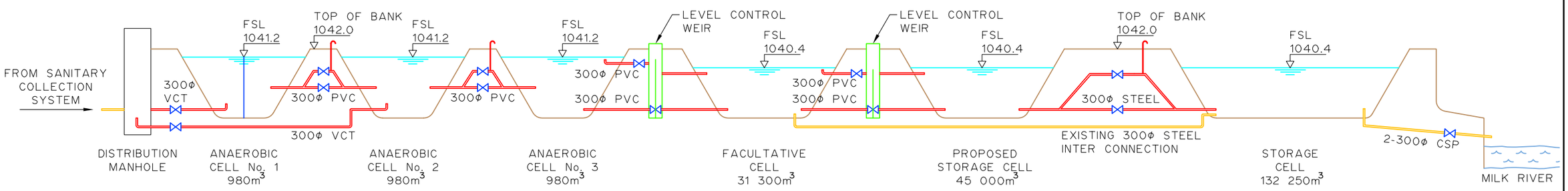

HYDRAULIC PROFILE

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED LAGOON TREATMENT SYSTEM
PLAN AND HYDRAULIC PROFILE

SCALE: NTS	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 5.6

5.3.7 Conclusions and Recommendations

The existing sewage treatment system operated by the Town of Milk River has adequate capacity to handle the current sewage flows but is almost at its capacity. The anaerobic cell interconnecting piping and storage cell volume is the limiting factor of this treatment system. The Town should make efforts to acquire land needed for this upgrade and continue to monitor and collect flow and effluent quality data in order to determine exactly when the upgrade will be required. The treatment cells have not been cleaned since their construction therefore it is recommended that the treatment cells, especially the anaerobic cells be desludged.

6.0 Storm Water Management

6.1 Background

The topography of Milk River indicates a general sloping to the south and west. The Town is bounded on the west by Highway 4 and on the east by County Road. The Milk River is effectively the south boundary and the north edge of Town abuts agricultural lands.

Surveys of drainage works, topographical data, and field analysis were used to determine the storm water flow patterns and catchment areas within the Town and the immediate surrounding area. Discussions with Town personnel also helped determine problem areas, such as those that experience recurring ponding or flooding.

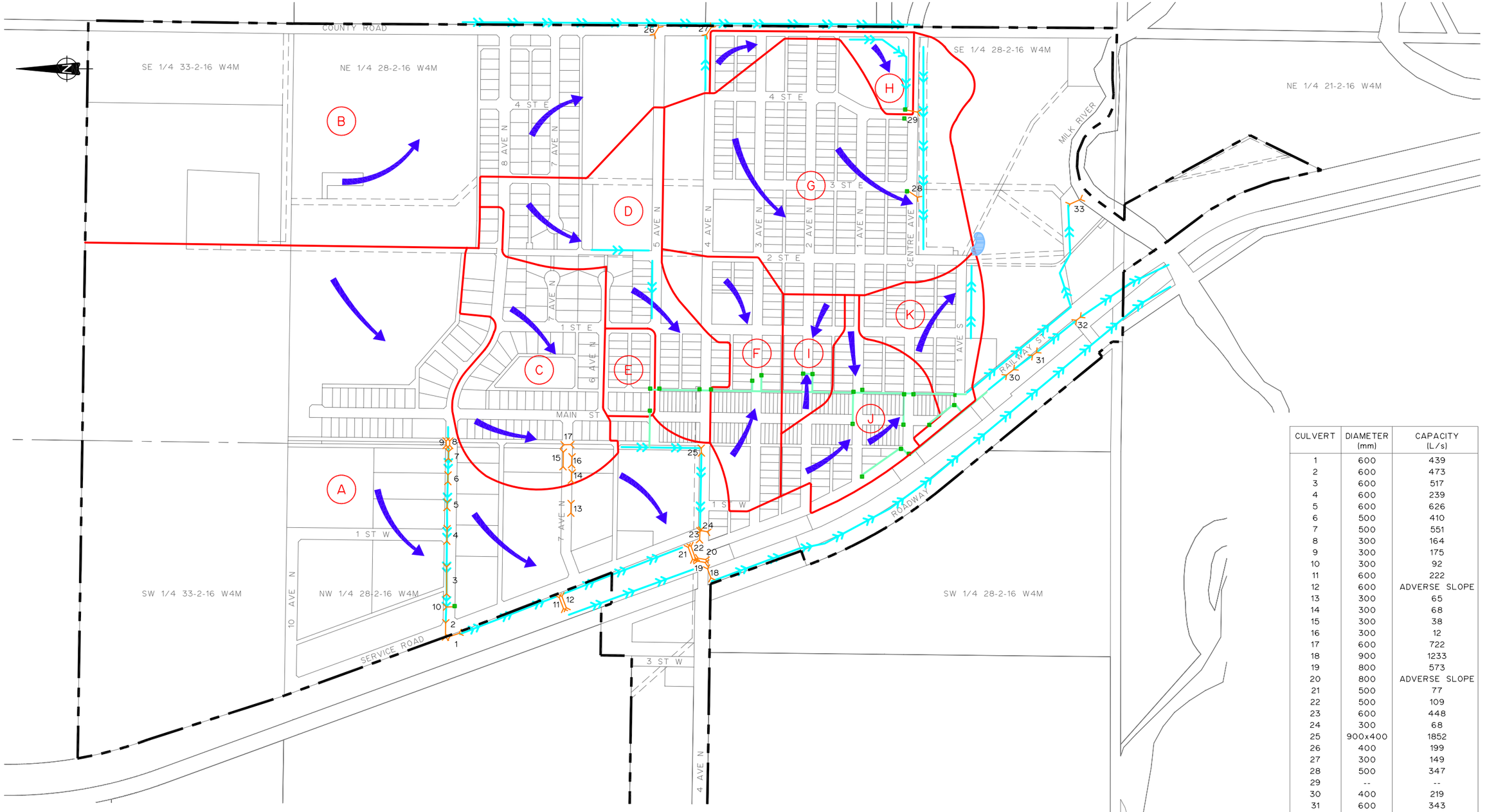
The following section addresses existing storm water issues and provides a storm water management plan for areas of future development.

6.2 Existing Storm Water System

6.2.1 Major (Overland) Drainage

The majority of runoff water from precipitation or snowmelt flows overland through the Town along curbs and gutters and via swales, ditches, and culverts. Figure 6.1 outlines the existing drainage paths and catchment areas within the Town. The current system is relatively effective, runoff water drains well from the majority of the roadways and as such the Town has historically only experienced minor local ponding issues.

The northwest catchments (Areas A, C, & E) drain to the southwest along roadways, gutters, swales and ditches. Stormwater is conveyed into the highway ditches and eventually into the ditch west of the CP Rail where it flows south and outfalls into the Milk River. The downtown and central areas of the Town (Areas D, F, I, & J) flow toward the underground storm system located in the lane east of Main Street. The runoff is collected and conveyed by the storm



CULVERT	DIAMETER (mm)	CAPACITY (L/s)
1	600	439
2	600	473
3	600	517
4	600	239
5	600	626
6	500	410
7	500	551
8	300	164
9	300	175
10	300	92
11	600	222
12	600	ADVERSE SLOPE
13	300	65
14	300	68
15	300	38
16	300	12
17	600	722
18	900	1233
19	800	573
20	800	ADVERSE SLOPE
21	500	77
22	500	109
23	600	448
24	300	68
25	900x400	1852
26	400	199
27	300	149
28	500	347
29	--	--
30	400	219
31	600	343
32	600	543
33	800	2236

LEGEND

CATCHMENT AREA (A)

CATCHMENT BOUNDARY

EXISTING STORM SEWER

EXISTING CATCH BASIN

EXISTING CULVERT

EXISTING DITCH/SWALE

TOWN BOUNDARY

EXISTING POND

DRAINAGE PATTERN

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
EXISTING DRAINAGE PATTERNS

SCALE: 1:7500 | DATE: DECEMBER 2006 | JOB: 1440-029-00 | FIGURE: 6.1

where it discharges into the highway ditch south of 1st Avenue South and eventually flows south and east into the Milk River.

Areas G, H, and K drain toward the intersection of 2nd Street East and 1st Avenue South along roadways, gutters, and a ditch located along the northside of the golf course. The stormwater from these areas ponds in a low depression located southeast of the previously mentioned intersection. A small amount of stormwater is able to drain from this ponded area along an informal drainage route through the golf course into the Milk River. During large rainfall events this pond fills with water, spills into the adjacent intersection and ponds within the roadway.

Discussions with Town personnel identified a few minor stormwater problems within the Town. The intersection of 3rd Avenue North and Highway 4 experiences local ponding along the east side of the Highway. This is a low lying area with no defined drainage. During cold weather this area can freeze creating a safety hazard for motorists. A shallow informal swale was dug along the east side of the highway from 3rd Avenue North to 4th Avenue North to help drain this area. The swale is not well enough defined to allow proper drainage and requires excavation and proper grading. It was also noted that Culvert 23 was plugged and causing problems with drainage near the intersection of 4th Avenue North and the Service Road east of the Highway. Culvert 23 has since been cleaned out and the problem alleviated.

6.2.2 Minor (Underground) Drainage

The Town has a rudimentary underground storm drainage system which runs south along the lane east of Main Street, from 5th Avenue North to 1st Avenue South. This storm main typically has two catchbasins tied to it at each intersecting avenue. The storm system collects and conveys runoff water from areas D, F, I, J and a small portion of K. The runoff water collected through these catchbasins flows south to 1st Avenue South where it is discharged into a ditch along the east side of Highway 4. The stormwater continues along this ditch eventually travelling east to culvert 33 where it discharges into the Milk River.

Measurements were taken at various catchbasins by Town personnel to determine the average slope of the storm pipe. The average slope is then used to calculate the capacity of the storm system. The average capacity was calculated to be approximately 1,350 l/s, which is

approximately equal to the runoff from areas D, F, I, and J during a 1 in 5 year rainfall event. The minor (underground) drainage system is relatively effective at collecting and conveying stormwater; however it is designed to handle the smaller more frequent rainfall events. During major storm events (i.e.1 in 100 year) ponding of low lying areas will occur, especially in areas F and I, as overland drainage is minimal. Local ponding at the catchbasin inlets is common during typical rainfall due to build up of debris; this is particularly true during the fall season when leaves collect and obstruct the flow.

6.3 Proposed Works

6.3.1 Maintenance & Upgrades

The stormwater infrastructure is relatively effective and minimal upgrades are required. It is recommended that the Town continue maintenance and upkeep of the stormwater system by ensuring that all culverts, storm pipes, catchbasins, and ditches remain clear of debris which may obstruct the flow of stormwater.

To alleviate the ponding experienced at the intersection of 3rd Avenue North and Highway 4, it is proposed that a concrete swale be constructed at this intersection to provide positive drainage to the north. It is also proposed that a formal swale/ditch be constructed along the east side of the Highway to convey runoff from the concrete swale to the culvert at 4th Avenue North. Runoff from 3rd Avenue would then drain north to 4th Avenue North, west under the highway to the CP Rail ditch and then south to the Milk River. This work must be coordinated with Alberta Infrastructure and Transportation as it is within the Highway right-of-way. The estimated cost to complete this work is $23,000 including contingencies and engineering. Detailed cost estimates are included in Appendix K.

With respect to the ponding that occurs at the intersection of 2nd Street East and 1st Avenue South, it is recommended that the Town construct a formal stormwater detention/retention pond southeast of this intersection with a defined drainage swale/ditch through the golf course to the Milk River. The stormwater pond could be a wet pond design which would provide the golf course with a water feature and could possibly be used for irrigation purposes. The estimated

cost to construct the stormwater management facility and drainage swale/ditch is $231,000 including contingencies and engineering.

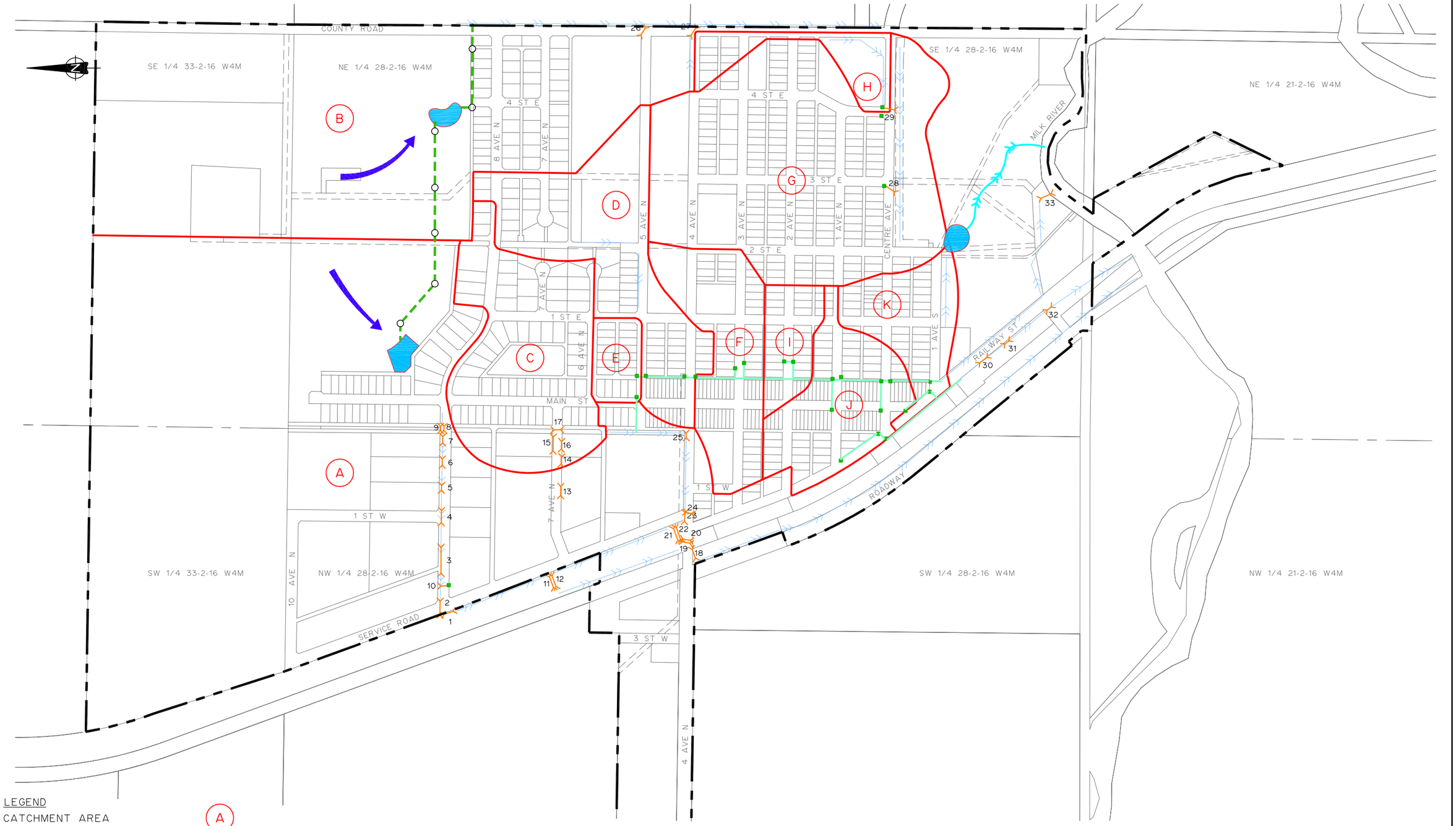
6.3.2 Future Growth

A storm water analysis is typically required for new developments to determine the pre-development and post-development storm water runoff. An underground storm pipe system is then designed to manage the 1 in 5 year post development runoff with surface grading designed to route the 1 in 100 year post development runoff to a storm water detention/retention pond. The storm water pond serves to limit the release of storm water into the existing system (1 in 5 year pre-development runoff) and to provide a certain level of treatment. As well as addressing storm water quantity, new developments must also address storm water quality. Alberta Environment's "Municipal Policies and Procedures Manual" (2001) requires a minimum of 85% removal of sediments with a particle size of 75 um or greater.

A preliminary analysis of storm water runoff from the future development of a portion of NE28 2-16-4 was performed. The pre-development 1 in 5 year runoff was determined to be approximately 157 L/s, which would also be the designated release rate from the proposed storm water retention pond for this area. The storm water retention pond should be sized to store approximately 2,500 cubic meters in order to handle the post-development runoff resulting from a 1 in 100 year storm event.

This retention pond would release into an underground storm piping system which would convey stormwater to the low lying area located approximately 450 meters to the east, where it would discharge into another storm pond. This second storm pond would be constructed to store the discharge from the first pond as well as the runoff from future development in the area bounded by 2nd street East, County Road, 8th Avenue North, and 10th Avenue North. This larger pond would require approximately 5,000 cubic meters of storage and would release stormwater into the ditch along County Road.

The proposed storm water system upgrades and the storm retention ponds for new developments are shown in Figure 6.2.



LEGEND

CATCHMENT AREA (A)

CATCHMENT BOUNDARY

EXISTING STORM SEWER

EXISTING CATCH BASIN

EXISTING CULVERT

EXISTING DITCH/SWALE

TOWN BOUNDARY

PROPOSED DITCH/SWALE

PROPOSED STORM SEWER

PROPOSED MANHOLE

PROPOSED STORM WATER POND

DRAINAGE PATTERN

mpe ENGINEERING LTD.

Lethbridge, Alberta

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
PROPOSED STORM WATER DRAINAGE IMPROVEMENTS

SCALE: 1:7500	DATE: DECEMBER 2006	JOB: 1440-029-00	FIGURE: 6.2

7.0 Capital Plan

The Town of Milk River, in undertaking this Infrastructure Master Plan, has developed the background and framework for maintaining and expanding the basic infrastructure needed to support a growing community. The relevant information on each of the major infrastructure systems is presented in their respective sections within this report. For each of the infrastructure components, improvements have been identified and preliminary cost estimates prepared. The cost estimates were prepared for each improvement independently of others. However projects could be completed in conjunction with others to use funds more efficiently and avoid duplication of costs on items such as roadwork.

Table 7.1 summarizes all of the infrastructure work noted in the various sections of this plan along with their estimated costs. The road work costs for the deep utilities have been broken out separately in order to avoid possible duplication of costs. The table prioritizes the infrastructure improvements by identifying whether the work is required in the short, medium, or long term. If one project is combined with another project to save construction costs then both projects would be targeted for completion at the earliest of the two terms (ie. a short term project combined with a long term project; both completed in short term). The short term is defined as 1-5 years, the medium term as 5-10 years and the long term is beyond 10 years. The costs within the short, medium, and long term columns have been color coded to identify the items which would be completed in a single project.

The Capital Plan will be an evolving plan to address infrastructure items, both those included here and others that may arise. Therefore, the Capital Plan presented here may represent priorities as they exist this year, but next year some items may shift either ahead or behind in the plan. The value in laying out projects in this capital plan is that the Town can use the plan to position itself to take advantage in pursuing provincial funding and grants, in seeking debentures, in assigning off-site levies, and in judging appropriate levels of taxation.

Table 7.1 - Milk River Infrastructure Capital Plan

Item	Project	Preliminary Cost Estimate	AI&T Grant or Other Funding	Town Share	Town Share of Capital Costs (Net Grants) by Term			COMMENTS
					Short Term 1 - 5 Years	Medium Term 5 - 10 Years	Long Term 10 + Years	
POPULATION PROJECTION					**924 -971**	**1,020**	**1020+**	
INFRASTRUCTURE CAPITAL PROJECTS								
1.0	**Concrete Roadway Components**							
1.0.1	Curbs & Gutters	**$280,100**	0.0%	$280,000	**$31,500**	**$159,000**	**$202,000**	
1.0.2	Swales	**$56,900**	0.0%	$57,000	**$10,700**	**$29,000**	**$38,000**	
1.0.3	Monolithic Sidewalks	**$989,100**	0.0%	$989,000	**$79,900**	**$580,000**	**$740,000**	
1.0.4	Separate Sidewalks	**$669,300**	0.0%	$669,000	**$140,500**	**$337,000**	**$431,000**	
1.0.5	Wheelchair Ramps	**$92,800**	0.0%	$93,000	**$0**	**$59,000**	**$76,000**	
1.1	**Asphalt Roadway Components**							
1.1.1	Localized Road Reconstruction	**$114,900**	75.0%	$29,000	**$114,900**	**$0**	**$0**	
1.1.2.	Localized Asphalt Patching	**$65,300**	75.0%	$16,000	**$65,300**	**$0**	**$0**	
1.1.3	Asphalt Overlay - Structural Improvement	**$3,706,800**	75.0%	$927,000	**$0**	**$2,365,000**	**$3,019,000**	
1.1.4	Total Road Reconstruction	**$1,454,200**	75.0%	$364,000	**$0**	**$928,000**	**$1,184,000**	
1.2	**Roadwork for Deep Utilities**							
1.2.1	Railway Street Loop	**$118,000**	75.0%	$30,000			**$49,000**	Deep water main
1.2.2	4th Ave N Loop	**$159,000**	75.0%	$40,000		**$51,000**		Deep water main
1.2.3	Centre Ave Loop	**$90,000**	75.0%	$23,000		**$29,000**		Deep water main
1.2.4	4th Street E Loop	**$55,000**	75.0%	$14,000		**$18,000**		Deep water main
1.2.5	250 mm Water Main for Pressure Zone	**$276,000**	75.0%	$69,000	**$69,000**			Deep water main
1.2.6	250 mm Water Main for Gravity Fed Zone #1	**$69,000**	75.0%	$17,000	**$17,000**			Deep water main
1.2.7	250 mm Water Main for Gravity Fed Zone #2	**$207,000**	75.0%	$52,000	**$52,000**			Deep water main
1.2.8	Phase 1 (Lift Station to Manhole 5)	**$0**	75.0%	$0	**$0**			Deep sanitary trunk
1.2.9	Phase 2 (Manhole 5 to Manhole 9)	**$194,000**	75.0%	$49,000	**$49,000**			Deep sanitary trunk
1.2.10	Phase 3 (Manhole 9 to Manhole 31)	**$166,000**	75.0%	$42,000	**$42,000**			Deep sanitary trunk
1.2.11	Drainage Improvement	**$6,700**	75.0%	$2,000			**$3,000**	Storm Water Management
2.0	**Water Treatment & Distribution (excluding roadwork)**							
2.1	Railway Street Loop	**$175,000**	0.0%	$175,000			**$285,000**	Deep water main
2.2	4th Ave N Loop	**$194,000**	0.0%	$194,000		**$248,000**		Deep water main
2.3	Centre Ave Loop	**$154,000**	0.0%	$154,000		**$197,000**		Deep water main
2.4	4th Street E Loop	**$138,000**	0.0%	$138,000		**$176,000**		Deep water main
2.5	250 mm Water Main for Pressure Zone	**$364,000**	0.0%	$364,000	**$364,000**			Deep water main
2.6	250 mm Water Main for Gravity Fed Zone #1	**$564,000**	0.0%	$564,000	**$564,000**			Deep water main
2.7	250 mm Water Main for Gravity Fed Zone #2	**$770,000**	0.0%	$770,000	**$770,000**			Deep water main
2.8	Water Treatment System Upgrade	**$1,268,000**	75.0%	$317,000		**$405,000**		
2.9	Booster Station Upgrade	**$199,000**	75.0%	$50,000	**$50,000**			
3.0	**Sewage Collection & Treatment (excluding roadwork)**							
3.1	Lift Station No.1 & Forcemain Upgrade	**$300,000**	75.0%	$75,000	**$75,000**			Upgrade Lift Station No.1 and Supply & Install 250 mm PVC Forcemain
3.2	Phase 1 (Lift Station to Manhole 5)	**$236,000**	0.0%	$236,000	**$236,000**			Deep sanitary trunk
3.3	Phase 2 (Manhole 5 to Manhole 9)	**$197,000**	0.0%	$197,000	**$197,000**			Deep sanitary trunk
3.4	Phase 3 (Manhole 9 to Manhole 31)	**$180,000**	0.0%	$180,000	**$180,000**			Deep sanitary trunk
3.5	Campground Lift Station	**$100,000**	75.0%	$25,000		**$32,000**		Upgrade Campground Lift Station
3.6	Lagoon Treatment System Upgrade	**$1,357,000**	75.0%	$339,000		**$433,000**		Upgrade existing cells and add more storage
4.0	**Storm Sewer (excluding roadwork)**							
4.1	Drainage Improvement	**$16,300**	75.0%	$4,000			**$7,000**	Storm Water Management
4.1	Storm Water Management Facility	**$231,000**	75.0%	$58,000			**$94,000**	Storm Water Management
	TOTAL (w/o Section 1.2 Roadwork for Deep Utilities)	**$13,870,000**		**$7,264,000**	**$2,878,800**	**$5,948,000**	**$6,076,000**	

Notes:
1. Like colours in a column represent costs associated with a single project.
2. All costs based on Year 2006. Inflation is factored at 5% / year
3. Street Improvement Program (SIP) and Alberta Municipal Water/Wastewater Partnership (AMWWP) grants were applied where applicable (75% Province, 25% Municipality).
4. Alberta Municipal Infrastructure Program (AMIP), New Deal for Cities and Communities (NDCC), and Canada-Alberta Municipal Rural Infrastructure Fund (CAMRIF) grants may be applied at the discretion of the Municipality

Figure 7.1 provides a graphic depiction of the Capital Plan. It shows that the total infrastructure commitment by the Town amounts to $13.360 million, of which approximately $6.225 million may be offset with provincial grants and funding and the remaining $7.135 million will have to be funded through the Town's regular budget process.

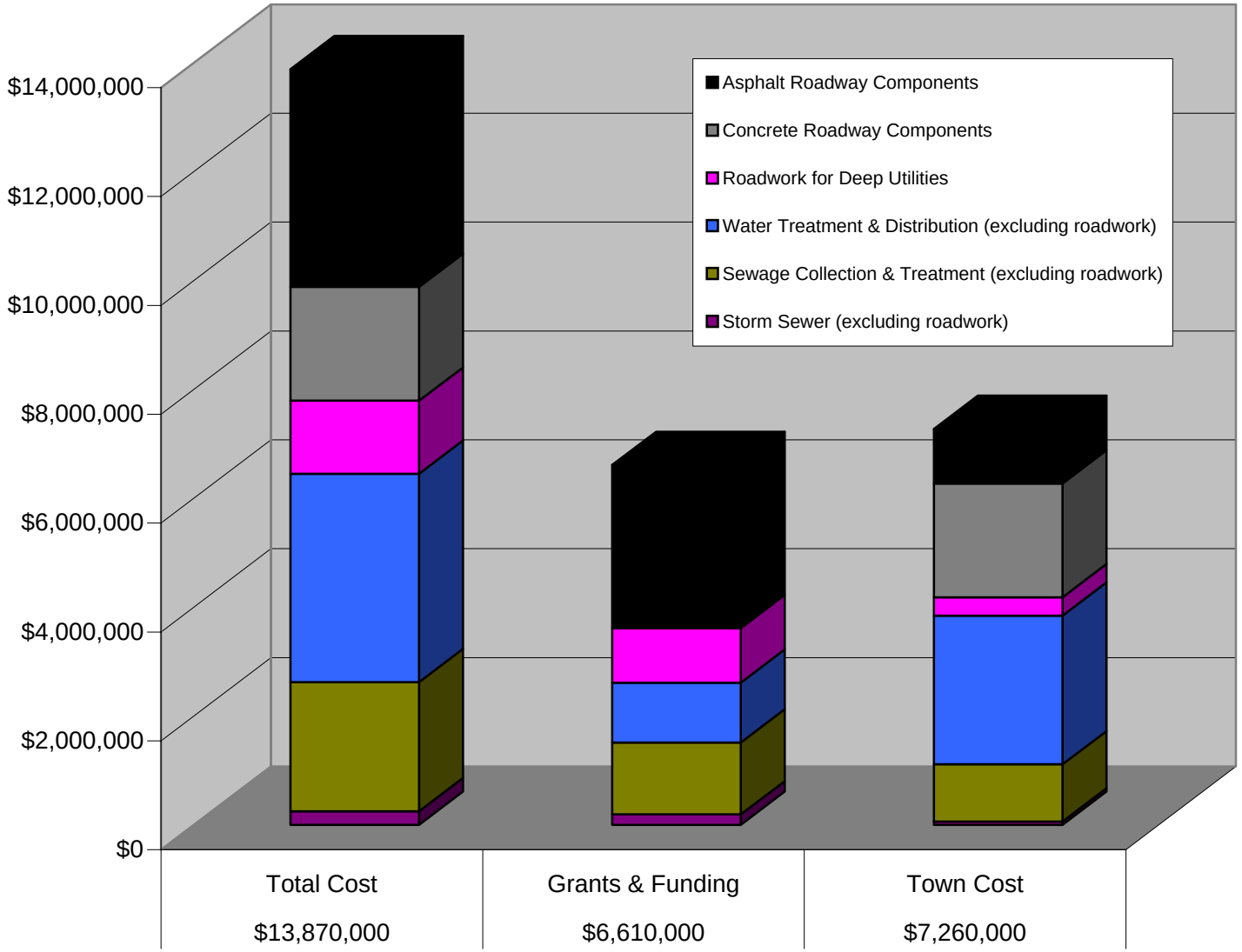
7.1 Funding

Government grants and funding support are available to communities like Milk River to undertake infrastructure projects. This support comes in a variety of programs, some of which are described as follows:

- **Alberta Municipal Infrastructure Program (AMIP)** – per capita grant in support of core and other infrastructure needs. Milk River qualifies for total funding of $832,000 over the 5 year life of the program.
- **Alberta Municipal Water/Wastewater Partnership (AMWWP)** – population based funding for specified water and wastewater projects. Milk River qualifies for 75% funding support.
- **Canada-Alberta Municipal Rural Infrastructure Fund (CAMRIF)** – federal cost sharing program that requires 1/3 funding from each of provincial, federal and municipal levels of government. Status of program is uncertain at this time.
- **New Deal for Cities and Communities (NDCC)** – per capita grant for environmentally sustainable infrastructure projects.
- **Street Improvement Program (SIP)** – provincial cost sharing program targeting road improvements. Funding is 75% province, 25% municipality.

Where applicable, the Street Improvement Program (SIP) and Alberta Municipal Water/Wastewater Partnership (AMWWP) funding has been applied to the cost figures in Table 7.1. The Alberta Municipal Infrastructure Program (AMIP), the New Deal for Cities and Communities (NDCC), and the Canada-Alberta Municipal Rural Infrastructure Fund (CAMRIF) grants have not been applied as these are discretionary on the part of the Village.

Figure 7.1 - Capital Plan Funding Allocation



7.2 Off-site Levies

The Town of Milk River does not have a bylaw that deals with off-site levies. In order to offset a portion of the costs associated with the construction of the proposed works, the Town should consider a bylaw to apply off-site levies against developers.

7.3 Inflation

Inflation has been applied to the cost figures in Table 7.1 for all costs slated to occur beyond the short term. An inflation rate of 5% per year has been used resulting in 27.63% inflation for the medium term (5 years) and 62.89% inflation for the long term (10 years).

8.0 References

Alberta Environment, "Municipal Policies and Procedures Manual", Environmental Service, Environmental Sciences Division, Municipal Program Development Branch, Edmonton, Alberta, April 2001.

Alberta Environment, "Standards and Guidelines for Municipal Waterworks, Wastewater and Strom Drainage Systems," Drinking Water Branch, Environmental Policy Branch, Environmental Assurance Division, Edmonton, Alberta, January 2006.

MPE Engineering Ltd., "Town of Milk River Water Supply Study", report to the Town of Milk River, April 1991.

Stantec Consulting Ltd., "Underground Infrastructure Master Plan Study e-Report 2000", report to the City of Lethbridge, Lethbridge, Alberta, April 2000.

Appendix A – Terms of Reference

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T1J 0V1

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Fax: (403) 329-9354
E-Mail: mpe-leth@telusplanet.net

Town of Milk River
P.O. Box 270,
Milk River, AB
T0K 1M0

January 25th, 2006
File: N:\Proposal\Milk River\P01

Attention: Travis Peters
Chief Administrator Officer

Dear Sir:

Re: Town of Milk River – Infrastructure Master Plan

As discussed, we have prepared a proposal to develop the Town's Infrastructure Management Plan (IMP). A typical IMP assesses the following infrastructure:

- Water supply, treatment, storage and distribution,
- Sewage collection (including Lift Stations) and sewage treatment and disposal,
- Storm water collection, storage, treatment and release (Storm Water Management),
- Roadways,

Common to all infrastructure assessments are:

- Population projections,
- Water cycle analysis,
- Operation and maintenance reviews,
- Preparation of capital plans for:
  - Rehabilitation of existing infrastructure,
  - New infrastructure for areas of future growth.

We have divided our proposal into the four main areas of infrastructure, which provides a description of the proposed work in each area.

Water Supply, Treatment, Storage and Distribution

As you are aware MPE completed a water supply, treatment, storage and distribution pumping study in early 1989. This study is now dated and given that new standards have recently been released (January 2006) it will require significant updating.

The following scope of work is proposed:

- Generate projected water supply requirements for the 20 year design population,

- Tour each facility and discuss deficiencies with Operator,
- Prepare a schematic drawing of existing water supply and treatment system,
- Review water supply, treatment, storage and pumping capacities and flag upgrades required to meet new standards,
- Prepare conceptual arrangement drawings of upgrading required,
- Meet with representatives from Alberta Environment to obtain their input,
- Review current Licence to Operate,
- Review of the existing condition of the water distribution system including pipe diameters, pipe materials and hydrant condition and locations,
- Review of the Fire Underwriters Survey requirements for the community,
- Review of existing capacity of the local fire department (pumping capacity) designated for the Town,
- Analysis of the distribution system would include:

    - An updated computerized hydraulic model to simulate the hydraulic behaviour of the existing and future water distribution system servicing the study area,

    - In areas of the analysis where it is deemed that items are critical for the analysis, the information will be field verified,

    - The assistance of Town staff would be required for the calibration of the computer model describing the existing distribution system. This would involve pressure monitoring and flow testing at hydrants or other connections to the water mainline,

    - Identify problem areas and provide alternatives to eliminate or minimize the problem area,

    - Size all watermains required to provide adequate service to the existing Town,

    - Size all watermains greater than 200mm required to service the areas of future development,

    - Assess key areas relative to current levels of fire protection and recommend future upgrading requirements including appropriate hydrant spacing,

- With a calibrated model in place, the Town will be in a position to complete "What if" scenarios relative to future development inquiries as they relate to the water distribution system.

Sewage Collection and Treatment

MPE will complete a review of the sanitary sewer collection and treatment system. MPE has been involved in completing an electrical controls and instrumentation upgrade at the sewage lift station. MPE has also completed a preliminary capacity assessment of the existing wastewater stabilization ponds. We understand that the collection system is a typical gravity collection network with one lift station located adjacent to the Milk River which pumps a bulk of the sewer to the waste water stabilization ponds generated in the lower elevations of Town. Sewage from developed areas, higher in elevation, flows by gravity directly to the wastewater stabilization pond, bypassing the sewage lift station.

We intend to develop a computerized hydraulic model of the existing sanitary sewer collection system servicing the Town. The software program that will be used is "SewerCAD" by Haestad Methods,

Some background work will be required to arrive at suitable estimates of current system flows during dry weather as well as during wet weather events. Based on these estimates, an upgrading scenario can be developed within the computer model wherein bottlenecks in the system can be identified and solutions can then be developed.

Calibration of the model is a key step in arriving at an acceptable representation of actual conditions. Given that wet weather flows are creating surcharging and back-ups in the system (e.g., June 2002), historical data such as sewer backup location and frequency, water levels in critical manholes, and flow rate and totalization data information on lift station operations will be required.

All the field data would then be incorporated into the model so that the behaviour of the model reflects what is essentially happening in the field. The calibrated model will then be used to identify possible solutions of the surcharging problems. The sanitary sewage component of the IMP would include:

- Review of available information on the existing sanitary sewer collection system, including pipe inverts and rim elevations, pipe diameter, pipe material and manholes, up to the wastewater stabilization ponds. Field confirm any gaps in record information,

- Review of available flow records (i.e., hour meter and flowmeter at Lift Station), annual reports to Alberta Environment and from data that relates flow to current population,

- Review of the existing land use as well as the proposed land use for parcels being considered for development,

- Hydraulic analysis of the sanitary sewer collection system with special attention to areas experiencing surcharging during wet weather,

- Recommendations for upgrading of the sanitary sewer collection system and sewage lift station.

In addition, during the course of a rainstorm, we would encourage the Town to take measurements (i.e., manhole water levels) at key locations in the sanitary system to further assist us in calibrating the model. Given that June is when we expect most rainstorms, data collection should occur before (during dry weather conditions) and during these storm events. When the model calibration has been completed, then various solutions can be developed in an attempt to mitigate the surcharging that is occurring.

With a calibrated model in place, the Town will be in a position to complete "What if" scenarios relative to future development inquiries as they relate to the sanitary sewer system.

In addition to the computer model, MPE would complete a condition review of the lift station and manholes. MPE would review any available video information of the condition of existing sewer lines, in order to complete the sewer condition assessment.

Relative to the wastewater stabilization ponds the following will be completed:

- Current condition,
- Current capacity of each treatment cell and interconnecting piping or weirs,
- Review current Licence to Operate,
- Review future requirements with Alberta Environment,
- Review upgrading options (if required).

Storm Water Management

We will complete a review of the storm water management system. We understand that currently there is limited underground storm water piping. Most stormwater management is through surface runoff directed through ditches and culverts into the Milk River.

The scope of work in the IMP would include:

- Review drainage issues with operational staff,
- Prepare options to alleviate issues,
- Review storm water management practices required for new developments,
- Determine capacity of the existing piped system,
- Prepare plot plans of existing storm sewer system including manhole rims and inverts, pipe sizes and lengths.
- Prepare plot plans indicating existing drainage patterns, culvert sizes, condition and material.

Roadways

We will undertake a condition review of the roadway system. Work would include the following:

- Complete an inventory of all roads, sidewalks, curb and gutter and swales,
- Assess the condition of all infrastructure (pavement, gravel roads, sidewalks, curb and gutters),
- Assessment of condition would be based on a rating system,
- Review any geometric problems with existing road infrastructure and provide recommendations for improvements.

Upon completion of the assessment of all four infrastructures, a "Capital Plan" will be formulated. The capital plan will include wishes of Council and administration relative to rehabilitation and new development, balanced with risk management, regulatory requirements and growth pressures. The capital plan would be broken down into short, medium and long term elements. Cost estimates will be completed for each infrastructure and divided among the three planning horizons. To offset expenditures, MPE will identify all likely sources of Provincial and Federal funding.

Our fees to undertake the various tasks as identified in this proposal are shown in the following summary table.

INFRASTRUCTURE COMPONENT
Water Supply, Treatment, Storage and Distribution
Sewage Collection and Treatment
Storm Water Management
Roadways

MPE Engineering Ltd. would like to thank the Town of Milk River for the opportunity to provide this submission and look forward to working with you to successfully complete this very important infrastructure management plan. If you have any questions, comments or require further clarification of our submission, please contact the undersigned at 317-3614.

Yours truly,

MPE ENGINEERING LTD.

Peter Brouwer, P. Eng.
Lethbridge Region Manager

PB:mw

Appendix B – Population Statistics

Statistics Canada Statistique Canada

Canada

	Milk River Alberta (Town)			Alberta (Province)		
Population and Dwelling Counts	Milk River, Town			Alberta		
	Total	Male	Female	Total	Male	Female
Population in 2001 [1]	879			2,974,807†		
Population in 1996 [2]	929			2,696,826†		
1996 to 2001 population change (%)	-5.4			10.3		
Total private dwellings	405			1,171,841		
Population density per square kilometre	368.1			4.6		
Land area (square km)	2.39			639,987.1		
Age Characteristics of the Population	Milk River, Town			Alberta		
	Total	Male	Female	Total	Male	Female
Total - All persons [3]	880	430	450	2,974,805	1,486,590	1,488,220
Age 0-4	50	20	30	186,430	95,270	91,165
Age 5-14	110	60	50	431,160	220,975	210,185
Age 15-19	65	35	30	222,960	114,040	108,925
Age 20-24	30	15	15	215,125	109,735	105,395
Age 25-44	205	100	100	948,740	475,920	472,825
Age 45-54	100	45	50	420,890	213,290	207,600
Age 55-64	80	40	40	241,090	120,805	120,285
Age 65-74	90	45	45	173,190	83,865	89,325
Age 75-84	105	40	65	102,350	42,285	60,060
Age 85 and over	45	20	30	32,860	10,410	22,455
Median age of the population	43.6	42.1	46.0	35.0	34.4	35.6
% of the population ages 15	81.3	79.1	83.3	79.2	78.7	79.8

HELP / FAQ

2001 Community Profiles

More free tables in Canadian Statistics

Population Statistics - Page 1 for:

Milk River (Town), Alberta APPLY MAP

Characteristics	Milk River	Alberta
Population in 1996 (1)	929	2,696,826
Population in 1991 (2)	926	2,545,553
1991 to 1996 population change (%)	0.3	5.9
Land area (square km)	2.20	638,232.66

Characteristics	Milk River			Alberta		
	Total	Male	Female	Total	Male	Female
Age characteristics of the population						
Total - All persons (3)	930	460	465	2,696,825	1,348,300	1,348,520
Age 0-4	65	35	30	194,235	99,525	94,705
Age 5-14	135	75	65	420,250	215,595	204,660
Age 15-19	45	25	20	191,445	98,190	93,255
Age 20-24	40	25	20	185,505	93,775	91,730
Age 25-54	315	160	155	1,235,530	622,355	613,175
Age 55-64	85	40	40	202,955	102,045	100,910
Age 65-74	100	40	60	156,550	74,015	82,535
Age 75 and over	145	65	85	110,355	42,805	67,550
Average age of the population	42.0	39.7	44.2	33.7	33.0	34.4
% of the population ages 15 and over	78.4	76.0	80.6	77.2	76.6	77.8
Language(s) first learned and still understood						
Total - All persons (4)	925	460	470	2,696,825	1,348,305	1,348,525
English	845	420	420	2,184,955	1,098,150	1,086,805
French	5	0	0	46,910	23,415	23,495
Both English and	0	0	0	10,000	4,890	5,110

French						
Other languages [(5)]	80	40	40	454,970	221,845	233,125

Town of Milk River

Municipal Code:0218

Membership in regional service commissions

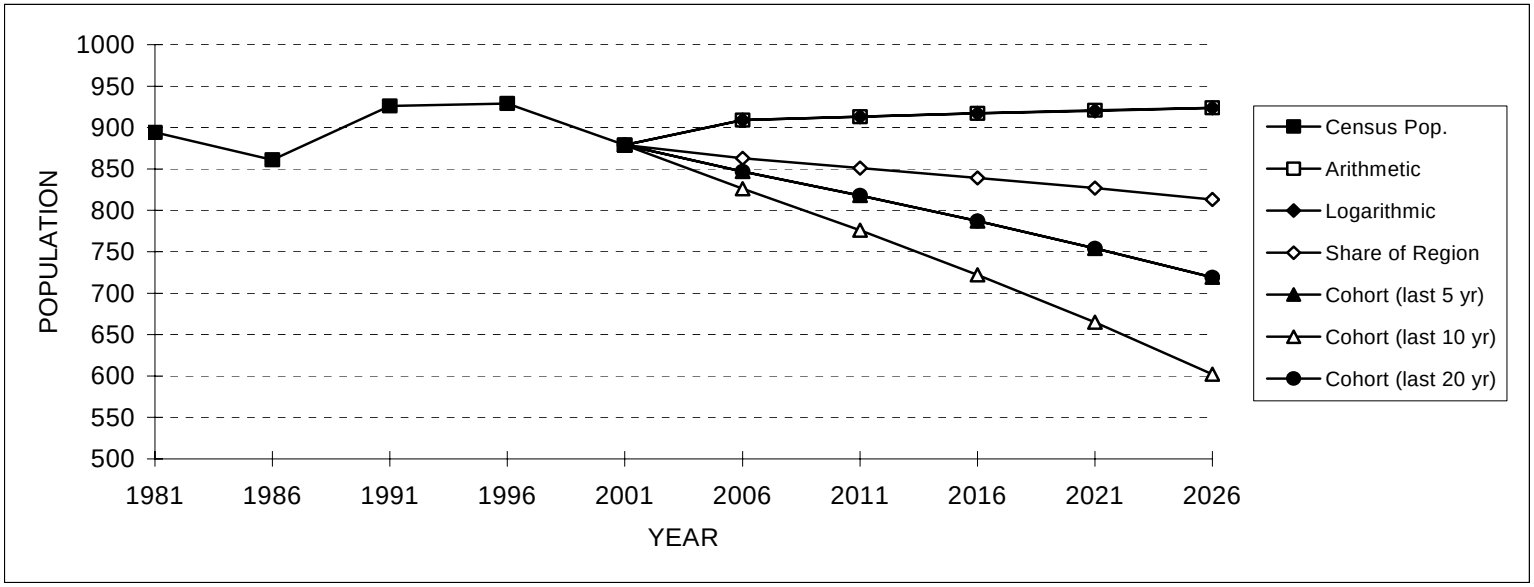
(None)

General Statistics	2005	2004	2003	2002	2001
Population	879	879	879	879	929
Total Full-Time Municipal Positions		8	8	9	7
Total Area of Municipality (Hectares)		233	233	233	233
Length of all Open Roads Maintained (Kilometres)		18	18	18	18
Water Mains Length (Kilometres)		14	14	14	14
Wastewater Mains Length (Kilometres)		15	15	15	15
Storm Drainage Mains Length (Kilometres)		1	1	1	1
Number of Dwelling Units		406	406	405	405
No. of Asst. Complaints Heard by Assessment Review Board					
Number of Residential Assessment Complaints		12	1		
Number of Farm Property Assessment Complaints					
Number of Non-residential Assessment Complaints		1			
Number of Machinery and Equipment Assessment Complaints					
Number of Other Assessment Complaints					

Updated: Jul. 14, 2006

MILK RIVER

Year	Census Pop.	Arithmetic	Logarithmic	Share of Region	Cohort (last 5 yr)	Cohort (last 10 yr)	Cohort (last 20 yr)
1981	894						
1986	861						
1991	926						
1996	929						
2001	879	879	879	879	879	879	879
2006		909	909	863	847	826	847
2011		913	913	851	818	776	818
2016		917	917	839	787	722	787
2021		921	920	827	754	665	754
2026		924	924	813	719	602	719



POPULATION PROJECTION: COHORT SURVIVAL
Compiled August 13, 2003

Municipality: **MILK RIVER**

AGE GROUP	2001 BASE POPULATION		2006 PROJECTION		2011 PROJECTION		2016 PROJECTION		2021 PROJECTION		2026 PROJECTION	
(cohort)	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0-4	25	30	17	16	12	12	10	9	7	7	4	4
5-9	25	20	26	37	18	23	14	19	11	16	8	14
10-14	35	25	15	10	16	27	8	13	4	9	1	7
15-19	35	30	30	25	10	10	11	27	3	13	-1	9
20-24	15	15	30	20	25	15	5	0	6	17	-2	3
25-29	15	15	10	10	25	15	20	10	0	-5	1	12
30-34	25	20	10	10	5	5	20	10	15	5	-5	-10
35-39	20	30	20	15	5	5	0	0	15	5	10	0
40-44	35	35	15	25	15	10	0	0	-5	-5	10	0
45-49	25	25	40	35	20	25	20	10	5	0	0	-5
50-54	20	30	20	25	35	35	15	25	15	10	0	0
55-59	25	15	20	35	20	30	35	40	15	30	15	15
60-64	20	20	30	20	25	40	25	35	40	45	20	35
65-69	25	25	25	20	35	20	30	40	30	35	44	44
70+	80	110	80	115	80	116	90	116	94	135	98	149
TOTAL	430	450	388	419	347	388	302	354	255	318	205	278
TOTAL	879		807		734		657		573		483	

AGE GROUP	SURVIVAL RATIO		FERTILITY RATE	*MIGRATION RATE		2006 BABIES	2011 BABIES	2016 BABIES	2021 BABIES	2026 BABIES
(cohort)	Male	Female		Male	Female	M & F	M & F	M & F	M & F	M & F
0-4	0.998384	0.998704		1	7					
5-9	0.999854	0.999894		-10	-10					
10-14	0.999734	0.99983		-5	0					
15-19	0.999016	0.99956	0.1259	-5	-10	4	3	1	3	2
20-24	0.99892	0.999628	0.3860	-5	-5	6	8	6	0	7
25-29	0.998936	0.999608	0.5612	-5	-5	8	6	8	6	-3
30-34	0.998662	0.999438	0.4456	-5	-5	9	4	2	4	2
35-39	0.998452	0.99914	0.1667	-5	-5	5	3	1	0	1
40-44	0.997926	0.998714	0.0274	5	0	1	1	0	0	0
45-49	0.997148	0.99805	0.0010	-5	0	0	0	0	0	0
50-54	0.995468	0.996892		0	5					
55-59	0.99218	0.994836		5	5					
60-64	0.987586	0.992622		5	0					
65-69	0.979506	0.987698		0	5					
70+	0.9375356	0.961398		-19	-20					
TOTAL				-47	-37	33	24	19	14	9
TOTAL				-85						

*** Migration Period: 5 year average 1996-2001**

COMPUTATION OF MIGRATION RATE (5 year period 1996-2001)

POPULATION PROJECTION: COHORT SURVIVAL
Compiled August 11, 2003

Municipality: **MILK RIVER**

AGE GROUP	2001 BASE POPULATION		2006 PROJECTION		2011 PROJECTION		2016 PROJECTION		2021 PROJECTION		2026 PROJECTION	
(cohort)	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
0-4	25	30	17	16	14	13	12	12	10	10	8	8
5-9	25	20	30	36	22	22	19	19	17	18	15	16
10-14	35	25	25	10	30	26	22	12	19	9	17	8
15-19	35	30	35	27	25	13	30	29	22	15	19	12
20-24	15	15	30	20	30	17	20	3	25	19	17	5
25-29	15	15	8	10	22	15	22	12	13	-2	18	14
30-34	25	20	13	15	5	10	20	15	20	12	10	-2
35-39	20	30	25	18	13	13	5	8	20	13	20	10
40-44	35	35	13	27	17	15	5	10	-2	5	12	10
45-49	25	25	42	35	20	27	25	15	13	10	5	5
50-54	20	30	17	25	35	35	13	27	17	15	5	10
55-59	25	15	20	27	17	22	35	32	13	25	17	13
60-64	20	20	27	17	22	30	20	25	37	35	15	27
65-69	25	25	25	17	32	15	27	27	25	22	42	32
70+	80	110	82	115	84	112	93	107	97	114	98	117
TOTAL	430	450	409	417	390	386	369	354	345	320	319	283
TOTAL	879		826		776		722		665		602	

AGE GROUP	SURVIVAL RATIO		FERTILITY RATE		*MIGRATION RATE			2006 BABIES	2011 BABIES	2016 BABIES	2021 BABIES	2026 BABIES
(cohort)	Male	Female			Male	Female		M & F	M & F	M & F	M & F	M & F
0-4	0.998384	0.998704			5	6						
5-9	0.999854	0.999894			0	-10						
10-14	0.999734	0.99983			0	3						
15-19	0.999016	0.99956	0.1259		-5	-10		4	3	2	4	2
20-24	0.99892	0.999628	0.3860		-7	-5		6	8	7	1	7
25-29	0.998936	0.999608	0.5612		-2	0		8	6	8	7	-1
30-34	0.998662	0.999438	0.4456		0	-2		9	7	4	7	6
35-39	0.998452	0.99914	0.1667		-7	-2		5	3	2	1	2
40-44	0.997926	0.998714	0.0274		8	0		1	1	0	0	0
45-49	0.997148	0.99805	0.0009		-7	0		0	0	0	0	0
50-54	0.995468	0.996892			0	-2						
55-59	0.99218	0.994836			3	3						
60-64	0.987586	0.992622			5	-2						
65-69	0.979506	0.987698			3	0						
70+	0.93753563	0.961398125			-20	-16						
TOTAL					-26	-39		33	27	24	20	15
TOTAL					-65							

*** Migration Period: 10 year average 1991-2001**

POPULATION PROJECTION: COHORT SURVIVAL
Compiled September 2, 2003

Municipality: **MILK RIVER**

AGE GROUP (cohort)	2001 BASE POPULATION Male	Female	2006 PROJECTION Male	Female	2011 PROJECTION Male	Female	2016 PROJECTION Male	Female	2021 PROJECTION Male	Female	2026 PROJECTION Male	Female
0-4	25	30	17	16	14	14	13	13	13	12	12	12
5-9	25	20	29	37	20	23	18	21	17	20	16	19
10-14	35	25	26	16	30	33	22	19	19	17	18	16
15-19	35	30	34	25	25	16	29	33	20	19	18	17
20-24	15	15	34	24	32	19	24	10	27	27	19	13
25-29	15	15	8	9	26	17	25	12	16	4	20	21
30-34	25	20	11	15	4	9	22	17	21	13	13	4
35-39	20	30	24	20	10	15	3	9	21	18	20	13
40-44	35	35	15	27	19	18	5	13	-2	6	16	15
45-49	25	25	39	34	19	26	23	16	9	11	1	5
50-54	20	30	20	26	34	35	14	27	17	17	4	13
55-59	25	15	21	29	21	25	35	34	15	26	19	16
60-64	20	20	29	16	25	30	25	26	38	35	19	27
65-69	25	25	22	21	31	17	27	31	27	27	41	36
70+	80	110	87	117	91	120	102	119	110	132	117	140
TOTAL	430	450	414	433	401	417	386	401	370	384	352	366
TOTAL	879		847		818		787		754		719	

AGE GROUP (cohort)	SURVIVAL RATIO Male	Female	FERTILITY RATE		20 YR AVG (1981-2001) MIGRATION RATE Male	Female		2006 BABIES M & F	2011 BABIES M & F	2016 BABIES M & F	2021 BABIES M & F	2026 BABIES M & F
0-4	0.998384	0.998704			4	7						
5-9	0.999854	0.999894			1	-4						
10-14	0.999734	0.99983			-1	0						
15-19	0.999016	0.99956	0.1259		-1	-6		4	3	2	4	2
20-24	0.99892	0.999628	0.3860		-7	-6		6	9	7	4	10
25-29	0.998936	0.999608	0.5612		-4	0		8	5	10	7	2
30-34	0.998662	0.999438	0.4456		-1	0		9	7	4	8	6
35-39	0.998452	0.99914	0.1667		-5	-2		5	3	3	1	3
40-44	0.997926	0.998714	0.0274		4	-1		1	1	0	0	0
45-49	0.997148	0.99805	0.0010		-5	1		0	0	0	0	0
50-54	0.995468	0.996892			1	-1						
55-59	0.99218	0.994836			4	1						
60-64	0.987586	0.992622			3	1						
65-69	0.979506	0.987698			12	4						
70+	0.9375356	0.96139813			-24	-17						
TOTAL					-21	-24		33	28	26	25	24
TOTAL					-45							

*** Migration Period: 20 year average 1981-2001**

Appendix C – Road Network Evaluation

Road Description	Side of Road	Wheel Chair Ramp Required	Curb & Gutter								Concrete Swale							Separate Sidewalk										Monolithic Sidewalk										Roads									
			Type	5	4	3	2	1	Total	Overall	5	4	3	2	1	Total	Overall	Width	5	4	3	2	1	Total	Overall	Type	Width	5	4	3	2	1	Total	Overall	Type	Overall	Width	Length	Area	Crack Sealing	Localized Reconstruction	Localized Patching	Road Asphalt Overlay	Road Reconstruction	New Road Construction
		(each)		(m)	(m)	(m)	(m)	(m)	(m)	Rating	(m)	(m)	(m)	(m)	(m)	(m)	Rating	(m)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	Rating		(m)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	(m) / (m^2)	Rating		Rating	(m)	(m)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)	(m^2)
1. 1st Avenue South - Railway St to 1St E	N	1																								Standard	1.5	12 / 19	0 / 0	0 / 0	0 / 0	0 / 0	12 / 19	Poor	A	2	13.6	142	1934	1934	0	18	1934	0	
	N	0																								Standard	1.7	0 / 0	112 / 190	0 / 0	0 / 0	0 / 0	112 / 190													
	N	0																								Standard	2.2	12 / 26	0 / 0	0 / 0	0 / 0	0 / 0	12 / 26													
2. 1st Avenue South - 1 St E to 2 St E	N	1	Standard	0	0	0	131	0	131	Good	0	0	18	0	0	18	Poor	1.2	38 / 45	0 / 0	8 / 10	85 / 102	0 / 0	131 / 157	Fair										A	2	13.0	144	1867	1867	0	0	1867	0	
3. Center Street - Railway St to Main St	N	0	Rolled	0	0	0	53	0	53	Good																								A	2	20.0	35	700	700	0	0	700	0	
	S	0	Standard	0	0	0	9	0	9	Good																																				
4. Center Street - Main St to 1St E	N	0																								Standard	2.1	0 / 0	0 / 0	7 / 14	15 / 31	137 / 289	159 / 333	Good	A	2	16.7	176	2946	2946	0	0	2946	0	
	S	0																								Standard	1.5	0 / 0	0 / 0	19 / 29	15 / 23	128 / 192	162 / 243	Good												
5. Center Street - 1 St E to 2 St E	N	0																								Standard	2.0	0 / 0	0 / 0	/ 0	/ 0	129 / 258	129 / 258	Good	A	2	15.5	144	2230	2230	0	93	2230	0	
	S	1																								Standard	1.9	0 / 0	0 / 0	49 / 93	50 / 94	32 / 61	131 / 248	Fair												
6. Center Street - 2 St E to 3 St E	N	0																								Standard	1.7	0 / 0	0 / 0	1 / 2	95 / 162	34 / 58	130 / 221	Good	A	2	14.0	144	2012	0	0	0	2012	0	
7. Center Street - 3 St E to 4 St E	N	2																								Standard	2.0	0 / 0	14 / 29	17 / 33	8 / 16	0 / 0	39 / 77	Poor	A	2	14.2	143	2024	2024	0	0	2024	0	
	N	0																								Standard	1.8	0 / 0	0 / 0	44 / 79	44 / 80	0 / 0	89 / 159													
8. Center Street - 4 St E to 5 St E																																		A	3	12.1	166	2003	2003	45	605	2003	0	
9. 1st Avenue North - Railway St to Main St	N		Standard	0	0	0	13	0	13	Good																Standard	2.2	0 / 0	0 / 0	105 / 230	0 / 0	0 / 0	105 / 230	Poor	A	2	15.3	126	1932	1932	0	0	1932	0	
	S	1																								Standard	1.9	0 / 0	0 / 0	0 / 0	45 / 85	62 / 118	107 / 203	Good												
10. 1st Avenue North - Main St to 1 St E	N	2	Standard	6	8	5	98	0	117	Fair	0	0	0	16	0	16	Good	1.2	0 / 0	5 / 6	36 / 43	76 / 91	0 / 0	117 / 141	Fair	Standard	2.3	0 / 0	8 / 18	34 / 78	0 / 0	0 / 0	42 / 97	Poor	A	2	14.0	175	2444	2444	0	0	2444	0	
	S	0	Standard	0	0	0	75	0	75	Good	0	0	44	0	0	44	Poor	1.2	0 / 0	0 / 0	16 / 19	102 / 122	0 / 0	118 / 142	Good	Standard	2.4	0 / 0	0 / 0	14 / 33	26 / 63	0 / 0	40 / 96	Fair												
11. 1st Avenue North - 1 St E to 2 St E	N	2	Standard	0	0	0	129	0	129	Good	0	0	0	17	0	17	Good	1.2	0 / 0	0 / 0	5 / 5	125 / 150	0 / 0	129 / 155	Good										A	2	12.2	141	1720	1720	0	0	1720	0	
	S	2	Standard	0	0	0	128	0	128	Good								1.2	0 / 0	0 / 0	19 / 23	109 / 130	0 / 0	128 / 153	Good																						
12. 1st Avenue North - 2 St E to 3 St E	N	2	Standard	0	0	0	130	0	130	Good	0	0	0	17	0	17	Good	1.2	0 / 0	0 / 0	36 / 43	94 / 113	0 / 0	130 / 156	Fair										A	2	12.3	143	1754	1754	0	0	1754	0	
	S	2	Standard	0	0	51	79	0	130	Fair								1.2	0 / 0	0 / 0	24 / 28	106 / 128	0 / 0	130 / 156	Fair																						
13. 1st Avenue North - 3 St E to 4 St E	N	1									0	0	16	0	0	16	Poor									Standard	1.9	0 / 0	0 / 0	98 / 185	38 / 72	0 / 0	135 / 257	Poor	A	2	15.2	162	2459	2459	0	0	2459	0	
	S	0																								Rolled	2.0	0 / 0	0 / 0	11 / 22	117 / 233	0 / 0	128 / 255	Good												
14. 2nd Avenue North - Railway St to Main St	N	0	Standard	0	0	0	3	0	3	Good																Standard	2.1	0 / 0	0 / 0	73 / 154	89 / 188	0 / 0	163 / 342	Poor	A	2	15.7	174	2730	2730	89	0	2730	0	
	S	0																								Standard	2.1	0 / 0	0 / 0	0 / 0	0 / 0	159 / 334	159 / 334	Good												
15. 2nd Avenue North - Main St to 1 St E	N	1	Standard	0	0	16	91	0	107	Good	0	0	0	17	0	17	Good	1.2	0 / 0	0 / 0	100 / 120	7 / 8	0 / 0	107 / 129	Poor	Standard	1.8	0 / 0	0 / 0	52 / 93	0 / 0	0 / 0	52 / 93	Poor	A	2	13.9	173	2409	2409	25	0	2409	0	
	S	2	Standard	0	0	30	81	0	111	Fair	0	0	0	17	0	17	Good	1.2	0 / 0	0 / 0	26 / 31	85 / 102	0 / 0	111 / 133	Fair	Standard	1.9	0 / 0	0 / 0	0 / 0	48 / 91	0 / 0	48 / 91	Good												
16. 2nd Avenue North - 1 St E to 2 St E	N	1	Standard	0	0	53	77	0	130	Poor								1.2	0 / 0	0 / 0	33 / 39	97 / 117	0 / 0	130 / 156	Fair										A	2	12.3	143	1758	1758	0	0	1758	0	
	S	2	Standard	0	0	16	114	0	130	Good								1.2	0 / 0	3 / 4	48 / 57	79 / 95	0 / 0	130 / 156	Fair																						
17. 2nd Avenue North - 2 St E to 3 St E	N	1	Standard	0	0	47	84	0	131	Fair	0	0	14	0	0	14	Poor	1.2	0 / 0	20 / 24	5 / 5	106 / 128	0 / 0	131 / 157	Fair										A	2	12.5	145	1818	1818	0	0	1818	0	
	S	1	Standard	0	0	27	104	0	131	Fair								1.2	0 / 0	0 / 0	35 / 42	96 / 115	0 / 0	131 / 157	Fair																						
18. 2nd Avenue North - 3 St E to 4 St E	N	2	Standard	0	0	17	143	0	160	Good	0	0	0	16	0	16	Good	1.2	0 / 0	0 / 0	87 / 104	73 / 88	0 / 0	160 / 192	Poor										A	2	14.2	174	2467	2467	0	0	2467	0	
	S	0																								Rolled	1.7	0 / 0	28 / 47	34 / 58	96 / 164	0 / 0	158 / 269	Fair												
19. 2nd Avenue North - 4 St E to 5 St E	N	2	Standard	0	0	0	8	0	8	Good								1.2	0 / 0	0 / 0	0 / 0	8 / 10	0 / 0	8 / 10	Good	Rolled	1.6	0 / 0	0 / 0	23 / 37	85 / 137	0 / 0	109 / 174	Fair	A	2	15.6	134	2092	2092	145	0	2092	0	
	S	1																								Rolled	1.8	0 / 0	0 / 0	14 / 26	106 / 190	0 / 0	120 / 216	Good												
20. 3rd Avenue North - Railway St to 1 St W	N	0	Standard	0	0	15	0	19	34	Poor								1.2	0 / 0	15 / 18	0 / 0	0 / 0	19 / 23	34 / 41	Poor										A	2	12.0	39	464	464	0	0	464	0	
21. 3rd Avenue North - 1 St W to Main St	N	0	Standard	0	10	0	42	0	52	Fair								1.2	0 / 0	3 / 3	29 / 35	20 / 24	0 / 0	52 / 62	Poor	Rolled	2.2	0 / 0	0 / 0	13 / 29	101 / 223	0 / 0	115 / 252	Good	A	2	12.0	178	2141	2141	0	0	2141	0	
22. 3rd Avenue North - Railway St to Main St	S	0	Standard	0	0	199	0	0	199	Poor								1.2	0 / 0	0 / 0	105 / 126	94 / 113	0 / 0	199 / 239	Poor											2										
23. 3rd Avenue North - Main St to 1 St E	N	2	Standard	0	0	27	134	0	161	Fair	0	0	15	0	0	15	Poor	1.2	0 / 0	53 / 63	68 / 81	40 / 48	0 / 0	161 / 193	Poor										A	2	12.9	176	2268	2268	0	0	2268	0	
	S	1																								Rolled	1.7	0 / 0	0 / 0	8 / 13	151 / 257	0 / 0	159 / 270	Good												
24. 3rd Avenue North - 1 St E to 2 St E	N	1																								Standard	1.7	0 / 0	0 / 0	70 / 119	58 / 99	0 / 0	128 / 218	Poor	A	2	14.8	142	2096	2096	0	0	2096	0	
	S	2																								Standard	1.7	0 / 0	0 / 0	130 / 221	0 / 0	0 / 0	130 / 221	Poor												
25. 3rd Avenue North - 2 St E to 3 St E	N	0									0	0	0	15	0	15	Good									Standard	1.7	0 / 0	0 / 0	0 / 0	0 / 0	132 / 224	132 / 224	Good	A	2	13.9	145	2010	2010	0	0	2010	0	
	S	1	Standard	0	0	70	60	0	130	Poor								1.2	0 / 0	0 / 0	36 / 44	94 / 113	0 / 0	130 / 156	Fair																						
26. 3rd Avenue North - 3 St E to 4 St E	N	1	Standard	0	0	47	112	0	158	Fair	0	0	0	13	0	13	Good	1.2	0 / 0	0 / 0	77 / 93	81 / 97	0 / 0	158 / 190	Poor										A	2	12.2	173	2111	2111	0	0	2111	0	
	S	2	Standard	0	0	0	159	0	159	Good								1.2	0 / 0	0 / 0	82 / 98	78 / 93	0 / 0	159 / 191	Poor																						
27. 3rd Avenue North - 4 St E to 5 St E	N	1	Standard	0	58	0	59	0	116	Poor	0	0	0	11	0	11	Good	1.2	0 / 0	52 / 62	12 / 14	47 / 56	0 / 0	111 / 133	Poor										A	2	11.3	133	1507	1507	138	0	1507	0	
	S	1																								Rolled	1.8	0 / 0	0 / 0	49 / 87	68 / 122	0 / 0	117 / 210	Poor												
28. 4th Avenue North - Railway St to 1 St W	S	0	Standard	0	15	0	52	0	67	Fair								1.2	0 / 0	0 / 0	16 / 19	18 / 22	0 / 0	34 / 40	Poor										A	2	8.8	72	632	632	0	0	632	0	
29. 4th Avenue North - 1 St W to Main St	N	1									0	10	0	0	0	10	Poor									Rolled	1.8	0 / 0	0 / 0	43 / 78	0 / 0	0 / 0	43 / 78	Poor	A	2	11.4	175	1994	1994	60	0	1994	0	
	S	1									15	0	0	0	0	15	Poor									Rolled	1.2	0 / 0	0 / 0	0 / 0	42 / 50	0 / 0	42 / 50	Good												
30. 4th Avenue North - Main St to 1 St E	N	2	Standard	0	0	0	161	0	161	Good								1.2	0 / 0	0 / 0	82 / 99	78 / 94	0 / 0	161 / 193	Poor										A	2	12.3	182	2234	2234	0	0	2234	0	
	S	1	Standard	0	0	30	131	0	161	Fair								1.2	0 / 0	9 / 11	106 / 127	46 / 56	0 / 0	161 / 193	Poor																						
31. 4th Avenue North - 3 St E to 5 St E	N	0																								Rolled	1.8	0 / 0	0 / 0	0 / 0	67 / 121	0 / 0	67 / 121	Good												
32. 4th Avenue North - 3 St E to 4 St E	S	2																								Standard	1.8	0 / 0	0 / 0	28 / 50	130 / 235	0 / 0	158 / 285	Fair	A	2	14.6	179	2609	2609	0	0	2609	0	
33. 4th Avenue North - 4 St E to 5 St E	S	0	Rolled	0	0	0	75	0	75	Good																Rolled	1.7	0 / 0	0 / 0	22 / 37	18 / 31	0 / 0	40 / 68	Poor	A	2	15.3	133	2027	2027	175	0	2027	0	

Road Description	Side of Road	Wheel Chair Ramp Required	Curb & Gutter								Concrete Swale							Separate Sidewalk								Monolithic Sidewalk								Roads									
		(each)	Type	5 (m)	4 (m)	3 (m)	2 (m)	1 (m)	Total (m)	Overall Rating	5 (m)	4 (m)	3 (m)	2 (m)	1 (m)	Total (m)	Overall Rating	Width (m)	5 (m) / (m^2)	4 (m) / (m^2)	3 (m) / (m^2)	2 (m) / (m^2)	1 (m) / (m^2)	Total (m) / (m^2)	Overall Rating	Type	Width (m)	5 (m) / (m^2)	4 (m) / (m^2)	3 (m) / (m^2)	2 (m) / (m^2)	1 (m) / (m^2)	Total (m) / (m^2)	Overall Rating	Type	Overall Rating	Width (m)	Length (m)	Area (m^2)	Crack Sealing (m^2)	Localized Reconstruction (m^2)	Localized Patching (m^2)	Road Asphalt Overlay (m^2)	Road Reconstruction (m^2)	New Road Construction (m^2)
34. 5th Avenue North - Lane to Main St	N	1	Standard	0	0	11	31	0	42	Fair																									A	2	9.7	51	493	493	0	0	493	0	
35. 5th Avenue North - Main St to 1 St E	N	2																								Rolled	1.7	0 / 0	0 / 0	13 / 22	145 / 246	0 / 0	158 / 269	Good	A	2	14.0	182	2545	2545	0	0	2545	0	
	S	2	Standard	0	0	6	154	0	160	Good								1.2	0 / 0	7 / 8	43 / 51	111 / 133	0 / 0	160 / 192	Fair																				
36. 5th Avenue North - 1 St E to 5 ST E **																																			A/OG	4	7.9	582	4597	0	0	0	0	6983	
37. 6th Avenue North - Main St to 1 St E	N	0	Rolled	0	0	0	160	0	160	Good																									A	2	10.2	182	1851	1851	143	0	1851	0	
	S	2																								Rolled	1.7	0 / 0	0 / 0	78 / 132	80 / 137	0 / 0	158 / 269	Poor										
38. 6th Avenue North - 1 St E to Cul-de-sac	N	1																								Rolled	1.8	0 / 0	0 / 0	76 / 138	35 / 62	0 / 0	111 / 200	Poor	A	3	10.0	117	1170	1170	158	0	1170	0	
	S	1																								Rolled	1.8	0 / 0	0 / 0	78 / 140	30 / 54	0 / 0	108 / 194	Poor										
39. 7th Avenue North - Service Road to Main St	N	0	Rolled	0	0	0	41	0	41	Good																									AM	3	13.0	340	4419	0	0	0	0	0	
	S	0	Rolled	0	0	0	40	0	40	Good																																		
40. 7th Avenue North - 1 St E to Cul-de-sac	N	0	Rolled	0	0	0	111	0	111	Good																									A	2	10.0	124	1237	1237	0	0	1237	0	
	S	0	Rolled	0	0	8	103	0	110	Good																																		
41. 7th Avenue North - 3 St E to Cul-de-sac	N	0	Rolled	0	0	0	0	106	106	Good																									A	1	15.0	115	1725	0	0	0	1725	0	
	S	0	Rolled	0	0	0	0	109	109	Good																																		
42. 7th Avenue North - 3 St E to 4 St E	N	0	Rolled	0	0	0	0	134	134	Good																									A	1	12.0	162	1944	0	0	0	0	0	
	S	0	Rolled	0	0	0	0	156	156	Good																																		
43. 7th Avenue North - 4 St E to 5 St E **																																			U			155		0	0	0	0	0	1860
44. 8th Avenue North - Service Road to Main St **	S	0	Rolled	0	0	0	41	0	41	Good																									A	4	12.0	430	5156	0	0	0	0	5156	
45. 8th Avenue North - Main St to 1 St E	N		Rolled	0	0	76	111	0	187	Poor																									A	3	16.2	101	1643	1643	81	298	1643	0	
	S	0	Rolled	0	0	0	184	0	184	Good																																		
46. 8th Avenue North - 1 St E to 3 St E	N	0	Rolled	0	0	0	299	0	299	Good																									A	2	13.6	298	4051	4051	82	275	4051	0	
	S	0	Rolled	0	0	14	222	42	279	Good																																		
47. 8th Avenue North - 3 St E to 5 St E **																																			G	2	9.0	271	2439	0	0	0	0	0	3252
48. Service Road - 4 Ave N to 7 Ave N																																			A	3	11.4	260	2964	2964	0	0	2964	0	
																																			G		3.5	160	560	0	0	0	0	0	
49. Service Road - 7 Ave N to 8 Ave N																																			A	3	11.3	246	2780	2780	0	0	2780	0	
																																			G		3.4	246	836	0	0	0	0	0	
50. Service Road - 8 Ave N to 10 Ave N																																			AM	2	17.1	152	2603	0	0	0	0	0	
51. 1st Street West - 3 Ave N to 4 Ave N	W	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	37 / 45	50 / 60	0 / 0	88 / 105	Poor												A	2	9.4	88	827	827	0	0	827	0	
52. Main Street - Cul-de-sac to Center St	W	-	Rolled	24	0	13	0	0	37	Poor																									A	2	10.0	40	400	400	0	0	400	0	
	E		Standard	0	0	0	57	0	57	Good																																		
53. Main Street - Center St to 1 Ave N	W	-	Standard	0	12	0	0	0	12	Poor																Standard	2.1	0 / 0	0 / 0	0 / 0	0 / 0	72 / 151	72 / 151	Good	A	2	16.6	86	1428	1428	0	0	1428	0	
	E	-																								Standard	1.8	0 / 0	0 / 0	0 / 0	84 / 151	0 / 0	84 / 151	Good										
54. Main Street - 1 Ave N to 2 Ave N	W	-																								Standard	1.9	0 / 0	0 / 0	0 / 0	0 / 0	84 / 160	84 / 160	Good	A	2	15.8	85	1343	1343	0	0	1343	0	
	E	-																1.5	0 / 0	0 / 0	42 / 63	0 / 0	0 / 0	42 / 63	Poor	Standard	2.3	0 / 0	0 / 0	0 / 0	28 / 63	17 / 38	44 / 102	Good										
55. Main Street - 2 Ave N to 3 Ave N	W	-																								Standard	2.0	0 / 0	0 / 0	0 / 0	86 / 171	0 / 0	86 / 171	Good	A	2	15.6	86	1342	1342	0	0	1342	0	
	E	-																								Standard	1.7	0 / 0	0 / 0	0 / 0	0 / 0	85 / 144	85 / 144	Good										
56. Main Street - 3 Ave N to 4 Ave N	W	-	Standard	0	0	41	47	0	88	Poor								1.2	0 / 0	0 / 0	8 / 9	80 / 96	0 / 0	88 / 105	Good												A	2	12.2	88	1074	1074	0	0	1074	0	
	E	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	35 / 41	54 / 64	0 / 0	88 / 106	Fair																				
57. Main Street - 4 Ave N to 5 Ave N	W	-	Standard	0	0	27	52	0	79	Fair								1.2	0 / 0	0 / 0	56 / 67	28 / 34	0 / 0	84 / 101	Poor												A	2	12.3	91	1119	1119	0	0	1119	0	
	E	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	60 / 72	28 / 33	0 / 0	88 / 105	Poor																				
58. Main Street - 5 Ave N to 7 Ave N	W	-																								Rolled	1.7	0 / 0	0 / 0	42 / 72	114 / 193	0 / 0	156 / 265	Fair		2								
59. Main Street - 5 Ave N to 6 Ave N	E	-																								Rolled	1.7	0 / 0	0 / 0	35 / 60	52 / 88	0 / 0	87 / 149	Poor	A	2	15.6	88	1373	1373	0	0	1373	0	
60. Main Street - 7 Ave N to 8 Ave N	W	-	Rolled	0	0	0	212	0	212	Good																																		
61. Main Street - 6 Ave N to 8 Ave N	E	-	Rolled	0	0	0	285	0	285	Good																									A	2	13.0	285	3705	3705	0	0	3705	0	
62. Main Street - 8 Ave N to Cul-de-sac	W	-	Rolled	0	0	0	247	0	247	Good																									A	2	12.0	248	2976	2976	9	344	2976	0	
	E	-	Rolled	0	0	0	246	0	246	Good																																		
63. 1A Street East **	W	-	Rolled	0	0	0	0	41	41	Good																									A	2	11.9	41	488	0	0	0	488	0	
	E	-	Rolled	0	0	0	0	41	41	Good																									G		5.0	24	120	0	0	0	0	0	288
64. 1st Street East - 1 Ave S to Center St	W	-	Standard	0	0	14	69	0	83	Fair								1.2	0 / 0	0 / 0	40 / 48	43 / 52	0 / 0	83 / 100	Poor												A	2	12.3	86	1058	1058	0	0	1058	0	
	E	-	Standard	0	5	81	0	0	86	Poor								1.2	0 / 0	0 / 0	11 / 13	75 / 90	0 / 0	86 / 103	Good																				
65. 1st Street East - Center St to 1 Ave N	W	-	Standard	0	0	0	86	0	86	Good								1.2	0 / 0	0 / 0	7 / 9	71 / 86	7 / 9	86 / 103	Good												A	2	12.4	88	1091	1091	0	0	1091	0	
	E	-	Standard	0	0	6	80	0	86	Good								1.2	0 / 0	0 / 0	24 / 29	62 / 75	0 / 0	86 / 103	Fair																				
66. 1st Street East - 1 Ave N to 2 Ave N	W	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	15 / 17	73 / 88	0 / 0	88 / 105	Fair												A	2	12.7	88	1118	1118	0	0	1118	0	
	E	-	Standard	0	0	16	72	0	88	Fair								1.2	0 / 0	0 / 0	11 / 14	77 / 92	0 / 0	88 / 105	Good																				

Road Description	Side of Road	Wheel Chair Ramp Required	Curb & Gutter								Concrete Swale							Separate Sidewalk								Monolithic Sidewalk								Roads										
		(each)	Type	5 (m)	4 (m)	3 (m)	2 (m)	1 (m)	Total (m)	Overall Rating	5 (m)	4 (m)	3 (m)	2 (m)	1 (m)	Total (m)	Overall Rating	Width (m)	5 (m) / (m^2)	4 (m) / (m^2)	3 (m) / (m^2)	2 (m) / (m^2)	1 (m) / (m^2)	Total (m) / (m^2)	Overall Rating	Type	Width (m)	5 (m) / (m^2)	4 (m) / (m^2)	3 (m) / (m^2)	2 (m) / (m^2)	1 (m) / (m^2)	Total (m) / (m^2)	Overall Rating	Type	Overall Rating	Width (m)	Length (m)	Area (m^2)	Crack Sealing (m^2)	Localized Reconstruction (m^2)	Localized Patching (m^2)	Road Asphalt Overlay (m^2)	Road Reconstruction (m^2)	New Road Construction (m^2)
67. 1st Street East - 2 Ave N to 3 Ave N	W	-	Standard	0	0	79	8	0	87	Poor								1.2	0 / 0	0 / 0	42 / 50	45 / 54	0 / 0	87 / 104	Poor										A	2	12.7	87	1105	1105	0	0	1105	0	
	E	-	Standard	0	0	46	41	0	87	Poor								1.2	0 / 0	0 / 0	13 / 16	74 / 89	0 / 0	87 / 104	Fair																				
68. 1st Street East - 3 Ave N to 4 Ave N	W	-	Standard	0	0	0	87	0	87	Good								1.2	0 / 0	12 / 15	15 / 18	60 / 71	0 / 0	87 / 104	Fair										A	2	14.4	87	1253	1253	0	0	1253	0	
	E	-																								Standard	1.7	0 / 0	0 / 0	4 / 6	82 / 140	0 / 0	86 / 146	Good											
69. 1st Street East - 4 Ave N to 5 Ave N	W	-	Standard	0	0	0	87	0	87	Good								1.2	5 / 6	0 / 0	45 / 54	37 / 45	0 / 0	87 / 105	Poor										A	2	12.6	88	1109	1109	0	0	1109	0	
70. 1st Street East - 5 Ave N to 6 Ave N	W	-																								Rolled	1.7	0 / 0	0 / 0	0 / 0	87 / 148	0 / 0	87 / 148	Good	A	2	14.0	88	1232	1232	0	0	1232	0	
	E	-	Rolled	0	0	0	91	0	91	Good																																			
71. 1st Street East - 6 Ave N to 8 Ave N	W	-	Rolled	0	0	4	198	0	202	Good																									A	2	13.7	203	2781	2781	0	0	2781	0	
	E	-	Rolled	0	0	0	190	0	190	Good																																			
72. 2nd Street East - 1 Ave S to Center St	W	-	Standard	0	6	0	80	0	86	Good								1.2	0 / 0	14 / 16	0 / 0	72 / 87	0 / 0	86 / 103	Fair										A	2	12.7	86	1092	1092	0	0	1092	0	
73. 2nd Street East - Center St to 1 Ave N	W	-																								Rolled	1.7	0 / 0	0 / 0	31 / 52	55 / 93	0 / 0	85 / 145	Fair	A	2	13.2	88	1162	1162	0	0	1162	0	
	E	-	Standard	0	0	0	86	0	86	Good								1.2	0 / 0	0 / 0	25 / 30	61 / 73	0 / 0	86 / 103	Fair																				
74. 2nd Street East - 1 Ave N to 2 Ave N	W	-																								Standard	1.7	0 / 0	0 / 0	32 / 54	56 / 95	0 / 0	87 / 149	Fair	A	2	13.2	88	1162	1162	0	0	1162	0	
	E	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	22 / 26	66 / 79	0 / 0	88 / 105	Fair																				
75. 2nd Street East - 2 Ave N to 3 Ave N	W	-																								Standard	1.7	0 / 0	0 / 0	87 / 147	0 / 0	0 / 0	87 / 147	Poor	A	2	13.0	87	1131	1131	0	0	1131	0	
	E	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	6 / 7	81 / 98	0 / 0	88 / 105	Good																				
76. 3rd Street East - Center St to 1 Ave N	W	-	Standard	0	0	0	86	0	86	Good								1.2	0 / 0	0 / 0	13 / 15	73 / 87	0 / 0	86 / 103	Good										A	2	13.9	88	1223	1223	0	0	1223	0	
	E	-																								Standard	1.7	0 / 0	0 / 0	0 / 0	16 / 27	0 / 0	16 / 27	Poor											
	E	-																								Rolled	1.7	0 / 0	0 / 0	52 / 88	18 / 30	0 / 0	69 / 117											
77. 3rd Street East - 1 Ave N to 2 Ave N	W	-	Standard	0	0	0	87	0	87	Good								1.2	0 / 0	0 / 0	17 / 21	70 / 84	0 / 0	87 / 105	Fair										A	2	14.8	88	1302	1302	0	0	1302	0	
	E	-																								Rolled	1.7	0 / 0	0 / 0	49 / 83	36 / 61	0 / 0	85 / 144	Poor											
78. 3rd Street East - 2 Ave N to 3 Ave N	W	-	Standard	0	0	0	88	0	88	Good								1.2	0 / 0	0 / 0	14 / 17	74 / 89	0 / 0	88 / 105	Fair										A	2	12.3	88	1082	1082	0	0	1082	0	
	E	-	Standard	0	0	8	80	0	88	Good								1.2	0 / 0	0 / 0	31 / 37	57 / 68	0 / 0	88 / 105	Fair																				
79. 3rd Street East - 3 Ave N to 4 Ave N	E	-																								Standard	1.8	0 / 0	0 / 0	66 / 118	21 / 38	0 / 0	86 / 156	Poor	A	2	11.7	87	1018	1018	0	0	1018	0	
80. 3rd Street East - 7 Ave N to 8 Ave N	W	-	Rolled	0	0	0	0	85	85	Good																									A	1	12.0	85	1020	0	0	0	1020	0	
	E	-	Rolled	0	0	0	0	85	85	Good																																			
81. 4th Street East - Center St to 1 Ave N	W	-																								Standard	1.9	0 / 0	27 / 51	12 / 23	46 / 86	0 / 0	85 / 161	Poor	A	2	18.5	85	1573	1573	0	0	1573	0	
82. 4th Street East - 1 Ave N to 2 Ave N	W	-																								Rolled	1.8	0 / 0	0 / 0	0 / 0	51 / 91	0 / 0	51 / 91	Good	A	2	17.2	90	1548	1548	0	0	1548	0	
	W	-																								Standard	1.9	0 / 0	0 / 0	0 / 0	39 / 74	0 / 0	39 / 74	Good											
83. 4th Street East - Center St to 2 Ave N	E	-	Rolled	0	0	29	164	0	193	Fair																										2									
84. 4th Street East - 2 Ave N to 3 Ave N	W	-																								Rolled	1.7	0 / 0	0 / 0	48 / 81	40 / 68	0 / 0	88 / 149	Poor	A	2	15.6	88	1373	1373	0	0	1373	0	
	E	-																								Standard	2.0	0 / 0	86 / 172	1 / 3	0 / 0	0 / 0	87 / 174	Poor											
85. 4th Street East - 3 Ave N to 4 Ave N	W	-																								Rolled	1.7	0 / 0	0 / 0	45 / 77	41 / 70	0 / 0	86 / 147	Poor	A	2	15.8	87	1375	1375	0	0	1375	0	
	E	-																								Standard	1.8	0 / 0	0 / 0	31 / 56	0 / 0	54 / 98	85 / 153	Fair											
86. 4th Street East - 7 Ave N to 8 Ave N **																																			U			85		0	0	0	0	0	1020
87. 5th Street East - Center St to 2 Ave N **																																			A	4	6.9	188	1297	0	0	0	0	2256	
88. 5th Street East - 2 Ave N to 3 Ave N **	W	-																								Rolled	1.9	0 / 0	0 / 0	20 / 38	67 / 127	0 / 0	87 / 165	Fair	A	4	9.4	87	818	0	0	0	0	1044	
89. 5th Street East - 3 Ave N to 4 Ave N **	W	-	Rolled	0	0	4	82	0	86	Good																									A	4	9.6	86	826	0	0	0	0	1032	
90. 5th Street East - 4 Ave N to 8 Ave N **																																			A	5	7.0	261	1827	0	0	0	0	3132	
																																			G	3	8.3	40	332	0	0	0	0	0	480
Totals (units)	58 (each)			30 (m) 0.3%	113 (m) 1.2%	1130 (m) 11.8%	7464 (m) 78.1%	818 (m) 8.6%	9556 (m)		15 (m) 5.4%	10 (m) 3.8%	107 (m) 39.5%	139 (m) 51.4%	0 (m) 0.0%	270 (m)			42 / 51 (m) (m^2) 0.8%	191 / 230 (m) (m^2) 3.6%	1718 / 2074 (m) (m^2) 32.3%	3368 / 4041 (m) (m^2) 62.9%	27 / 32 (m) (m^2) 0.5%	5346 / 6428 (m) (m^2)				24 / 44 (m) (m^2) 0.4%	275 / 507 (m) (m^2) 4.6%	1755 / 3191 (m) (m^2) 29.1%	2820 / 5081 (m) (m^2) 46.4%	1125 / 2124 (m) (m^2) 19.4%	5998 / 10947 (m) (m^2)					152504 (m^2) 78.3%	119485 (m^2)	1149 (m^2) 0.8%	1632 (m^2) 1.1%	123560 (m^2) 81.0%	20773 (m^2) 13.6%	6900 (m^2)

Assumptions **:

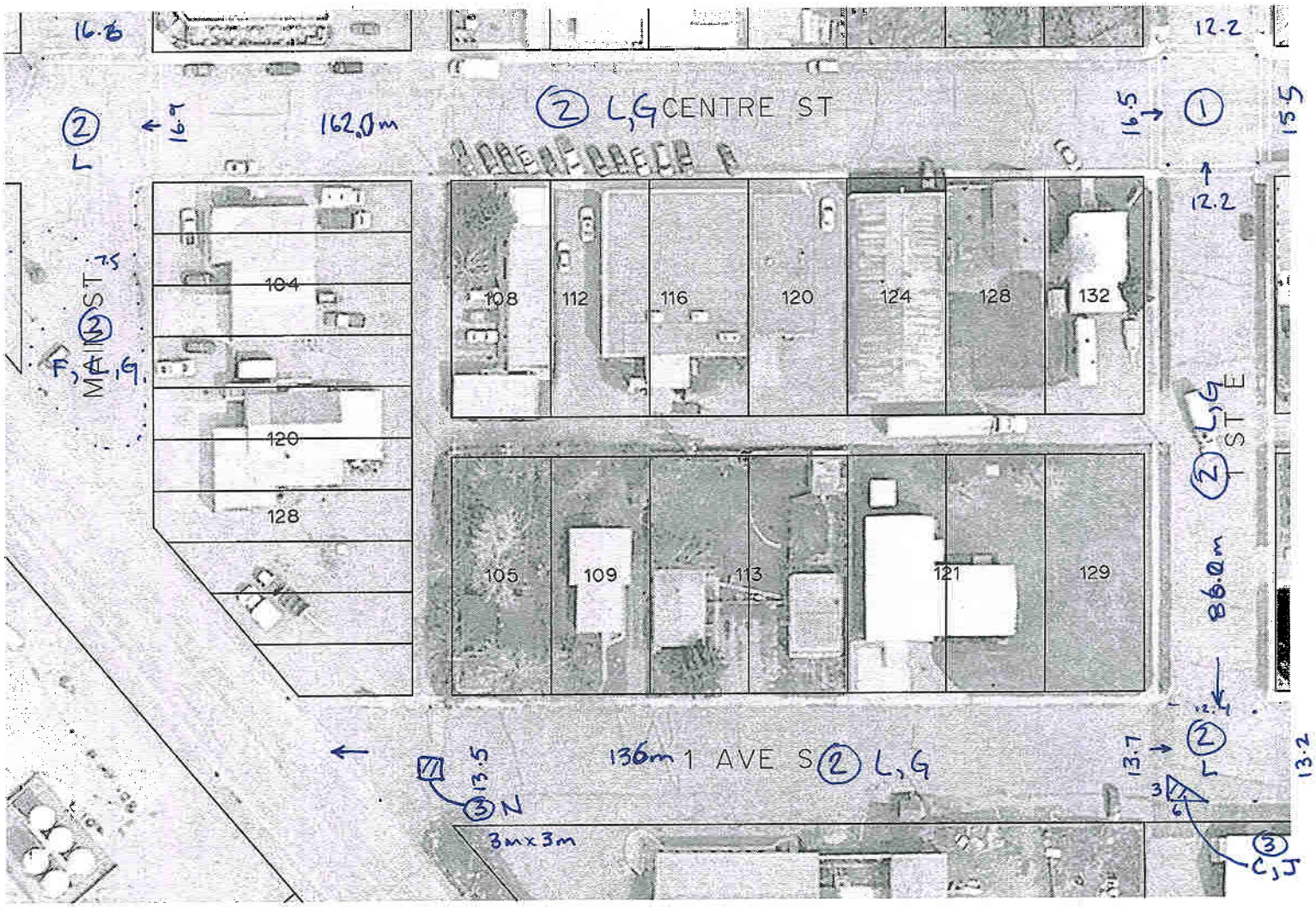
1. Required Wheel Chair Ramps identified with Avenues roads only.
2. Intersections ratings and dimensions are included with Avenues roads only.
3. Overall Condtion Rating for concrete components is based upon the total % of the components evaluation rating being 3, 4 and 5:
   - Good < 15%
   - 15% < Fair < 40%
   - 40% < Poor
4. Overall Road Condtion Rating is based upon the road evaluation rating:
   - Good = evaluation rating of 1 or 2
   - Fair = evaluation rating of 3
   - Poor = evaluation rating of 4 or 5
5. 8th Avenue North from Service Road to Main Street reconstrution is based upon new road width of 12.0m
5. 5th Avenue East road reconstruction based upon a new road width of 12.0m.
6. All new road construction is based upon a 12.0m road width

Abbreviations:

A - Asphalt
AM - Asphalt M
G - Gravel
OG - Olled Gra
N - North
S - South
E - East
W - West

Localized Condition Rating:

1 - Sound Physical Condition
2 - Acceptable Physical Condition
3 - Deterioration Evident
4 - Short Term Failure
5 - Failure Imminent



DEFICIENCY ITEMS

SIDEWALKS:
A - CORNER BREAK
B - FAULT/GAP
C - LINEAR CRACKING
D - TRANSVERSE CRACKING
E - DISTORTION
F - VERT DISPLACEMENT
G - SPALLING/PITTED
H - SETTLEMENT
J - PATCH

CURB AND GUTTER:
A - CRACKING
B - BROKEN
C - DISTORTION
D - VERT DISPLACEMENT
E - SLOPE/GRADING
F - REVERSE GUTTER

ROADS:
A - RAVELING
B - BLEEDING
C - POTHOLE
D - DISTORTION
E - ALLIGATOR CRACKING
F - LINEAR CRACKING
G - TRANSVERSE CRACKING
H - RUTTING
J - SLOPE/GRADING/DRAINAGE
K - FAILURE
L - OPEN SURFACE
M - PATCH REQUIRED
N - TRENCH SETTLEMENT

OVERALL CONDITION RATING:

1 - SOUND PHYSICAL CONDITION
2 - ACCEPTABLE PHYSICAL CONDITION
3 - DETERIORATION EVIDENT
4 - SHORT TERM FAILURE
5 - FAILURE IMMINENT

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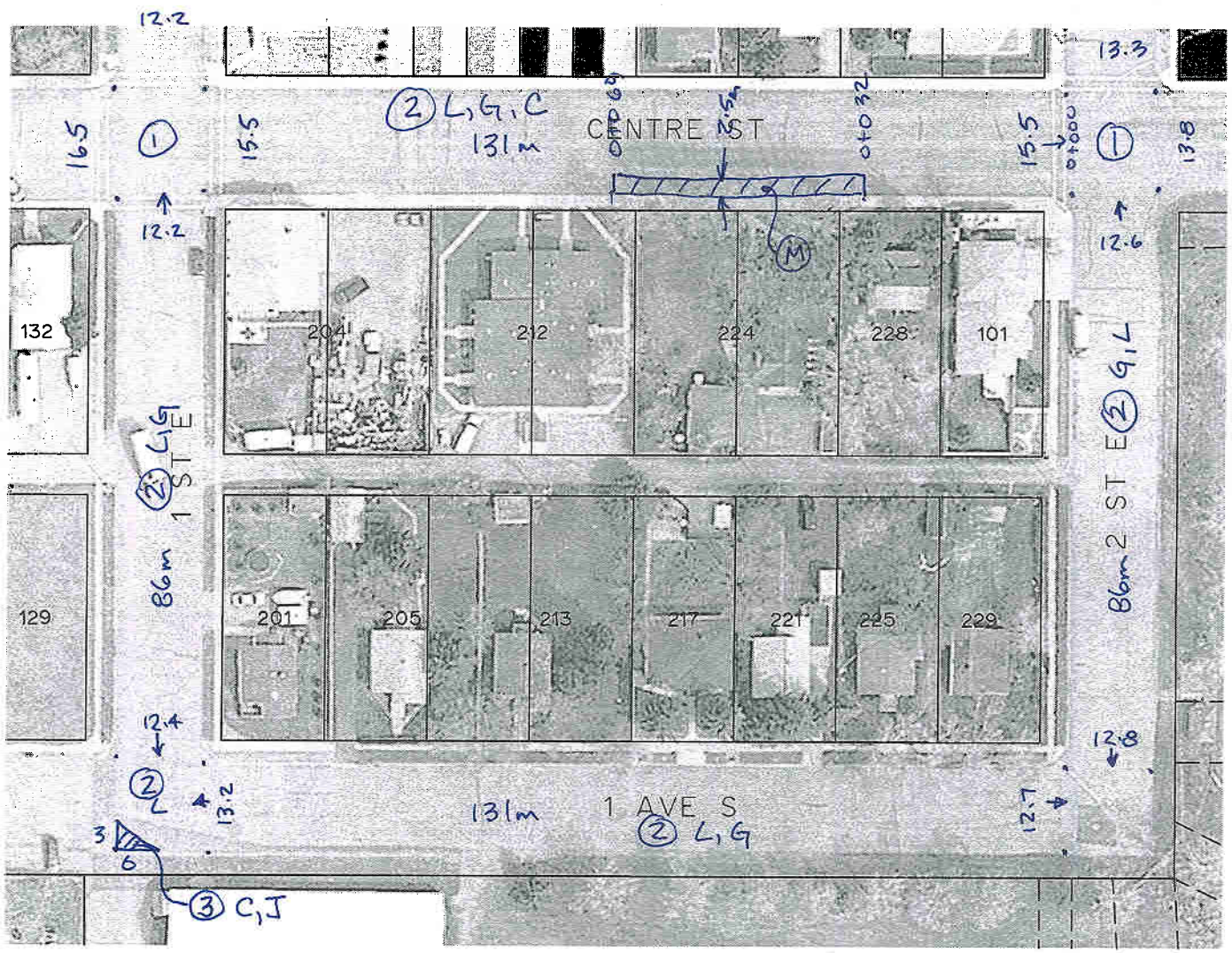
0 10 20 30 m

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1000 | DATE: OCT 2006

mpe ENGINEERING LTD.
Lethbridge, Alberta



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SIDEWALKS:
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F - VERT DISPLACEMENT
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CURB AND GUTTER:
A - CRACKING
B - BROKEN
C - DISTORTION
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E - SLOPE/GRADING
F - REVERSE GUTTER

ROADS:
A - RAVELING
B - BLEEDING
C - POTHOLE
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OVERALL CONDITION RATING:

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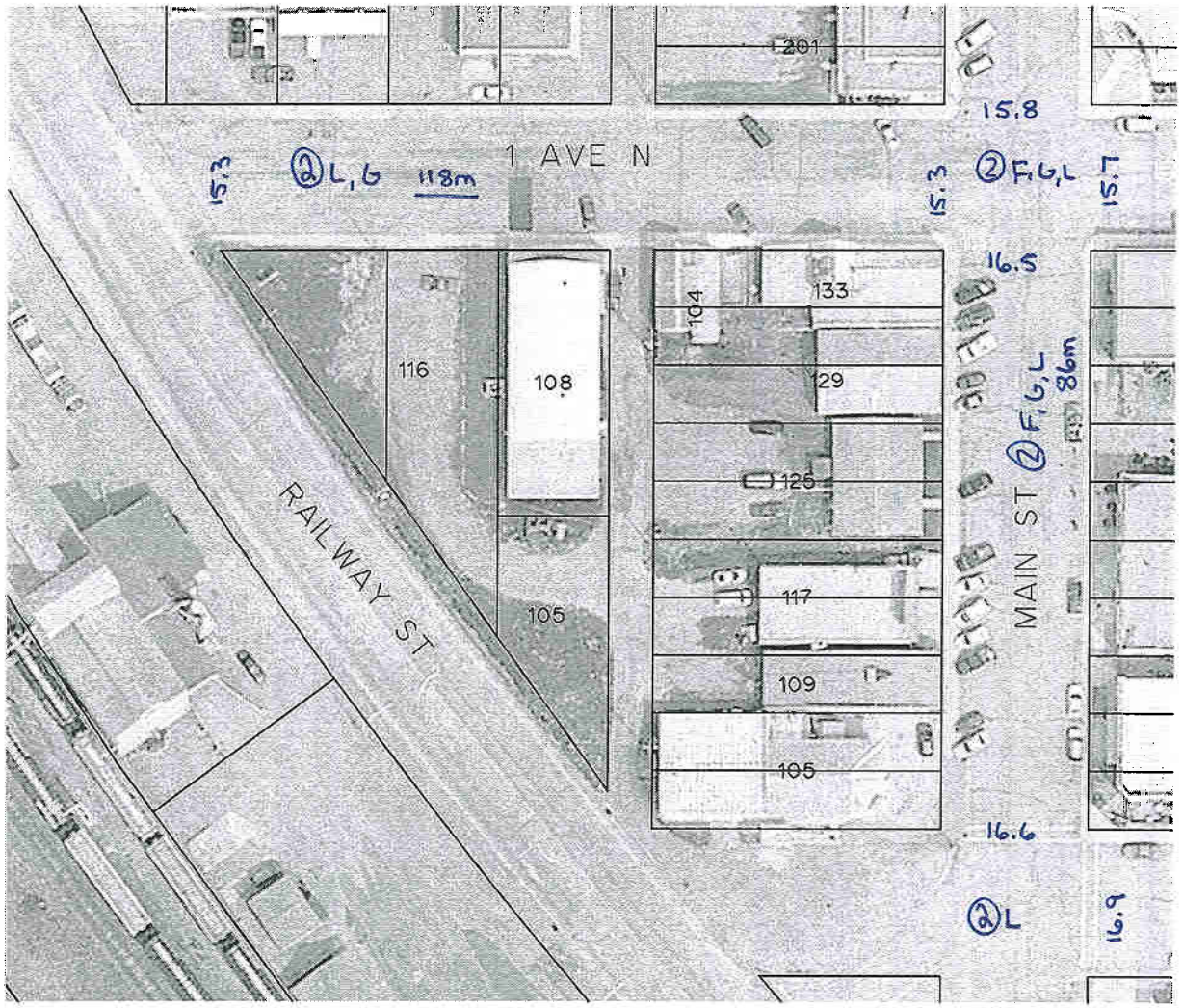

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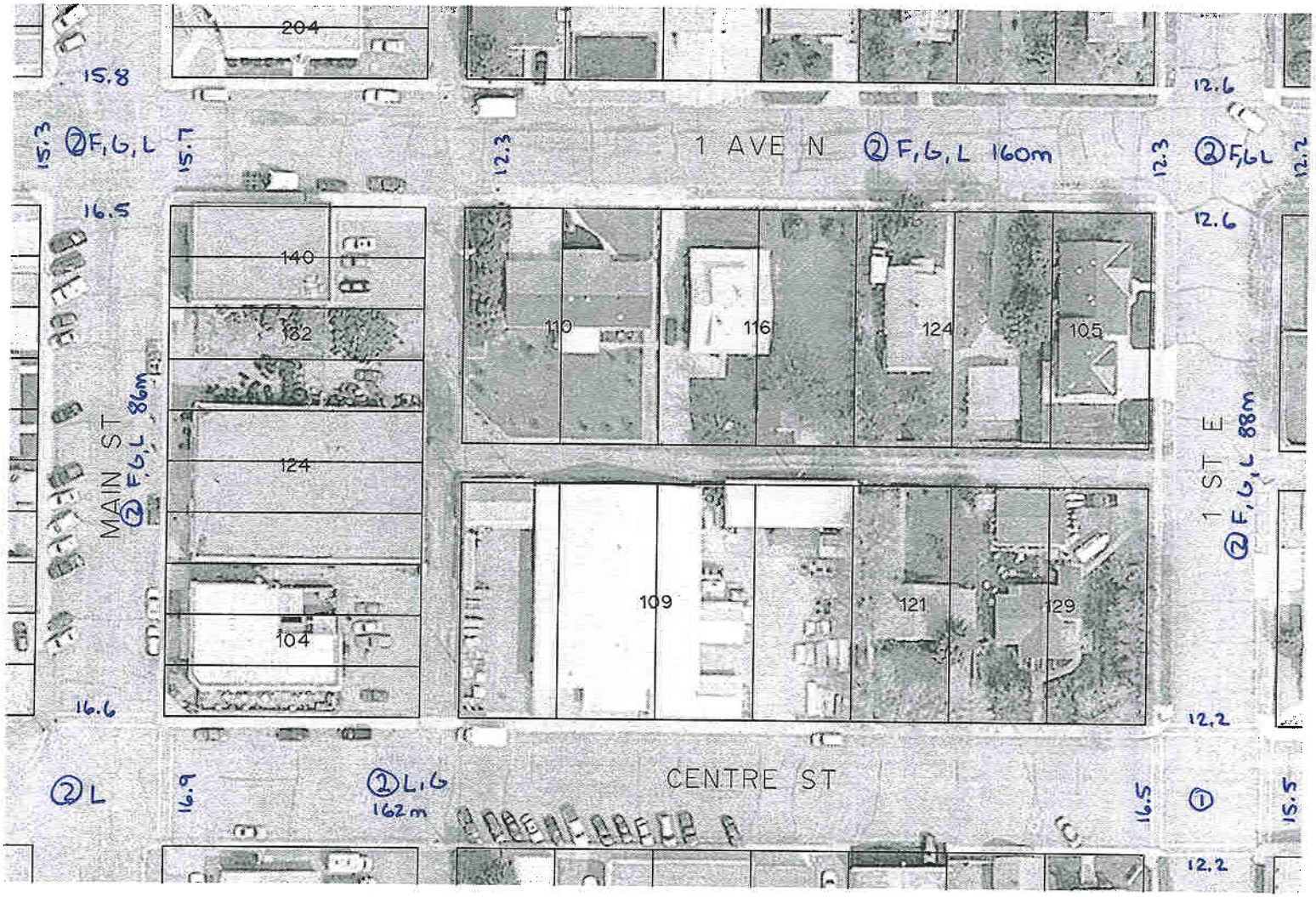

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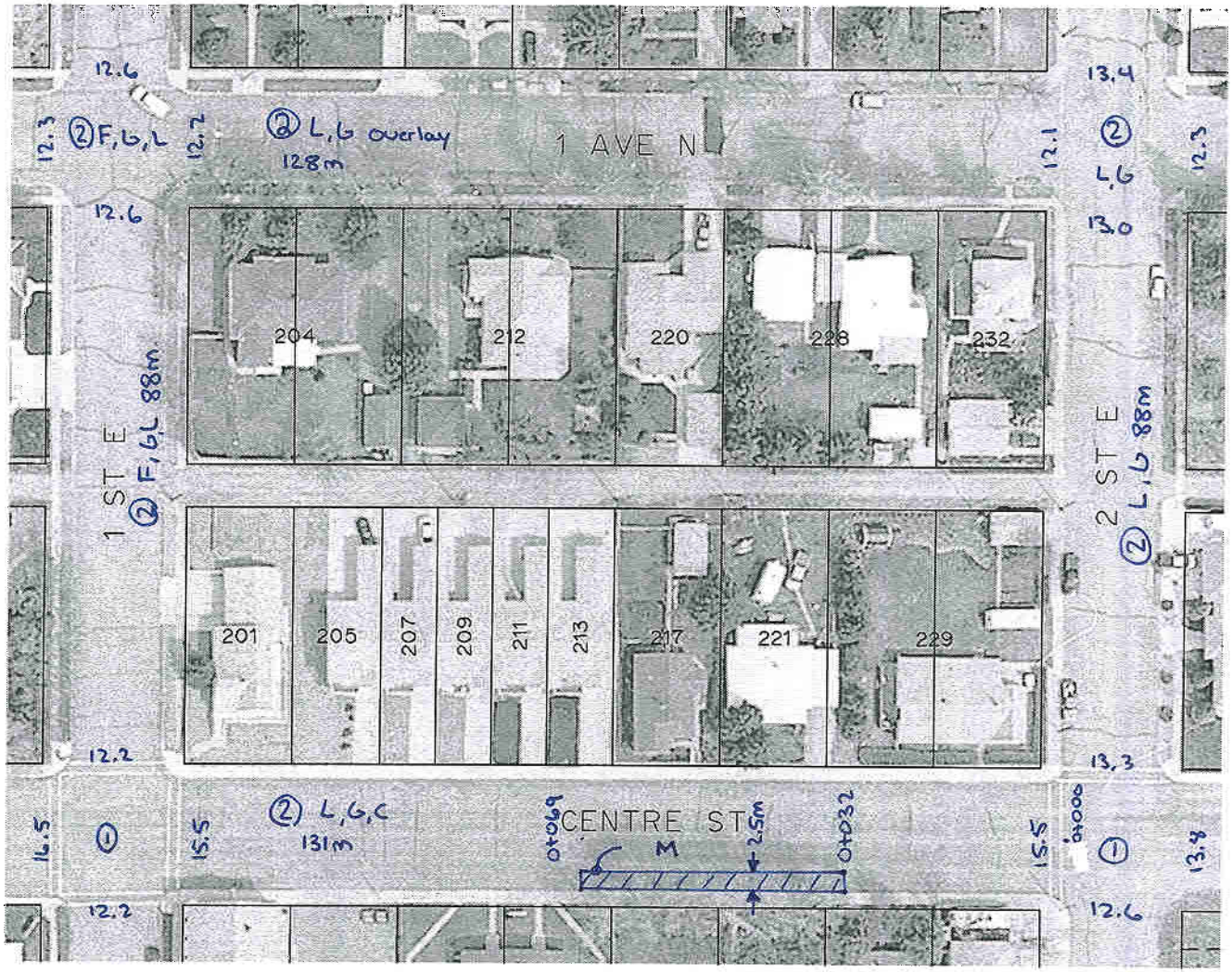

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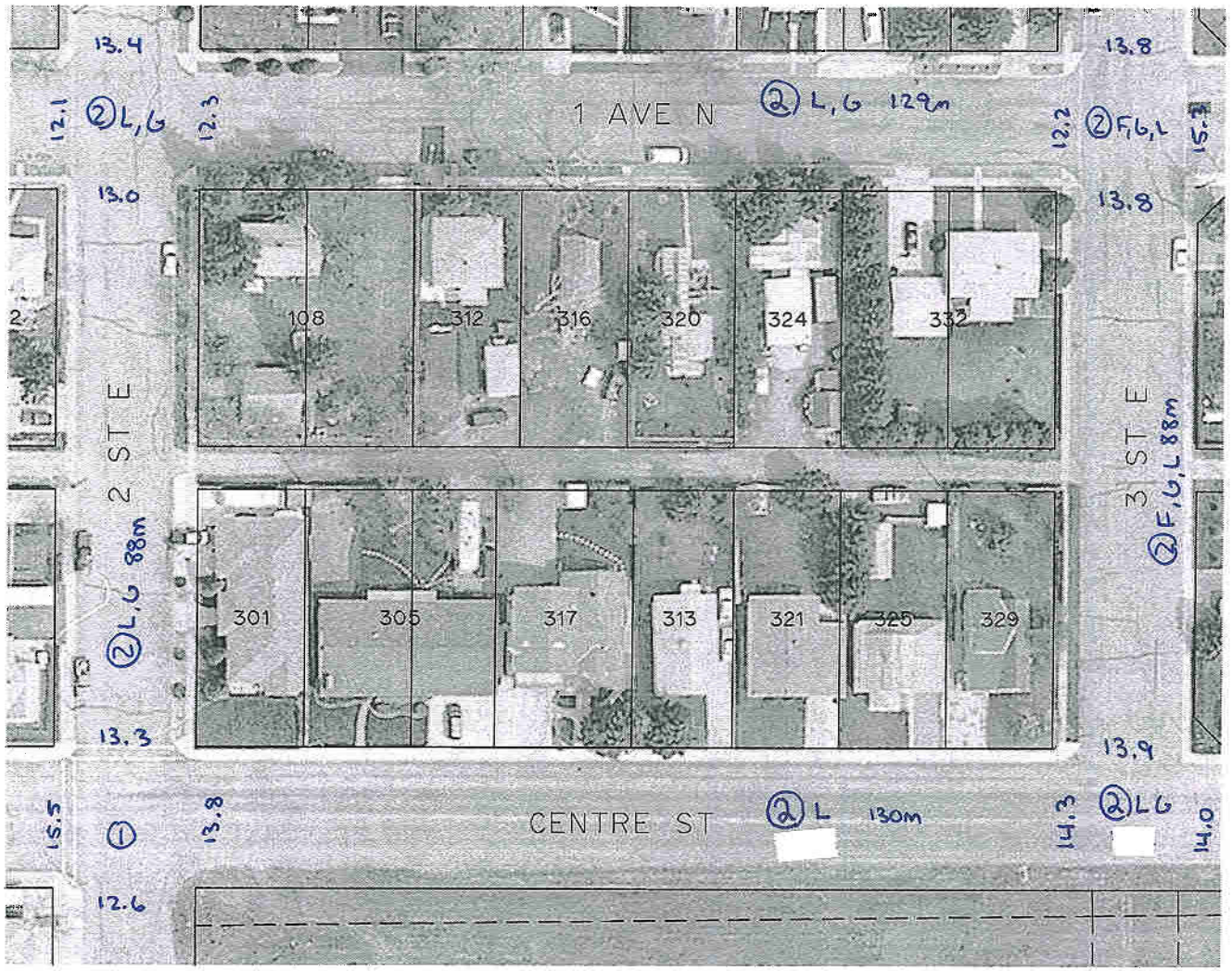

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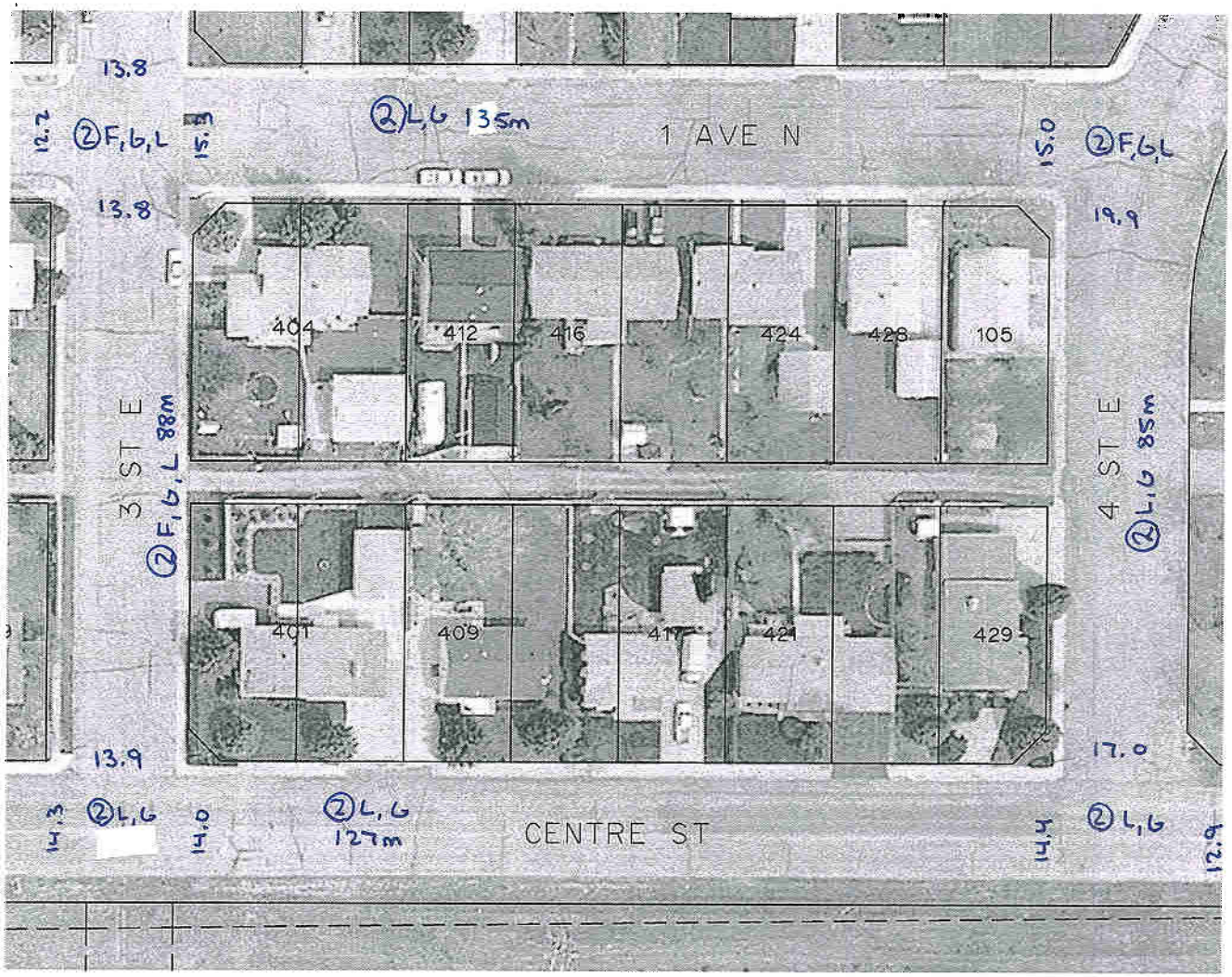

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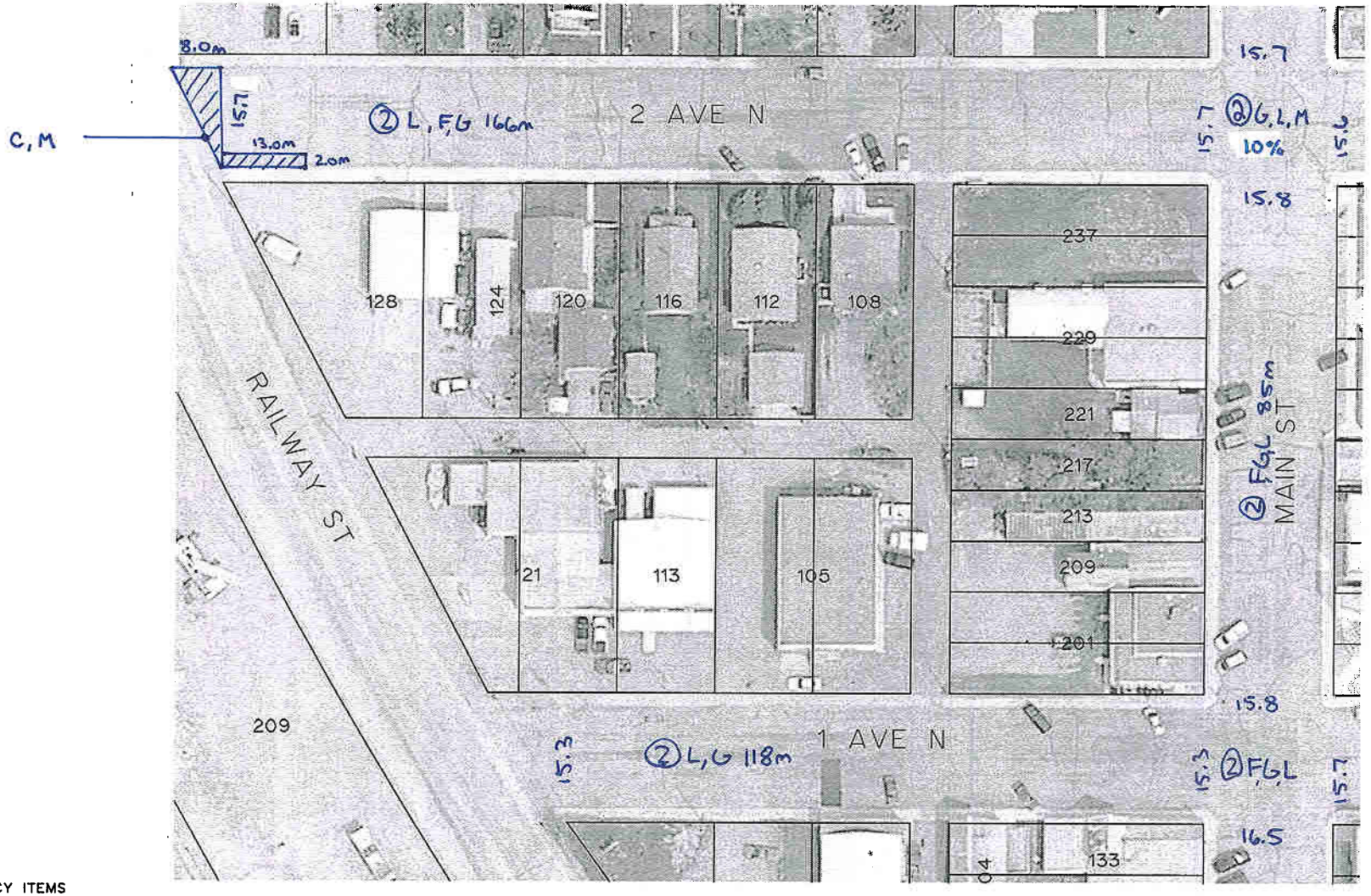

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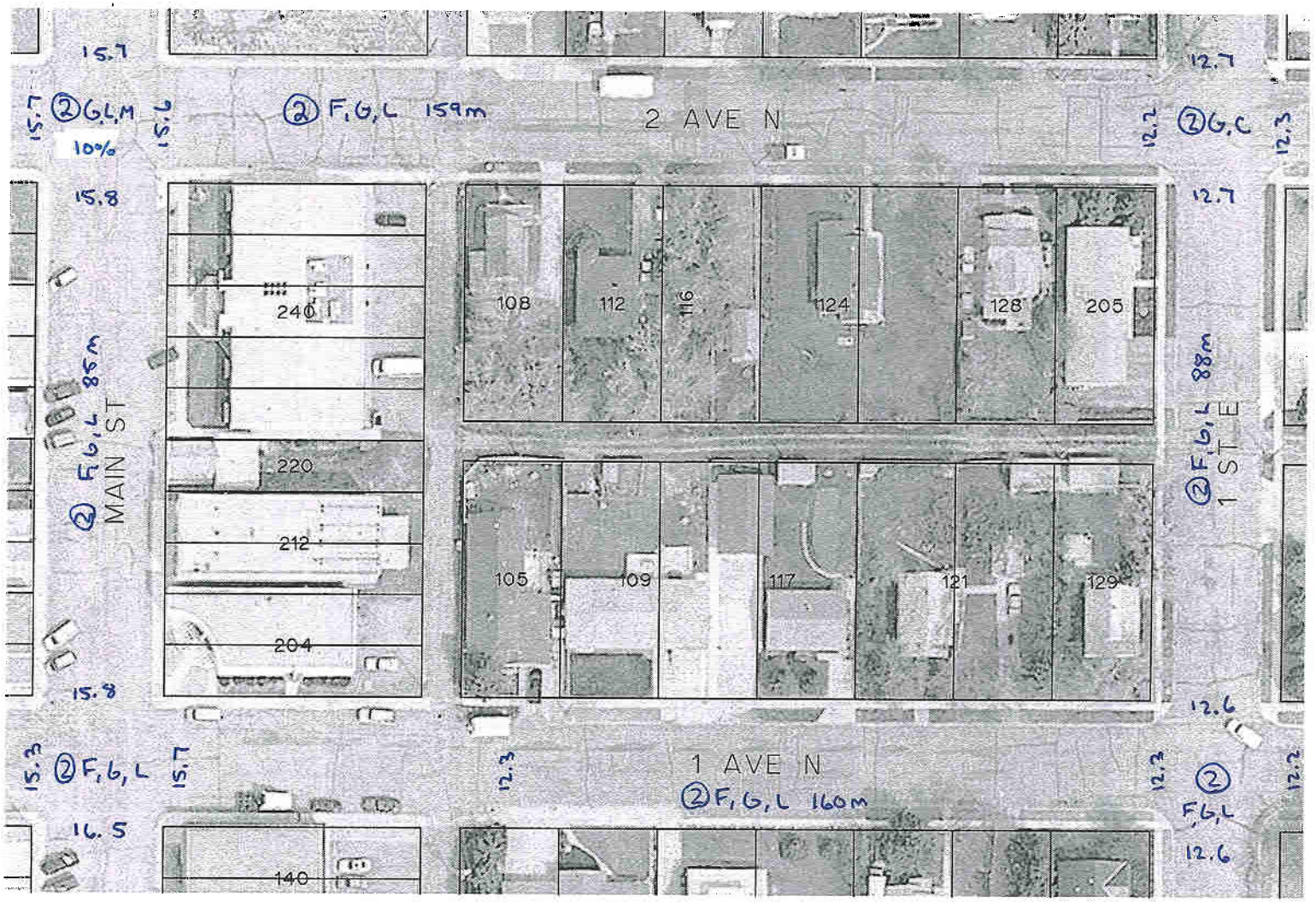

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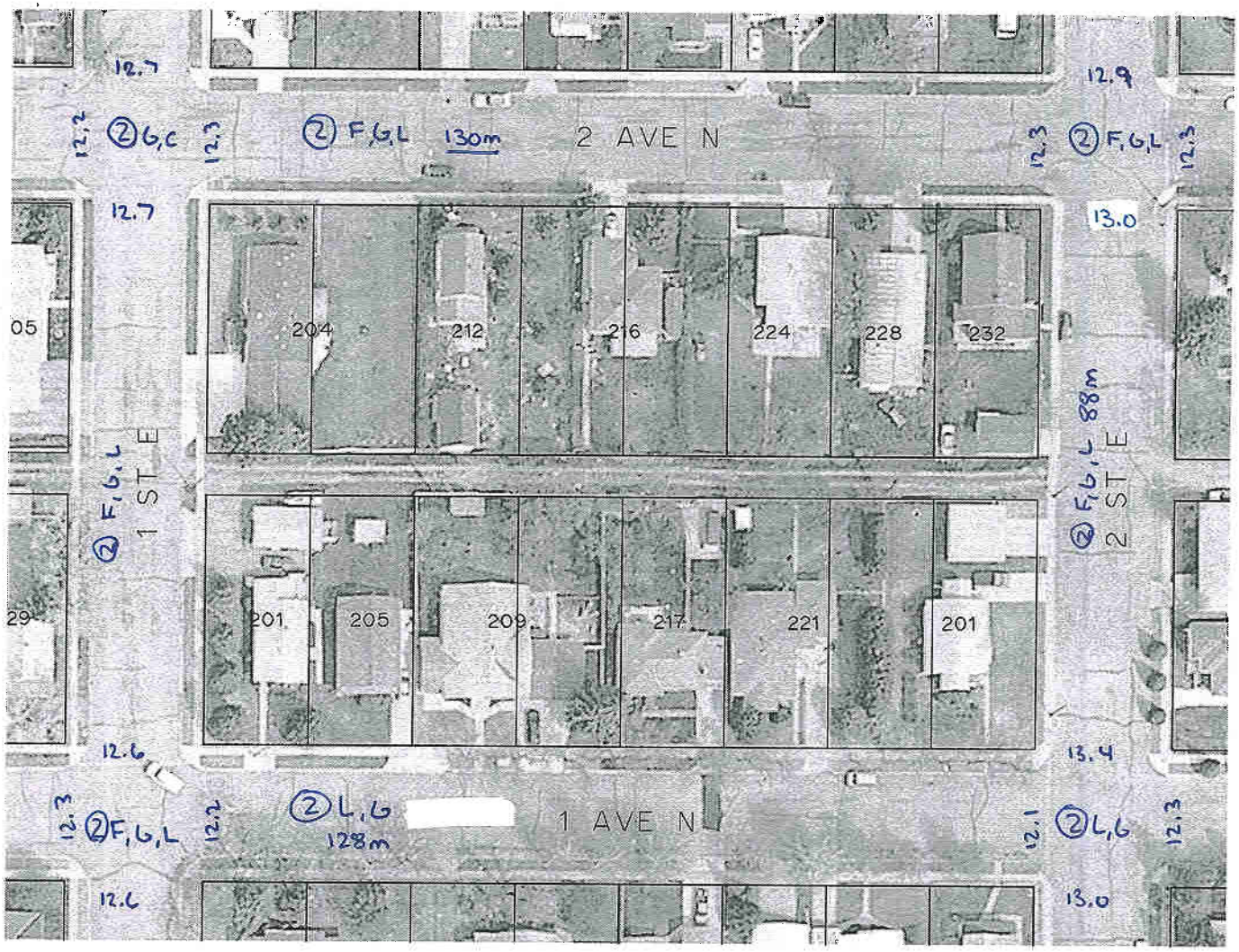

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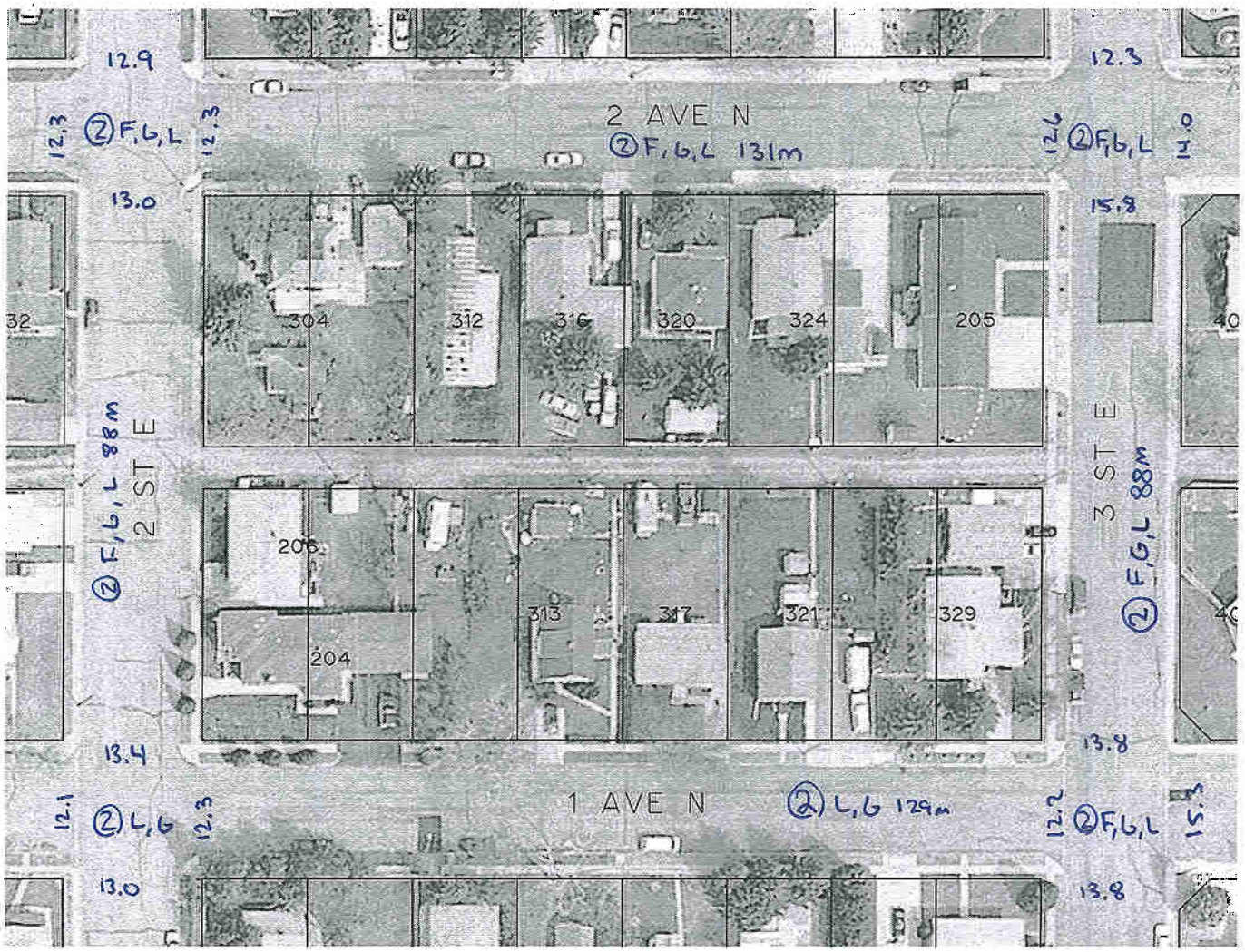

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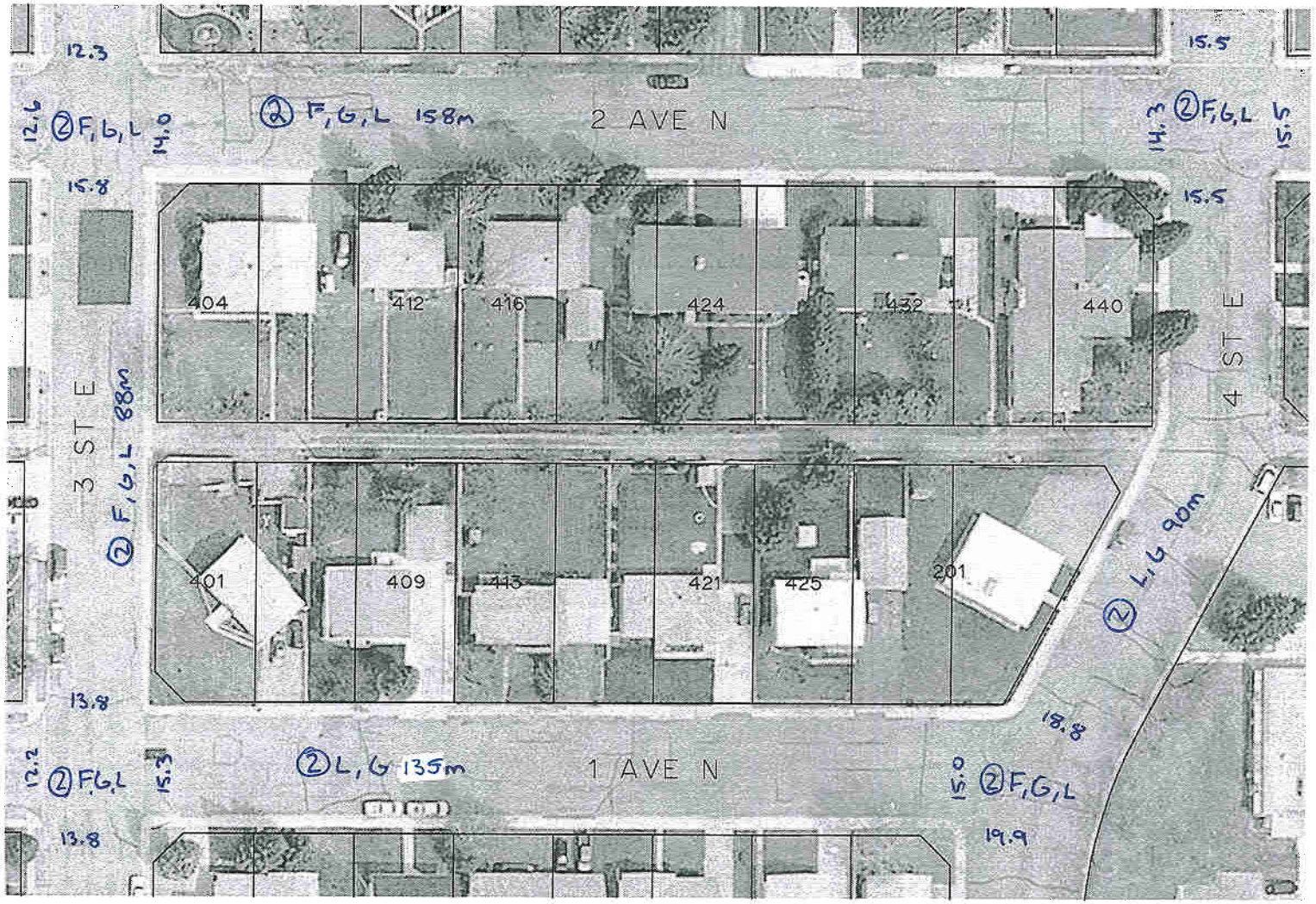

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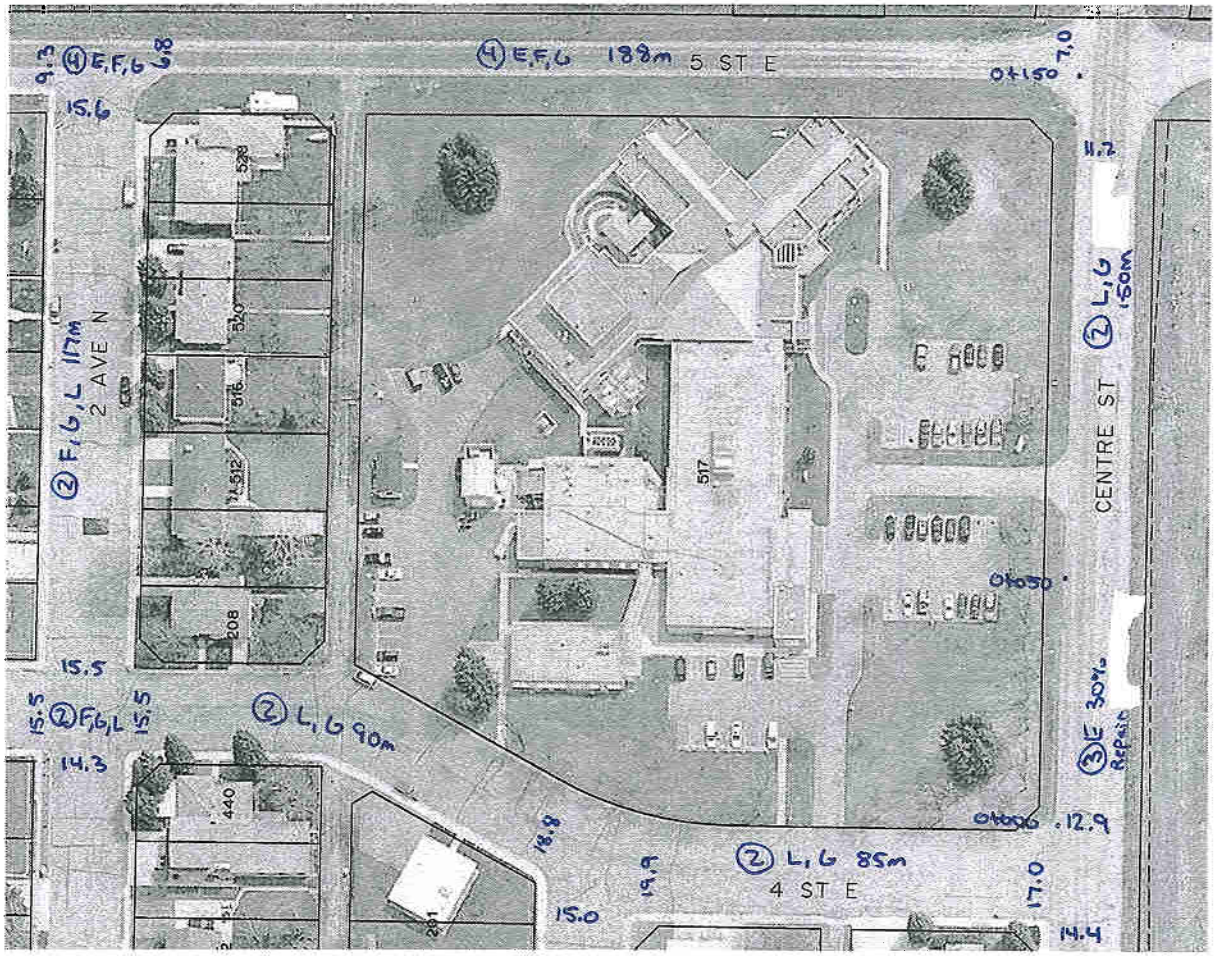

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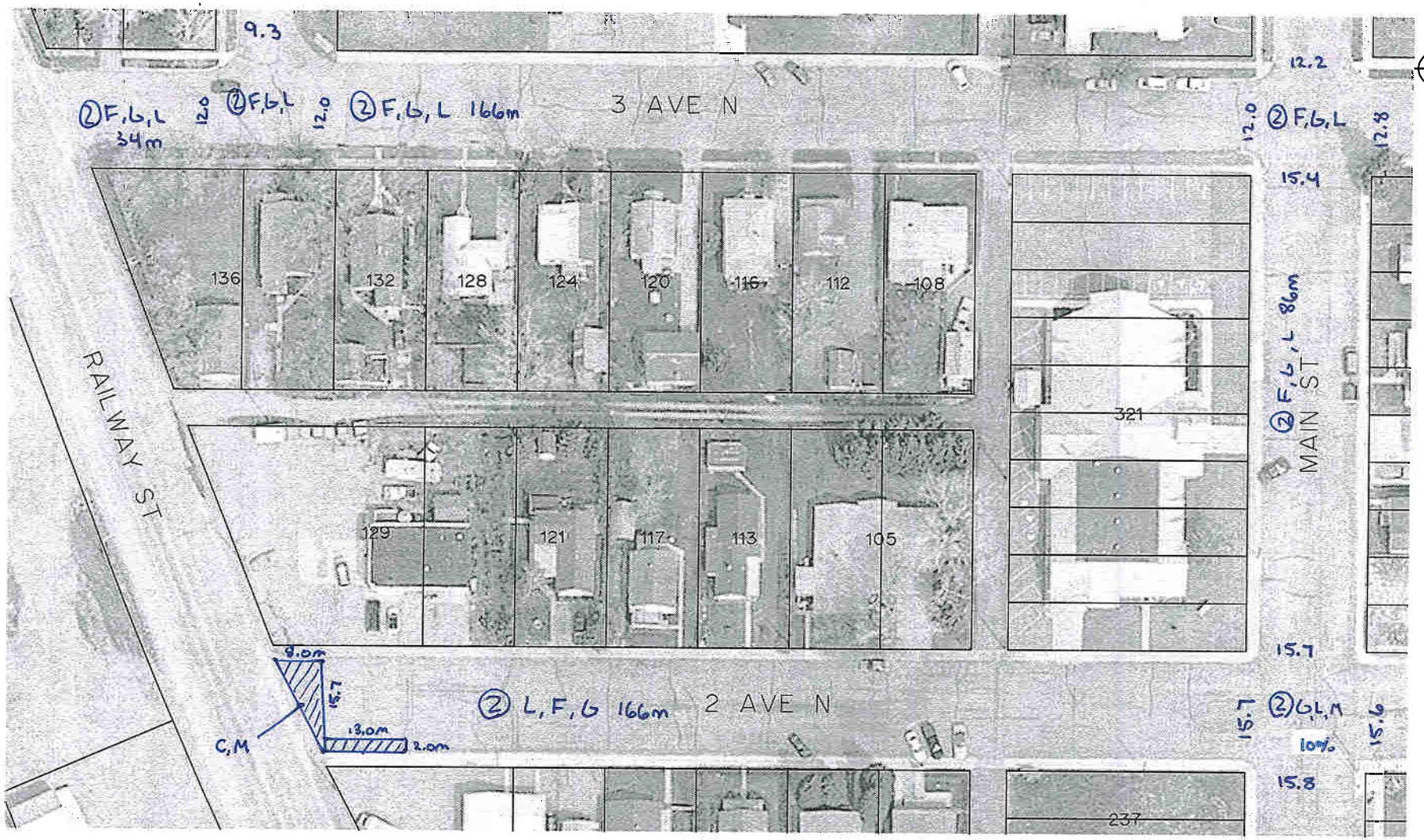

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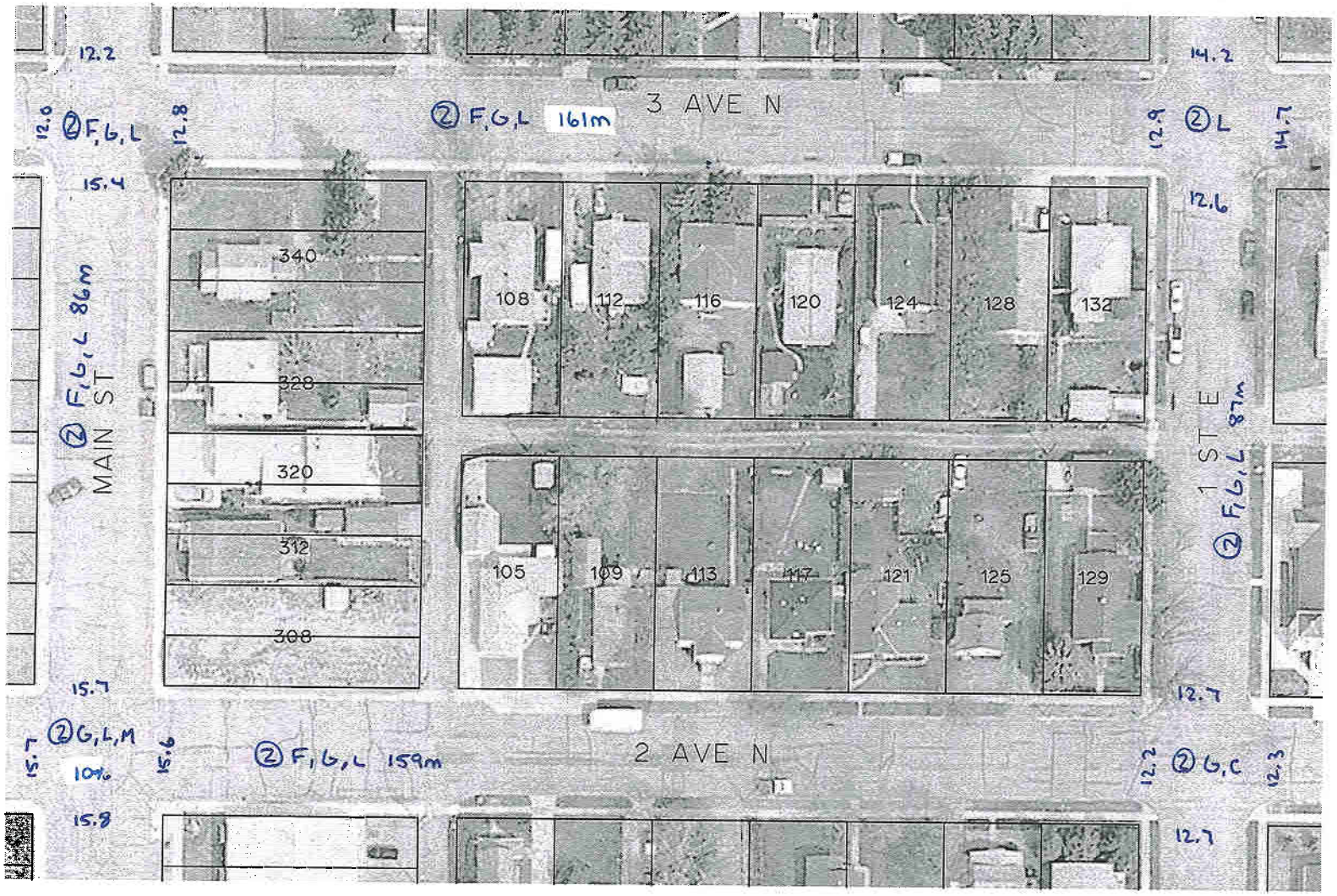

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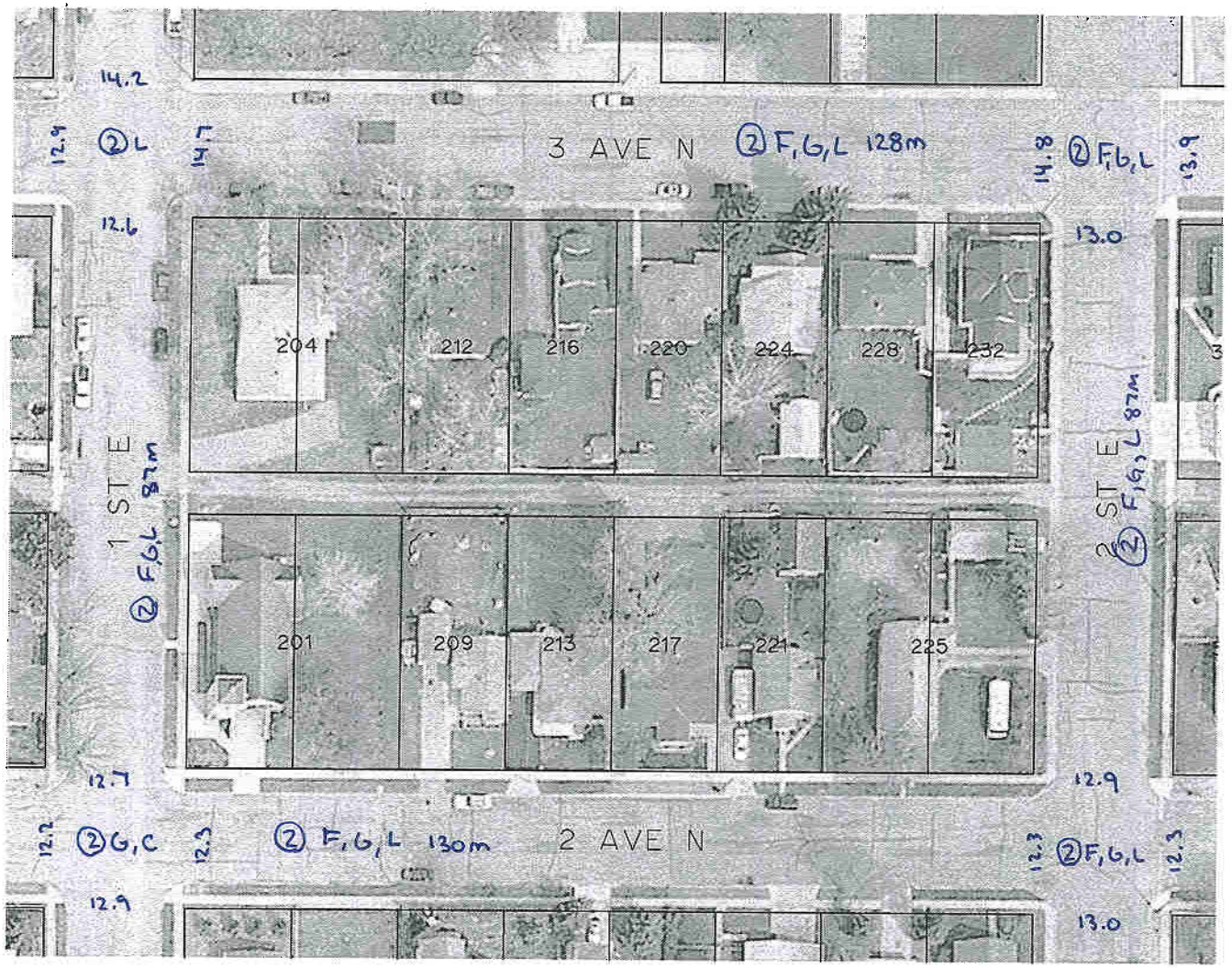

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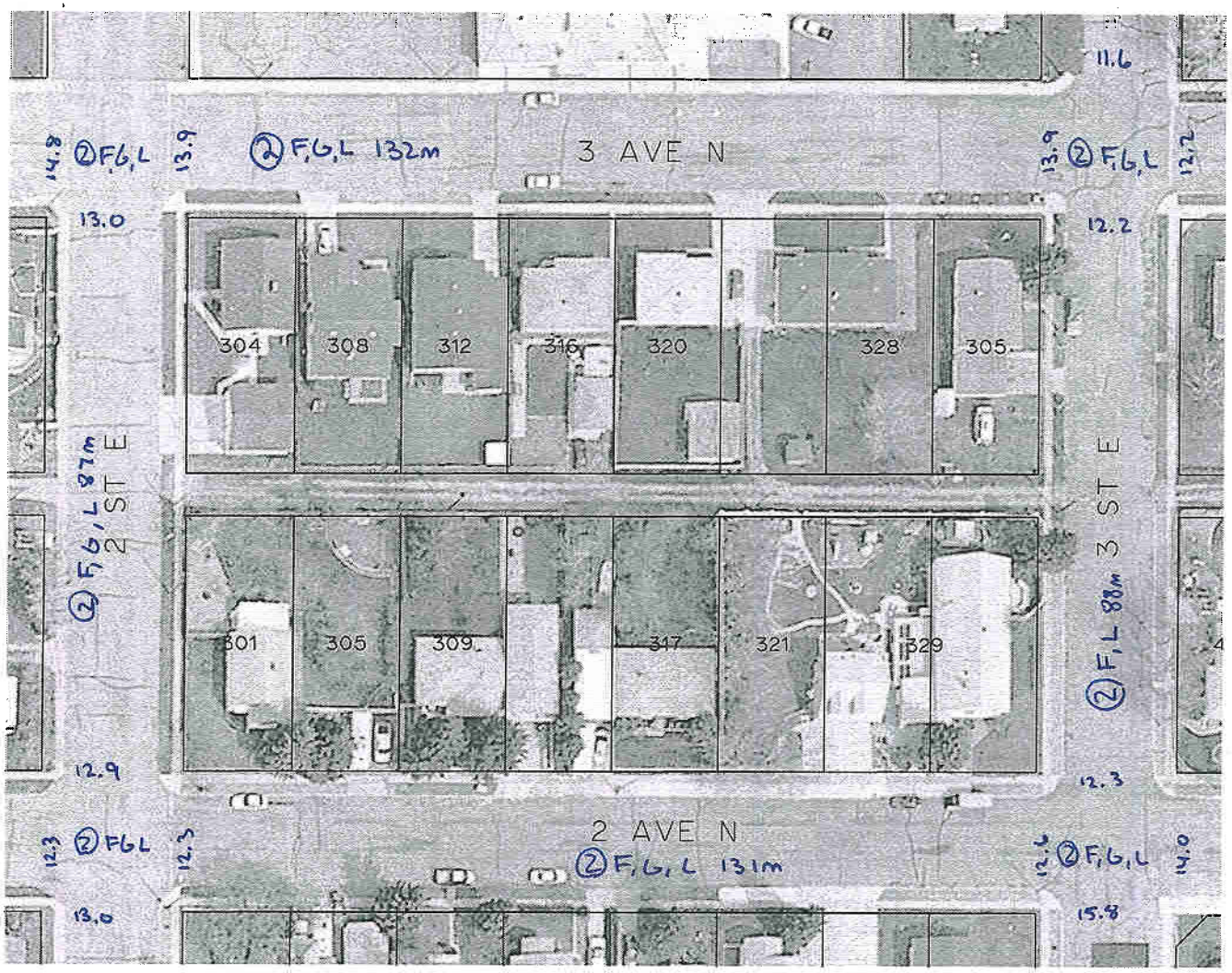

DEFICIENCY ITEMS

SIDEWALKS:
A - CORNER BREAK
B - FAULT/GAP
C - LINEAR CRACKING
D - TRANSVERSE CRACKING
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F - VERT DISPLACEMENT
G - SPALLING/PITTED
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J - PATCH

CURB AND GUTTER:
A - CRACKING
B - BROKEN
C - DISTORTION
D - VERT DISPLACEMENT
E - SLOPE/GRADING
F - REVERSE GUTTER

ROADS:
A - RAVELING
B - BLEEDING
C - POTHOLE
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K - FAILURE
L - OPEN SURFACE
M - PATCH REQUIRED
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OVERALL CONDITION RATING:

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2 - ACCEPTABLE PHYSICAL CONDITION
3 - DETERIORATION EVIDENT
4 - SHORT TERM FAILURE
5 - FAILURE IMMINENT

1:1000
0 10 20 30 m

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1000 | DATE: OCT 2006

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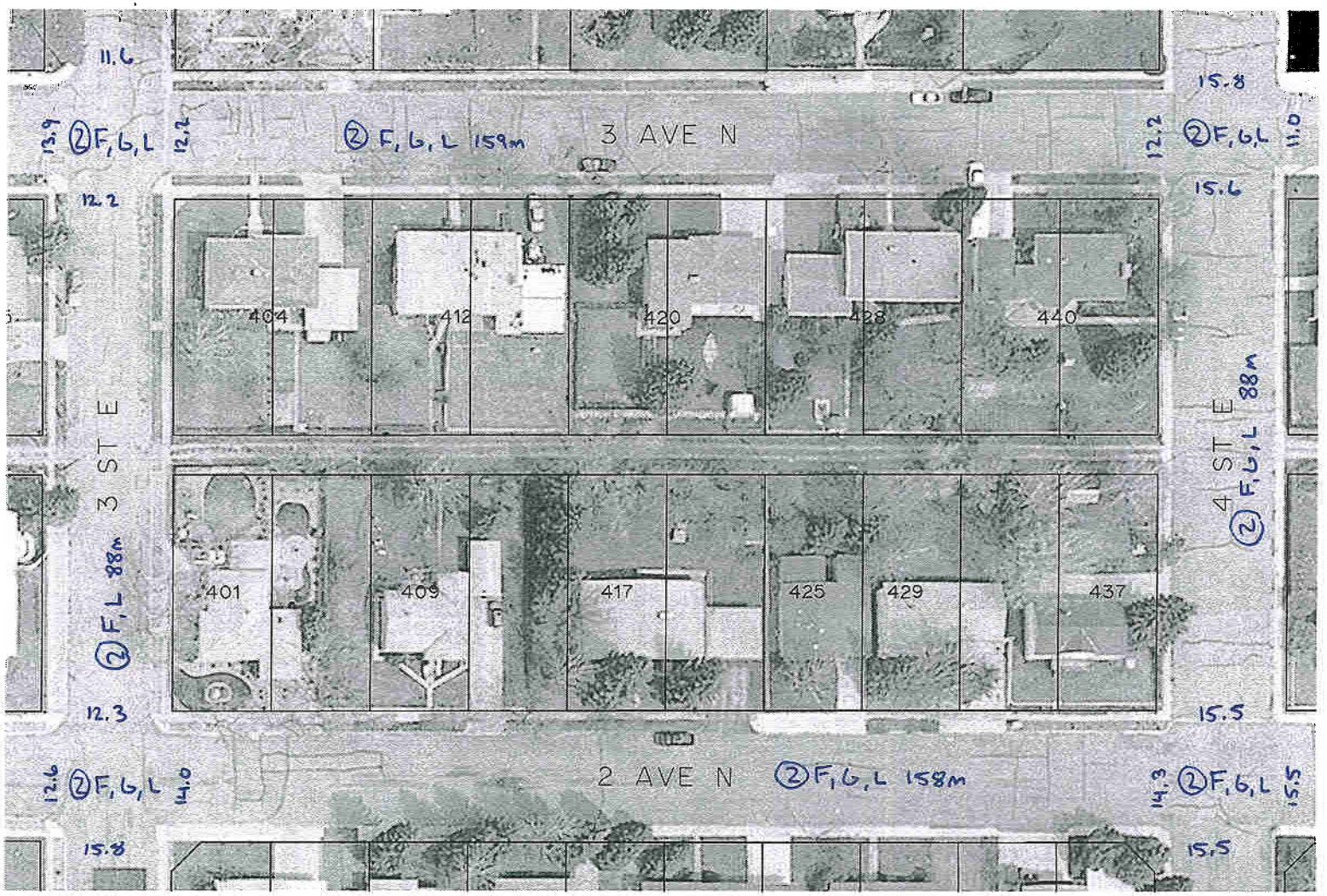
Lethbridge, Alberta



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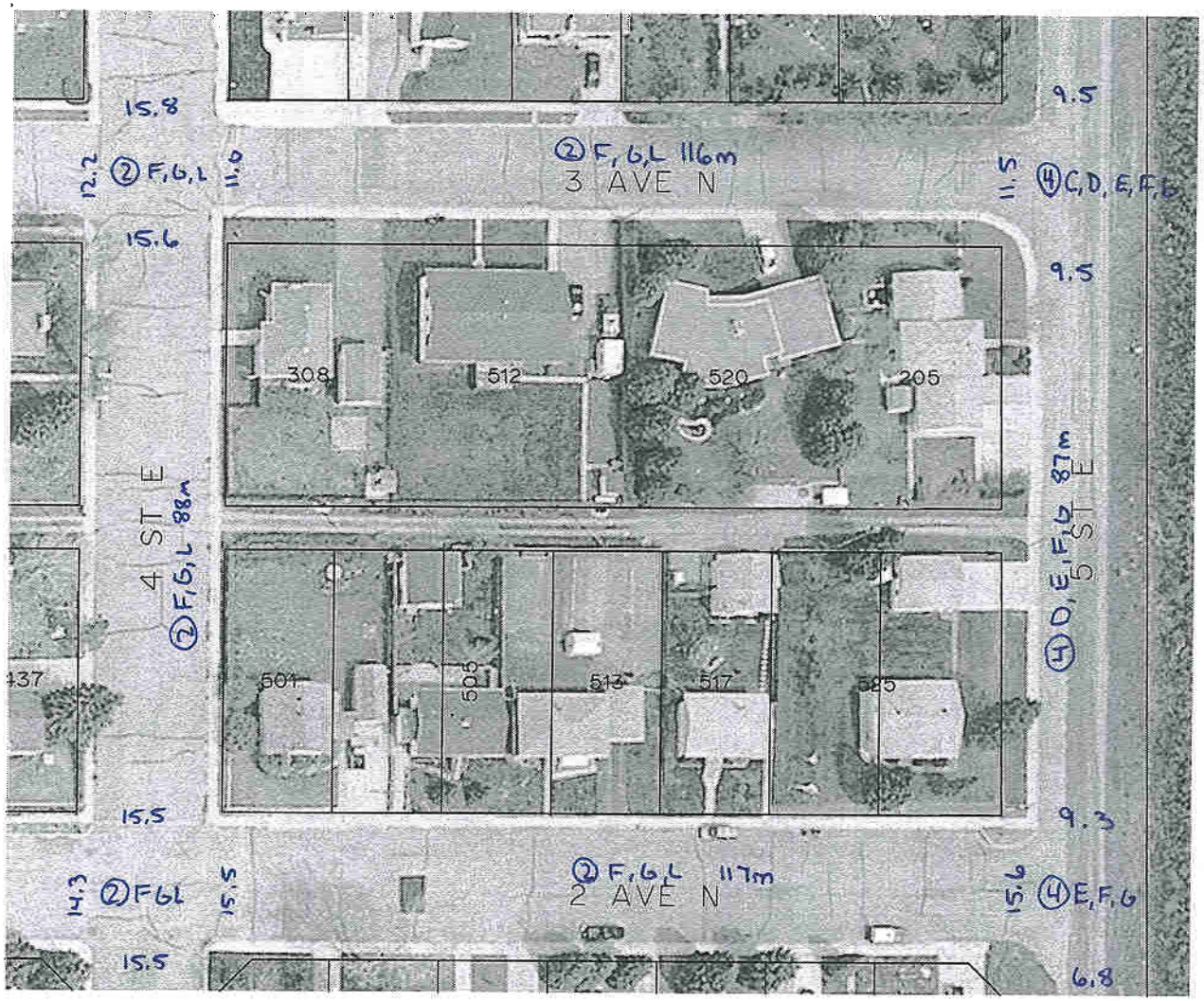

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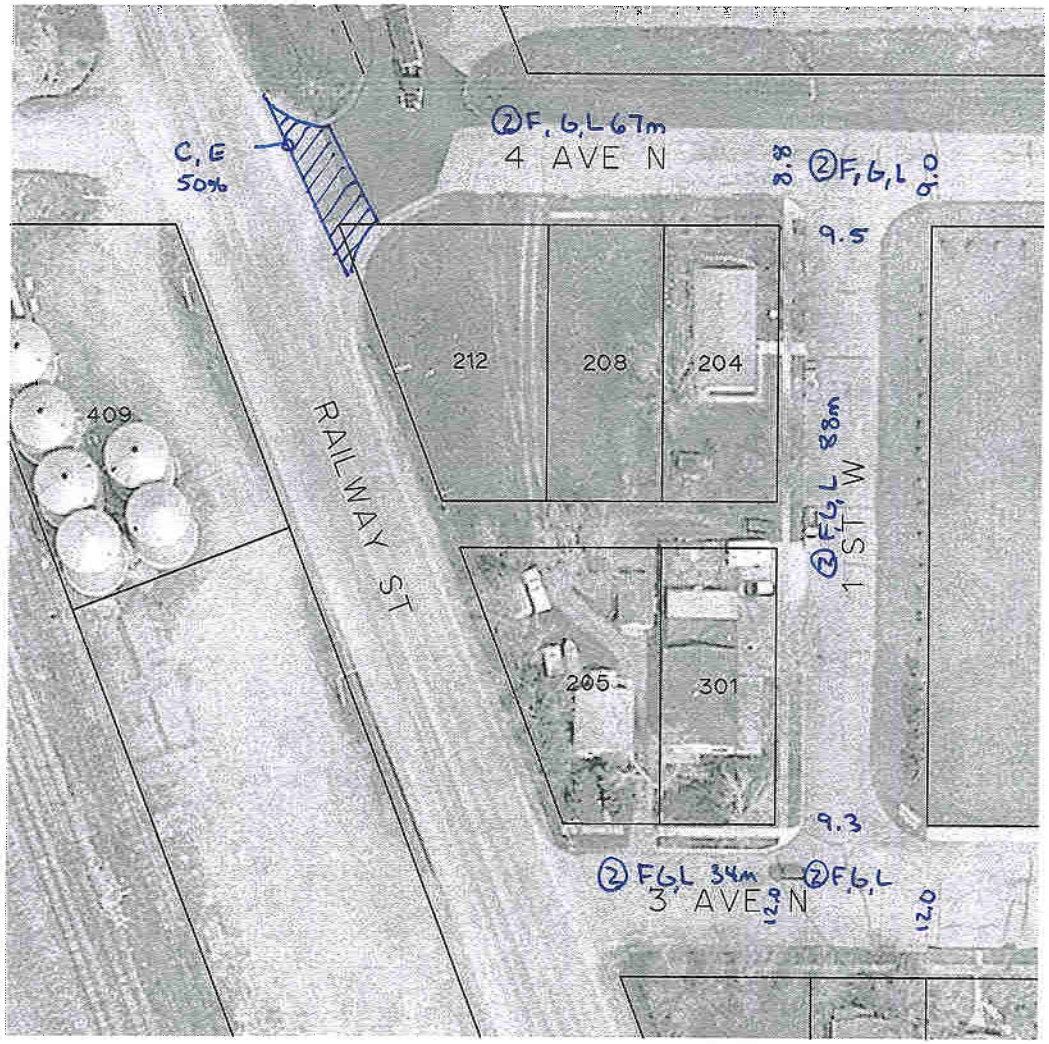

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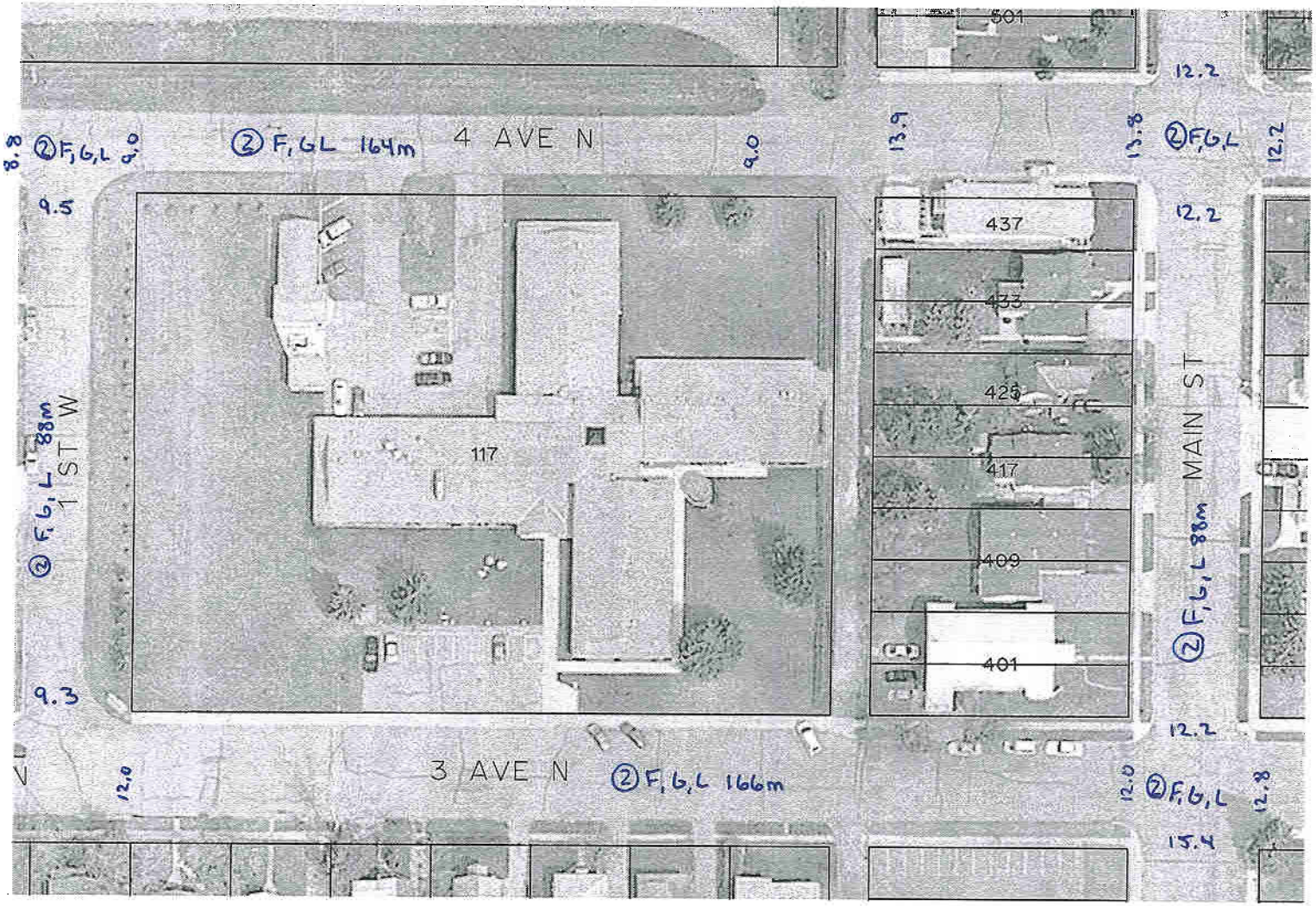

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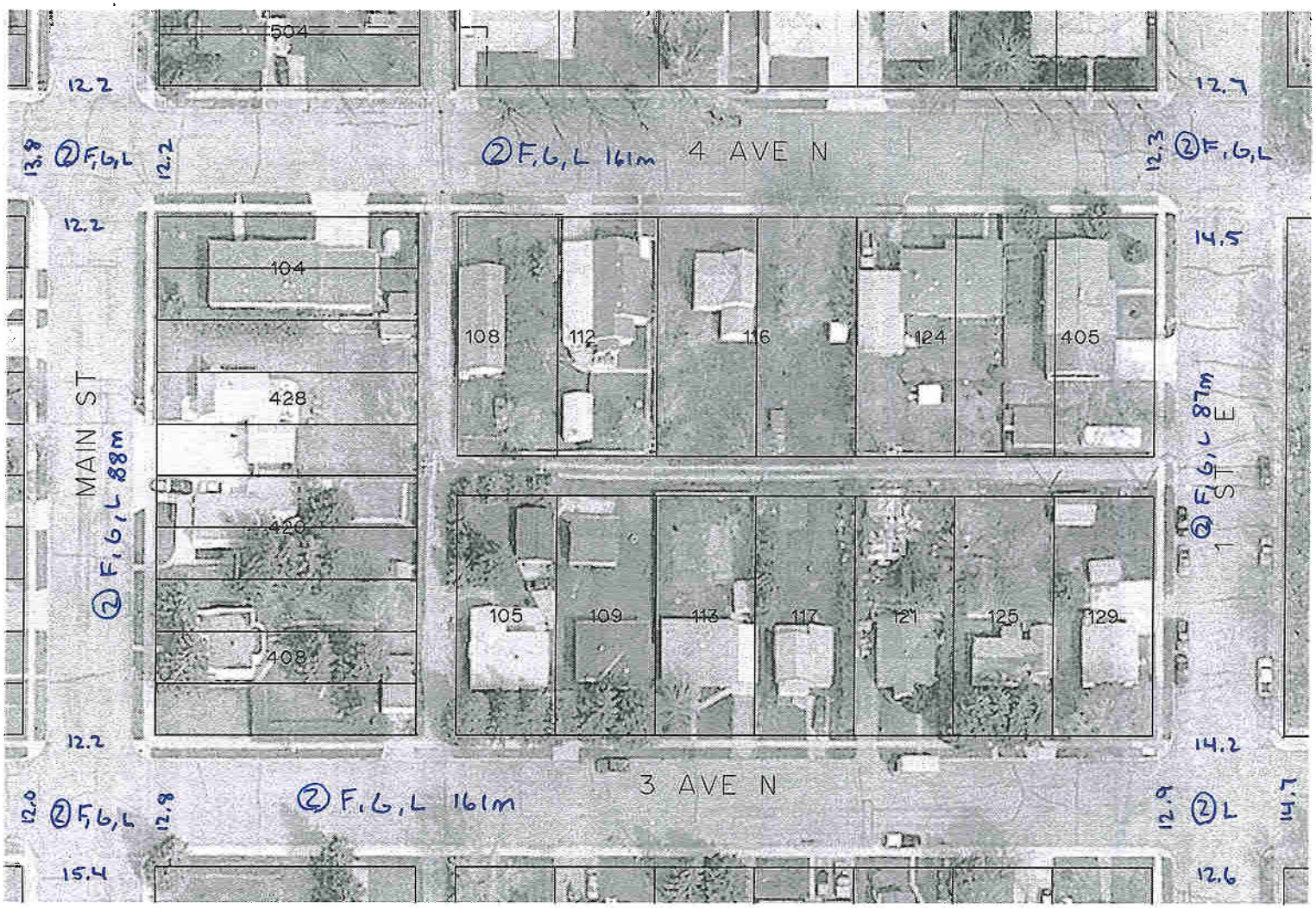

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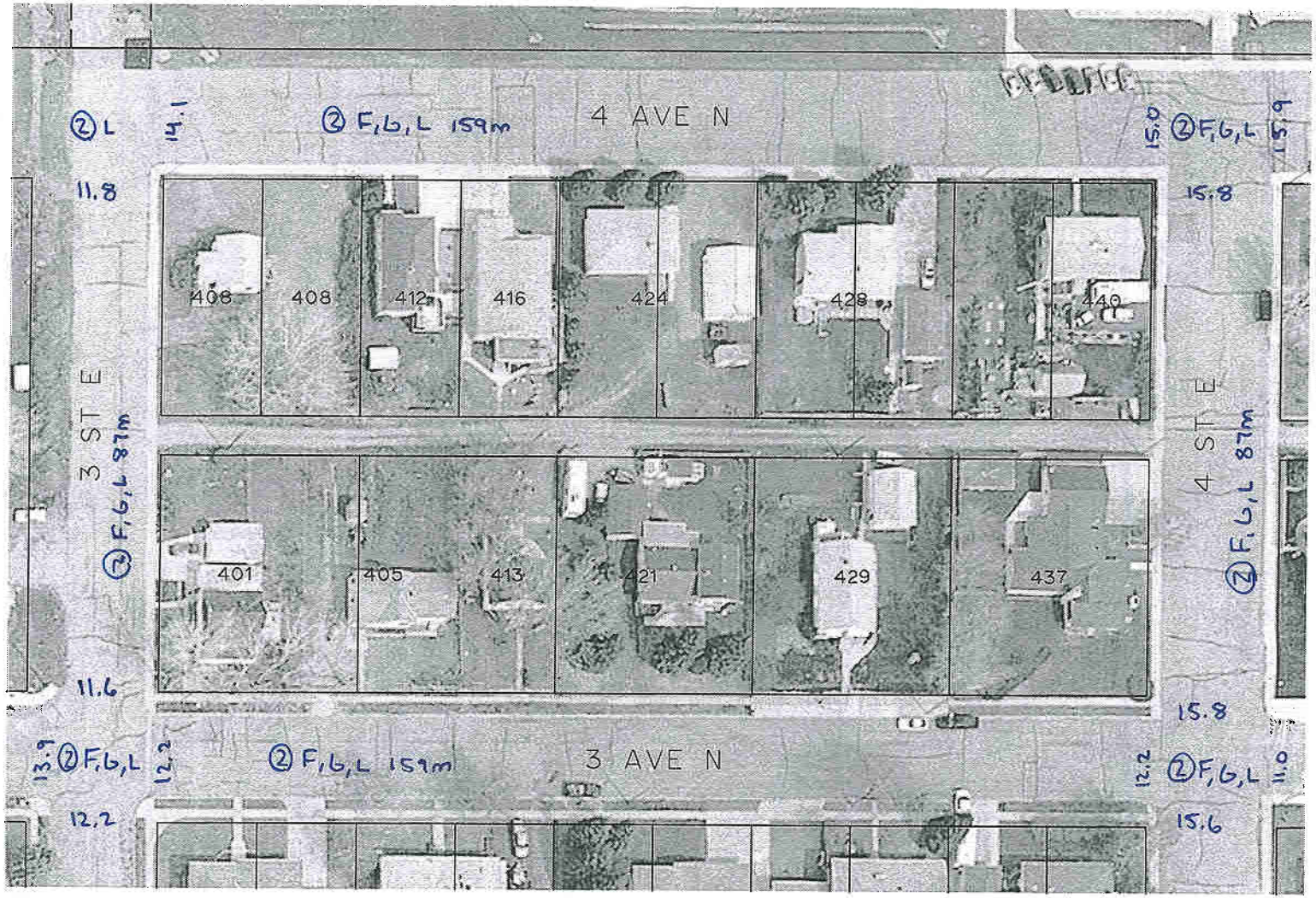

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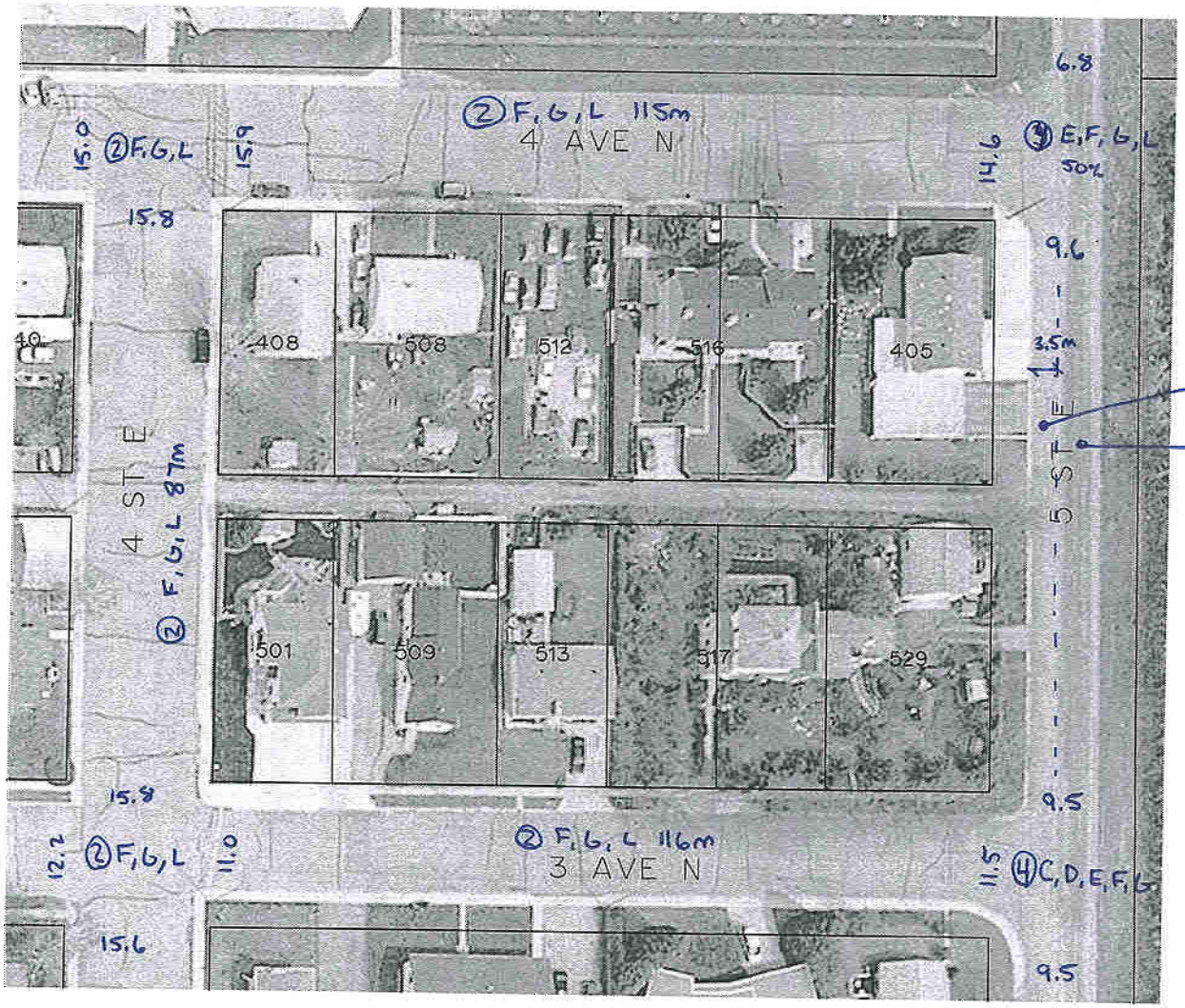

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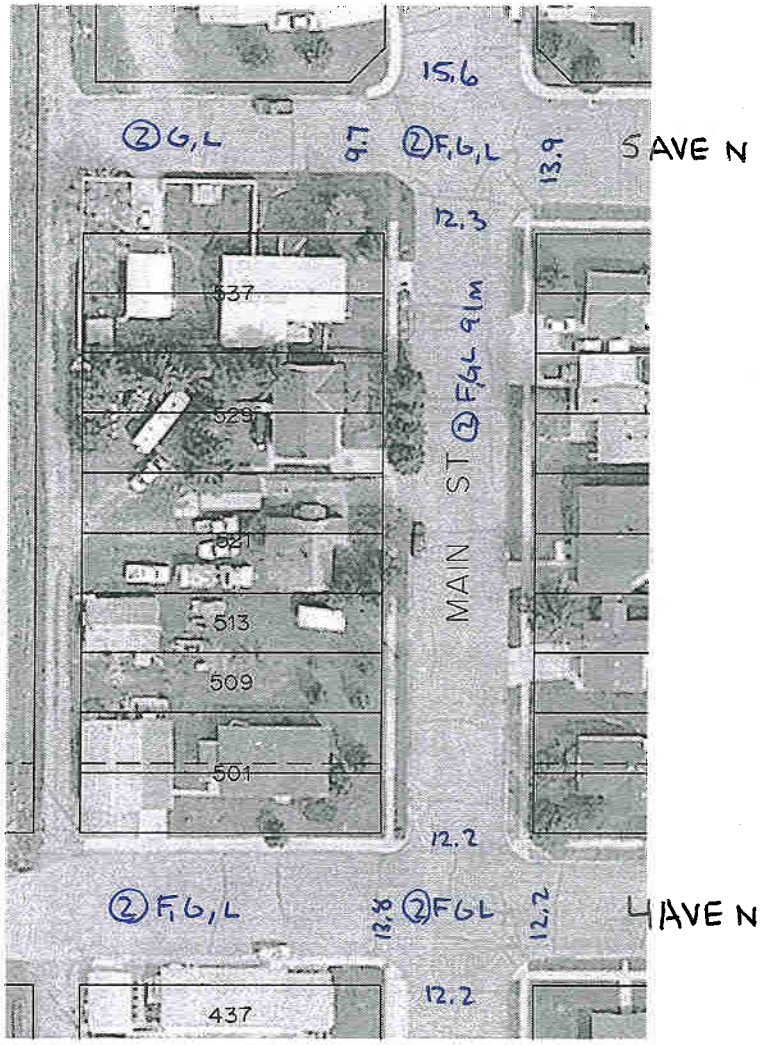

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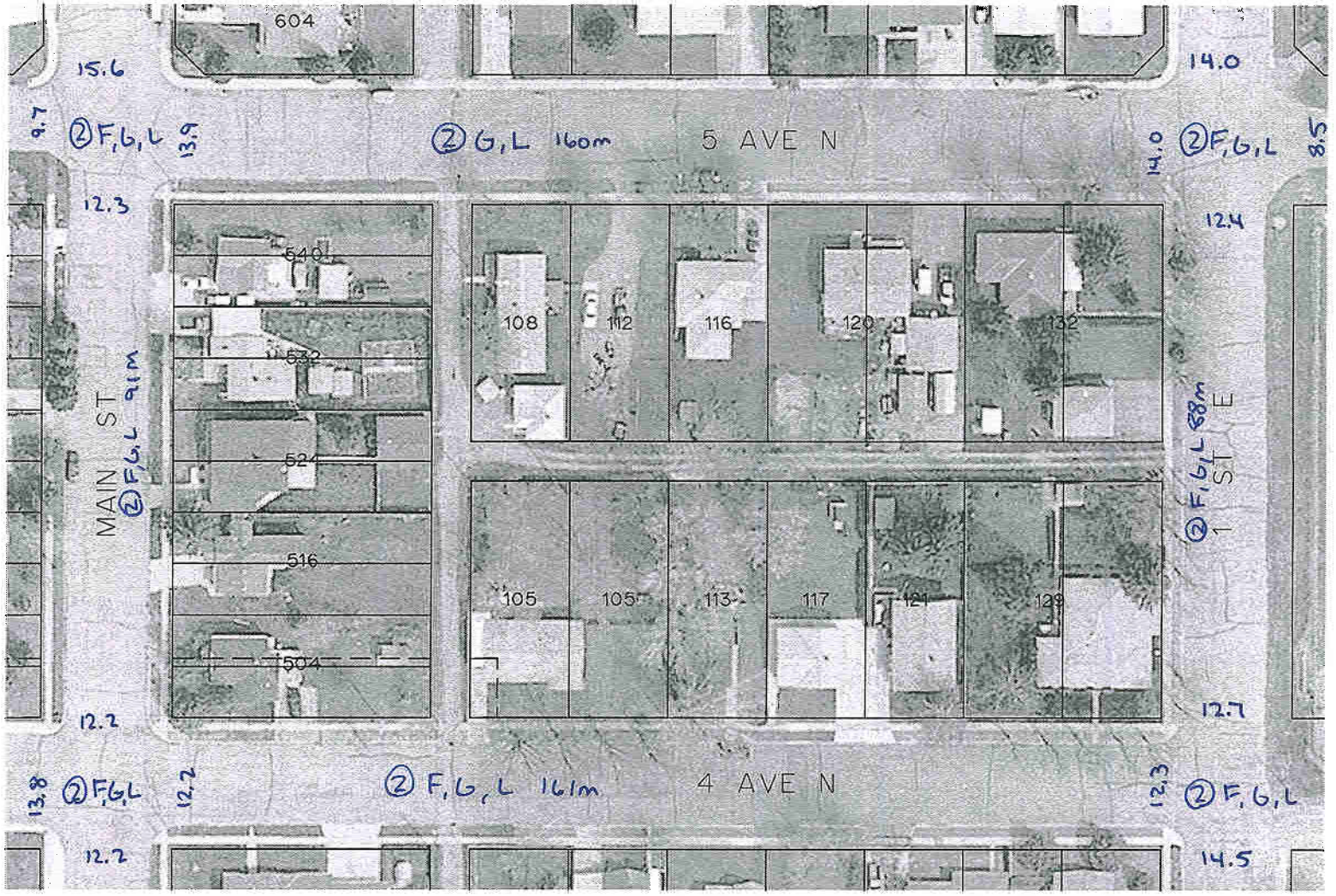

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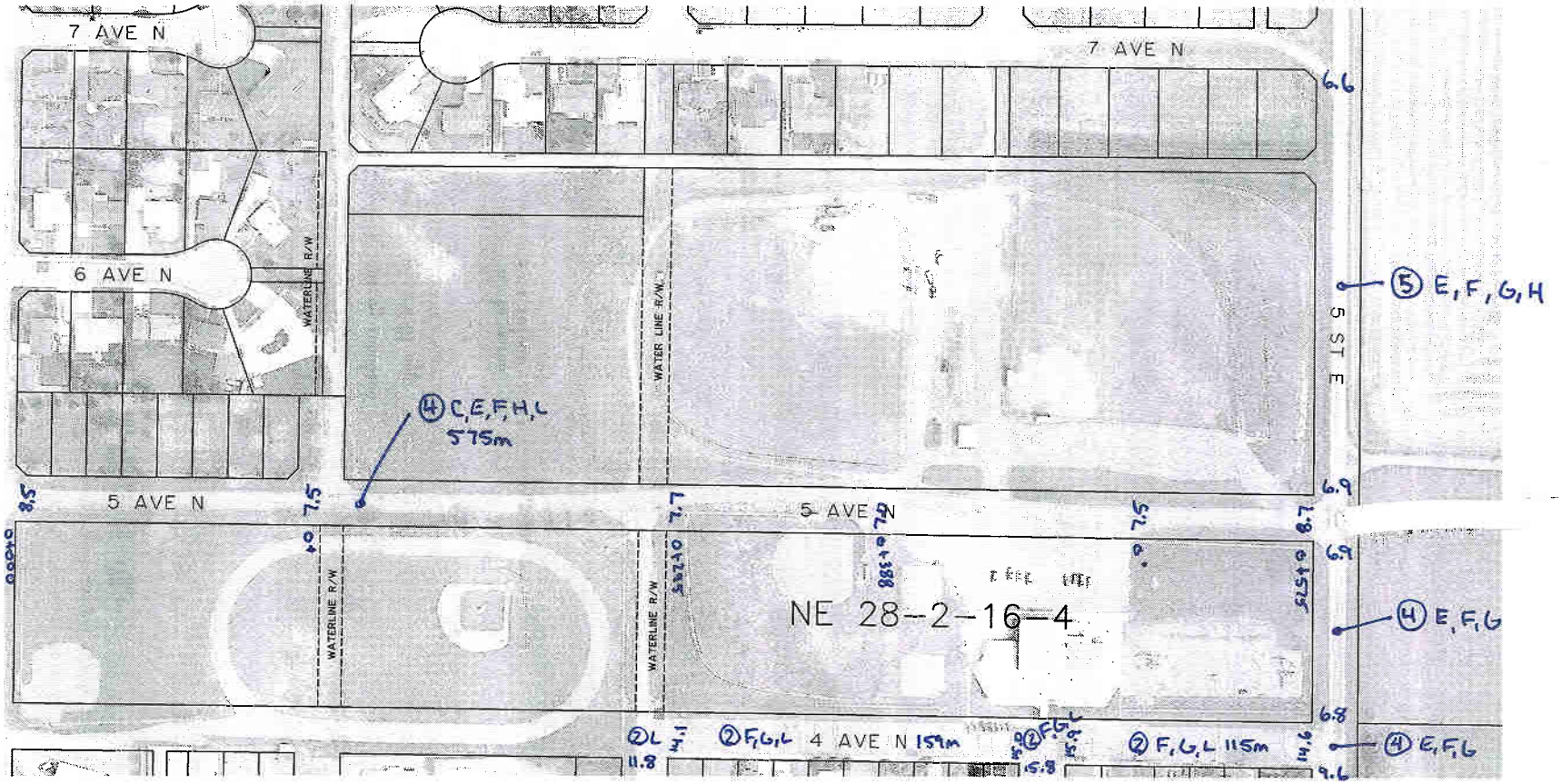

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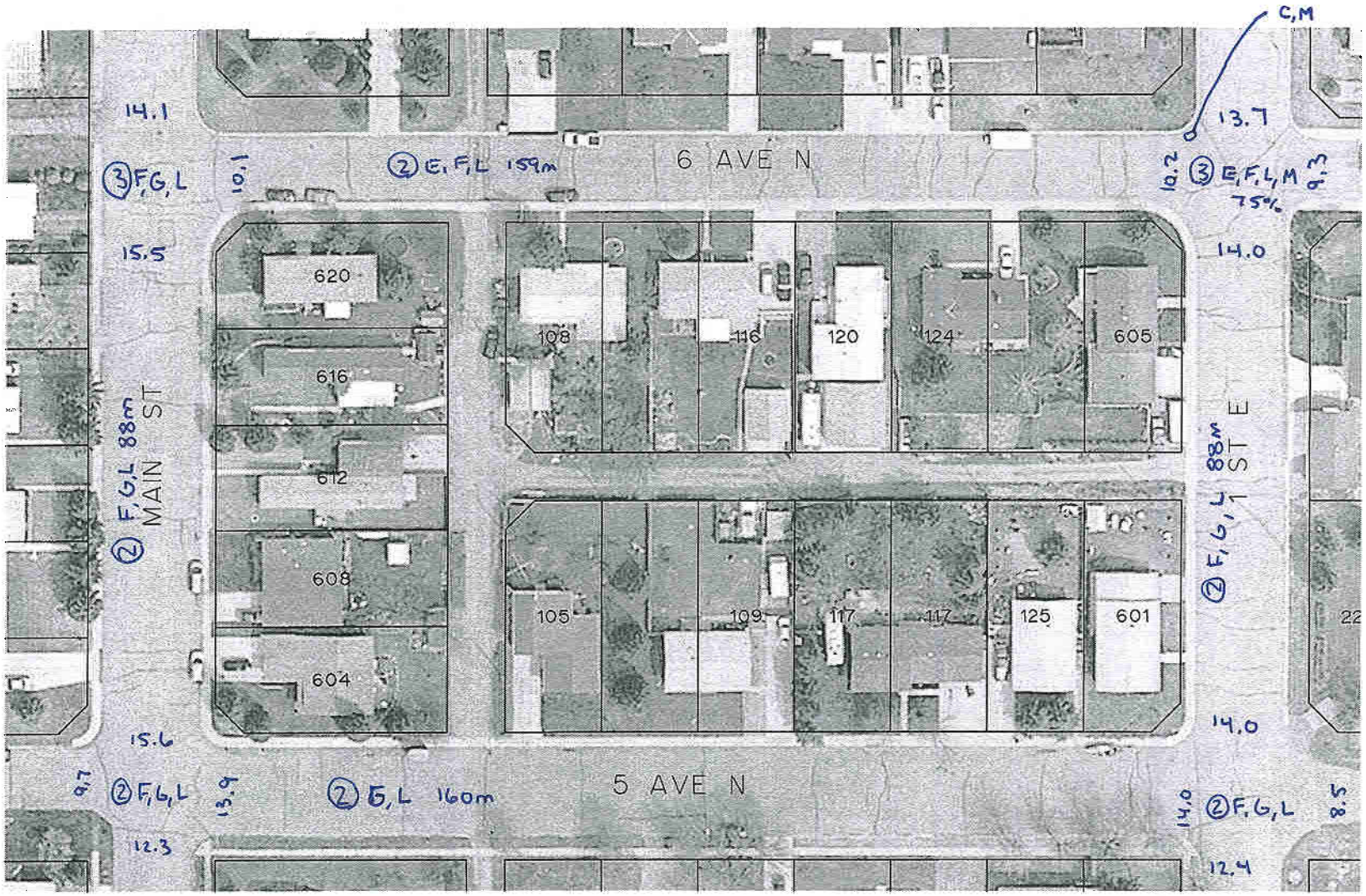

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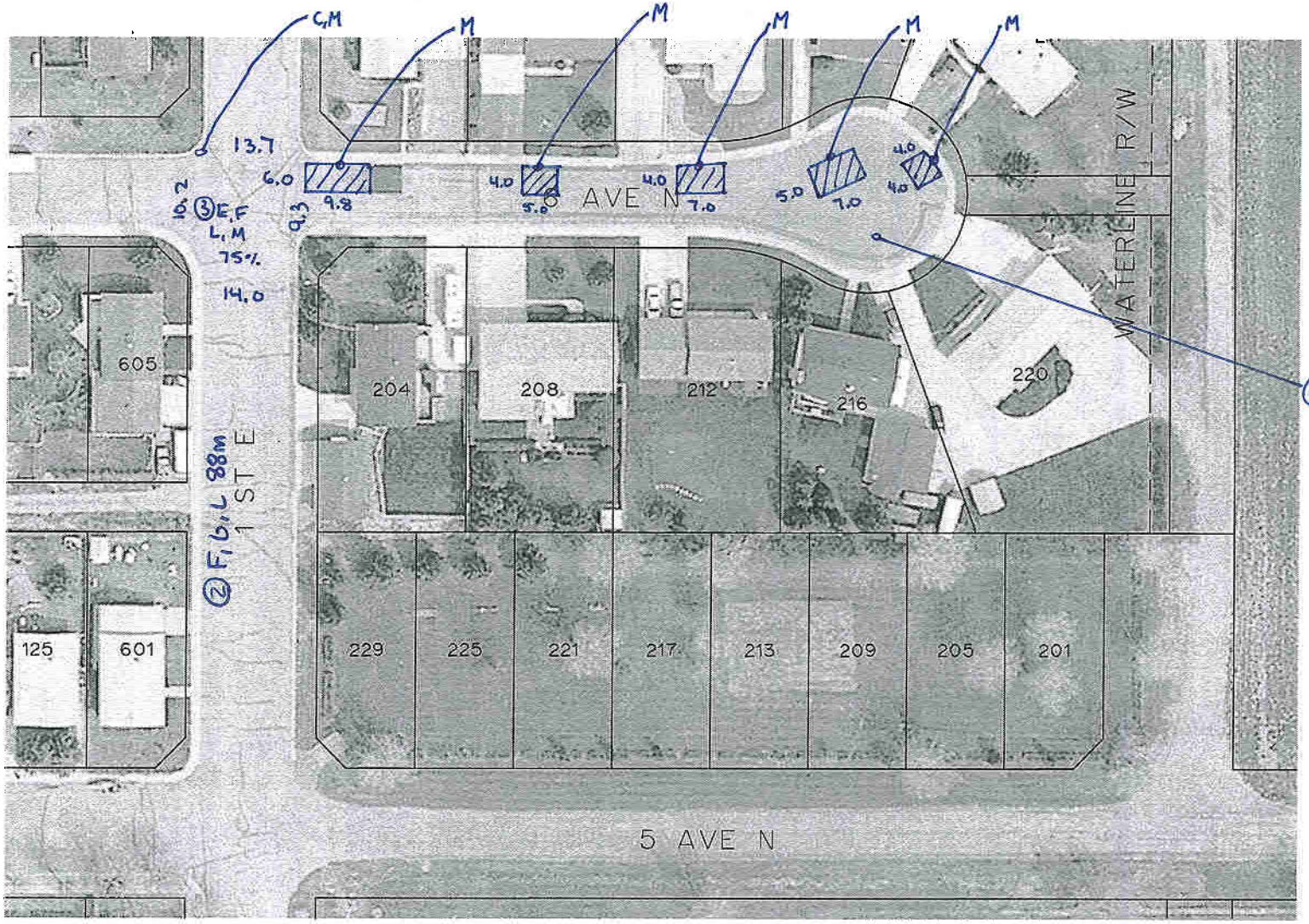

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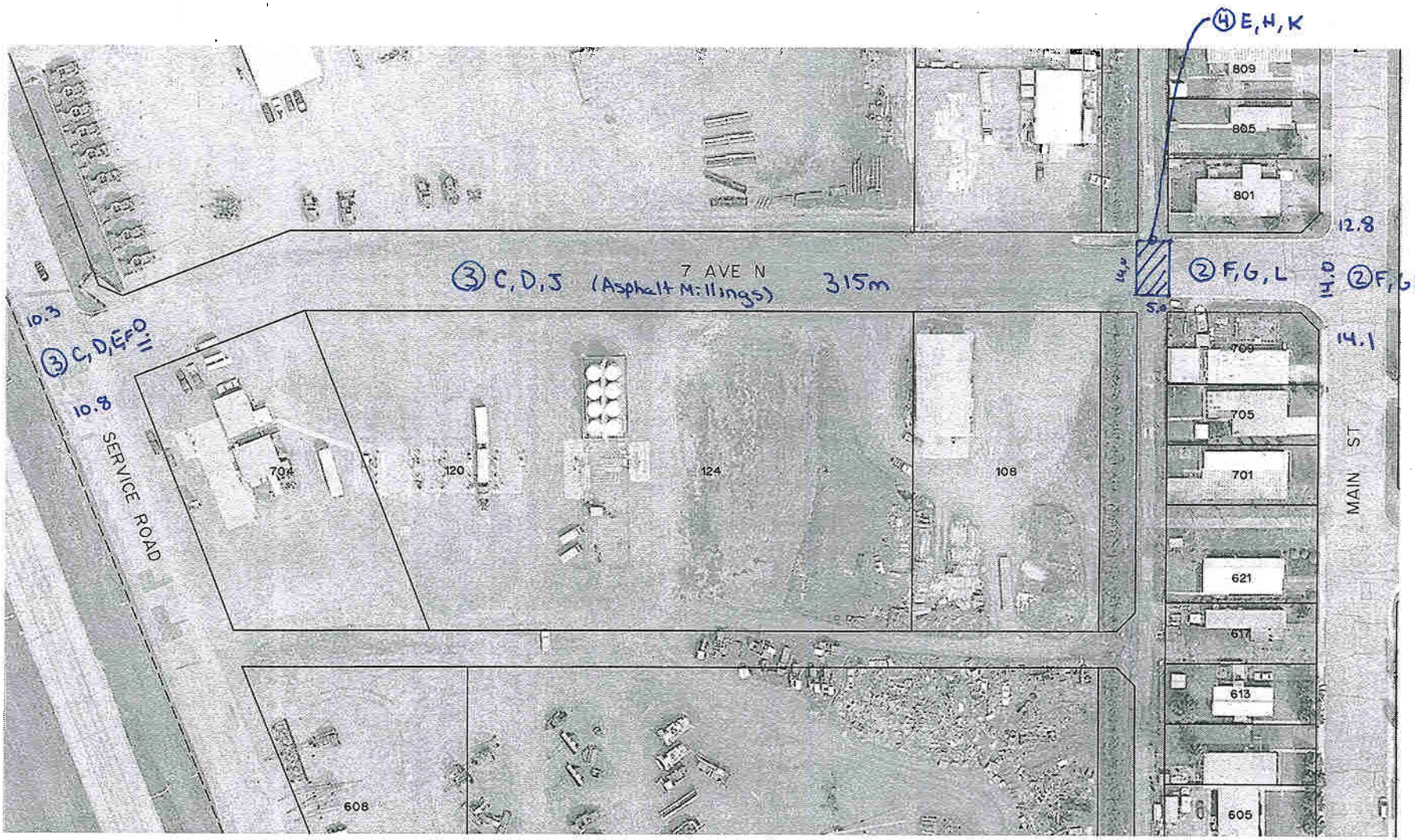

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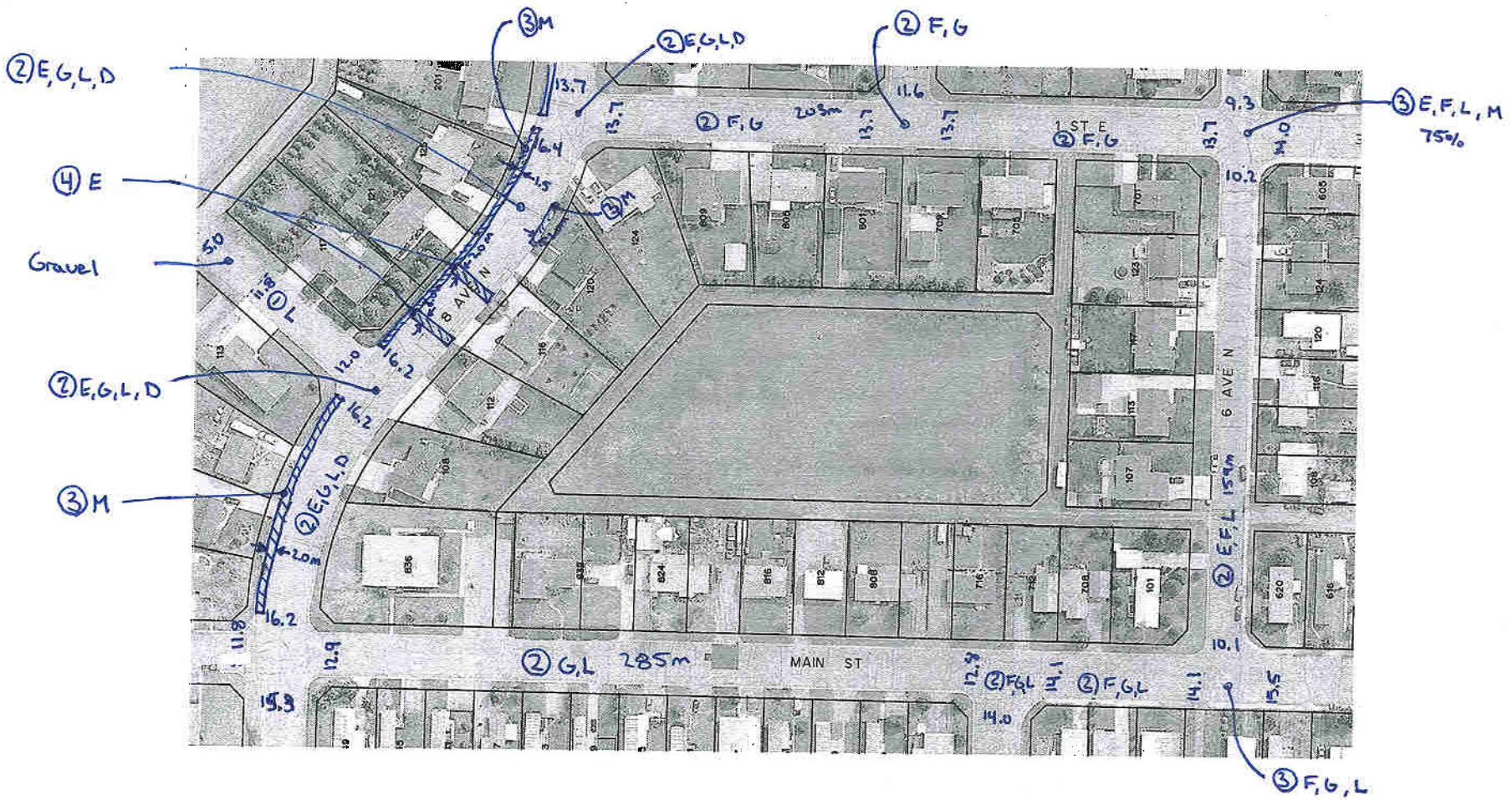

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Lethbridge, Alberta

DEFICIENCY ITEMS

SIDEWALKS:
A - CORNER BREAK
B - FAULT/GAP
C - LINEAR CRACKING
D - TRANSVERSE CRACKING
E - DISTORTION
F - VERT DISPLACEMENT
G - SPALLING/PITTED
H - SETTLEMENT
J - PATCH

CURB AND GUTTER:
A - CRACKING
B - BROKEN
C - DISTORTION
D - VERT DISPLACEMENT
E - SLOPE/GRADING
F - REVERSE GUTTER

ROADS:
A - RAVELING
B - BLEEDING
C - POTHOLE
D - DISTORTION
E - ALLIGATOR CRACKING
F - LINEAR CRACKING
G - TRANSVERSE CRACKING
H - RUTTING
J - SLOPE/GRADING/DRAINAGE
K - FAILURE
L - OPEN SURFACE
M - PATCH REQUIRED
N - TRENCH SETTLEMENT

OVERALL CONDITION RATING:

1 - SOUND PHYSICAL CONDITION
2 - ACCEPTABLE PHYSICAL CONDITION
3 - DETERIORATION EVIDENT
4 - SHORT TERM FAILURE
5 - FAILURE IMMINENT

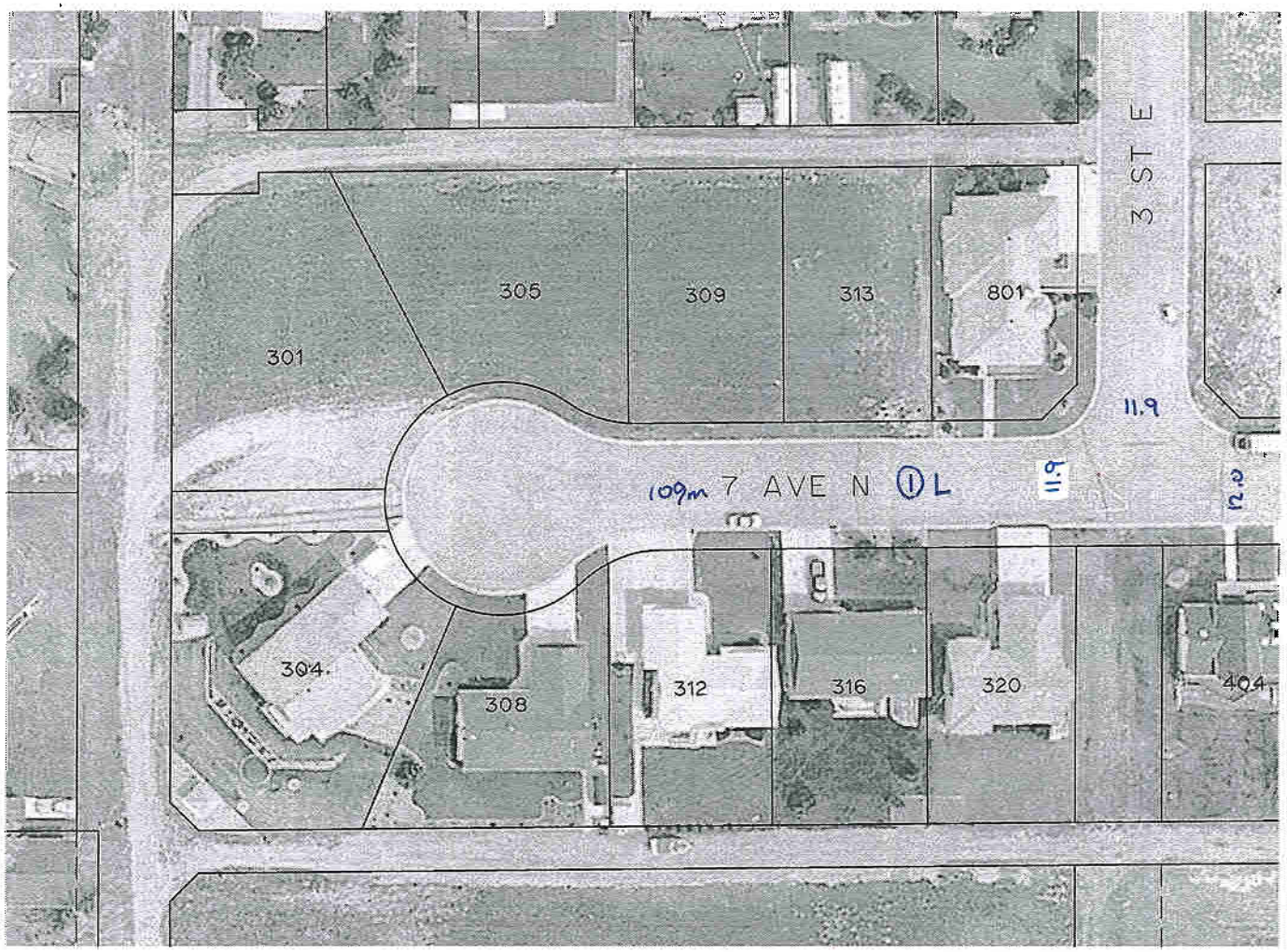
1:1000
0 10 20 30 m

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1000 | DATE: OCT 2006

mpe ENGINEERING LTD.
Lethbridge, Alberta



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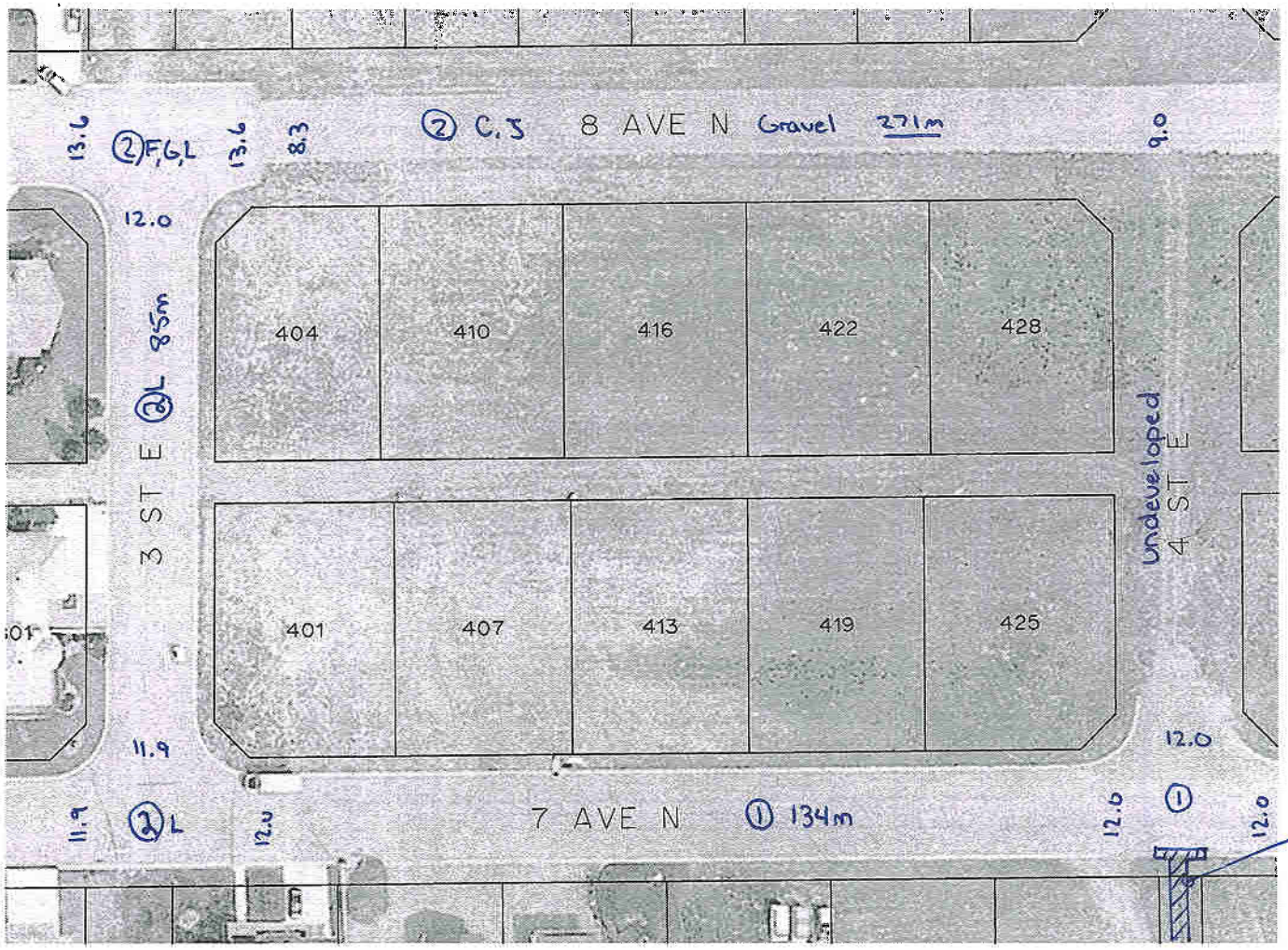

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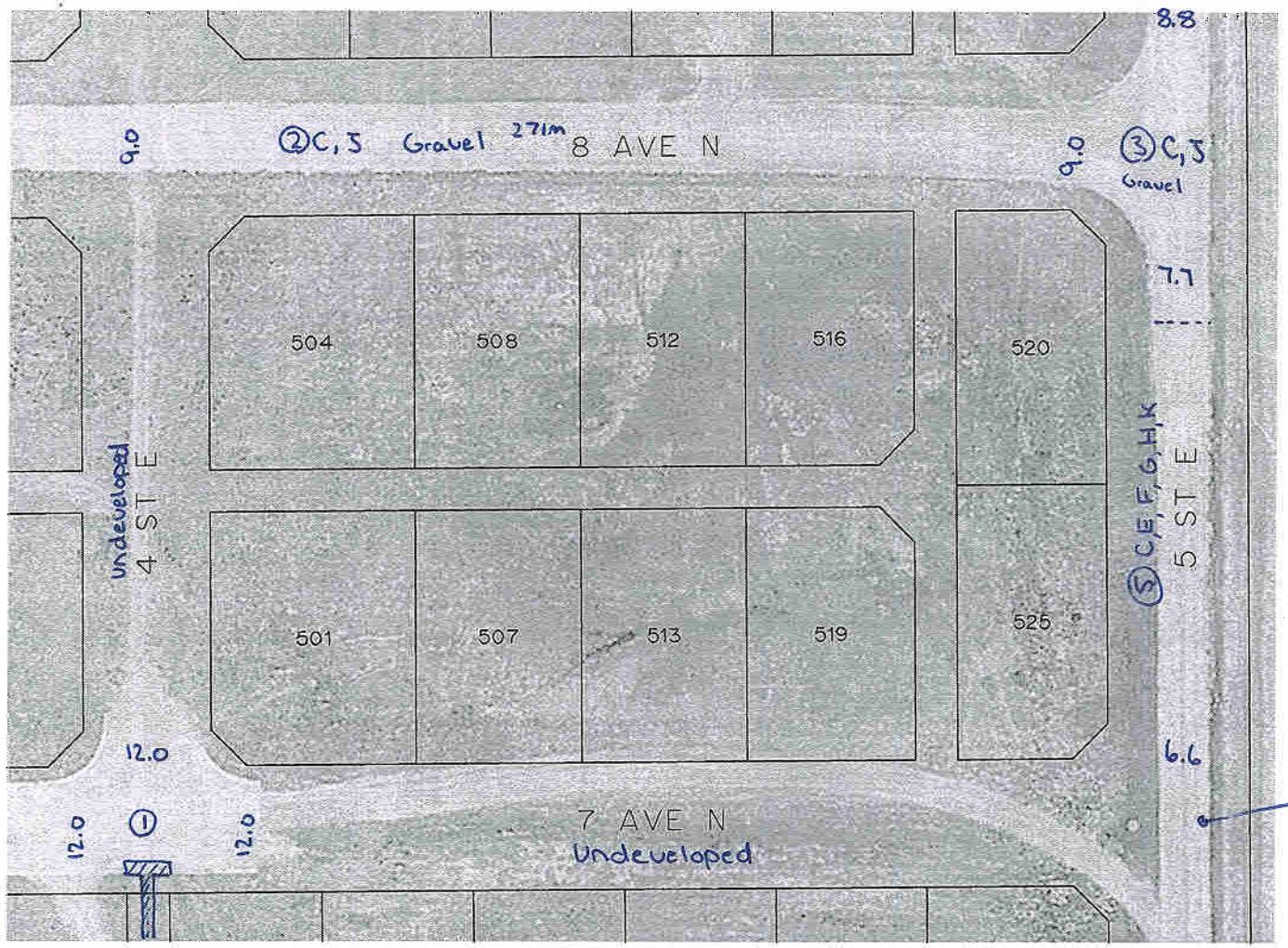

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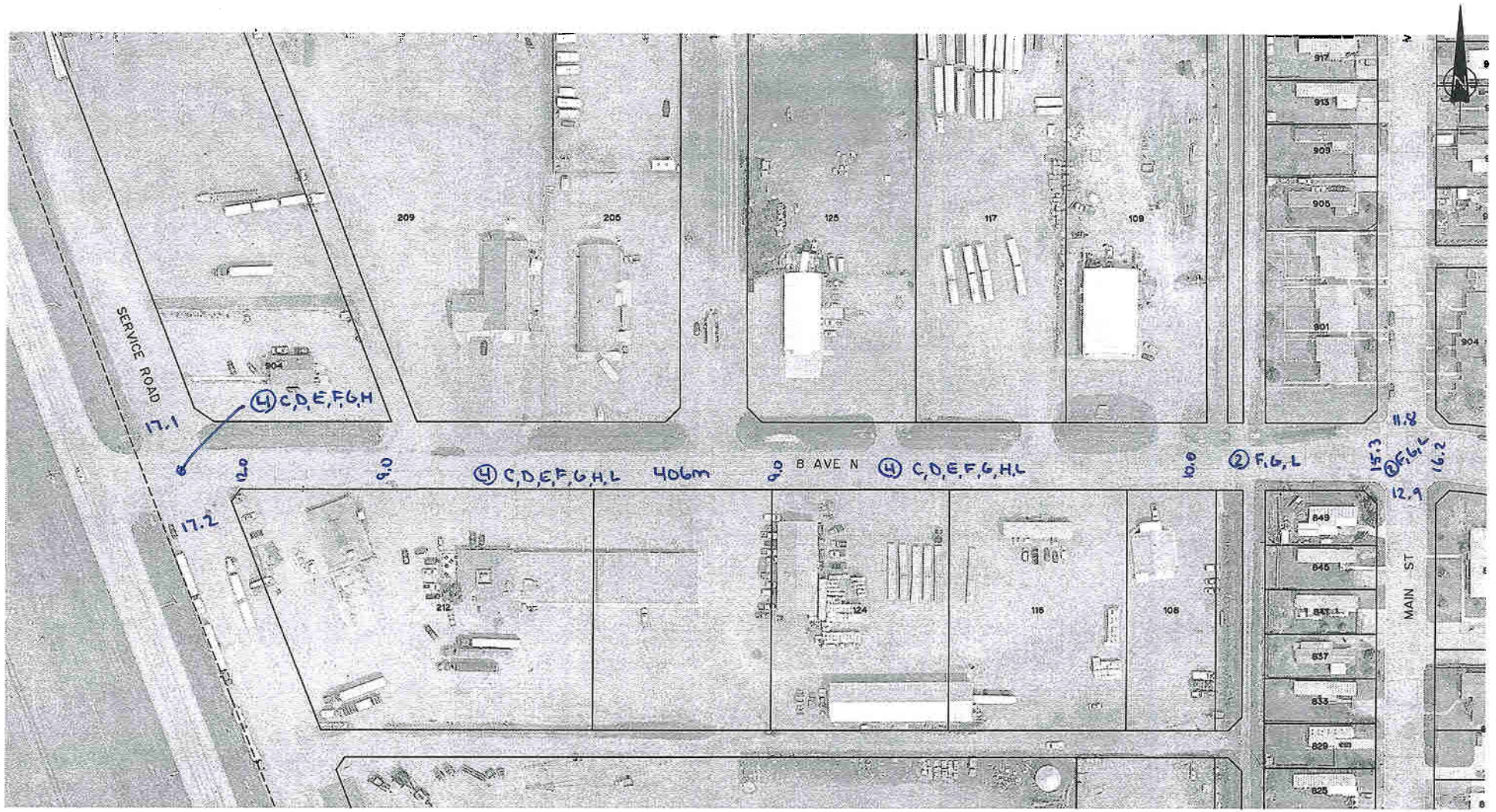

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SCALE: 1:2000 | DATE: OCT 2006

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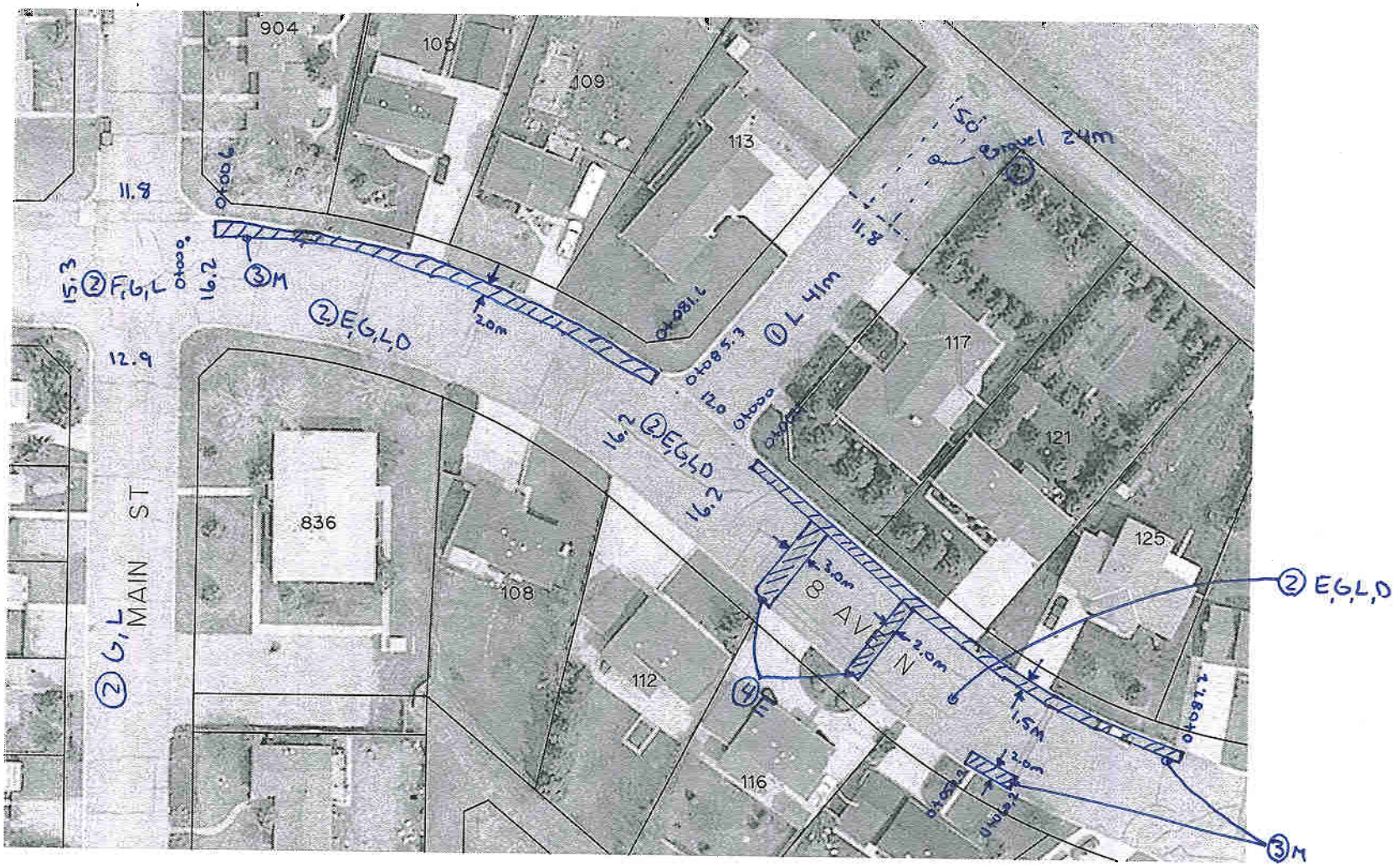

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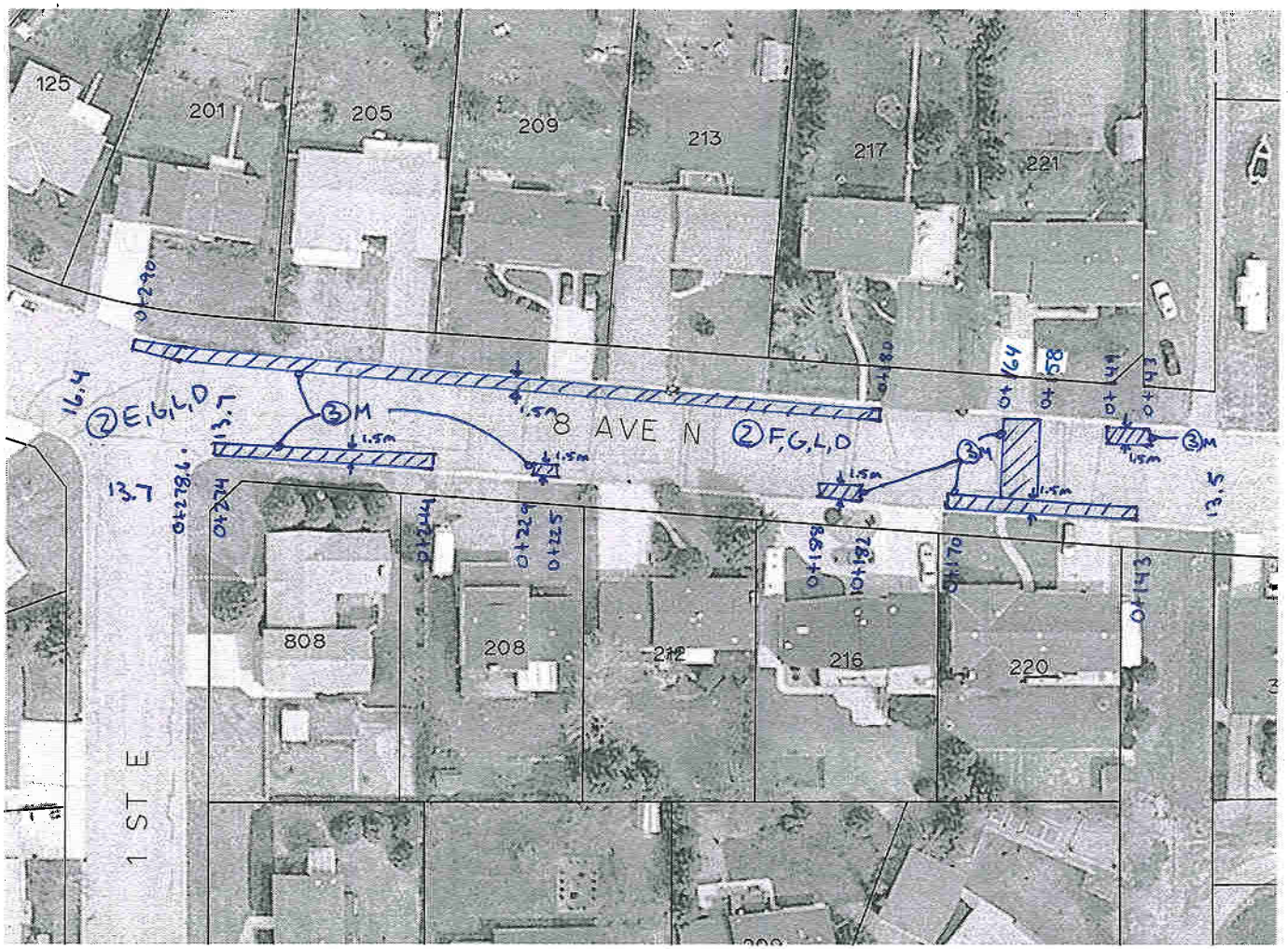

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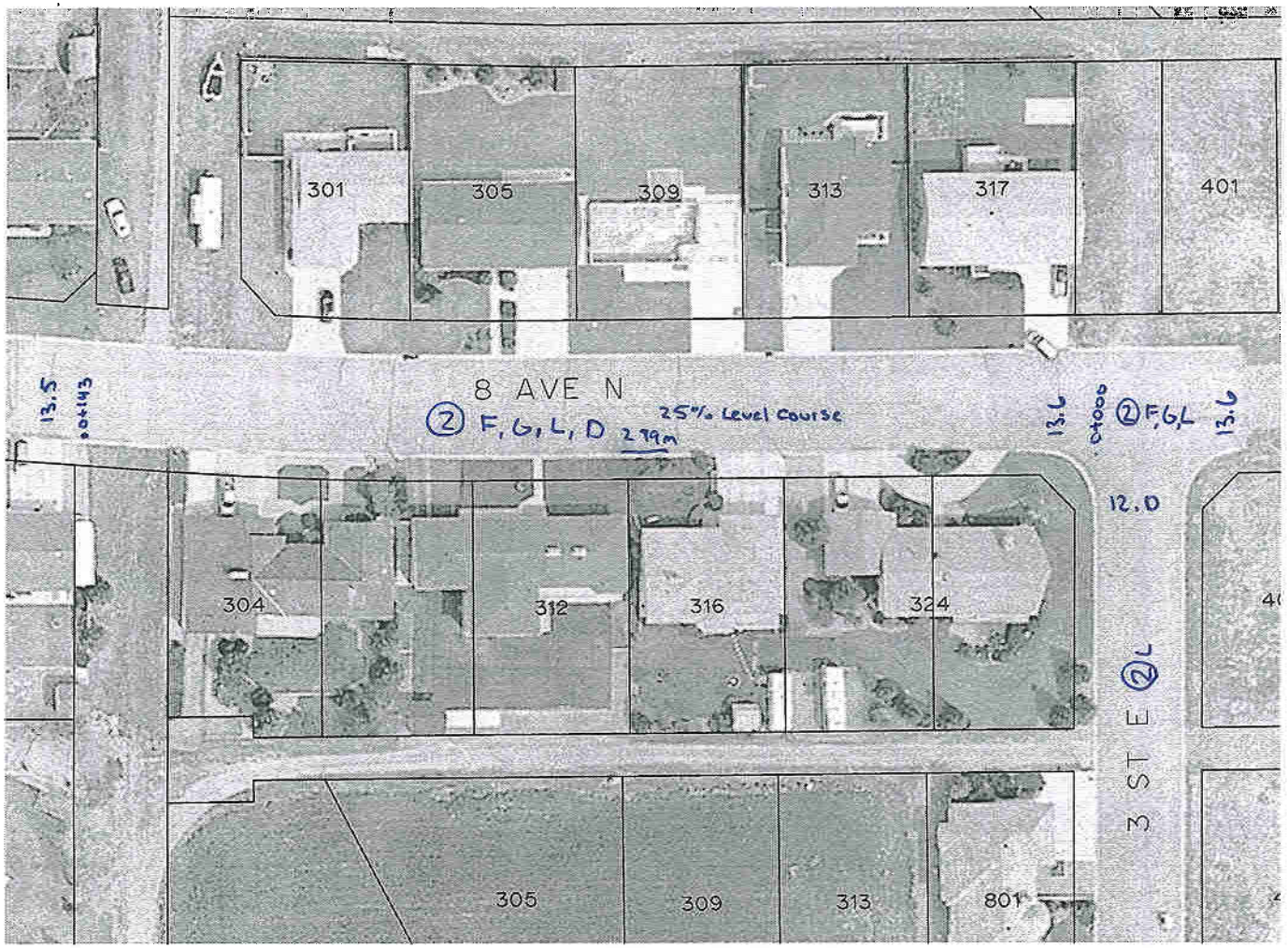

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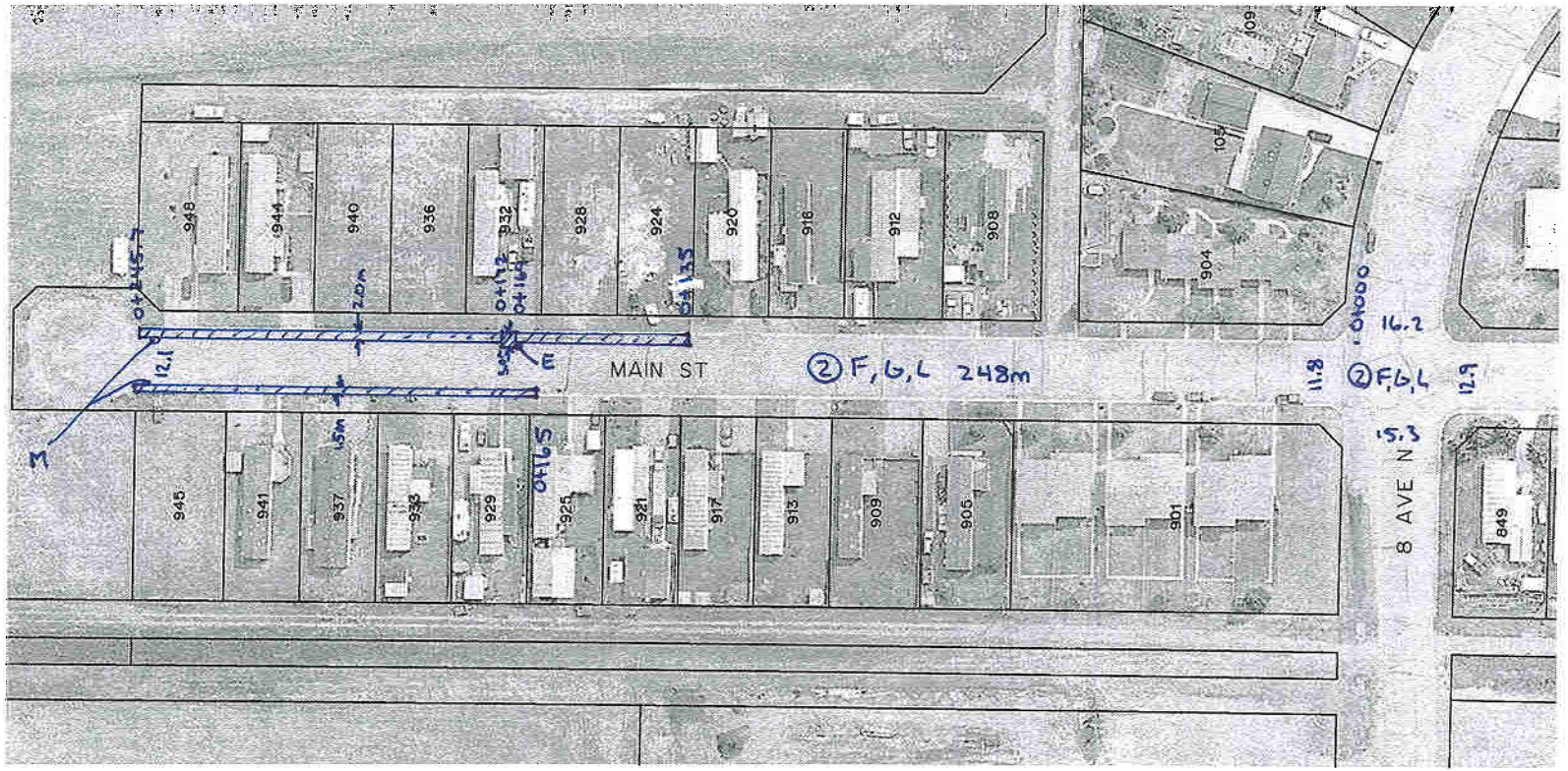

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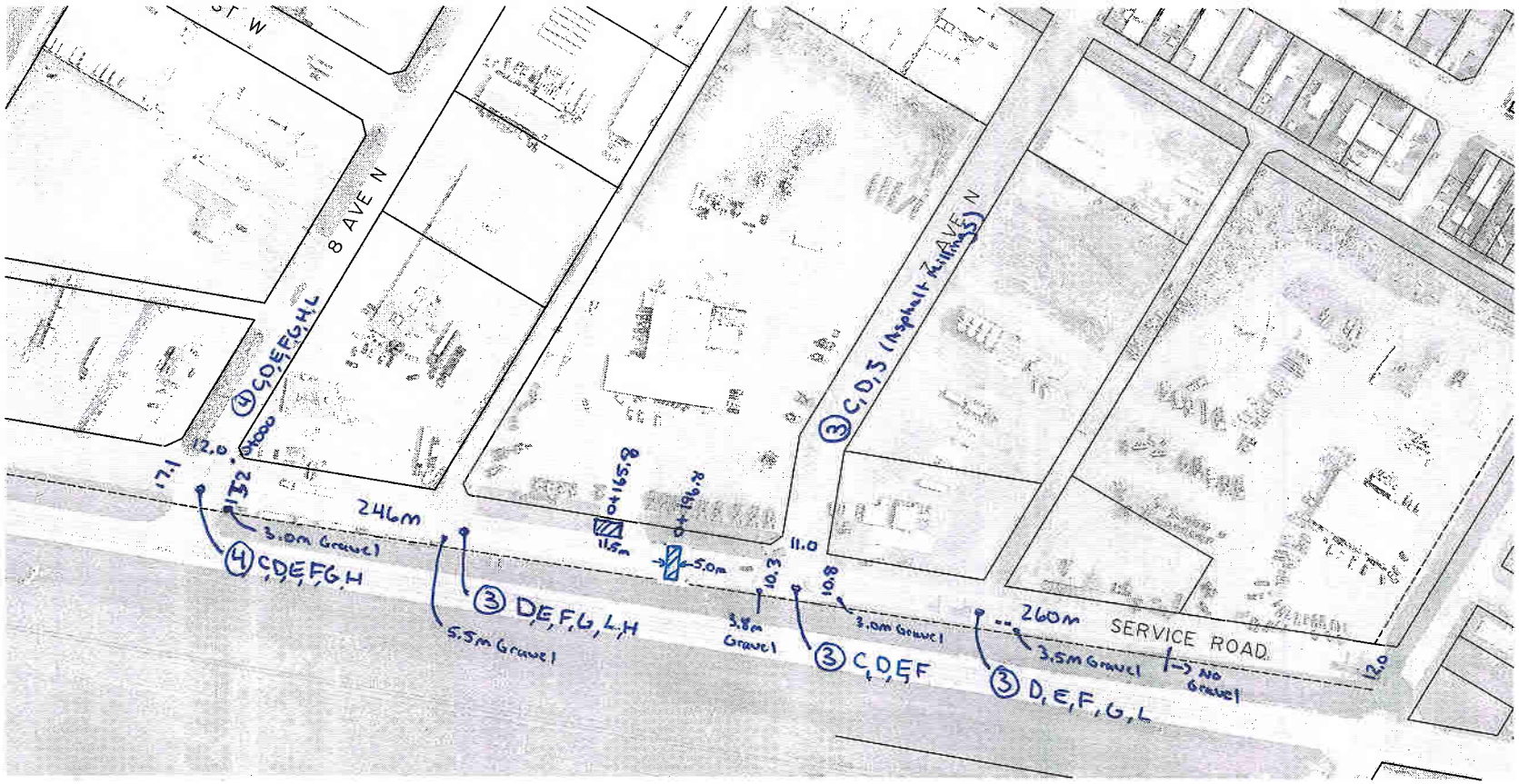
TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1500 | DATE: OCT 2006

mpe ENGINEERING LTD.
Lethbridge, Alberta



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- G - SPALLING/PITTED
- H - SETTLEMENT
- J - PATCH
- K - BROKEN
- WC - WHEELCHAIR RAMP

CURB AND GUTTER:
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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
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SCALE: 1:3000 | DATE: OCT 2006

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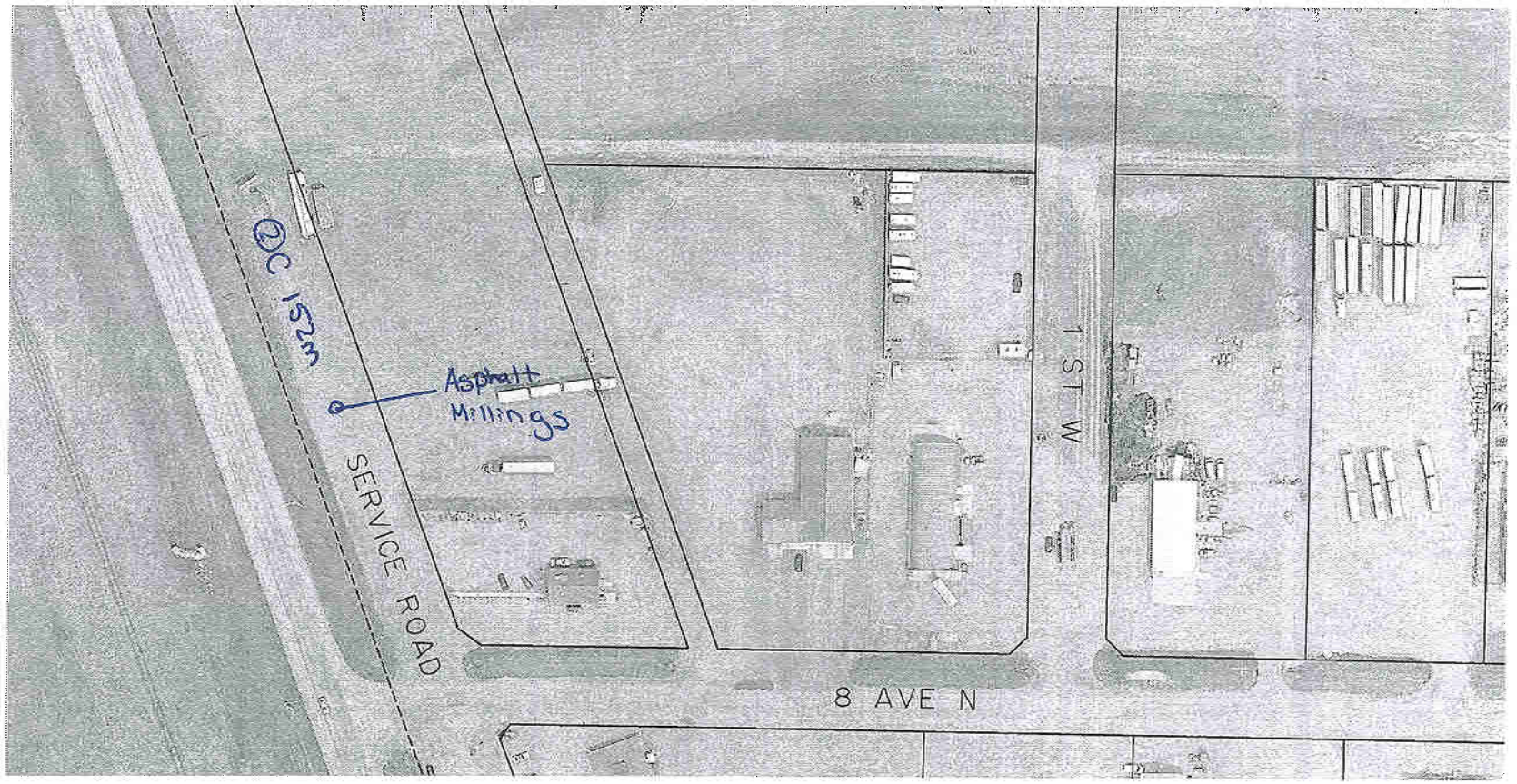

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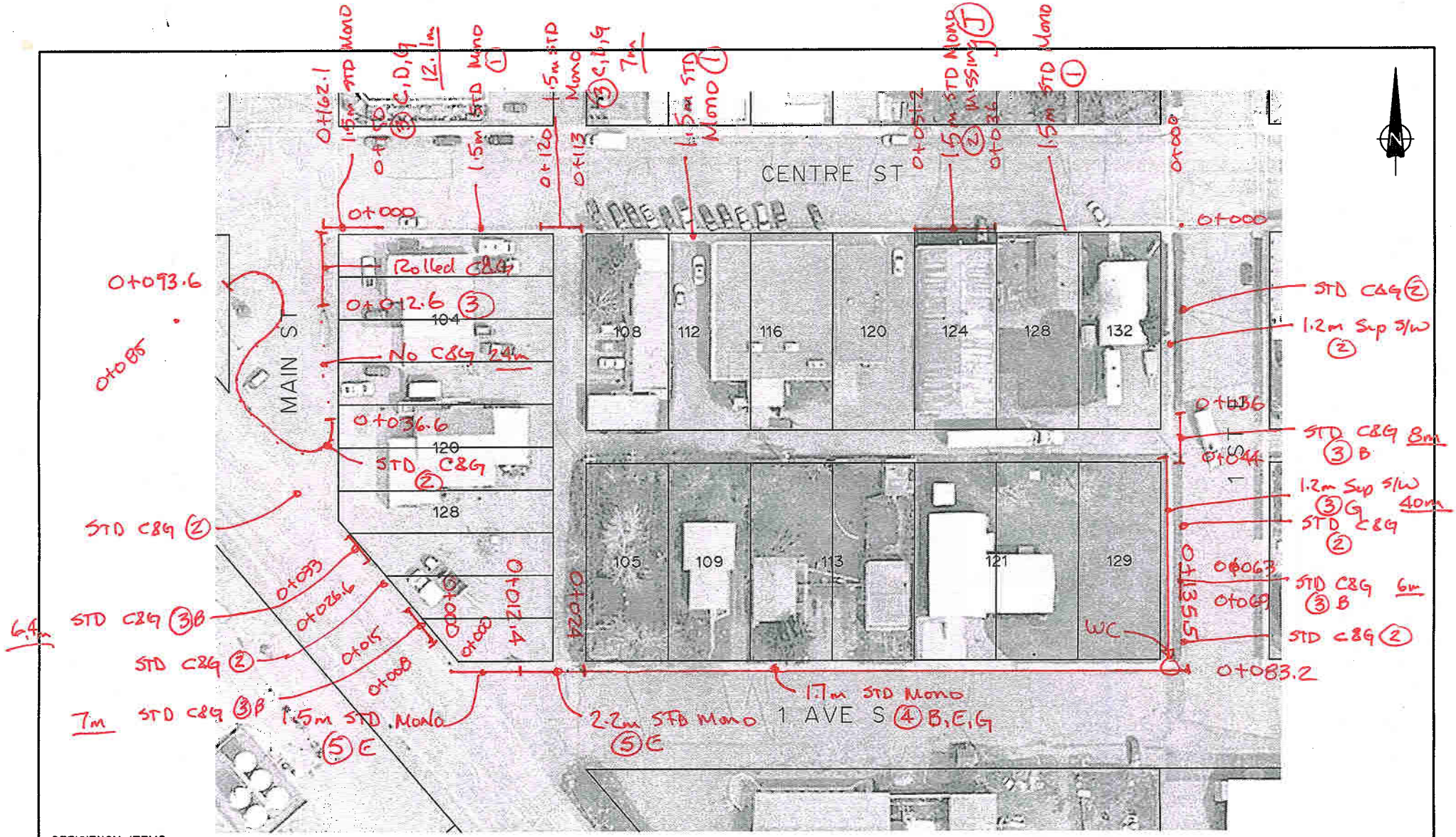

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WC - Wheel chair Ramp Required

CURB AND GUTTER:
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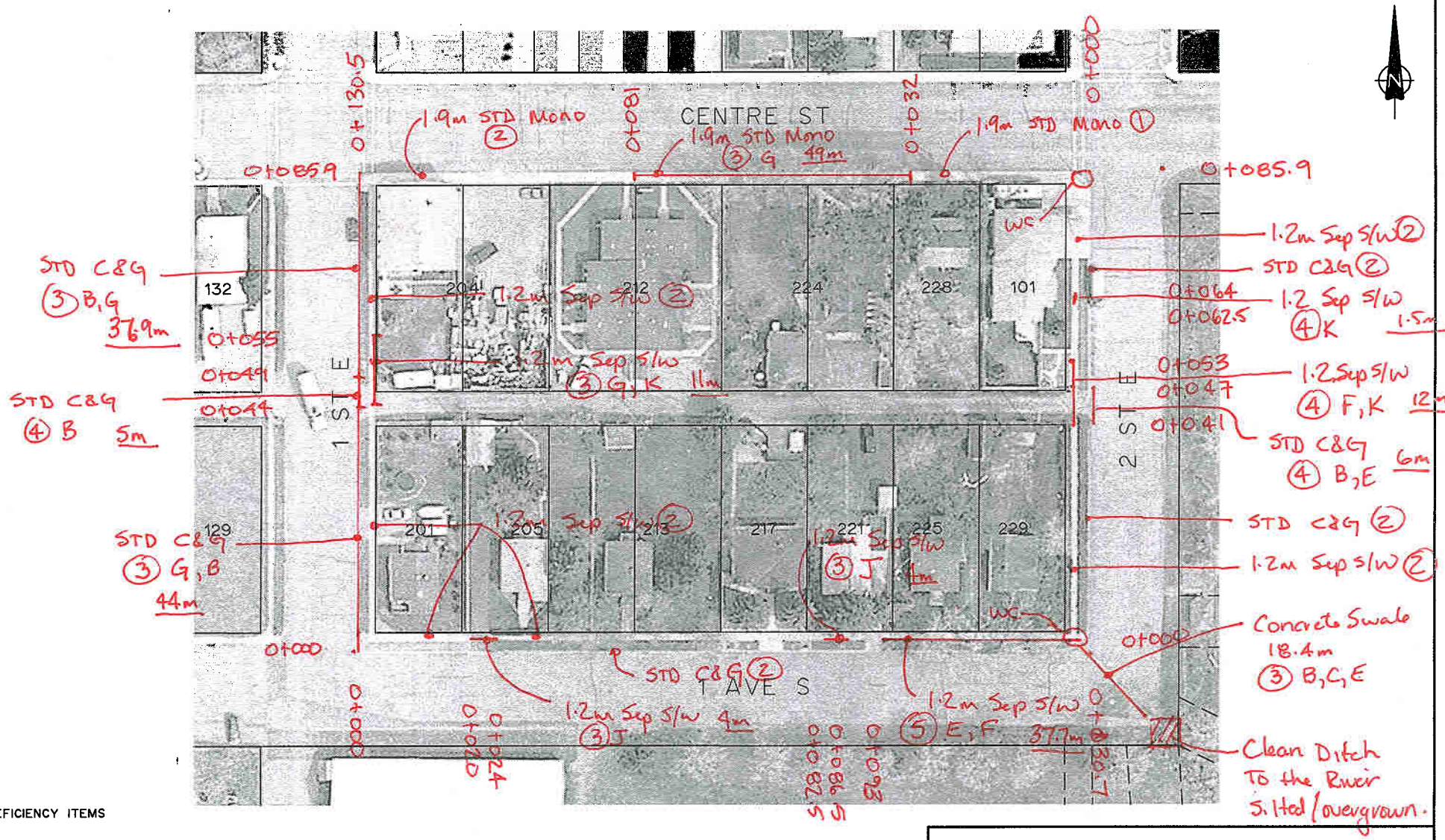

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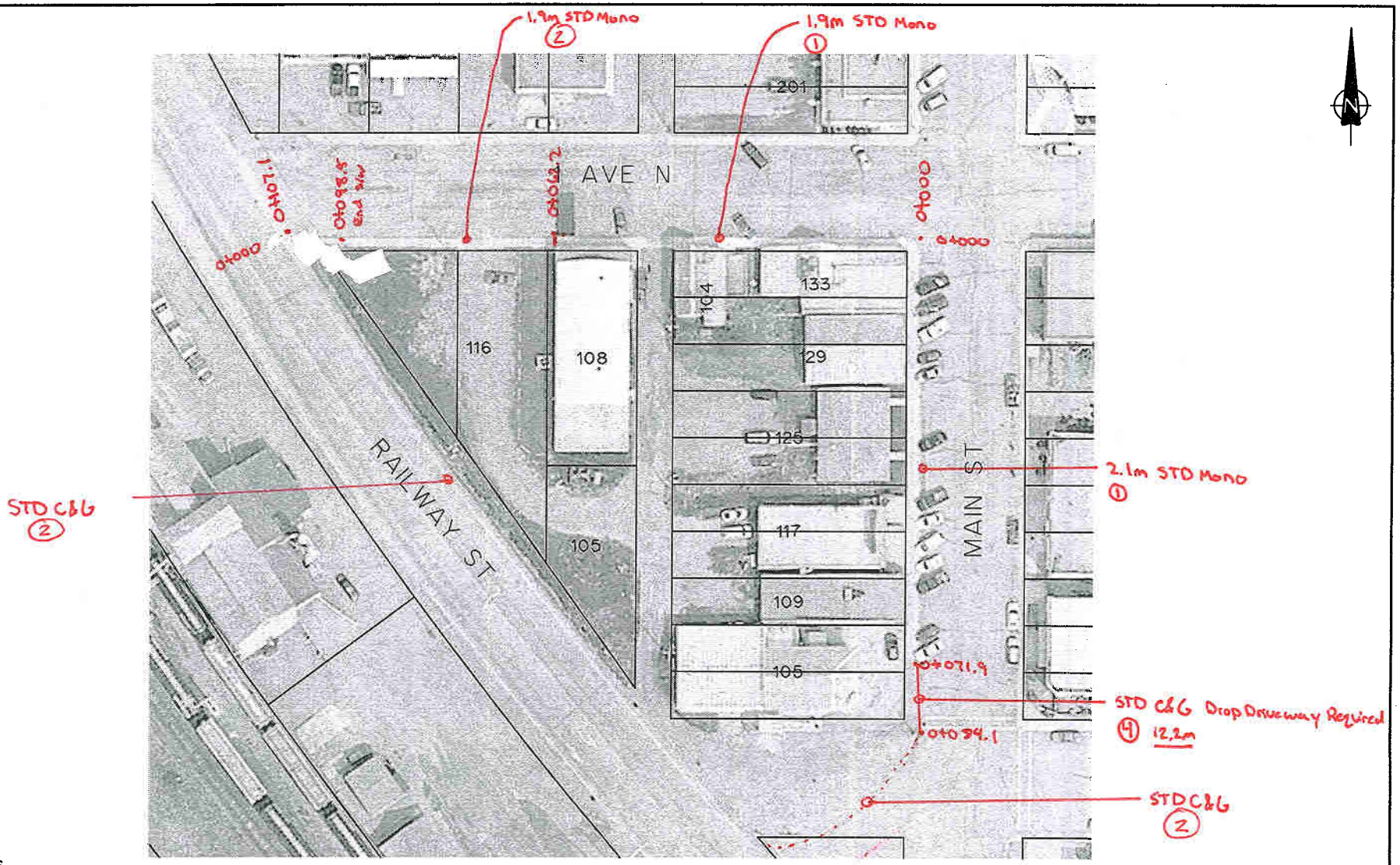

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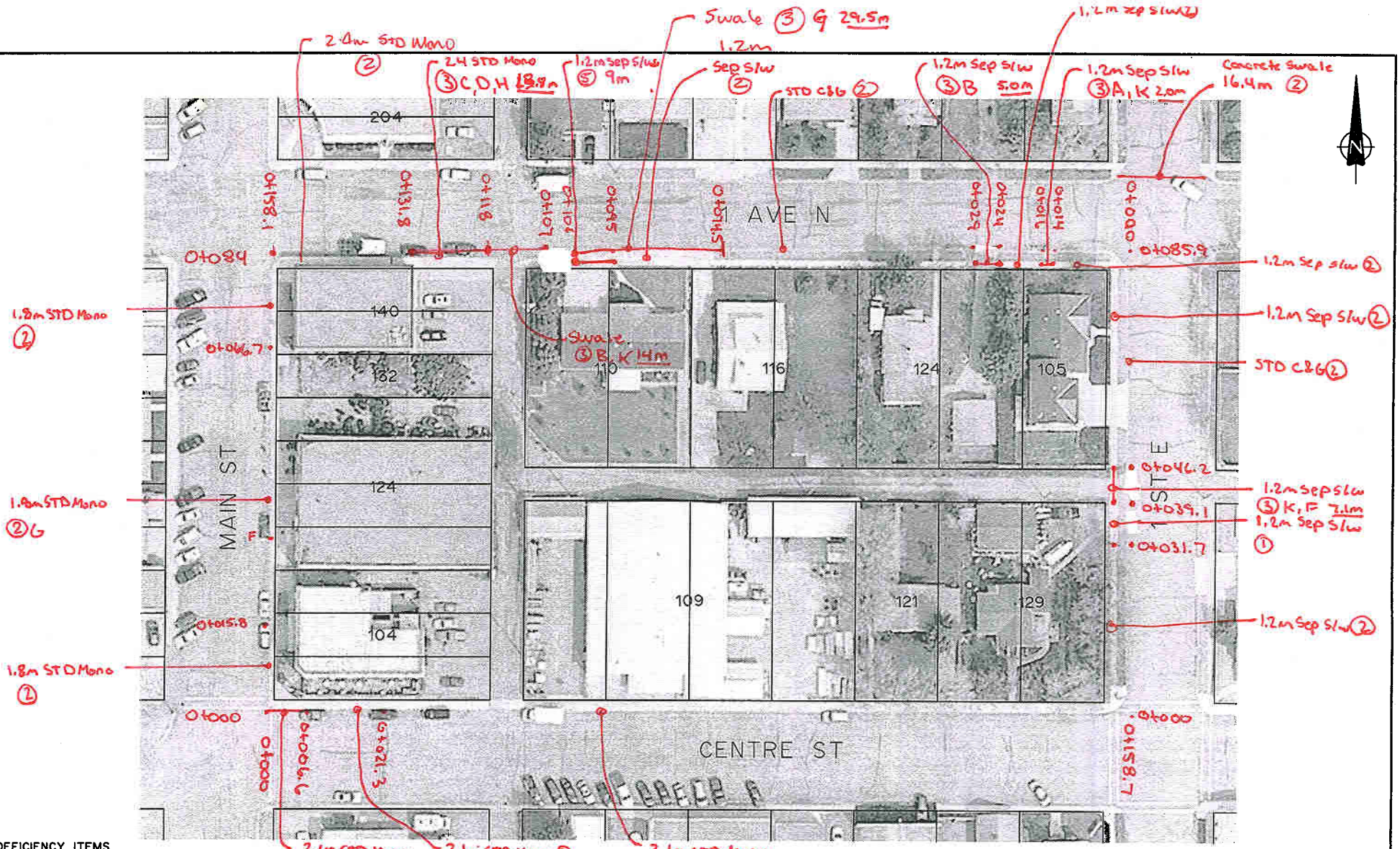

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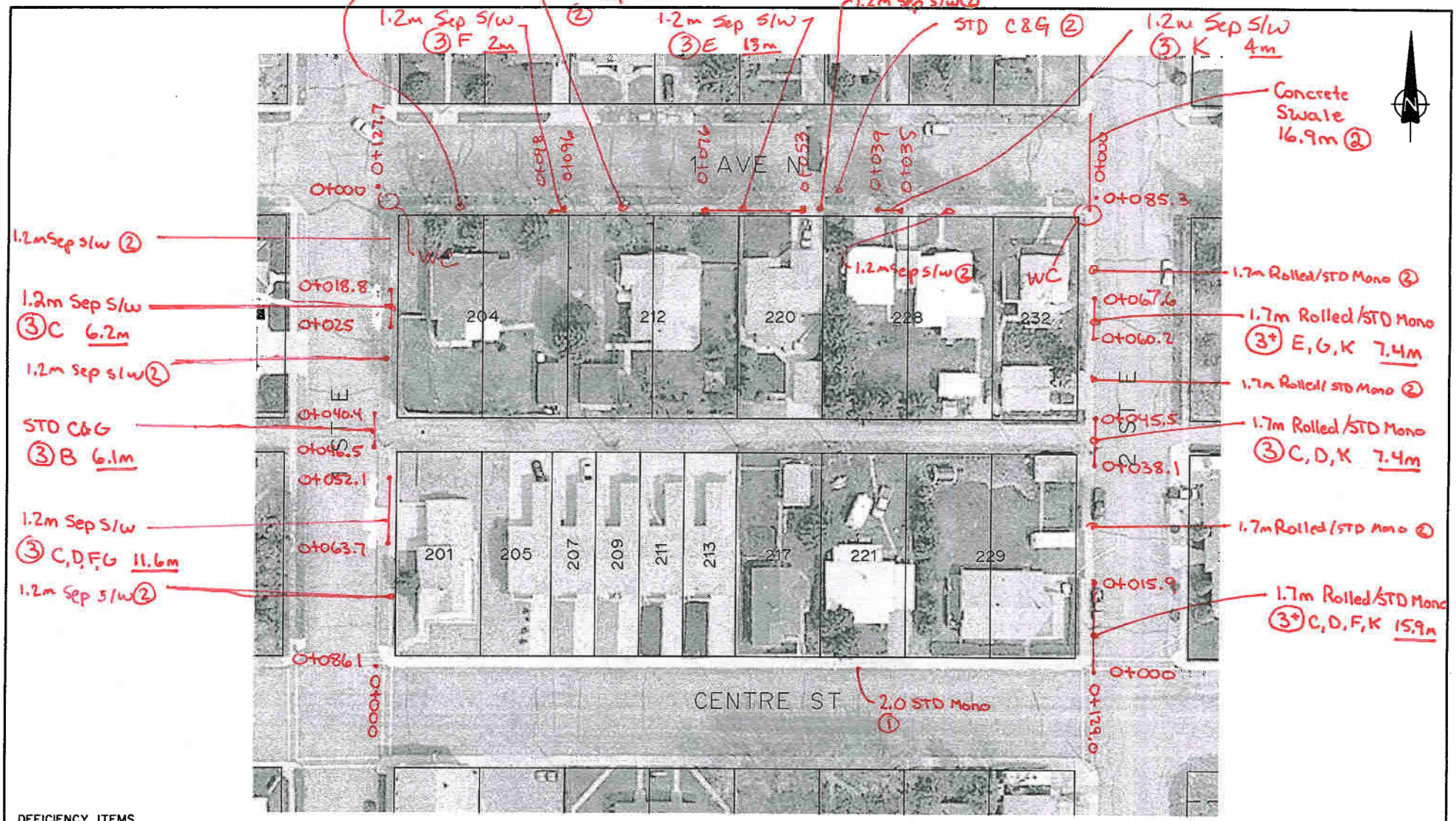

DEFICIENCY ITEMS

SIDEWALKS:
A - CORNER BREAK
B - FAULT/GAP
C - LINEAR CRACKING
D - TRANSVERSE CRACKING
E - DISTORTION
F - VERT DISPLACEMENT
G - SPALLING/PITTED
H - SETTLEMENT
J - PATCH
K - Broken
WC - Wheel chair Ramp, Required

CURB AND GUTTER:
A - CRACKING
B - BROKEN
C - DISTORTION
D - VERT DISPLACEMENT
E - SLOPE/GRADING
F - REVERSE GUTTER

ROADS:
A - RAVELING
B - BLEEDING
C - POTHOLE
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F - LINEAR CRACKING
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J - SLOPE/GRADING/DRAINAGE
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L - OPEN SURFACE
M - PATCH REQUIRED
N - TRENCH SETTLEMENT

OVERALL CONDITION RATING:
1 - SOUND PHYSICAL CONDITION
2 - ACCEPTABLE PHYSICAL CONDITION
3 - DETERIORATION EVIDENT
4 - SHORT TERM FAILURE
5 - FAILURE IMMINENT

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1000 | DATE: OCT 2006

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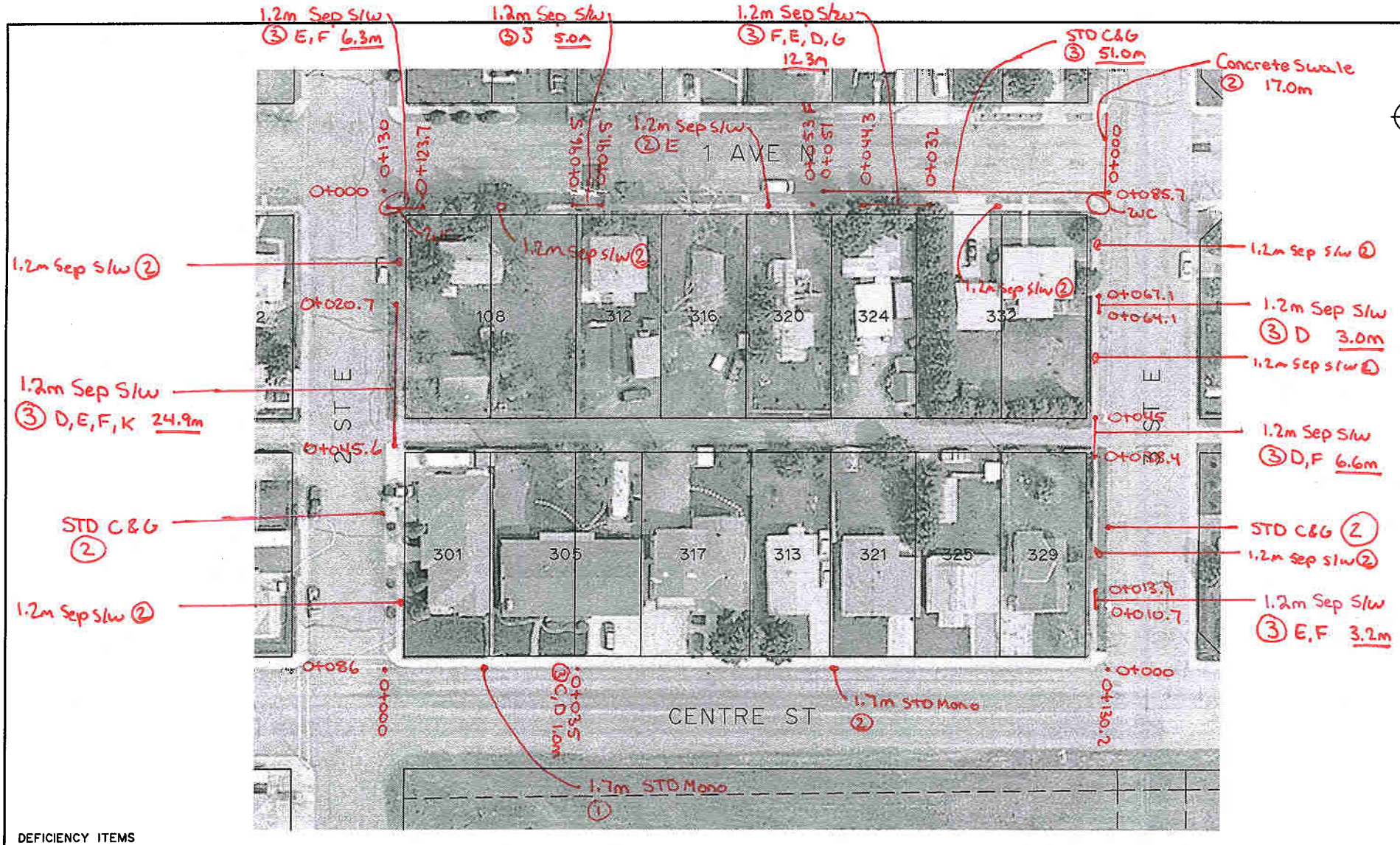

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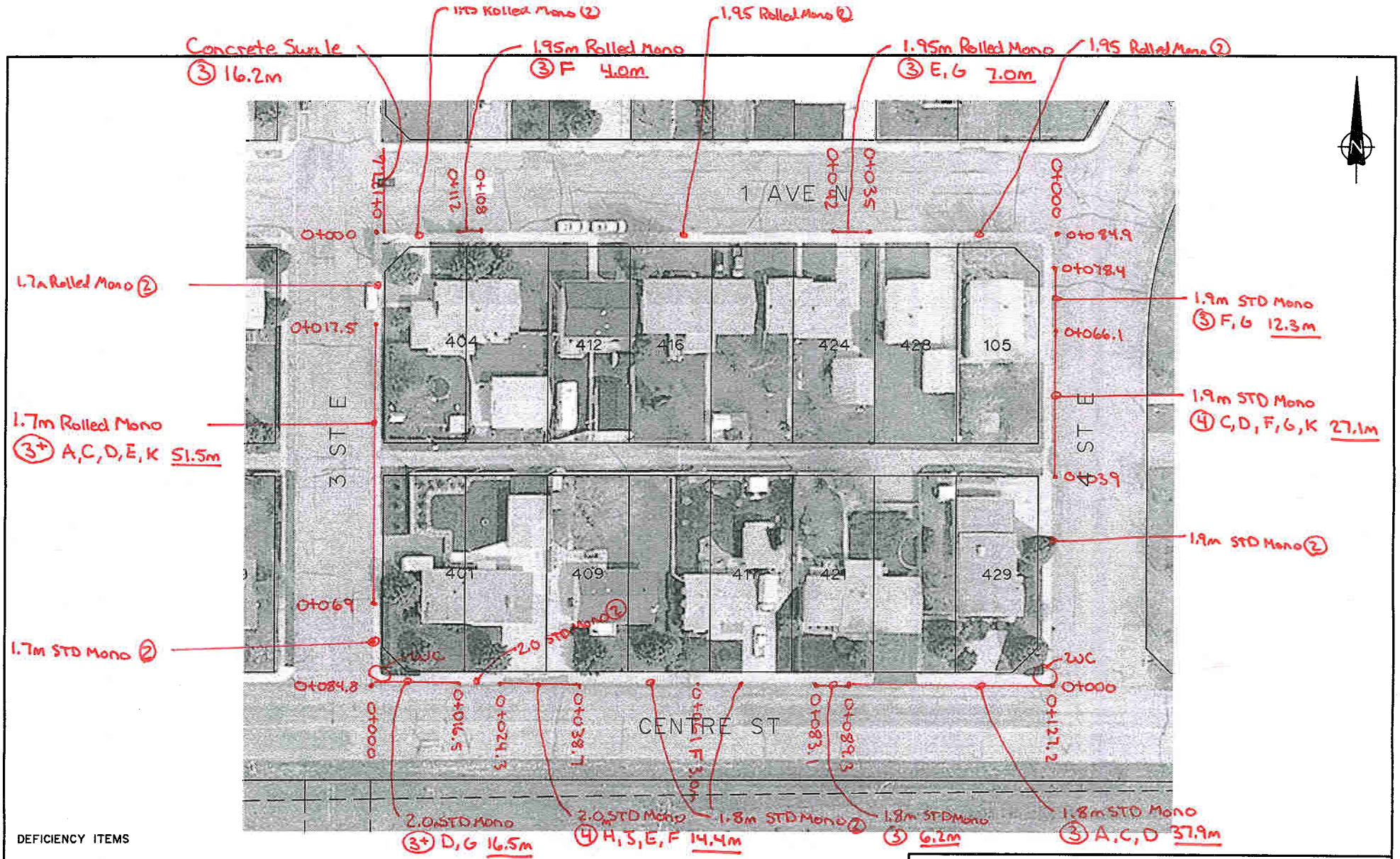

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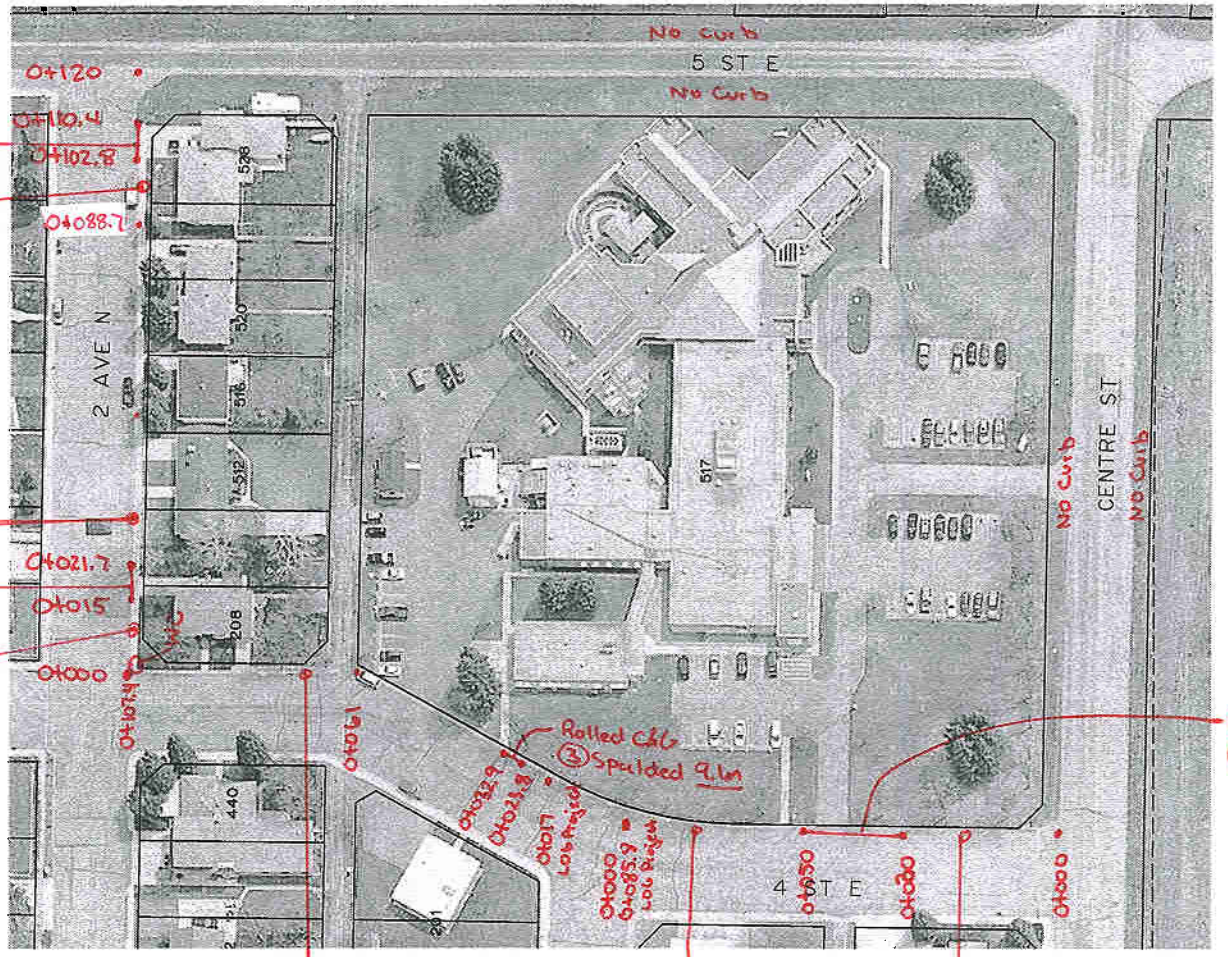

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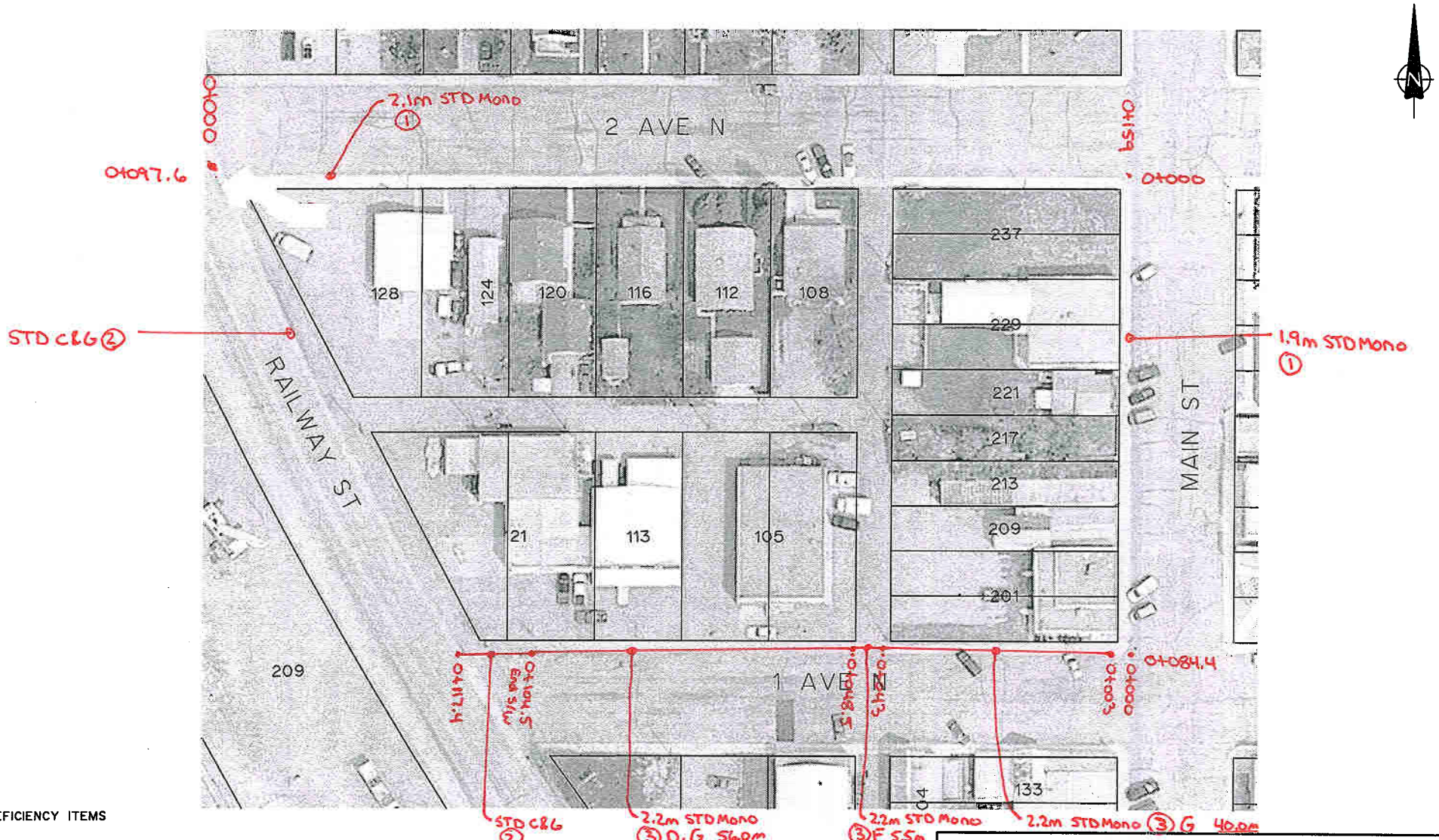

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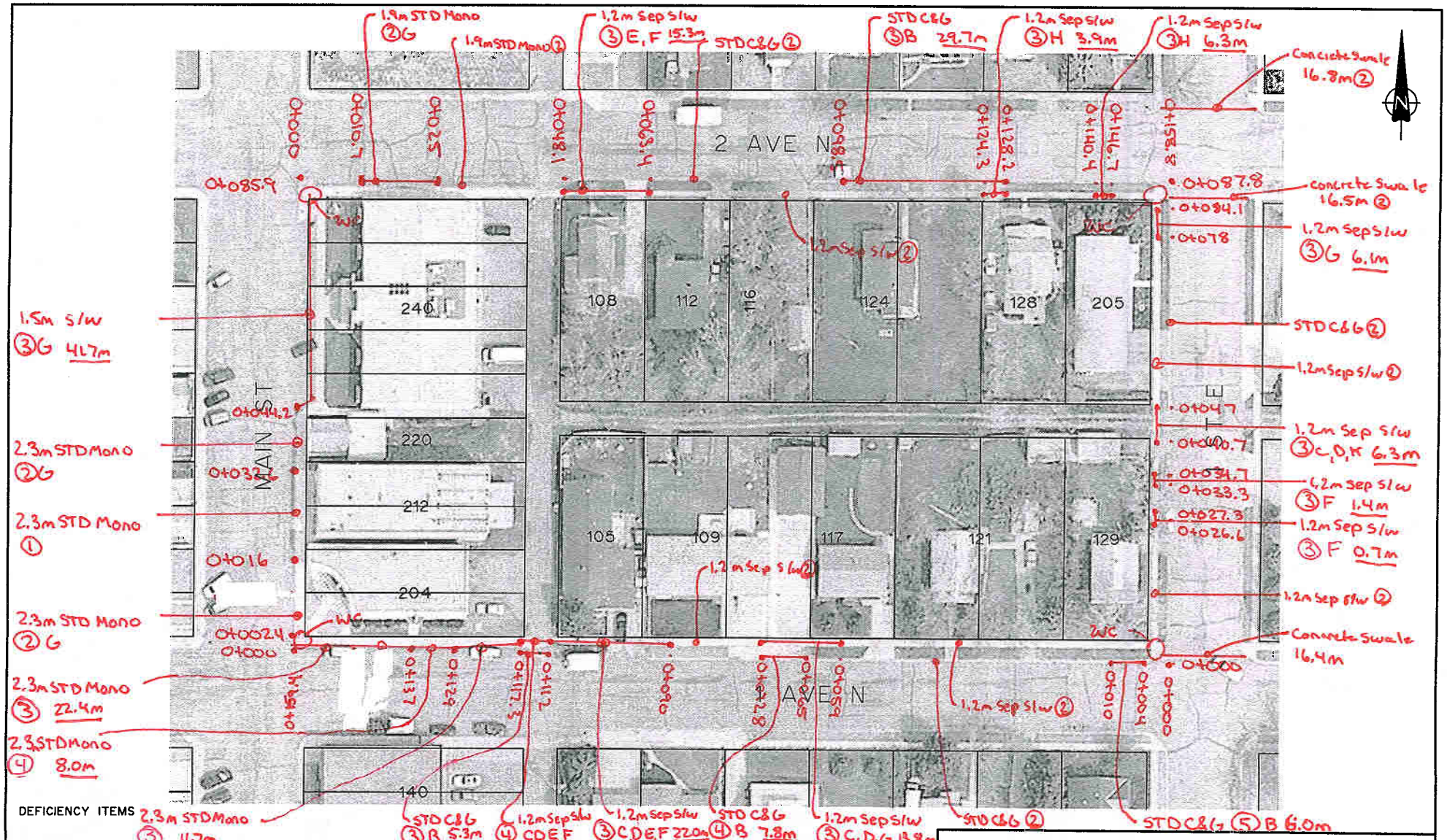

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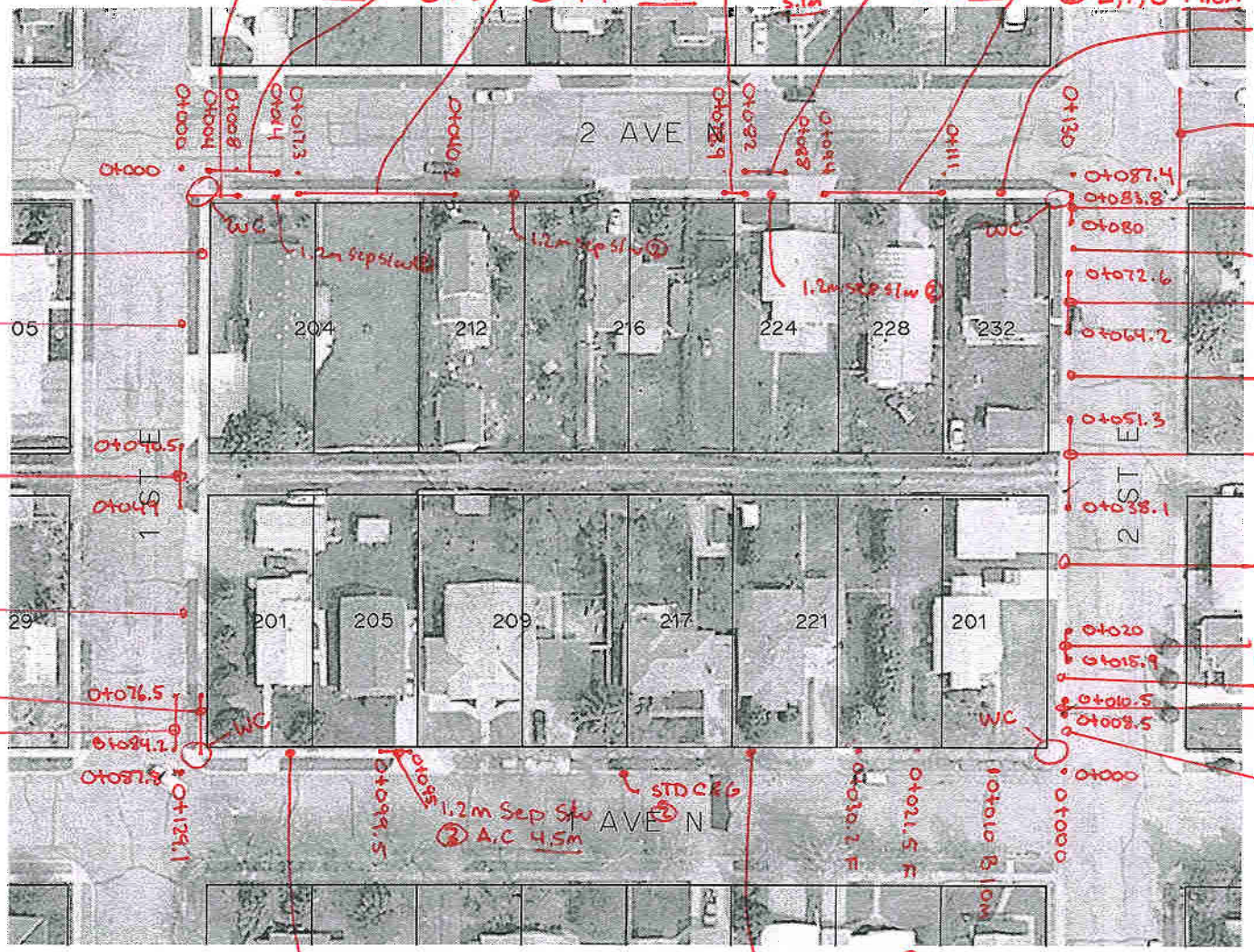

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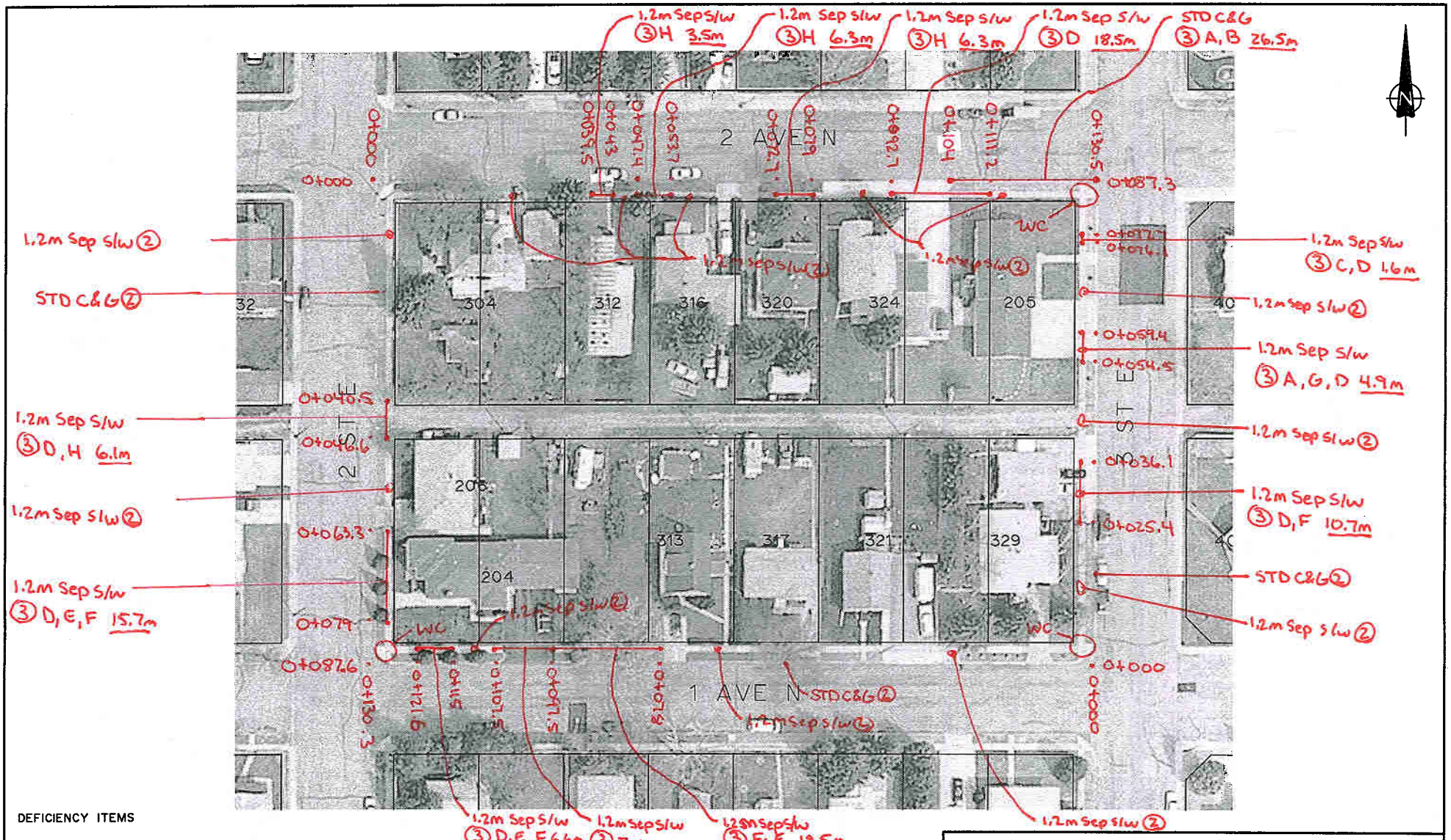

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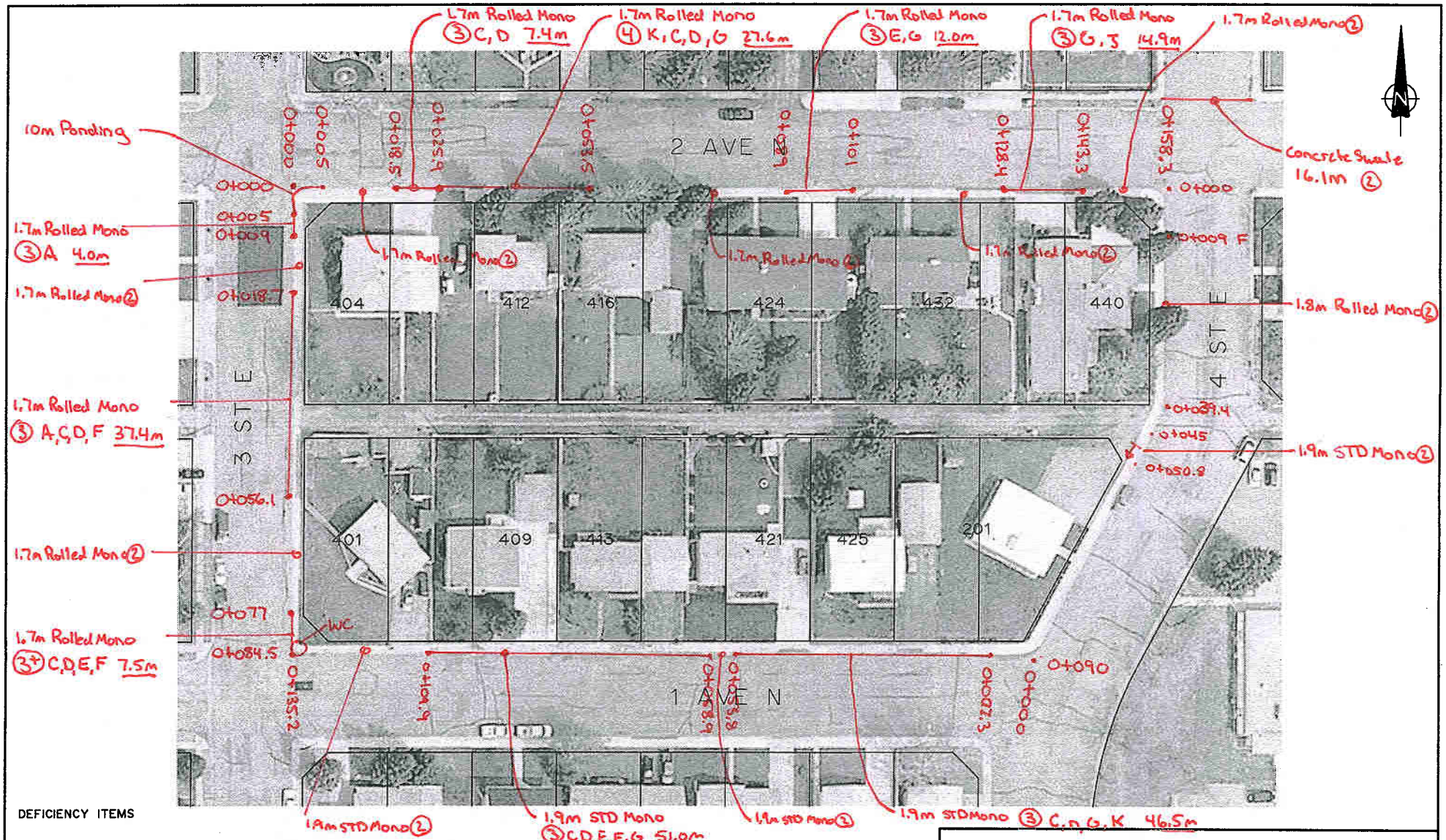

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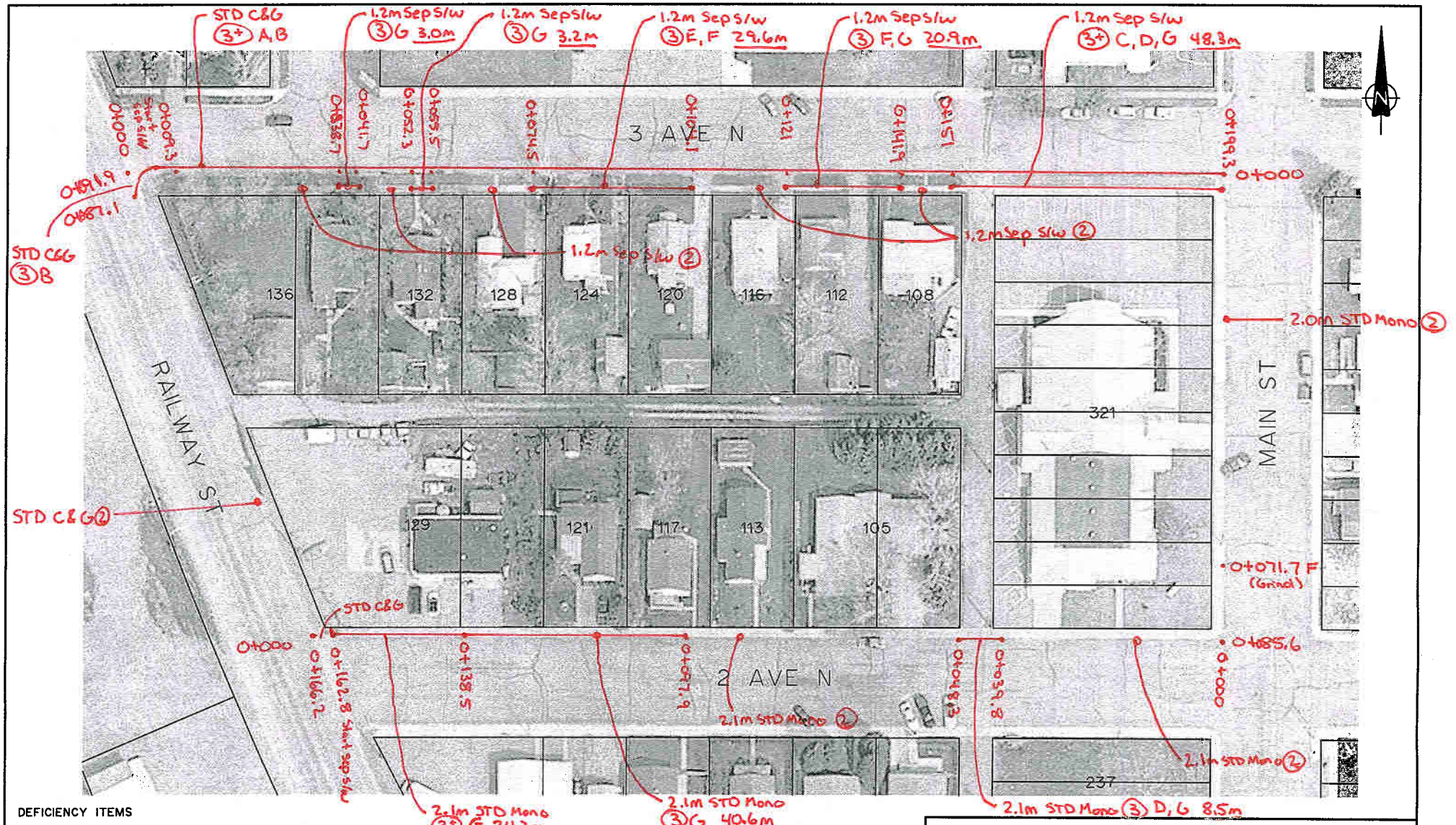

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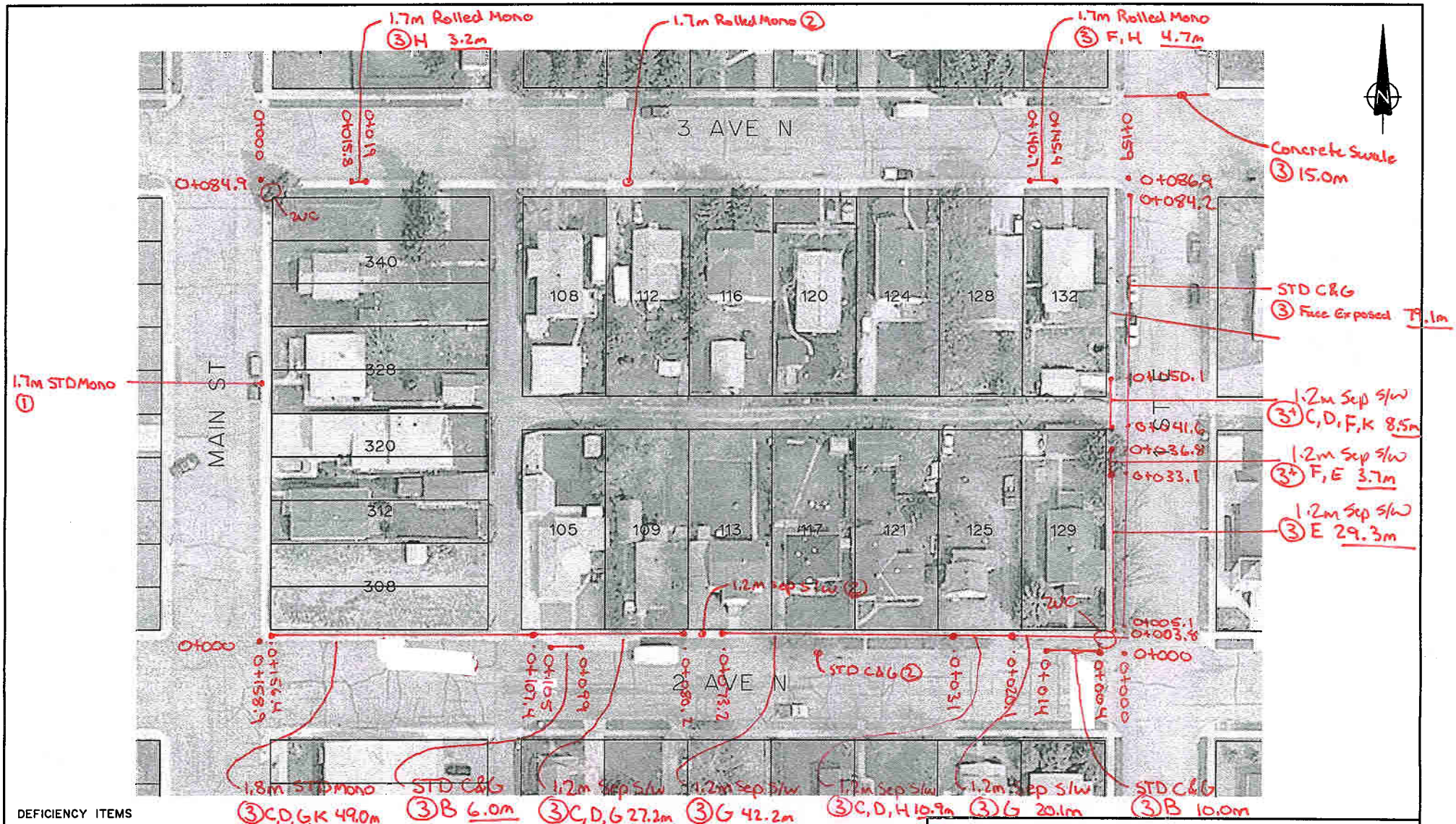

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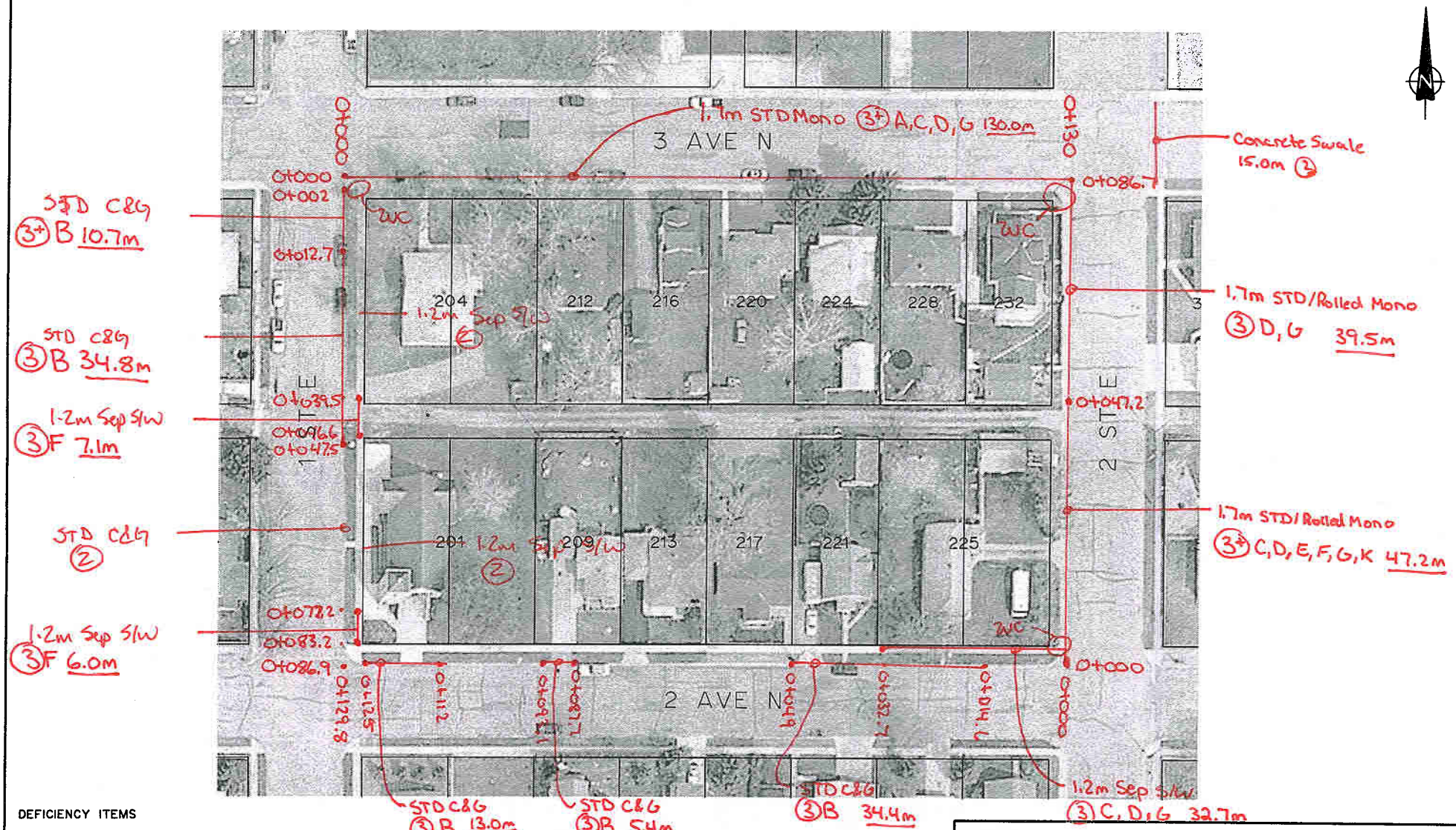

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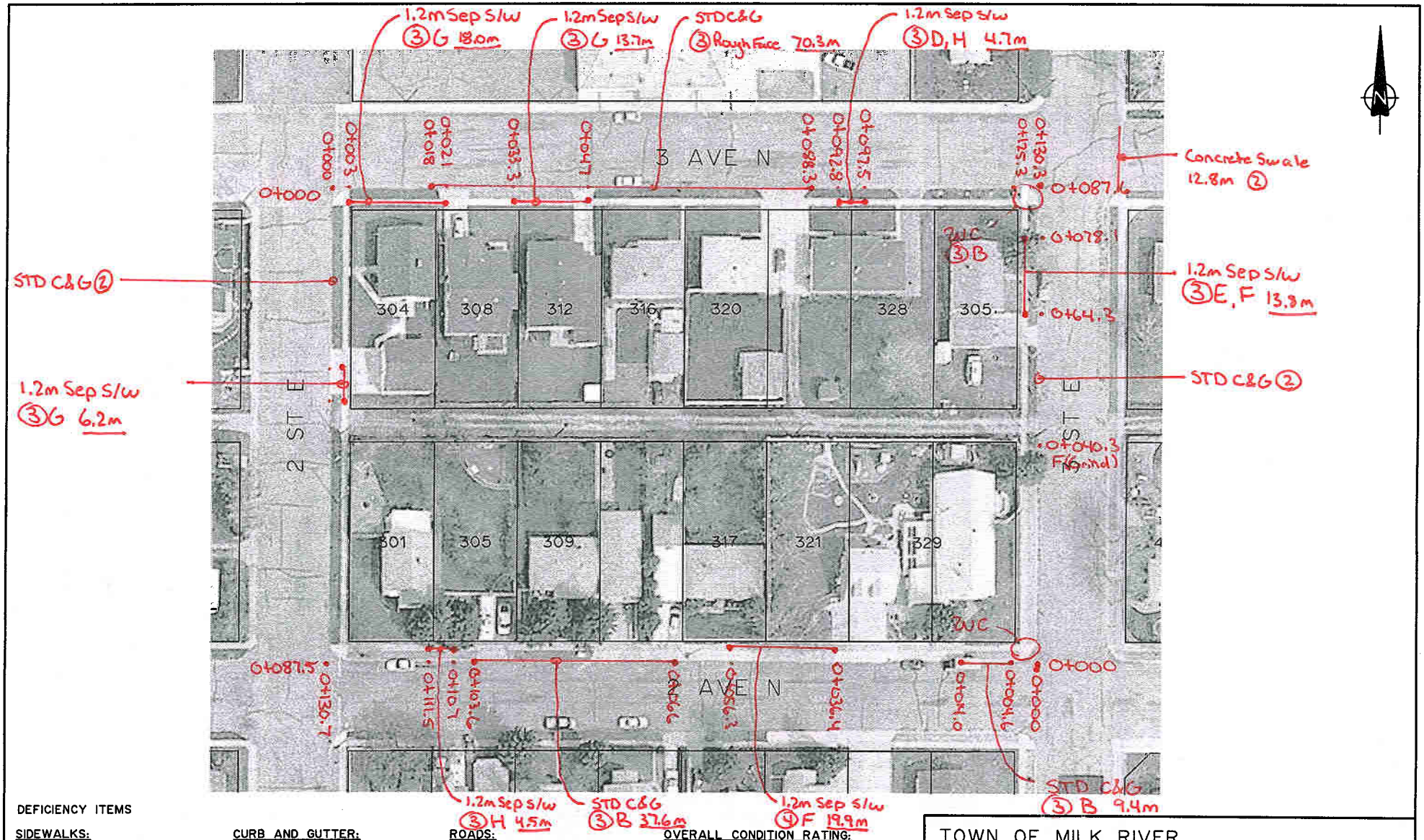

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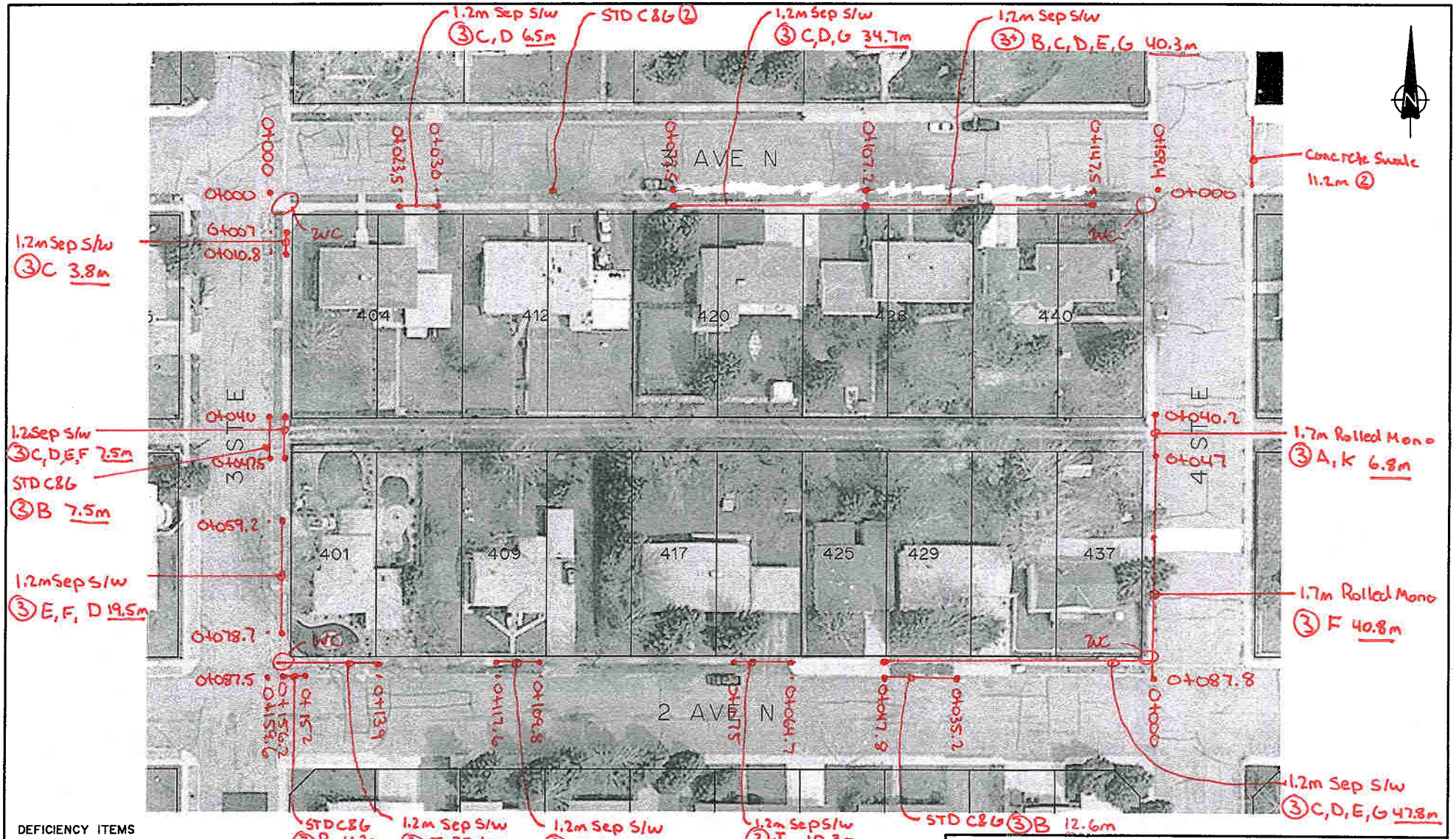

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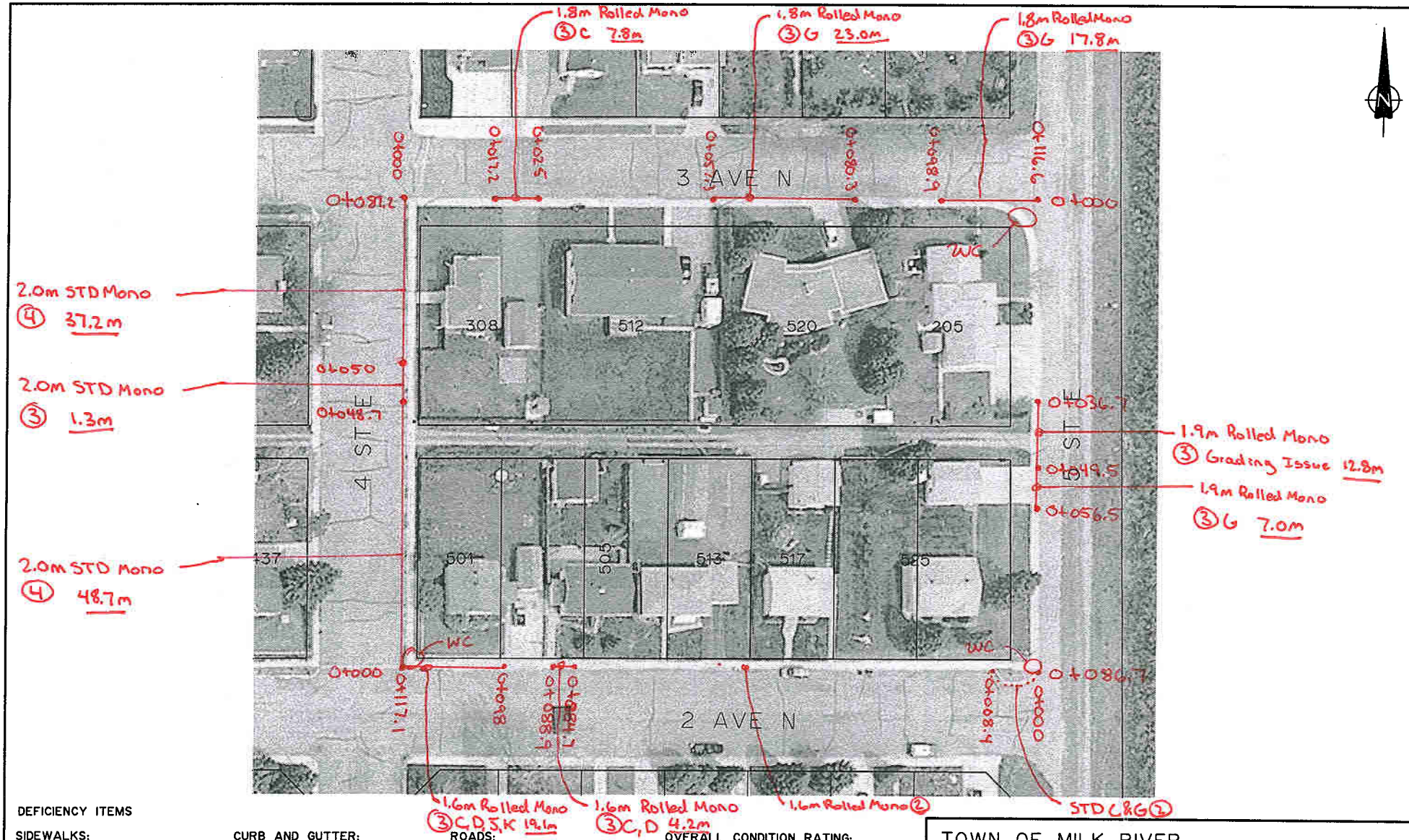

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F - VERT DISPLACEMENT
G - SPALLING/PITTED
H - SETTLEMENT
J - PATCH
K - Broken
WC - Wheelchair Ramp Required

CURB AND GUTTER:
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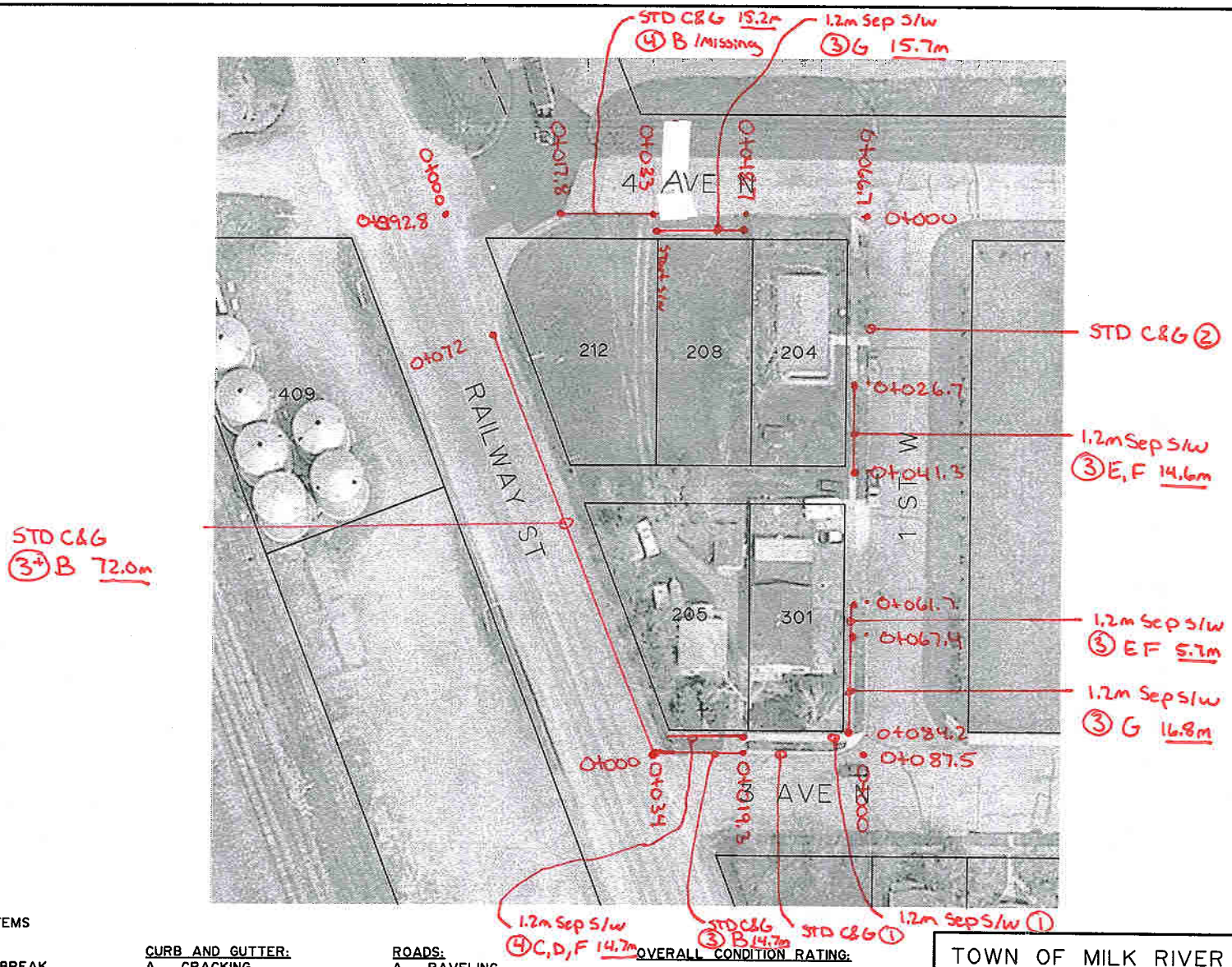
0 10 20 30 m

TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1000 | DATE: OCT 2006

mpe ENGINEERING LTD.
Lethbridge, Alberta



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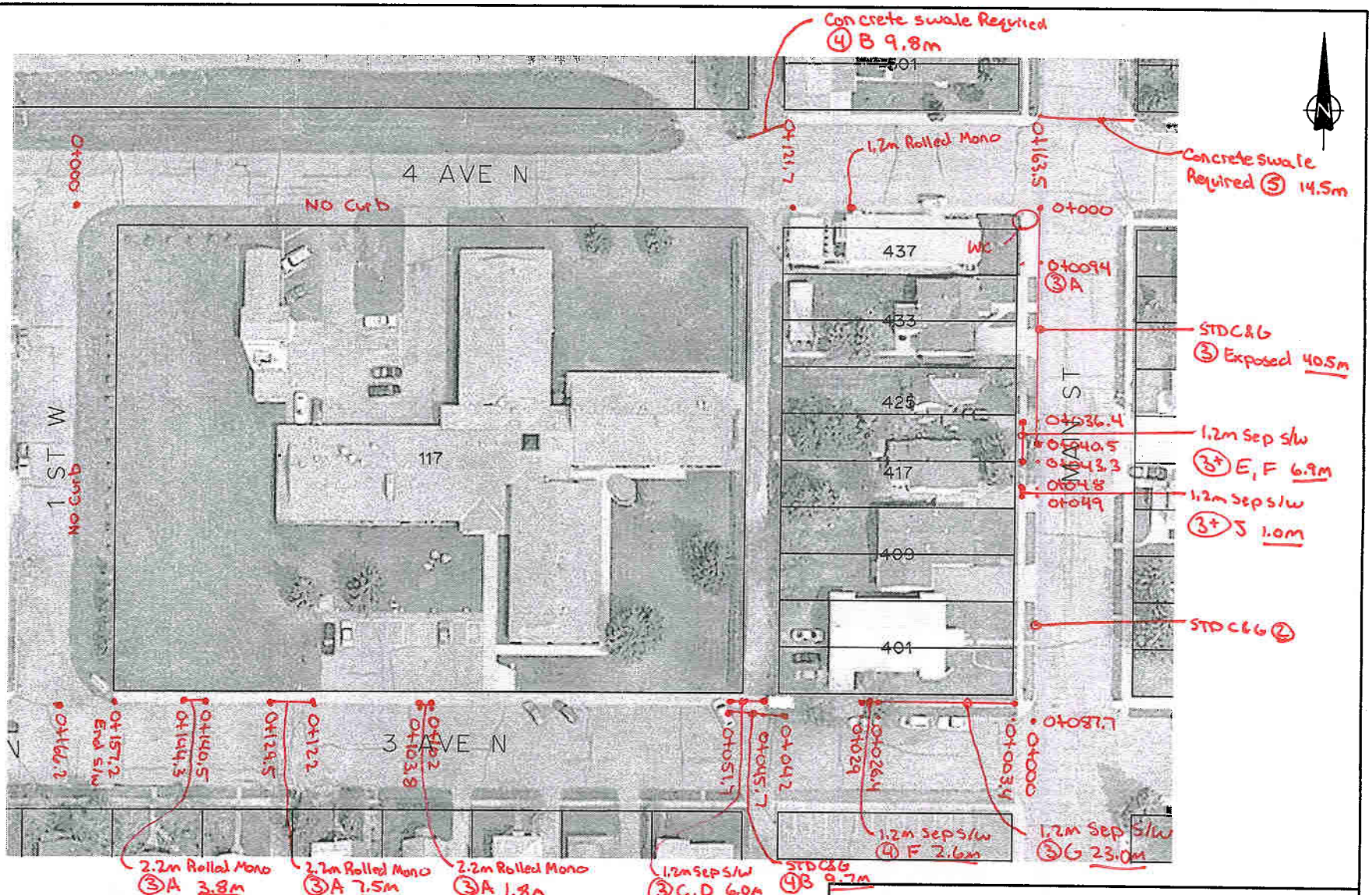

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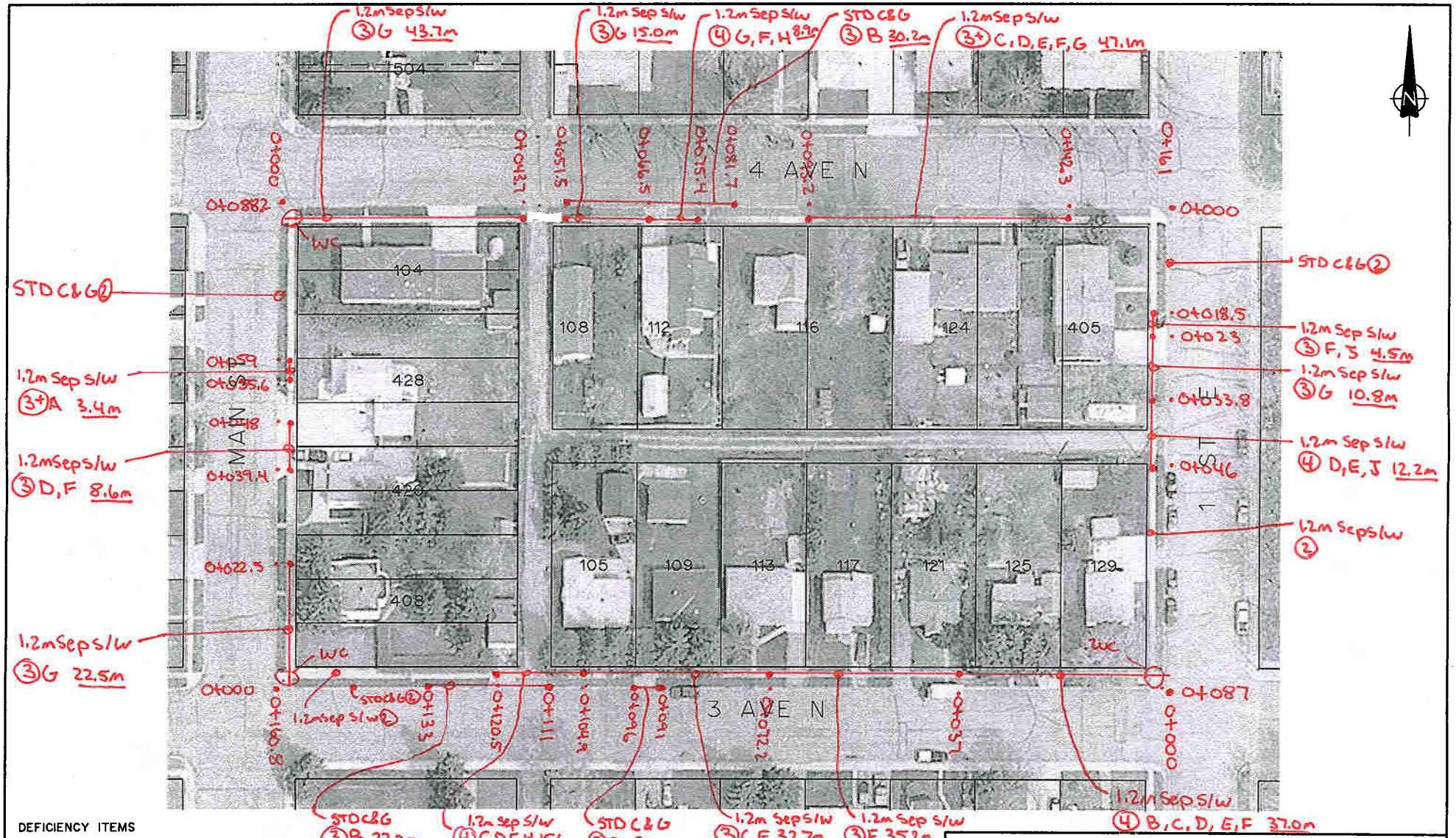

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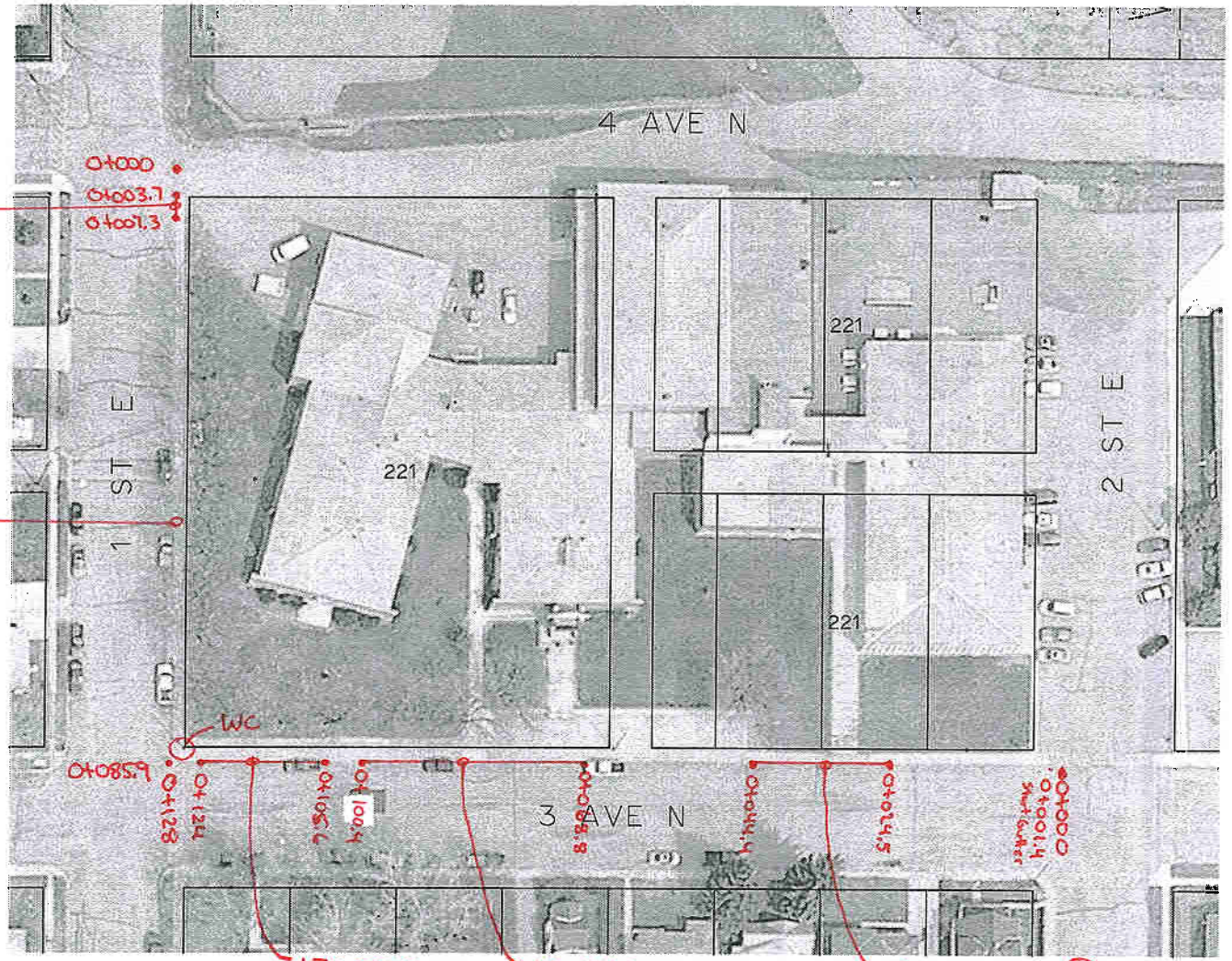

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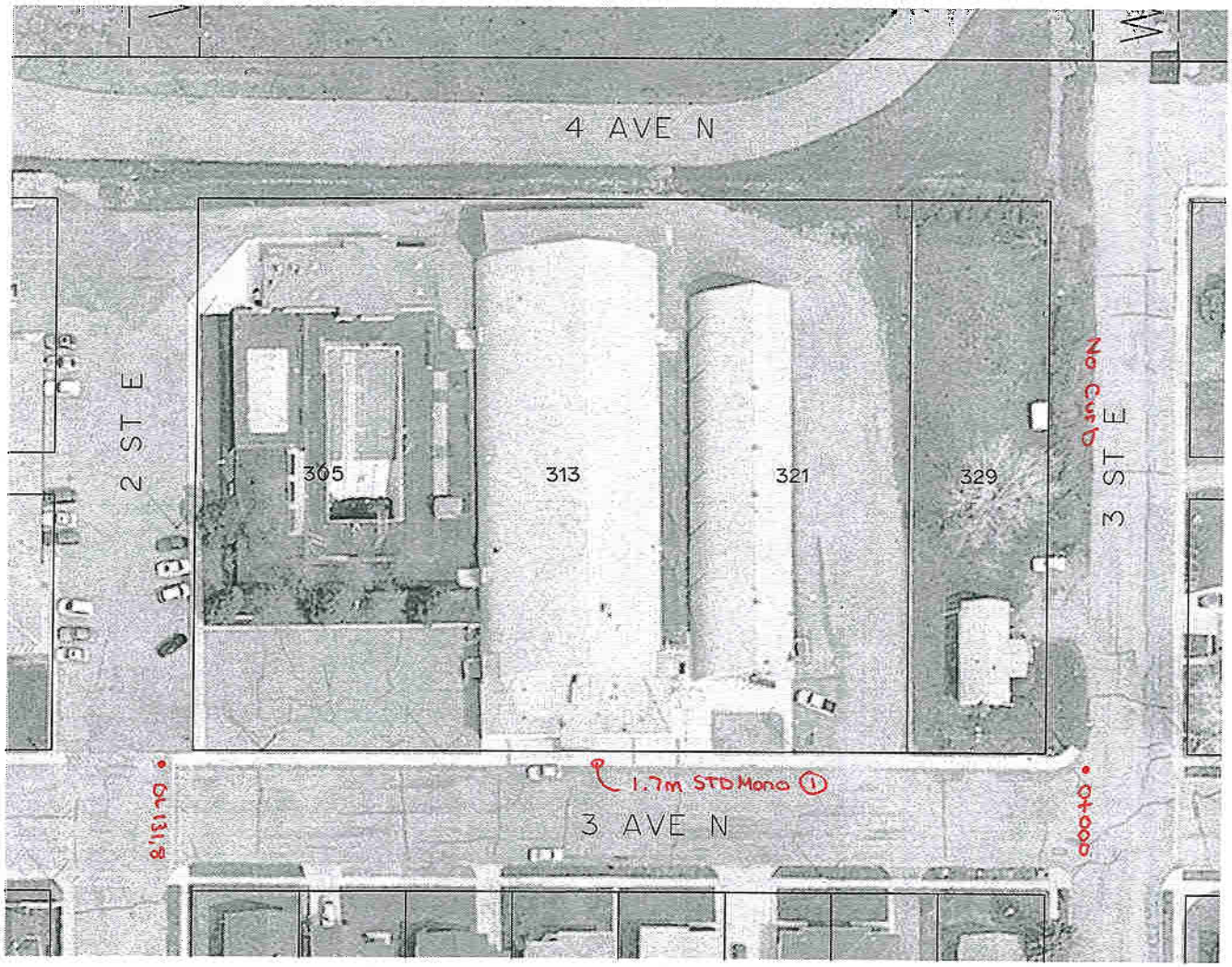

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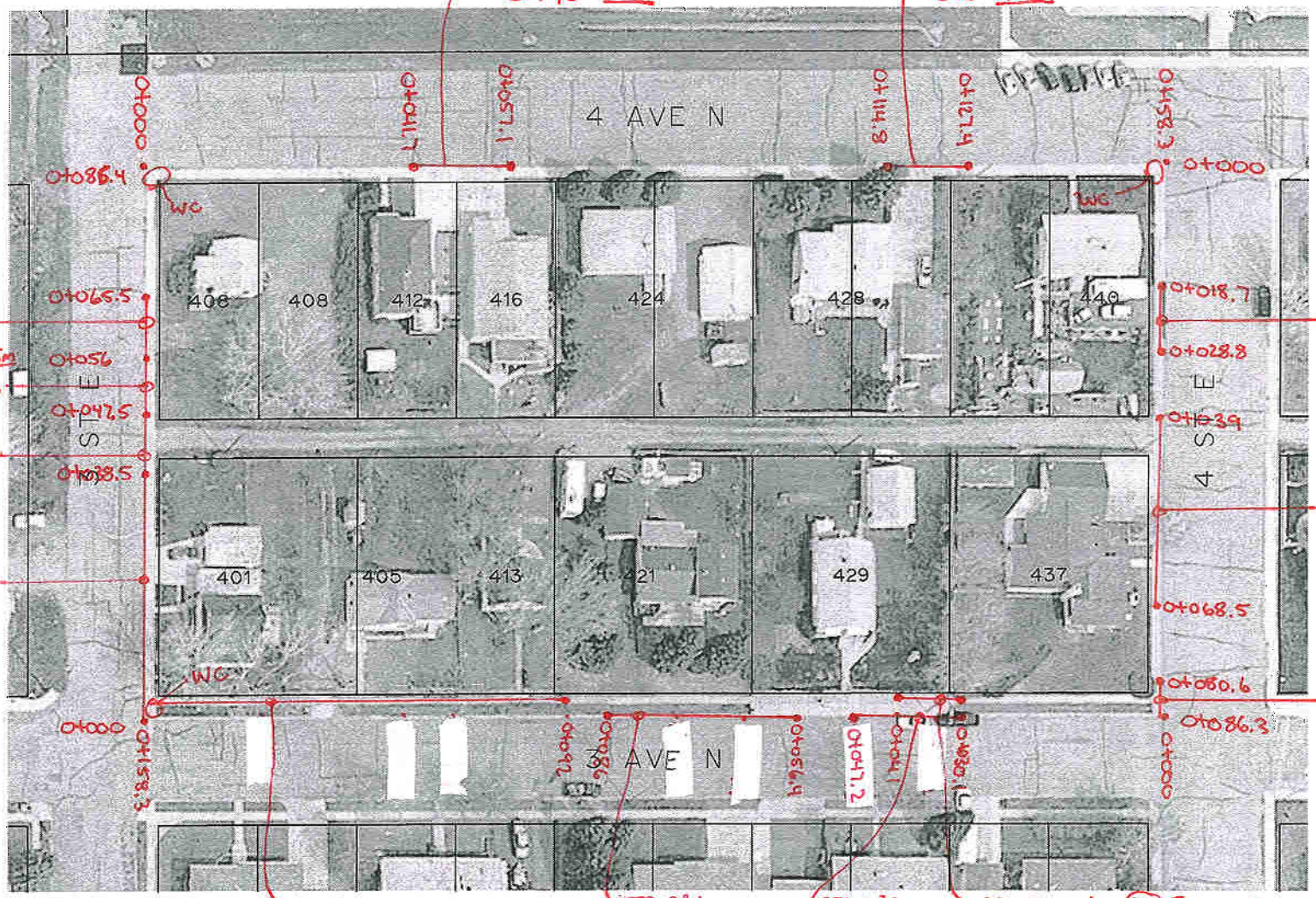

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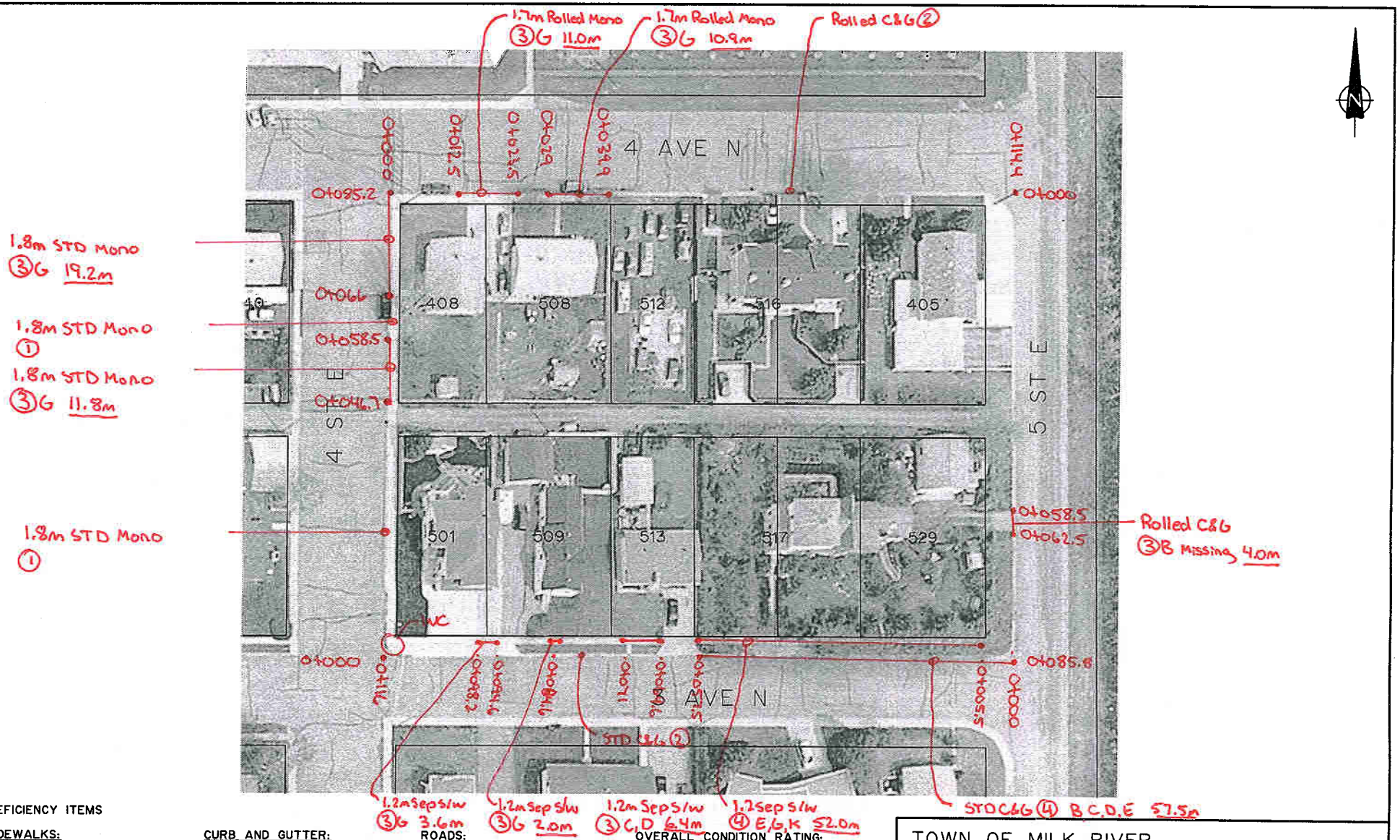

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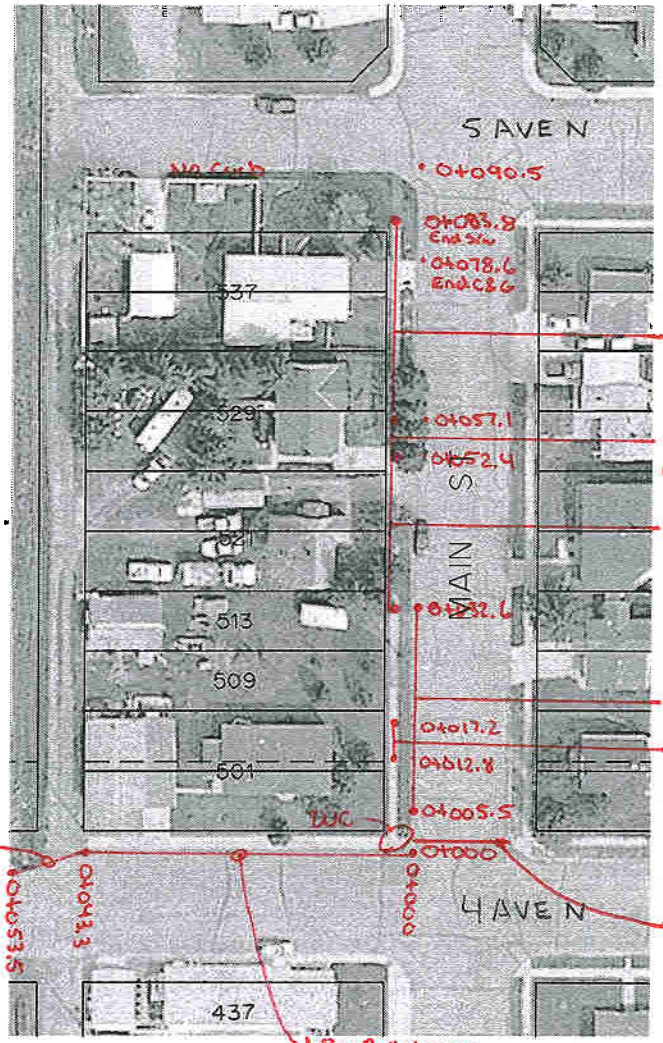

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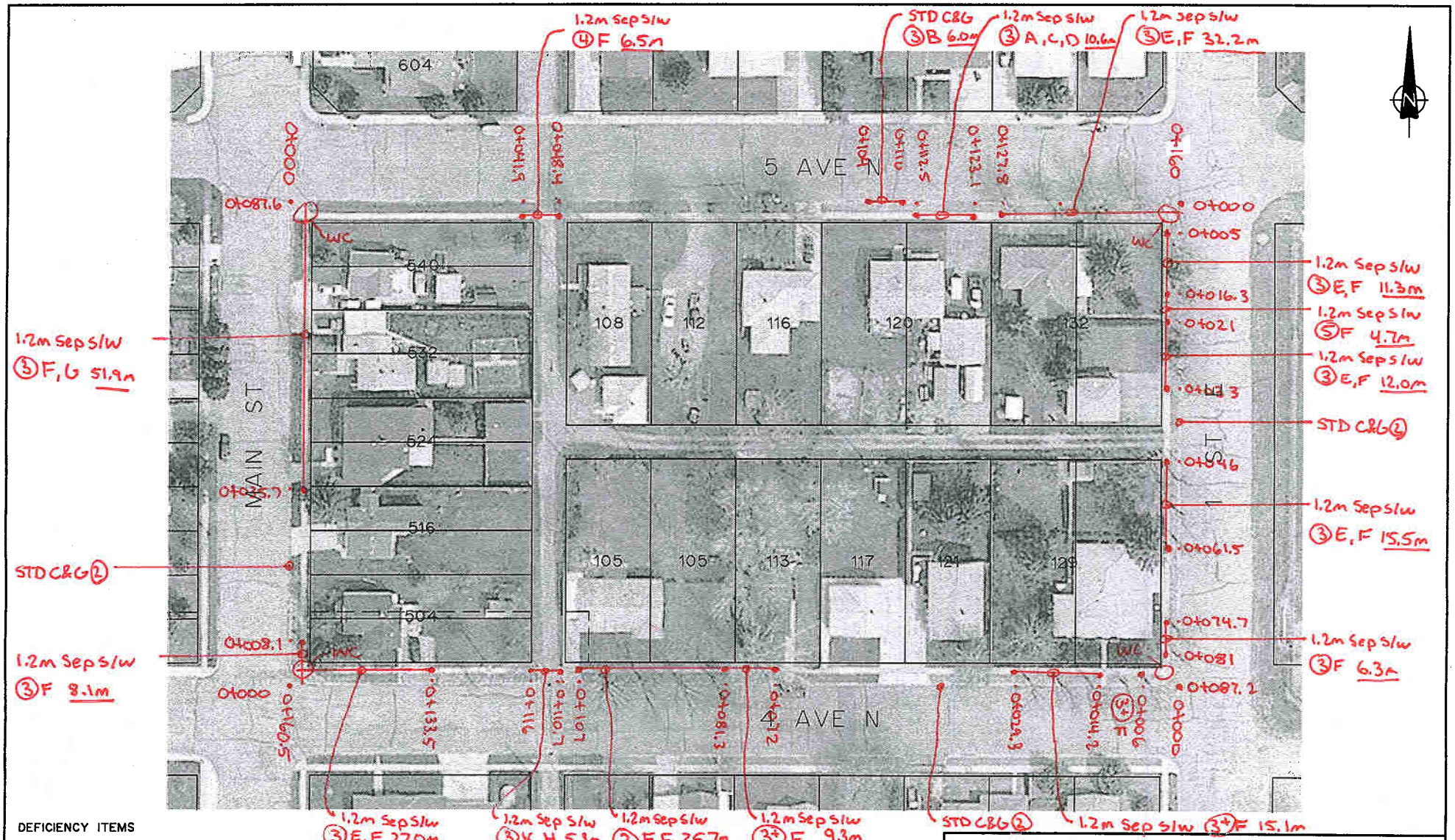

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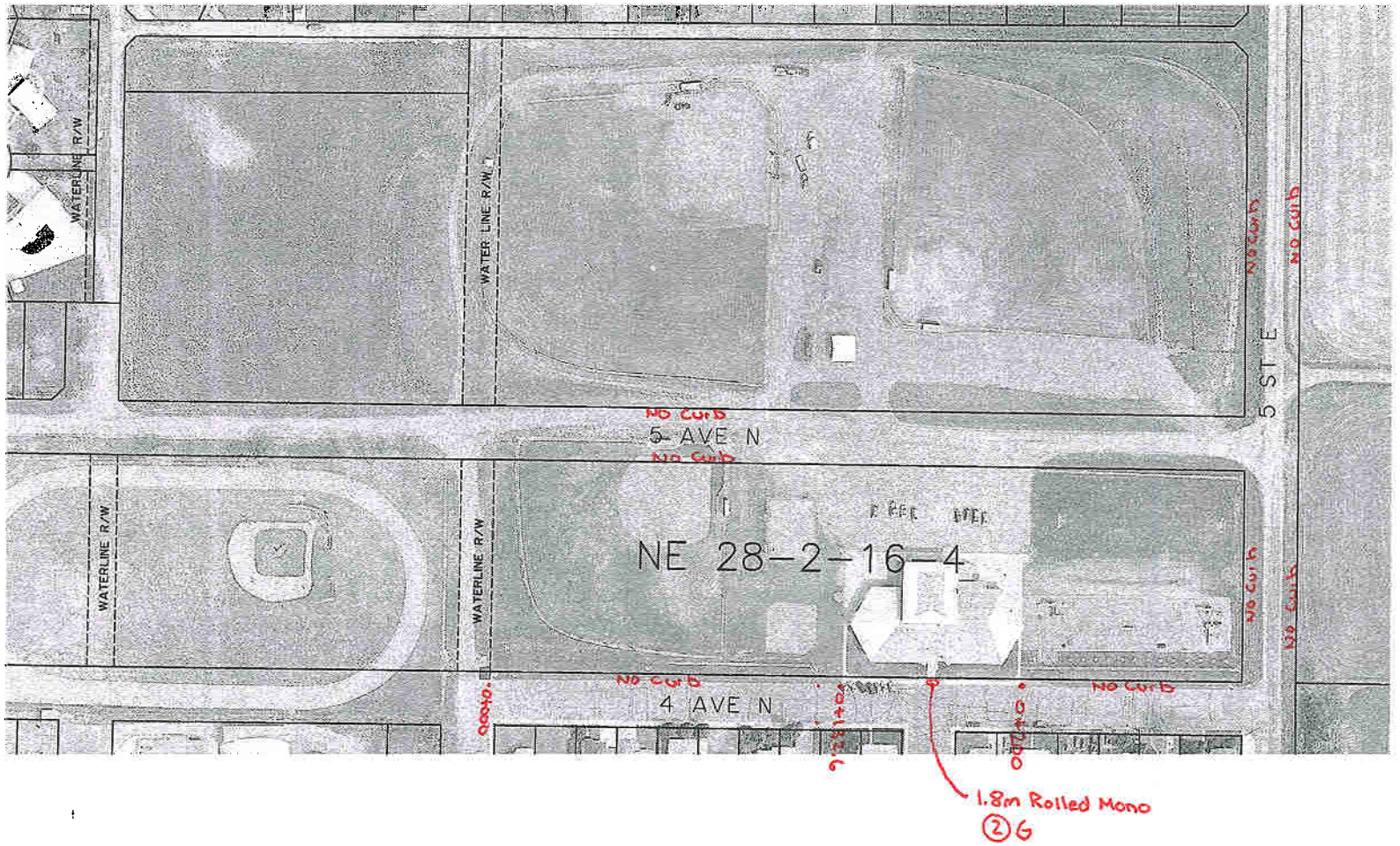

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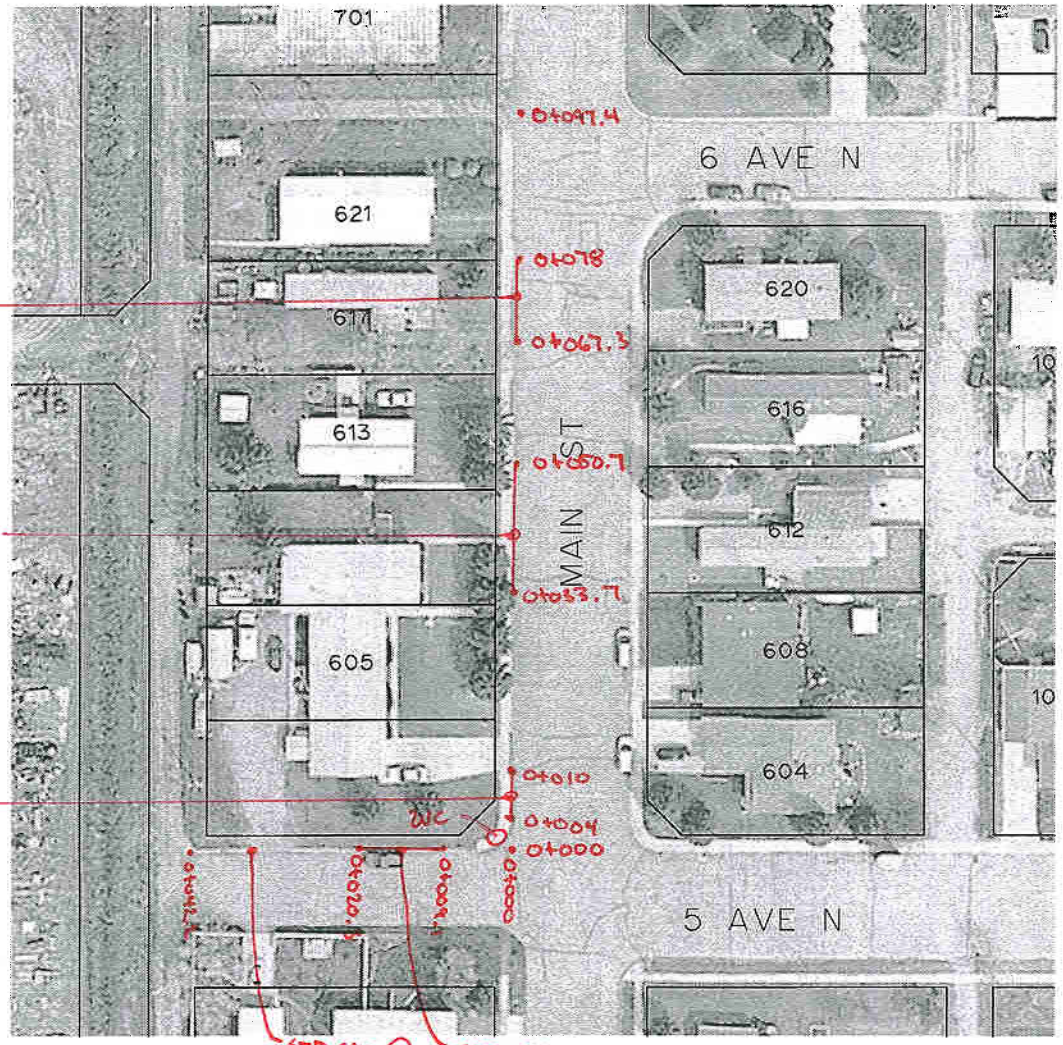

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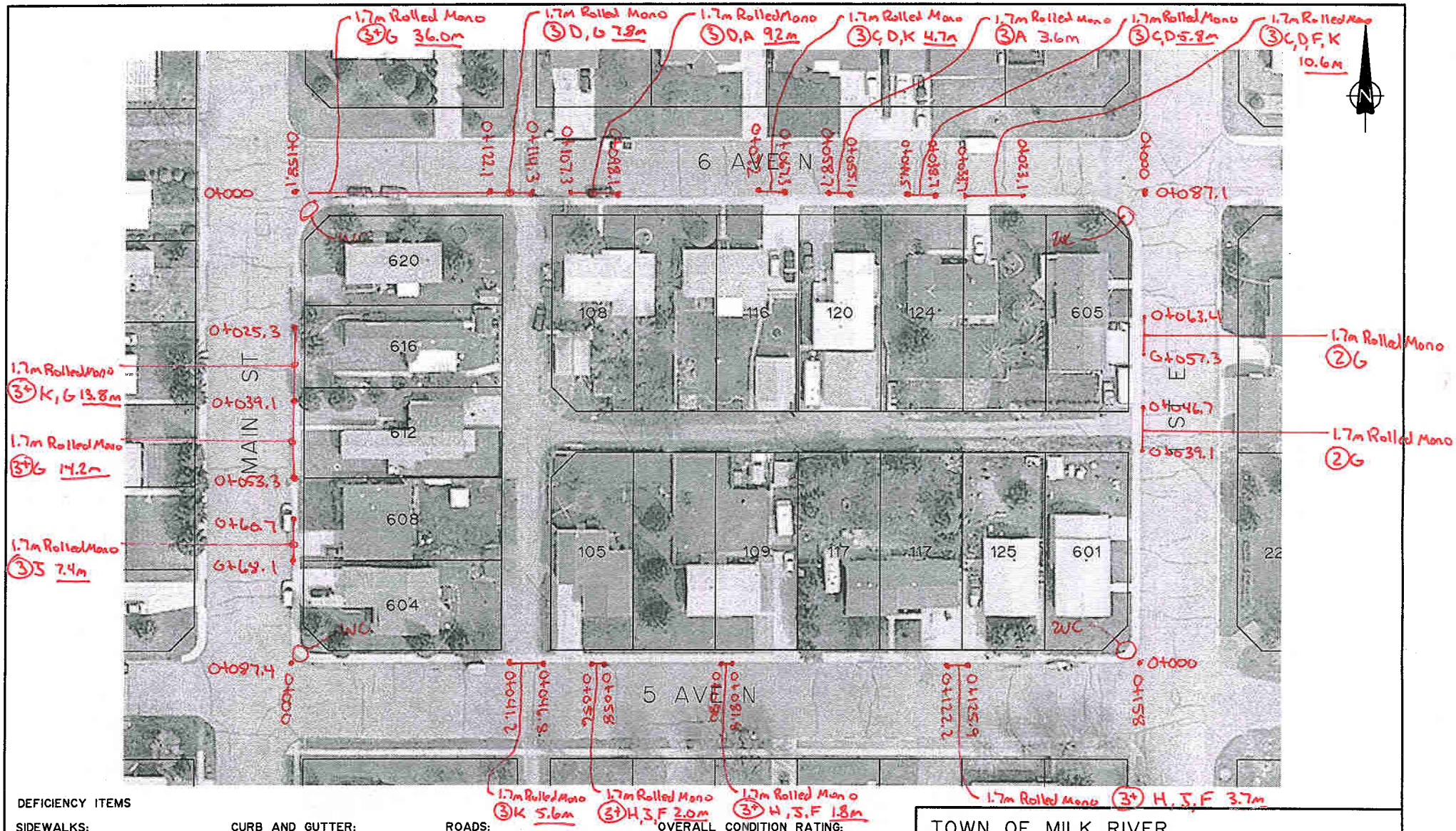

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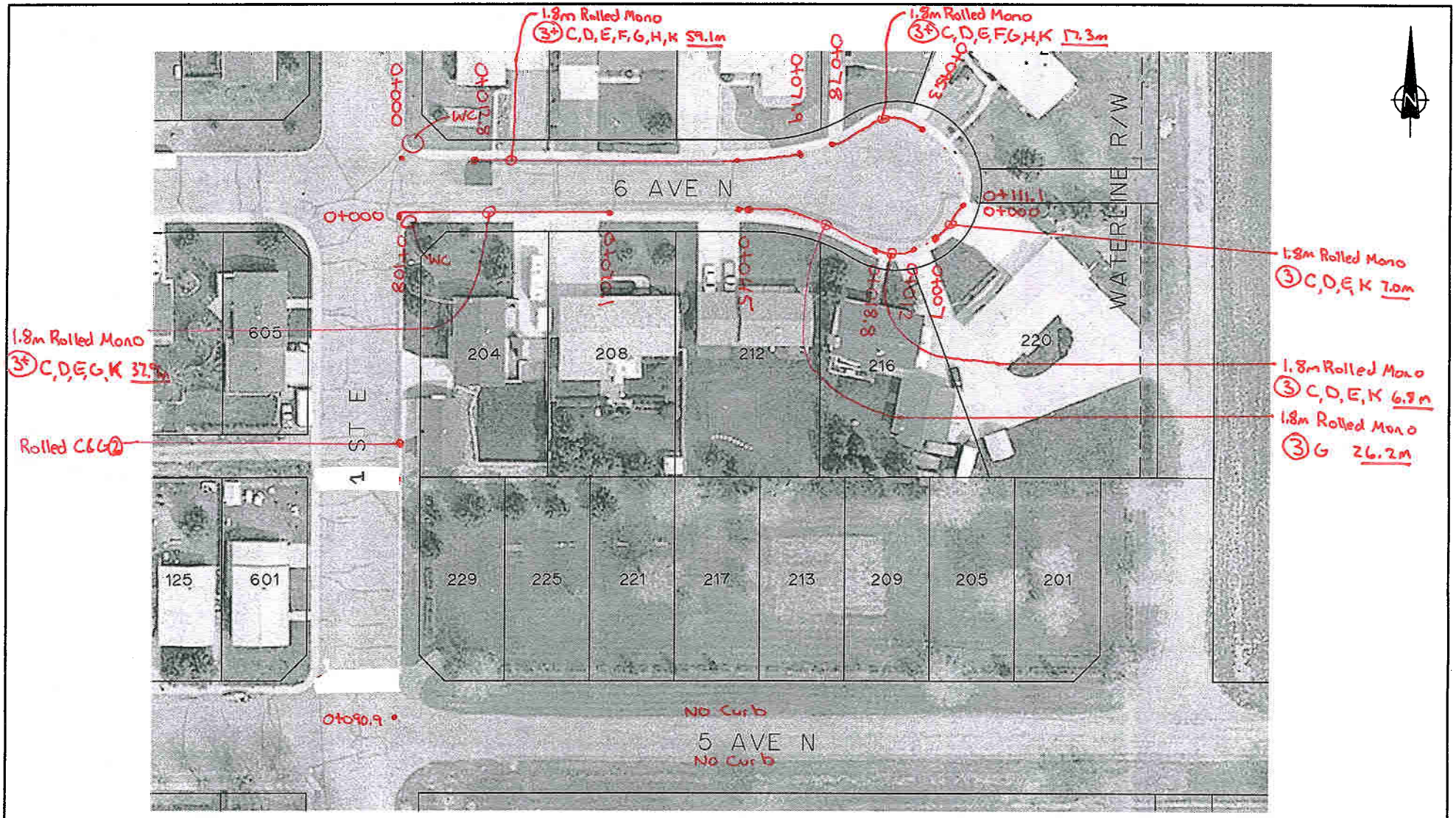

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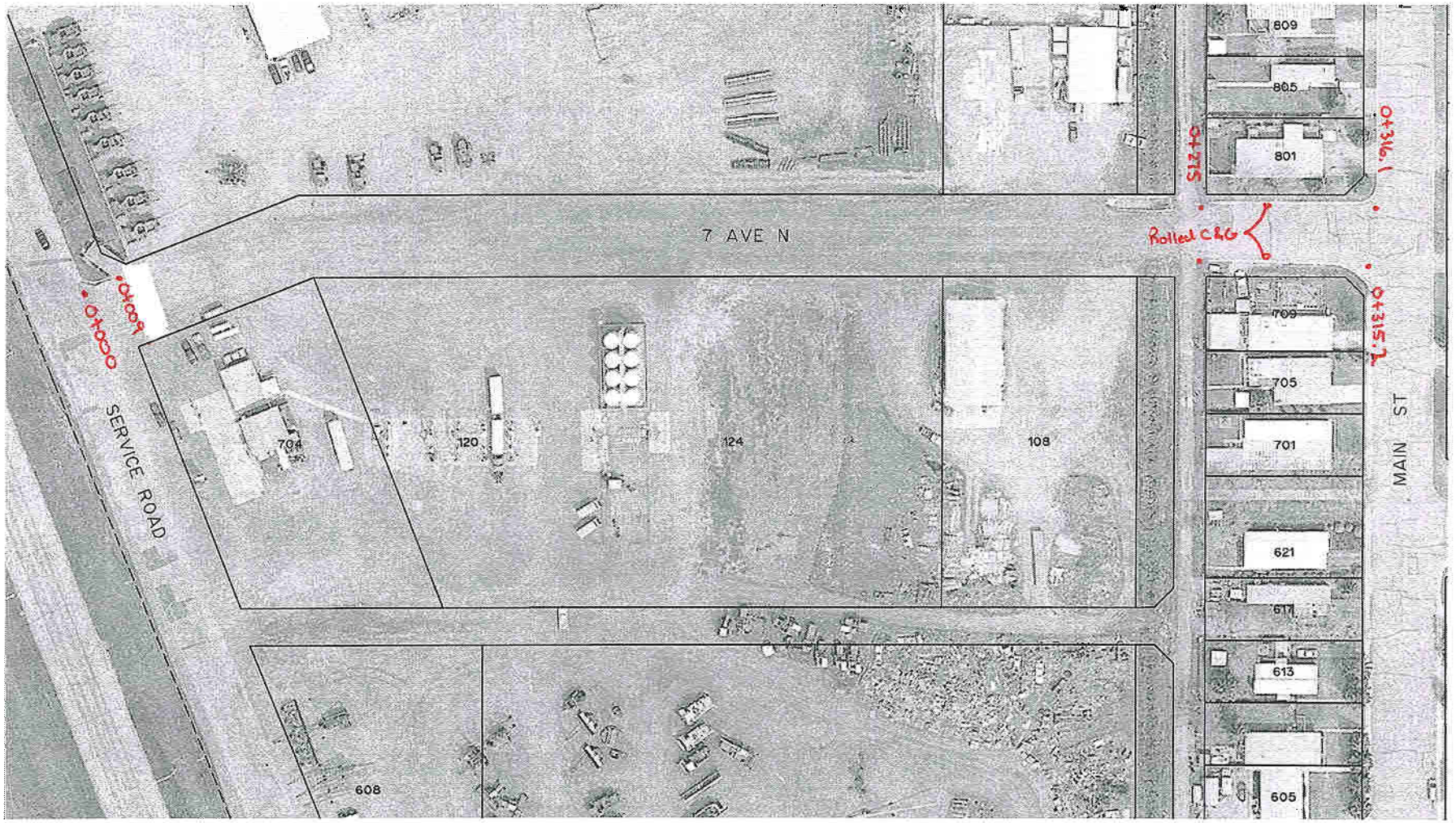

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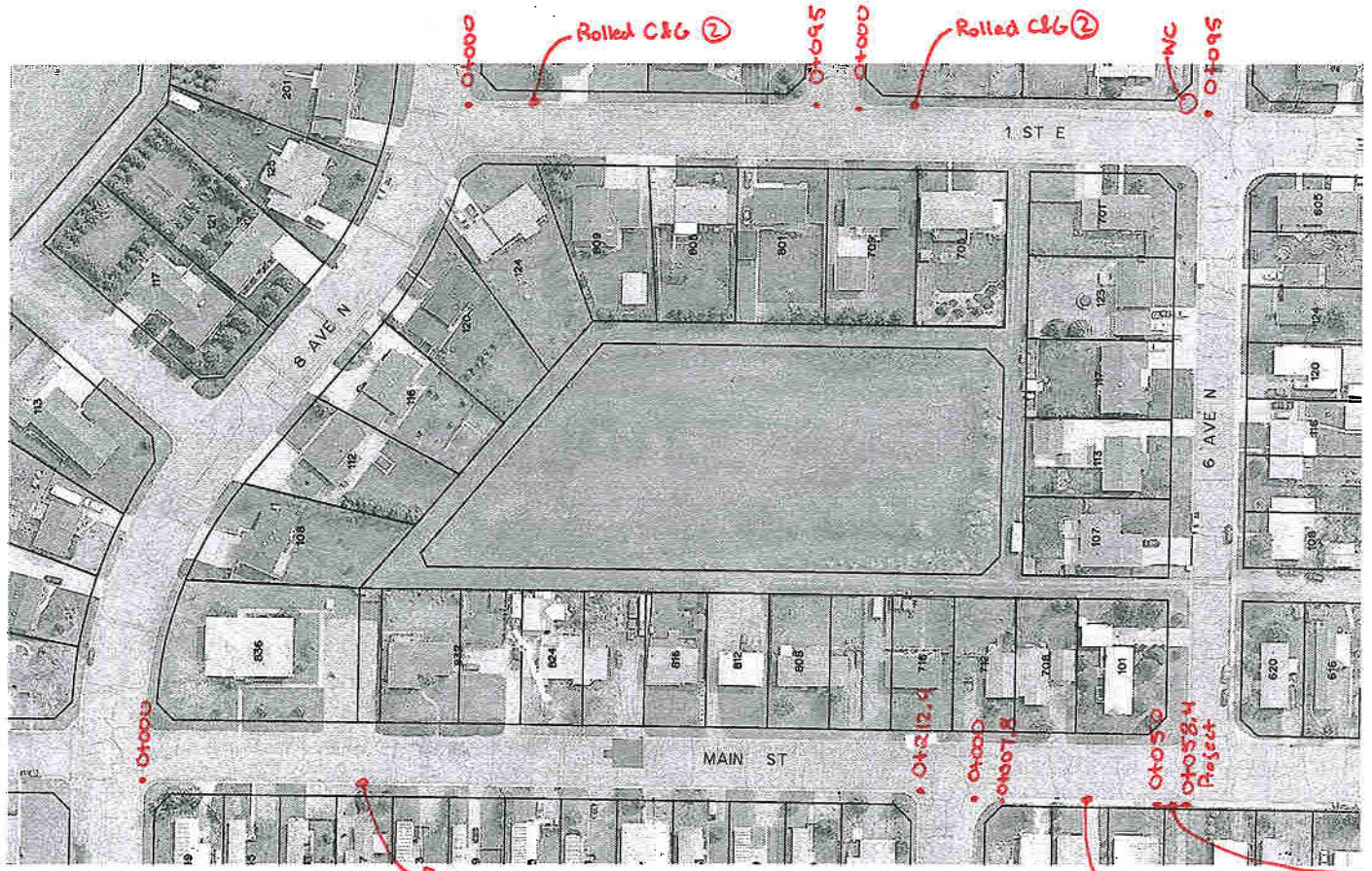
TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
ROAD EVALUATION

SCALE: 1:1500 | DATE: OCT 2006

mpe ENGINEERING LTD.
Lethbridge, Alberta



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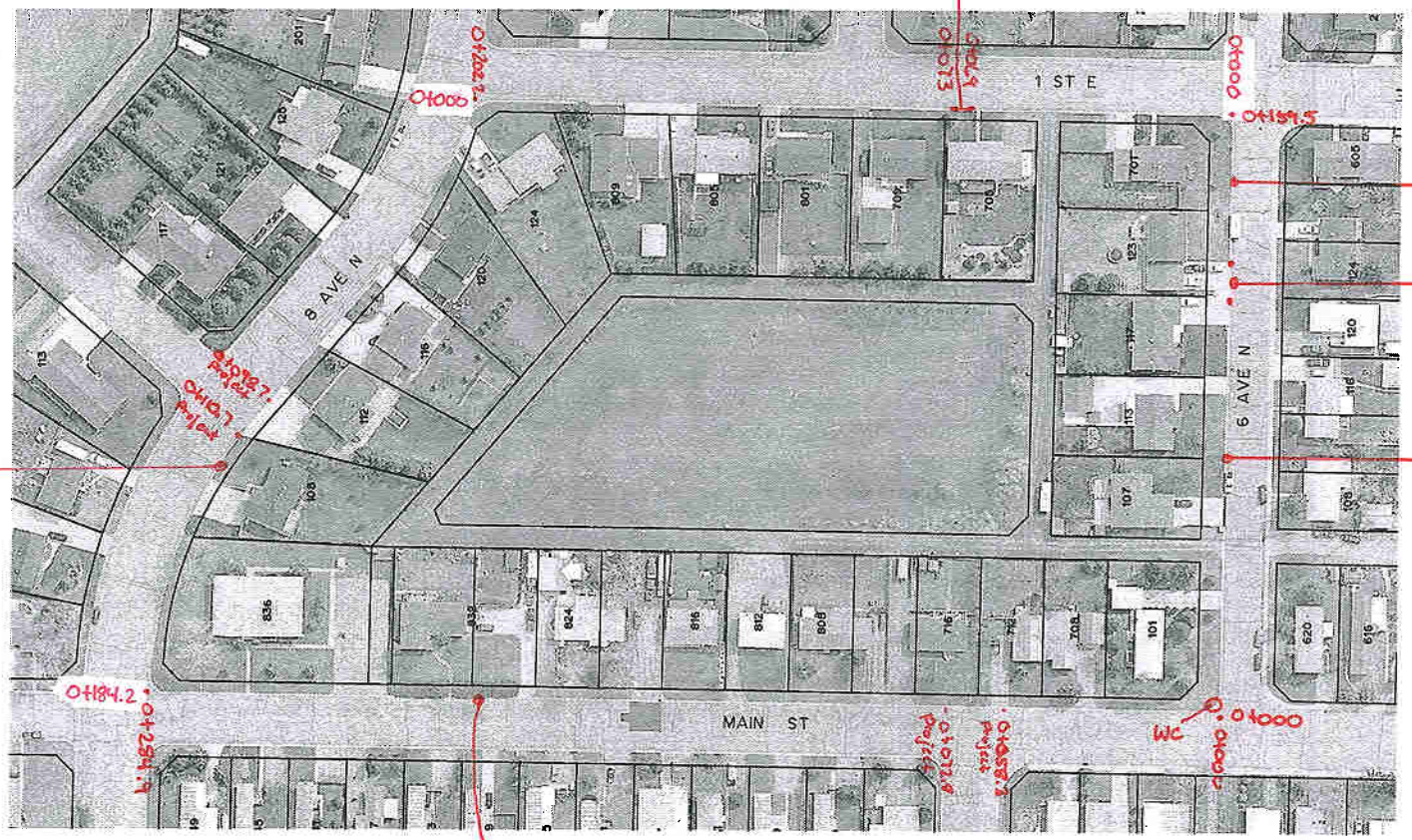

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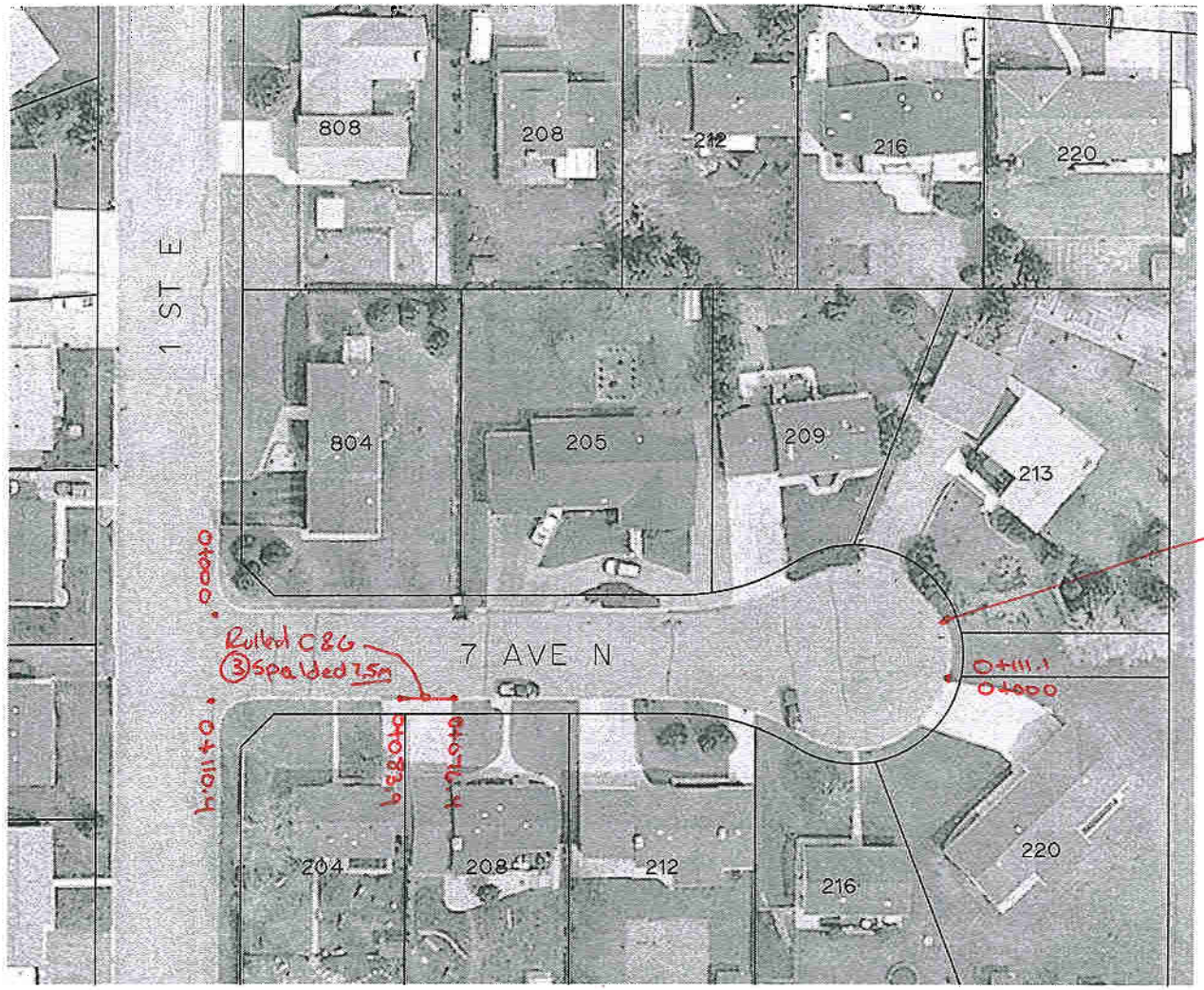

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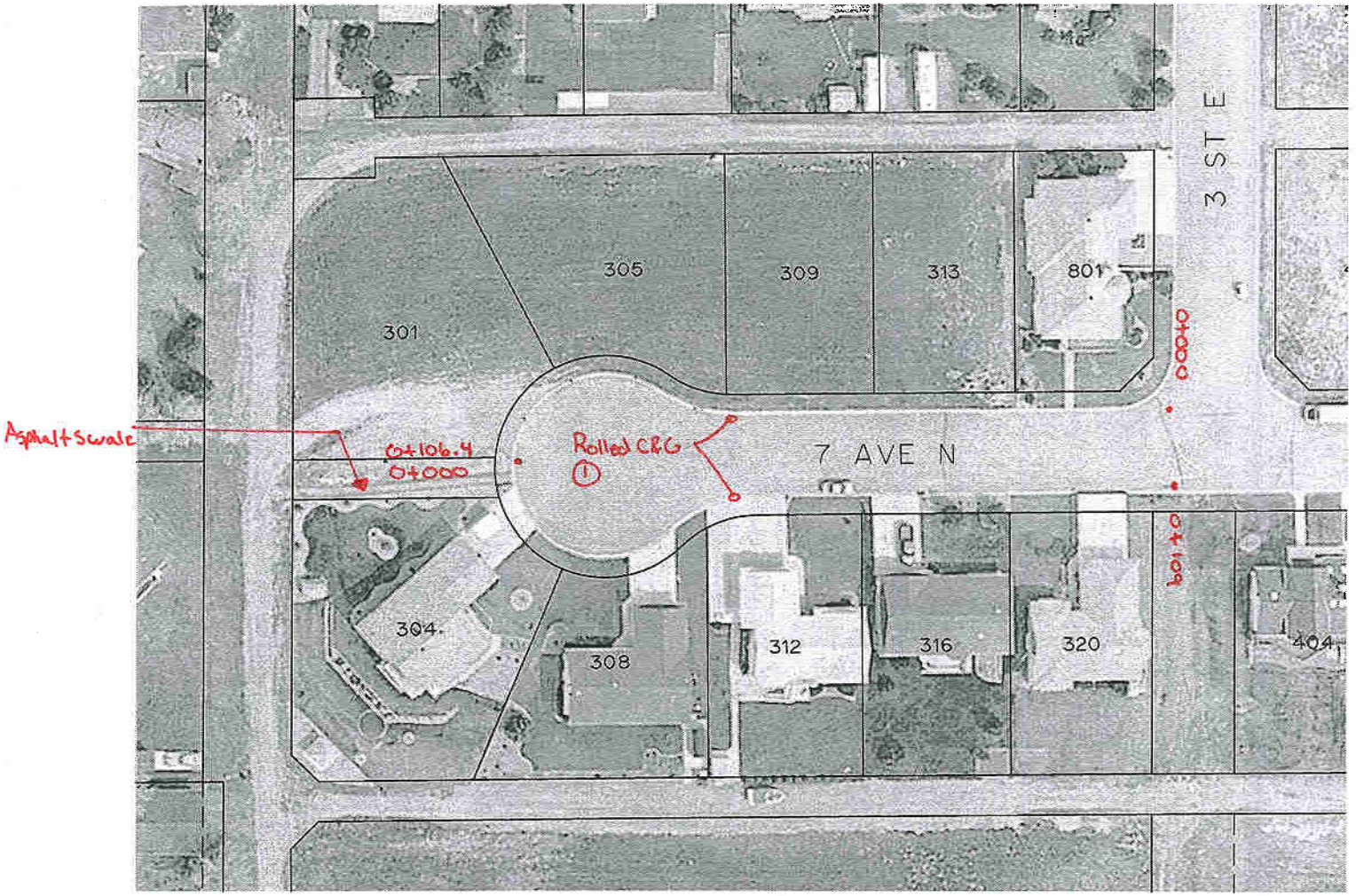

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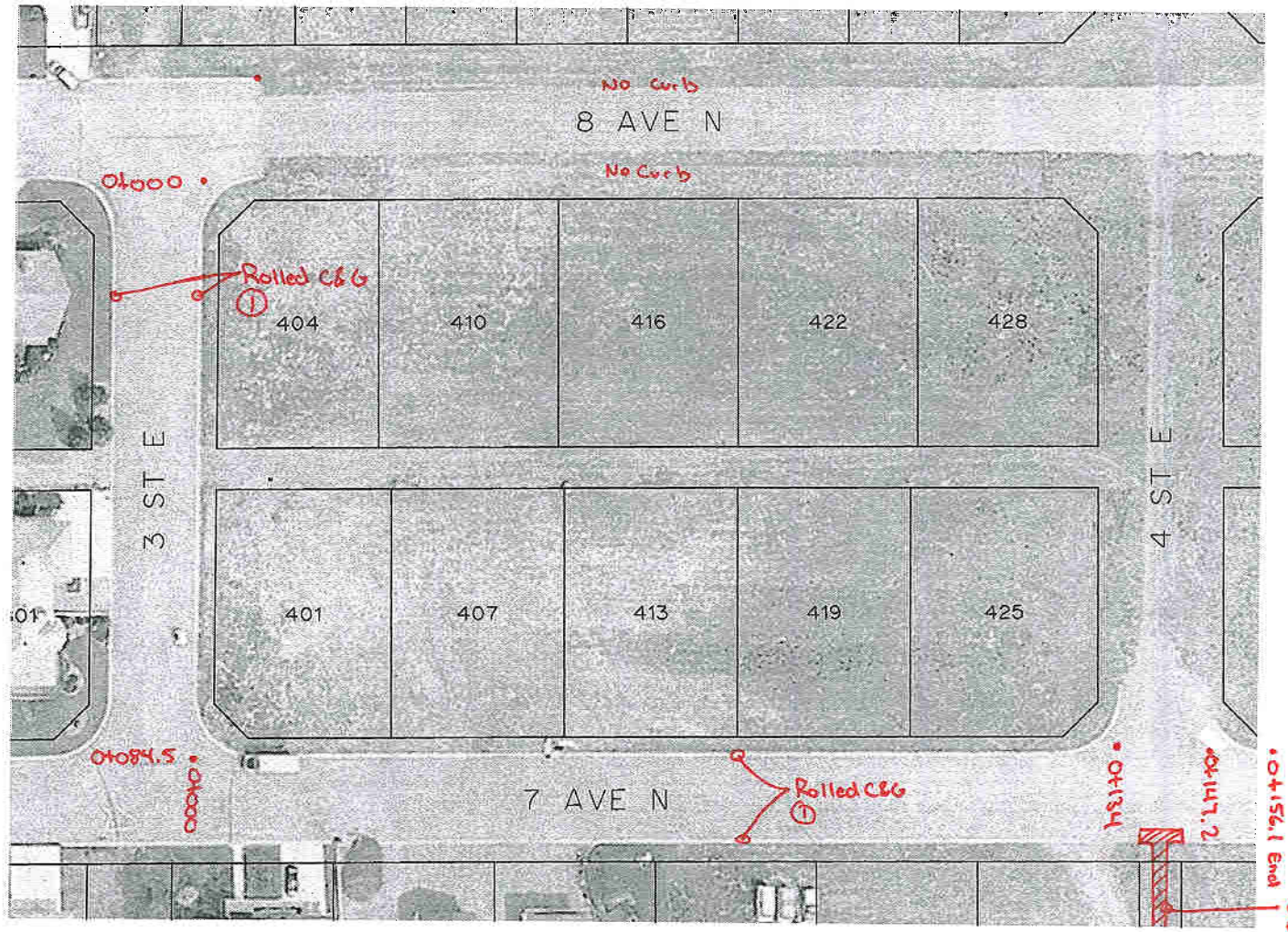

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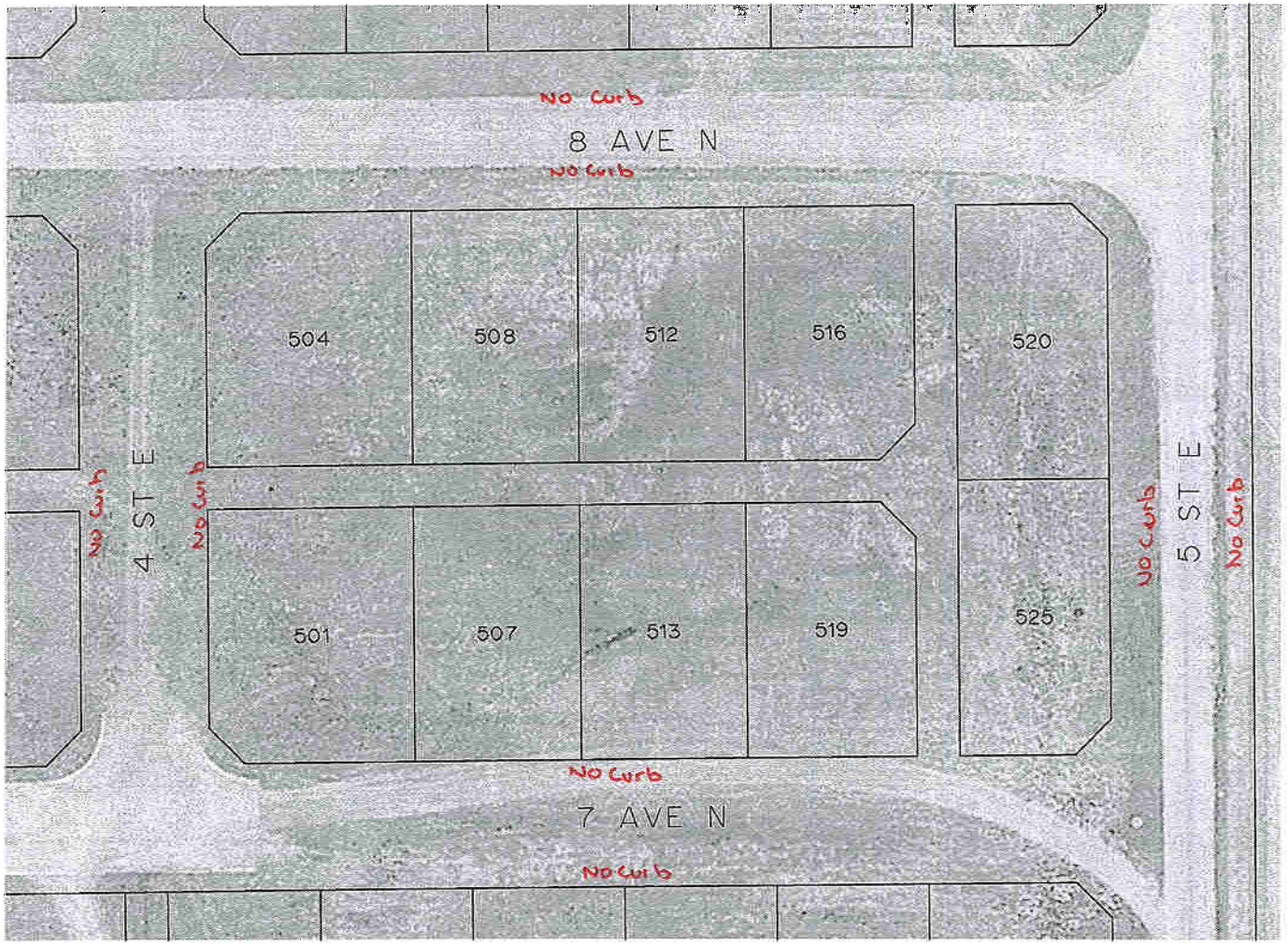

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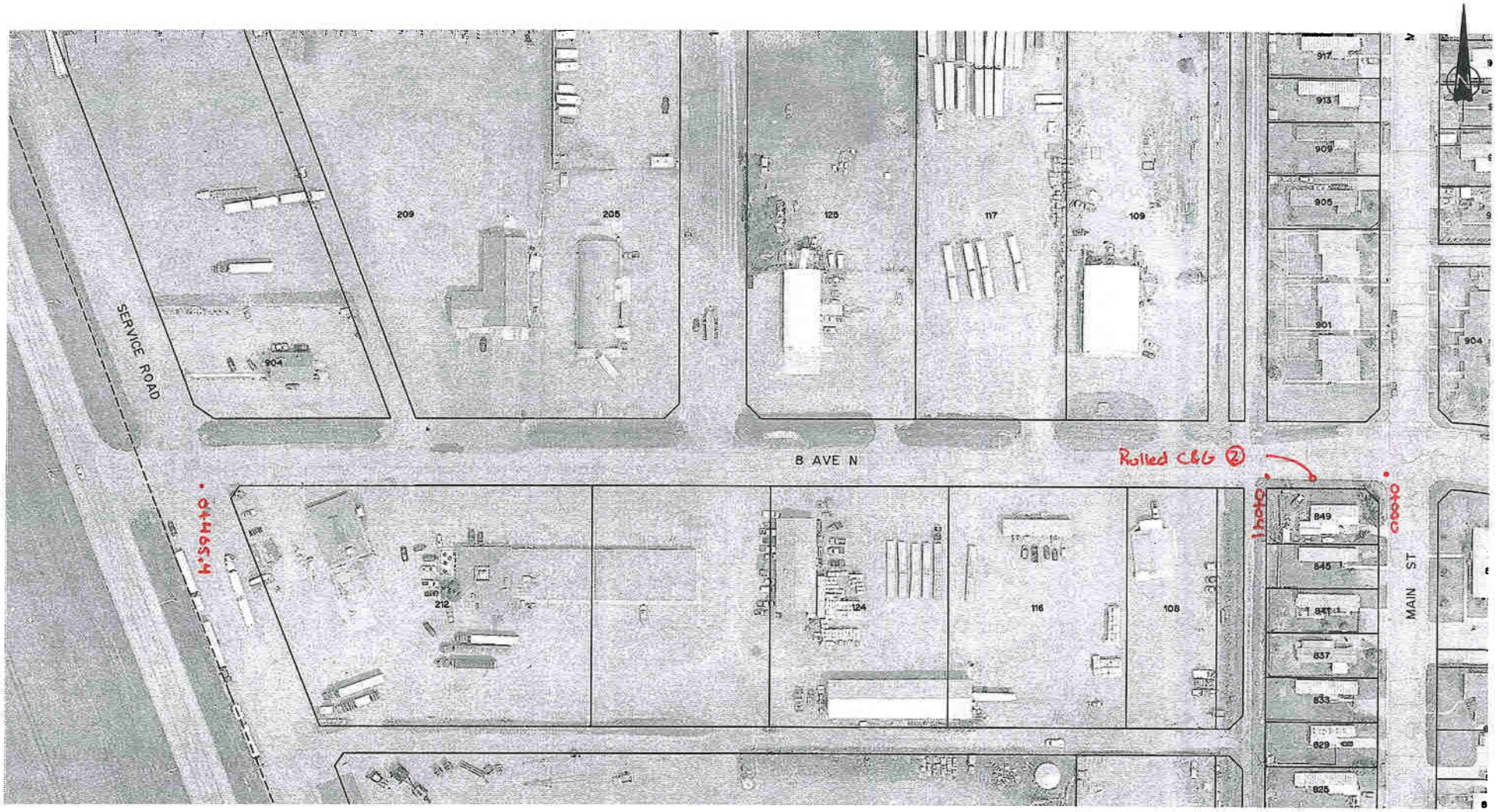

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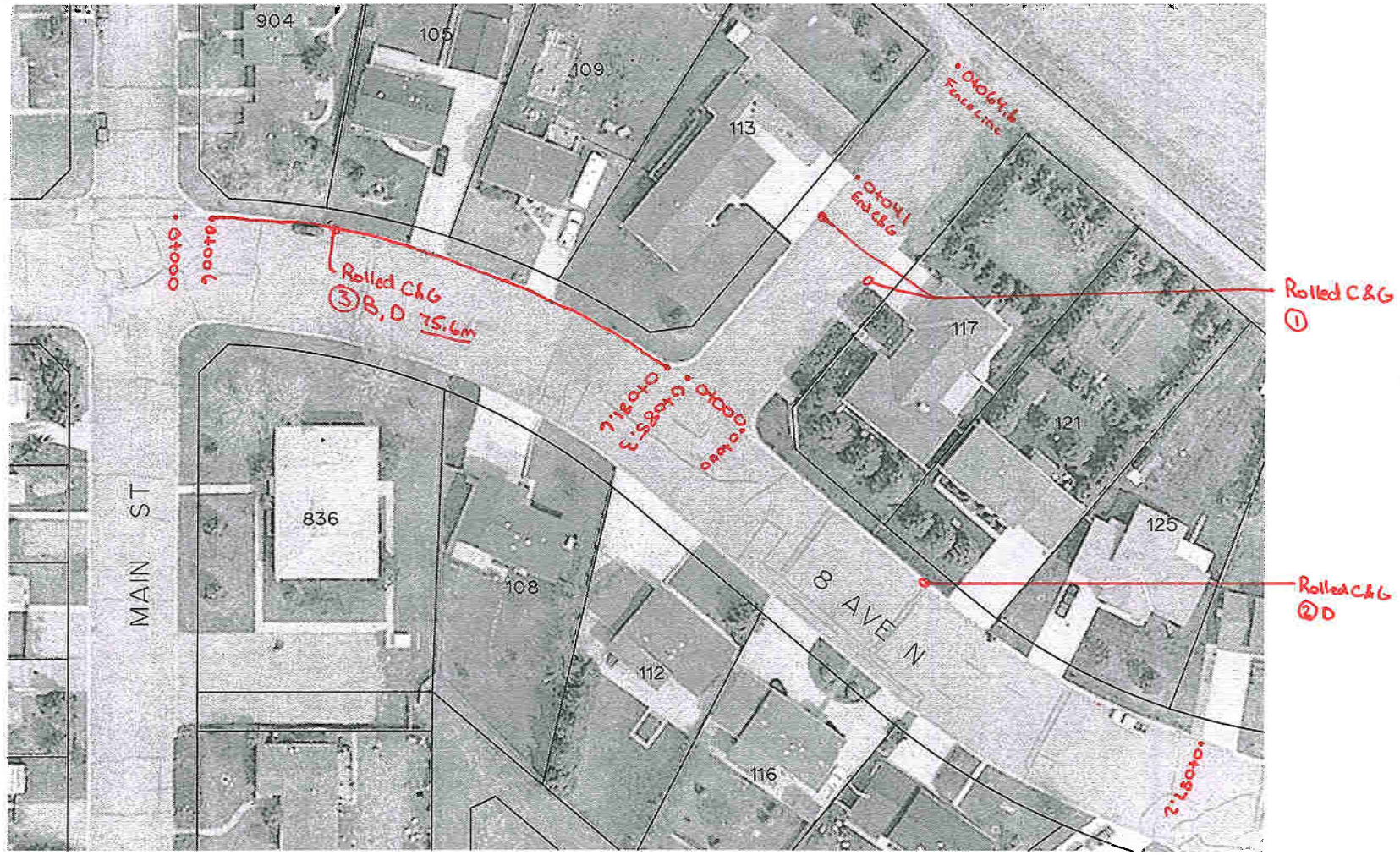

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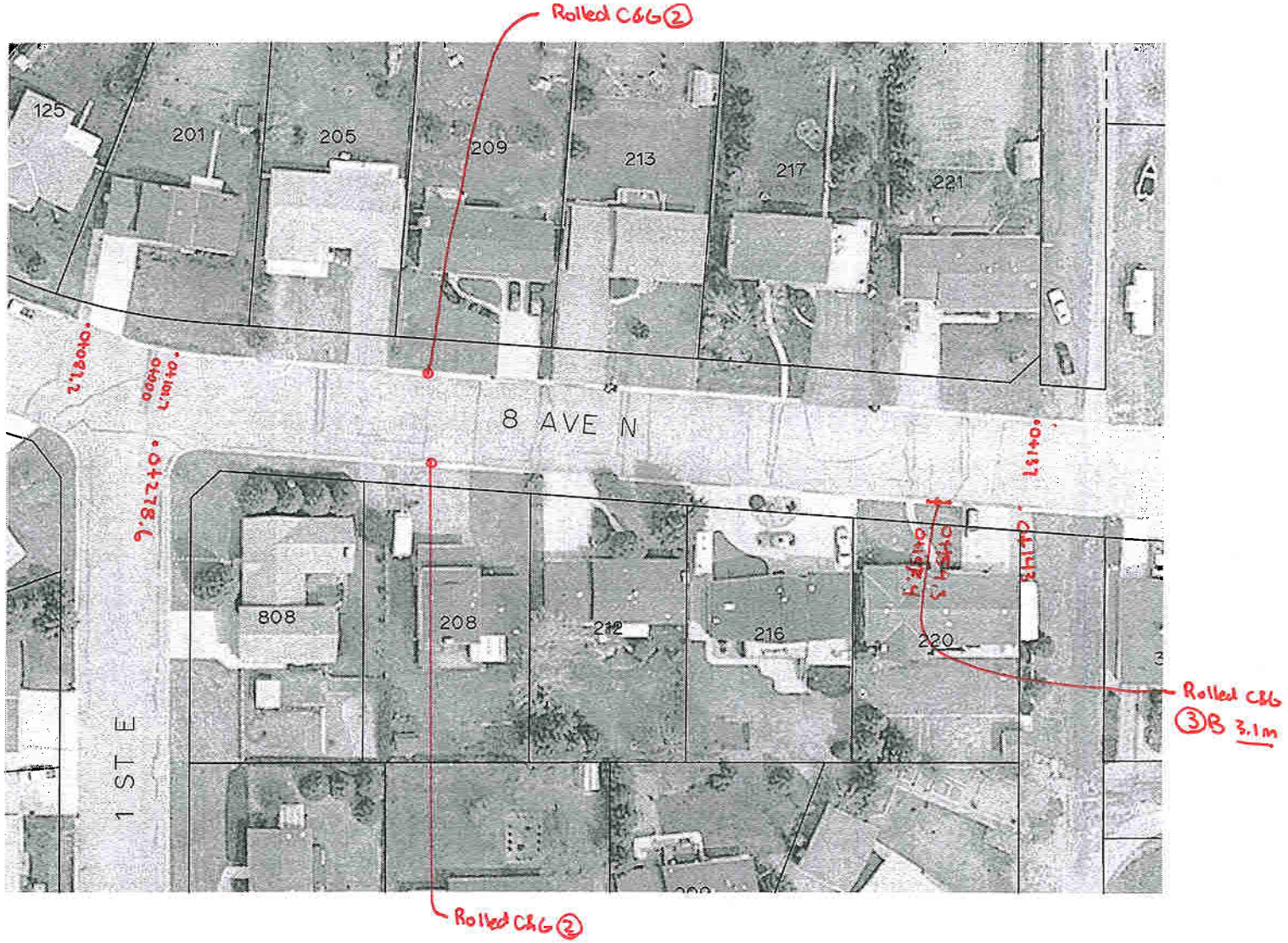

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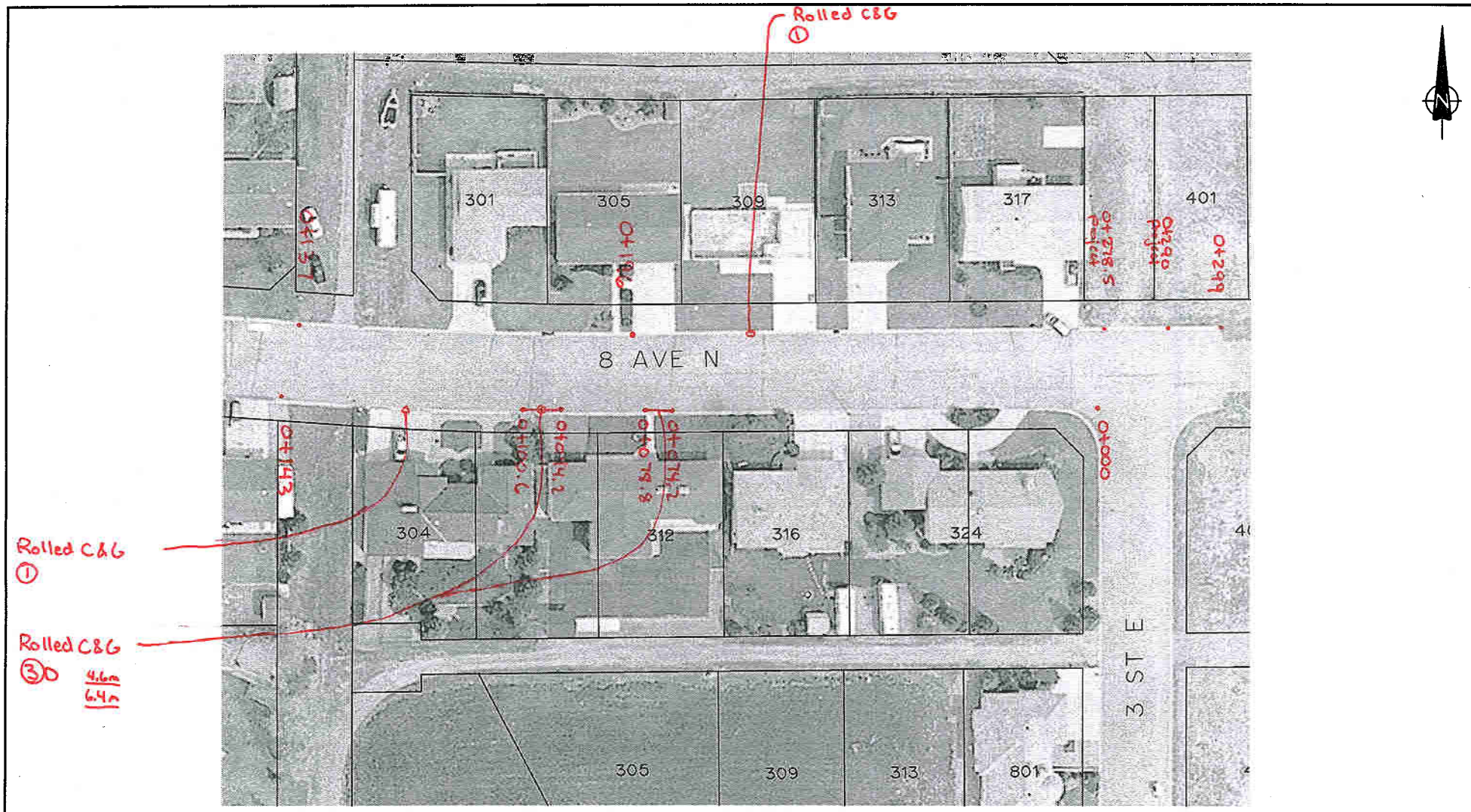

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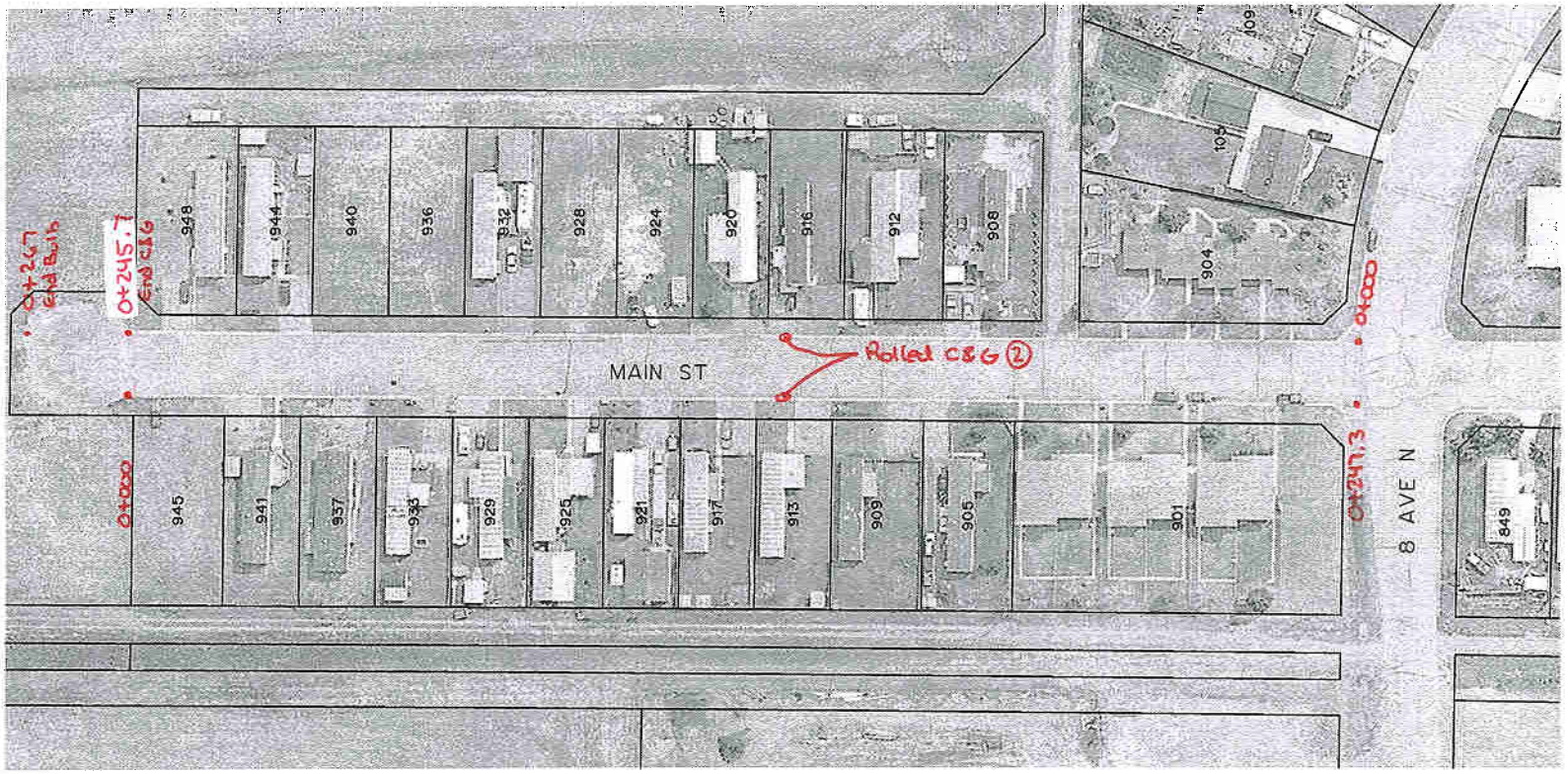

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TOWN OF MILK RIVER

INFRASTRUCTURE MASTER PLAN
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Appendix D – Road Network Cost Estimates

Town of Milk River - Infrastructure Master Plan
Roads

2007 Unit Pricing for Cost Estimates

Remove and Replace Concrete Curb & Gutter		
	Description of Work	**Cost per m**
1	Mobilization & demobilization (7%)	$10.80
2	Breakout and dispose of curb & gutter and 1.0m width of asphalt	$25.00
3	Hand formed curb & gutter	$90.00
4	100mm base granular material	$4.50
5	80mm asphalt patch ($130 per tonne) - assume 1.0m width	$25.00
6	Boulevard Restoration - assume 1.0m width	$10.00
	Subtotal Unit Price	$165.30
No allowance made for private driveway or sidewalk tie-ins - site specific item	Contingency (15%)	$24.80
	Geotechnical (2%)	$3.80
	Engineering (12%)	$22.80
	Total Unit Price	**$216.70**
	Rounded Unit Price	**$220.00**

Remove and Replace Concrete Swales		
	Description of Work	**Cost per m**
1	Mobilization & demobilization (7%)	$21.60
2	Breakout and dispose of curb & gutter and 3.0m width of asphalt	$40.00
3	Hand formed reinforced concrete swale	$175.00
4	100mm base granular material - 4.0m width	$18.00
5	80mm asphalt patch ($130 per tonne) - assume 1.5m width on either side of swale	$75.00
	Subtotal Unit Price	$329.60
	Contingency (15%)	$49.40
	Geotechnical (2%)	$7.60
	Engineering (12%)	$45.50
	Total Unit Price	**$432.10**
	Rounded Unit Price	**$435.00**

Remove and Replace Separate Sidewalks		
	Description of Work	**Cost per m^2**
1	Mobilization & demobilization (7%)	$12.70
2	Breakout and dispose of separate sidewalk	$20.00
3	Hand form separate sidewalk	$140.00
4	100mm base granular material	$4.50
5	Boulevard restoration - assume 1.0m width on either side of sidewalk	$17.00
	Subtotal Unit Price	$194.20
No allowance made for private driveway or sidewalk tie-ins - site specific item	Contingency (15%)	$29.10
	Geotechnical (2%)	$4.50
	Engineering (12%)	$26.80
	Total Unit Price	**$254.60**
	Rounded Unit Price	**$255.00**

Town of Milk River - Infrastructure Master Plan
Roads

2007 Unit Pricing for Cost Estimates

Remove and Replace Monolithic Sidewalks

	Description of Work	Cost per m^2
1	Mobilization & demobilization (7%)	$14.00
2	Breakout and dispose of monolithic sidewalk and 1.0m width of asphalt	$25.00
3	Hand form monolithic sidewalk	$140.00
4	100mm base granular material	$4.50
5	80mm asphalt patch ($130 per tonne) - assume 1.0m width	$25.00
6	Boulevard restoration - assume 1.0m width at back of sidewalk	$6.00

Subtotal Unit Price	$214.50
Contingency (15%)	$32.20
Geotechnical (2%)	$4.90
Engineering (12%)	$29.60
Total Unit Price	**$281.20**
Rounded Unit Price	**$285.00**

No allowance made for private driveway or sidewalk tie-ins - site specific item

No allowance made for new wheelchair ramps - site specific item

Install Wheelchair Ramp

	Description of Work	Cost per Unit
1	Mobilization & demobilization (7%)	$78.00
2	Breakout and dispose of curb & gutter, separate sidewalk and 1.0m width of asphalt	$120.00
3	Hand form wheelchair ramp	$840.00
4	100mm base granular material	$18.00
5	80mm asphalt patch ($130 per tonne) - assume 1.0m width	$100.00
6	Boulevard restoration - assume 1.0m width on either side of sidewalk	$40.00

Subtotal Unit Price	$1,196.00
Contingency (15%)	$179.40
Geotechnical (2%)	$27.50
Engineering (12%)	$165.00
Total Unit Price	**$1,567.90**
Rounded Unit Price	**$1,600.00**

Assumes to following

- an average new wheelchair ramp is $6m^2$
- an average of 4m of curb & gutter
- no allowance made for curb & gutter and sidewalk work
- 0.015m of level course asphalt required to restore road shape

Localized Road Reconstruction

	Description of Work	Cost per m^2
1	Mobilization & demobilization (7%)	$4.90
2	Breakout and dispose asphalt	$15.00
3	Waste excavation - assume 0.4m depth	$6.00
4	Subgrade preparation or geotextile fabric	$4.00
5	400mm granular material	$18.00
6	Prime coat	$2.00
7	80mm asphalt patch ($130 per tonne)	$25.00

Subtotal Unit Price	$74.90
Contingency (15%)	$11.20
Geotechnical (2%)	$1.70
Engineering (12%)	$10.30
Total Unit Price	**$98.10**
Rounded Unit Price	**$100.00**

No allowance made for curb & gutter and sidewalk work

Town of Milk River - Infrastructure Master Plan
Roads

2007 Unit Pricing for Cost Estimates

Localized Asphalt Patching - Overlay		
	Description of Work	**Cost per m^2**
1	Mobilization & demobilization (7%)	$1.90
2	Clean and tack coat patch area	$2.00
3	80mm asphalt patch ($130 per tonne) - assumed average thickness of patch	$25.00
	Subtotal Unit Price	$28.90
	Contingency (15%)	$4.30
	Geotechnical (2%)	$0.70
	Engineering (12%)	$4.00
	Total Unit Price	**$37.90**
	Rounded Unit Price	**$40.00**

No allowance made for curb & gutter and sidewalk work

Asphalt Overlay of Road		
	Description of Work	**Cost per m^2**
1	Mobilization & demobilization (7%)	$1.40
2	Cold mill asphalt along edge of road and tie-ins	$1.80
3	Clean and tack coat overlay area	$3.00
4	Adjust manholes and valves	$1.50
5	Asphalt leveling course ($90 per tonne)	$3.20
6	50mm asphalt overlay ($90 per tonne)	$10.80
	Subtotal Unit Price	$21.70
	Contingency (15%)	$3.30
	Geotechnical (2%)	$0.50
	Engineering (12%)	$3.00
	Total Unit Price	**$28.50**
	Rounded Unit Price	**$30.00**

Unit pricing based on 1 block of overlay, assuming the following:

- an average block is 12.0m wide and 125m long
- an average of 2 manholes and 4 valve adjustments per block
- no allowance made for curb & gutter and sidewalk work
- 0.015m of level course asphalt required to restore road shape

No allowance made for curb & gutter and sidewalk work

Total Road Reconstruction		
	Description of Work	**Cost per m^2**
1	Mobilization & demobilization (7%)	$3.50
2	Remove and dispose of asphalt	$7.00
3	Waste excavation - assume 0.4m depth	$6.00
4	Subgrade preparation or geotextile fabric	$2.50
5	350mm granular material	$15.80
6	Prime coat	$1.50
7	80mm asphalt ($80 per tonne)	$15.40
8	Adjust manholes and valves	$1.50
	Subtotal Unit Price	$53.20
	Contingency (15%)	$8.00
	Geotechnical (2%)	$1.20
	Engineering (12%)	$7.30
	Total Unit Price	**$69.70**
	Rounded Unit Price	**$70.00**

No allowance made for curb & gutter and sidewalk work

Town of Milk River - Infrastructure Master Plan
Roads

2007 Unit Pricing for Cost Estimates

New Road Construction		
	Description of Work	**Cost per m^2**
1	Mobilization & demobilization (7%)	$3.70
2	Common excavation	$5.00
3	Subgrade preparation	$2.00
4	350mm granular material	$15.80
5	Prime coat	$1.50
6	80mm asphalt ($80 per tonne)	$15.40
7	Curb & gutter	$11.70
8	Adjust manholes and valves	$1.50

Subtotal Unit Price	$56.60
Contingency (15%)	$8.50
Geotechnical (2%)	$1.30
Engineering (12%)	$7.80
Total Unit Price	**$74.20**
Rounded Unit Price	**$75.00**

Unit pricing based on 1 block of overlay, assuming the following:

- common excavation assume to be 0.5m per m2
- new road width 12.0m wide
- new extruded curb & gutter on both sides of the new road

Appendix E – Water Treatment System Cost Estimates

Project:	Milk River Water Treatment Plant Upgrade	**Project Manager:**	Peter Brouwer
	1440-029-00	**Prepared By:**	Jason Stusick
File:	N:14/40/029/Milk River WTP Upgrade Cost Estimate.xls	**Revision No.**	1
Date:	August 8, 2006		
		Checked By:	
			Signature and Date:

mpe ENGINEERING LTD.

Milk River Water Treatment System - Proposed Upgrades

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mob/demob/bonding/insurance	1	LS	$ 100,000.00	$ 100,000.00
2	Operation Manuals	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 105,000.00
Water Treatment Plant					
1	Supply and Install UV Disinfection Equipment, complete	1	LS	$ 200,000.00	$ 200,000.00
2	Mechanical Piping	1	LS	$ 30,000.00	$ 30,000.00
3	Misc Analytical Analyzers	1	LS	$ 15,000.00	$ 15,000.00
4	Building Sensors (Low Temp, Smoke, Heat, Intrusion)	1	LS	$ 3,000.00	$ 3,000.00
5	Electrical	1	LS	$ 15,000.00	$ 15,000.00
6	Programable Logic Controller (PLC)	1	LS	$ 10,000.00	$ 10,000.00
7	Supervisory Control and Data Acquisition (SCADA)	1	LS	$ 20,000.00	$ 20,000.00
8	Report and Trending Generation Program	1	LS	$ 7,000.00	$ 7,000.00
9	Programming (PLC & SCADA Programming)	1	LS	$ 50,000.00	$ 50,000.00
10	Panel View	1	LS	$ 3,000.00	$ 3,000.00
11	Radio Link To Town Shop	1	LS	$ 8,000.00	$ 8,000.00
		SUBTOTAL			$ 361,000.00
Raw Water Supply and Storage					
1	Radio Link to WTP	1	LS	$ 1,000.00	$ 1,000.00
2	Pressure Transmitter	1	LS	$ 2,000.00	$ 2,000.00
3	Building Sensors (Low Temp, Smoke, Heat, Intrusion)	1	LS	$ 3,000.00	$ 3,000.00
		SUBTOTAL			$ 6,000.00
Treated Water Reservoir					
1	Treated Water Reservoir (800 m^3 Capacity)	300	m^3	$ 1,400.00	$ 420,000.00
2	Mechanical Piping	1	LS	$ 30,000.00	$ 30,000.00
3	Water Proofing Reservoir	1	LS	$ 10,000.00	$ 10,000.00
4	Pressure Transmiter	1	LS	$ 2,000.00	$ 2,000.00
6	Flow Control Valve	1	LS	$ 5,000.00	$ 5,000.00
7	Electrical	1	LS	$ 10,000.00	$ 10,000.00
8	GeoTechnical Report and Testing	1	LS	$ 15,000.00	$ 15,000.00
9	Misc.	1	LS	$ 20,000.00	$ 20,000.00
		SUBTOTAL			$ 512,000.00
		GRAND SUBTOTAL			**$ 984,000.00**
TOTAL CONTINGENCY (15%)					$ 148,000.00
TOTAL ENGINEERING (12%)					$ 136,000.00
		GRAND TOTAL			**$ 1,268,000.00**

Project:	Milk River Water Treatment Plant Upgrade	**Project Manager:**	Peter Brouwer
	1440-029-00	**Prepared By:**	Jason Stusick
File:	N:14/40/029/Milk River WTP Upgrade Cost Estimate.xls	**Revision No.**	1
Date:	August 8, 2006		
		Checked By:	
			Signature and Date:

ENGINEERING LTD.

Milk River Water Treatment System - Proposed Upgrades

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mob/demob/bonding/insurance	1	LS	$ 25,000.00	$ 25,000.00
	SUBTOTAL				$ 25,000.00
Distribution Booster Pump Station					
1	Booster Pumps [15 HP]	2	ea	$ 15,000.00	$ 30,000.00
2	Variable Frequency Drvives	2	ea	$ 5,000.00	$ 10,000.00
3	Pressure Switch	1	LS	$ 1,000.00	$ 1,000.00
4	Pressure Transmitter	2	LS	$ 2,000.00	$ 4,000.00
5	Magmeter	1	LS	$ 3,000.00	$ 3,000.00
6	Building Sensors (Low Temp, Smoke, Heat, Intrusion)	1	LS	$ 3,000.00	$ 3,000.00
7	Mechanical Piping, Valves, etc	1	LS	$ 20,000.00	$ 20,000.00
8	PLC Upgrade	1	LS	$ 8,000.00	$ 8,000.00
9	Radio Link to WTP	1	LS	$ 8,000.00	$ 8,000.00
10	Panel View	1	LS	$ 3,000.00	$ 3,000.00
11	Programming (PLC & SCADA Programming)	1	LS	$ 20,000.00	$ 20,000.00
12	Electrical	1	LS	$ 10,000.00	$ 10,000.00
13	Building Upgrades	1	LS	$ 10,000.00	$ 10,000.00
	SUBTOTAL				$ 130,000.00
	GRAND SUBTOTAL				**$ 155,000.00**
TOTAL CONTINGENCY (15%)					$ 23,000.00
TOTAL ENGINEERING (12%)					$ 21,000.00
	GRAND TOTAL				**$ 199,000.00**

Appendix F – Water Distribution System Analysis

Scenario: 2006 - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,083.606	406.3	58.93
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,083.606	388.4	56.34
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,083.606	385.2	55.87
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.678	405.9	58.86
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.682	447.1	64.84
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.682	441.8	64.08
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.682	432.1	62.68
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.682	422.4	61.27
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.683	385.0	55.83
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.682	383.3	55.59
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.682	420.3	60.96
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,083.597	350.6	50.85
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,083.605	276.8	40.14
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,083.605	256.7	37.23
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,083.605	299.5	43.44
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,083.605	229.2	33.24
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,083.606	266.0	38.58
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,083.604	333.9	48.43
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.605	349.4	50.67
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.606	394.5	57.21
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,083.606	387.5	56.21
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,083.606	356.6	51.72
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,083.606	363.9	52.78
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,083.607	363.0	52.64
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,083.607	344.2	49.93
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,083.605	303.3	43.98
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,083.611	352.9	51.18
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,083.606	348.2	50.50
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,083.612	350.6	50.86
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,083.612	336.6	48.82
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,083.620	344.4	49.94
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,083.652	284.8	41.31
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,083.652	284.3	41.24
J-34	1,049.77	Zone	Demand	12,000	Fixed	12,000	1,108.679	576.6	83.62
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.679	496.1	71.95
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.680	445.5	64.61
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.680	457.4	66.34
J-38	1,060.73	Zone	Demand	3,190	Fixed	3,190	1,108.679	469.3	68.07
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.679	481.2	69.80
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.679	493.2	71.53
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,083.585	291.7	42.31
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.590	351.8	51.02
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.592	349.2	50.64
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,083.597	349.1	50.63
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,083.590	351.8	51.02
J-46	1,047.88	Zone	Demand	12,750	Fixed	12,750	1,083.590	349.5	50.70
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,083.590	350.3	50.80
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.586	321.7	46.65
J-49	1,050.93	Zone	Demand	12,750	Fixed	12,750	1,083.586	319.6	46.35
J-50	1,051.43	Zone	Demand	6,370	Fixed	6,370	1,108.679	560.3	81.26
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,083.607	353.6	51.28

Scenario: 2006 - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,083.608	352.6	51.14
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,083.617	334.9	48.57
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.679	532.3	77.20
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.680	479.0	69.47
J-56	1,040.67	Zone	Demand	12,750	Fixed	12,750	1,083.605	420.2	60.94
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,083.605	406.8	59.00
J-58	1,042.14	Zone	Demand	3,820	Fixed	3,820	1,083.605	405.8	58.86
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,083.584	288.1	41.78
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,083.637	324.4	47.04
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,083.612	353.5	51.27
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,083.607	356.9	51.76
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,083.607	358.3	51.97
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.606	394.5	57.22
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,083.606	401.1	58.17
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.611	321.9	46.68
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,083.606	338.6	49.11
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,083.607	364.7	52.90
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,083.606	368.7	53.47
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,083.605	317.2	46.01
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.682	449.6	65.21
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.682	430.4	62.43
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.681	448.0	64.98
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,083.634	318.3	46.17

Scenario: 2006 - Low Reservoir- Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,080.445	375.4	54.45
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,080.444	357.5	51.85
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,080.444	354.2	51.38
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.960	398.8	57.84
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,107.999	440.4	63.87
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,107.999	435.1	63.11
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.000	425.5	61.71
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.000	415.8	60.30
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.007	378.3	54.87
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.000	376.6	54.62
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,107.999	413.6	59.99
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,080.353	318.9	46.25
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,080.436	245.7	35.64
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,080.436	225.7	32.73
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,080.434	268.5	38.94
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,080.436	198.2	28.74
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,080.442	235.1	34.09
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,080.431	302.9	43.93
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,080.440	318.4	46.18
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,080.448	363.5	52.73
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,080.446	356.6	51.72
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,080.448	325.7	47.24
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,080.449	333.0	48.30
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,080.460	332.2	48.17
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,080.451	313.4	45.45
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,080.433	272.2	39.48
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,080.492	322.4	46.76
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,080.449	317.3	46.02
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,080.509	320.3	46.45
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,080.506	306.2	44.41
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,080.584	314.6	45.63
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,080.898	257.9	37.40
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,080.897	257.4	37.33
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,107.963	569.6	82.61
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,107.965	489.1	70.94
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,107.978	438.6	63.61
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,107.973	450.5	65.34
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,107.969	462.4	67.06
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,107.966	474.3	68.79
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,107.963	486.2	70.51
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,080.235	258.9	37.55
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,080.291	319.5	46.34
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,080.308	317.0	45.98
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,080.353	317.3	46.02
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,080.288	319.5	46.34
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,080.288	317.2	46.01
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,080.288	318.0	46.12
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,080.247	289.0	41.92
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,080.246	286.9	41.61
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,107.963	553.3	80.24
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,080.453	322.7	46.80

Scenario: 2006 - Low Reservoir- Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,080.460	321.8	46.67
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,080.550	304.8	44.21
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,107.966	525.3	76.19
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,107.977	472.1	68.48
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,080.435	389.2	56.45
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,080.434	375.8	54.50
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,080.434	374.8	54.36
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,080.233	255.3	37.02
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,080.745	296.1	42.94
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,080.502	323.0	46.85
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,080.460	326.1	47.29
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,080.452	327.5	47.50
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,080.446	363.6	52.73
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,080.441	370.1	53.68
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,080.492	291.4	42.26
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,080.447	307.7	44.62
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,080.453	333.9	48.42
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,080.441	337.7	48.98
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,080.433	286.2	41.51
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.000	442.9	64.24
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.000	423.8	61.46
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,107.991	441.2	64.00
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,080.720	289.8	42.03

Scenario: 2006 - Low Reservoir- Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	986.361	-545.4	-79.10
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	986.329	-563.6	-81.75
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	986.329	-566.9	-82.22
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.960	398.8	57.84
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,107.999	440.4	63.87
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,107.999	435.1	63.11
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.000	425.5	61.71
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.000	415.8	60.30
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.007	378.3	54.87
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.000	376.6	54.62
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,107.999	413.6	59.99
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	986.167	-602.9	-87.45
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	986.442	-674.2	-97.78
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	986.442	-694.2	-100.69
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	986.441	-651.4	-94.48
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	986.443	-721.7	-104.68
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	986.450	-684.8	-99.32
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	986.435	-617.0	-89.49
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	986.357	-602.4	-87.37
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	986.365	-557.2	-80.82
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	986.329	-564.5	-81.88
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	986.323	-595.5	-86.37
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	986.324	-588.2	-85.31
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	986.390	-588.5	-85.35
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	986.382	-607.3	-88.08
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	986.438	-647.7	-93.94
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	986.461	-597.9	-86.72
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	986.297	-604.2	-87.63
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	988.391	-581.3	-84.31
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	988.389	-595.4	-86.35
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	990.636	-565.7	-82.04
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	998.116	-552.3	-80.10
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	998.116	-552.8	-80.18
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,107.963	569.6	82.61
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,107.965	489.1	70.94
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,107.978	438.6	63.61
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,107.973	450.5	65.34
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,107.969	462.4	67.06
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,107.966	474.3	68.79
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,107.963	486.2	70.51
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	986.049	-662.9	-96.14
J-42	1,047.64	Zone	Demand	0	Fixed	0	986.105	-602.3	-87.35
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	986.122	-604.7	-87.71
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	986.167	-604.5	-87.67
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	986.102	-602.3	-87.36
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	986.102	-604.6	-87.69
J-47	1,047.80	Zone	Demand	0	Fixed	0	986.102	-603.8	-87.58
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	986.061	-632.8	-91.78
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	986.060	-634.9	-92.08
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,107.963	553.3	80.24
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	986.301	-598.7	-86.84

Scenario: 2006 - Low Reservoir- Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	986.274	-600.0	-87.02
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	986.576	-614.9	-89.18
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,107.966	525.3	76.19
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,107.977	472.1	68.48
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	986.351	-531.6	-77.10
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	986.349	-545.0	-79.05
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	986.349	-546.0	-79.19
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	986.047	-666.5	-96.67
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	994.741	-545.7	-79.14
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	983.057	-630.6	-91.47
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	986.362	-594.8	-86.27
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	986.355	-593.4	-86.07
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	986.344	-557.4	-80.84
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	986.333	-550.9	-79.90
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	986.509	-628.4	-91.15
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	986.437	-612.4	-88.82
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	986.384	-586.8	-85.11
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	986.358	-583.1	-84.57
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	986.434	-633.8	-91.92
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,107.999	442.9	64.24
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.000	423.8	61.46
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,107.991	441.2	64.00
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	992.356	-575.0	-83.40

Scenario: 2006 - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,076.507	336.8	48.85
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,076.504	318.9	46.25
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,076.505	315.7	45.79
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,107.065	390.1	56.57
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,107.148	432.1	62.67
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,107.148	426.8	61.90
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,107.149	417.1	60.50
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,107.149	407.4	59.09
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,107.164	370.1	53.68
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,107.150	368.3	53.41
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,107.148	405.3	58.78
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,076.312	279.3	40.51
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,076.487	207.1	30.04
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,076.487	187.0	27.12
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,076.484	229.8	33.33
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,076.488	159.5	23.14
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,076.501	196.5	28.50
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,076.476	264.2	38.32
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,076.495	279.8	40.58
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,076.512	325.0	47.14
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,076.508	318.0	46.13
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,076.513	287.2	41.65
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,076.514	294.5	42.72
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,076.537	293.8	42.61
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,076.520	274.9	39.87
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,076.481	233.5	33.87
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,076.605	284.3	41.24
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,076.514	278.8	40.43
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,076.641	282.4	40.96
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,076.636	268.3	38.92
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,076.800	277.6	40.26
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,077.465	224.3	32.53
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,077.465	223.8	32.46
J-34	1,049.77	Zone	Demand	61,740	Fixed	61,740	1,107.072	560.8	81.34
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,107.076	480.4	69.68
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,107.103	430.0	62.37
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,107.093	441.9	64.09
J-38	1,060.73	Zone	Demand	16,413	Fixed	16,413	1,107.083	453.7	65.80
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,107.078	465.6	67.52
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,107.072	477.4	69.25
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,076.062	218.1	31.63
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,076.180	279.3	40.51
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,076.216	277.0	40.17
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,076.312	277.8	40.29
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,076.174	279.2	40.50
J-46	1,047.88	Zone	Demand	65,599	Fixed	65,599	1,076.173	276.9	40.17
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,076.173	277.7	40.27
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,076.086	248.3	36.01
J-49	1,050.93	Zone	Demand	65,599	Fixed	65,599	1,076.085	246.2	35.70
J-50	1,051.43	Zone	Demand	32,774	Fixed	32,774	1,107.071	544.5	78.98
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,076.523	284.2	41.22

Scenario: 2006 - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,076.539	283.4	41.10
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,076.728	267.4	38.79
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,107.078	516.6	74.93
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,107.102	463.6	67.23
J-56	1,040.67	Zone	Demand	65,599	Fixed	65,599	1,076.486	350.5	50.84
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,076.483	337.1	48.89
J-58	1,042.14	Zone	Demand	19,654	Fixed	19,654	1,076.483	336.1	48.75
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,076.057	214.4	31.09
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,077.142	260.8	37.82
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,076.628	285.1	41.35
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,076.538	287.7	41.73
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,076.521	289.0	41.92
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,076.508	325.0	47.14
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,076.498	331.5	48.08
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,076.606	253.3	36.74
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,076.511	269.1	39.03
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,076.523	295.4	42.84
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,076.498	299.1	43.38
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,076.481	247.5	35.90
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,107.149	434.6	63.03
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,107.150	415.4	60.26
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,107.130	432.8	62.77
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,077.088	254.2	36.87

Scenario: 2006 - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,088.111	450.4	65.33
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,088.111	432.5	62.73
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,088.111	429.3	62.26
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.678	405.9	58.86
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.682	447.1	64.84
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.682	441.8	64.08
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.682	432.1	62.68
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.682	422.4	61.27
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.683	385.0	55.83
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.682	383.3	55.59
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.682	420.3	60.96
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,088.102	394.7	57.24
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,088.110	320.8	46.53
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,088.110	300.8	43.62
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,088.110	343.6	49.84
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,088.110	273.3	39.64
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,088.111	310.1	44.98
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,088.109	378.0	54.83
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.110	393.5	57.07
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.111	438.5	63.61
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,088.111	431.6	62.60
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,088.111	400.7	58.11
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,088.111	408.0	59.18
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,088.112	407.0	59.04
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,088.112	388.3	56.32
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,088.110	347.4	50.38
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,088.116	397.0	57.58
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,088.111	392.3	56.89
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,088.117	394.7	57.25
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,088.117	380.7	55.21
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,088.125	388.4	56.34
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,088.157	328.9	47.71
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,088.157	328.4	47.63
J-34	1,049.77	Zone	Demand	12,000	Fixed	12,000	1,108.679	576.6	83.62
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.679	496.1	71.95
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.680	445.5	64.61
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.680	457.4	66.34
J-38	1,060.73	Zone	Demand	3,190	Fixed	3,190	1,108.679	469.3	68.07
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.679	481.2	69.80
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.679	493.2	71.53
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,088.089	335.8	48.70
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.095	395.9	57.42
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.097	393.3	57.04
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,088.102	393.2	57.02
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,088.095	395.9	57.42
J-46	1,047.88	Zone	Demand	12,750	Fixed	12,750	1,088.095	393.6	57.09
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,088.095	394.4	57.20
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.091	365.8	53.05
J-49	1,050.93	Zone	Demand	12,750	Fixed	12,750	1,088.091	363.7	52.74
J-50	1,051.43	Zone	Demand	6,370	Fixed	6,370	1,108.679	560.3	81.26
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,088.112	397.7	57.68

Scenario: 2006 - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,088.112	396.7	57.53
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,088.122	378.9	54.96
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.679	532.3	77.20
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.680	479.0	69.47
J-56	1,040.67	Zone	Demand	12,750	Fixed	12,750	1,088.110	464.3	67.34
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,088.110	450.9	65.39
J-58	1,042.14	Zone	Demand	3,820	Fixed	3,820	1,088.110	449.9	65.25
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,088.089	332.1	48.17
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,088.142	368.4	53.44
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,088.117	397.6	57.66
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,088.112	401.0	58.16
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,088.112	402.4	58.37
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.111	438.6	63.61
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,088.110	445.2	64.57
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.116	366.0	53.08
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,088.111	382.7	55.50
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,088.112	408.8	59.29
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,088.111	412.8	59.87
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,088.110	361.3	52.40
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.682	449.6	65.21
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.682	430.4	62.43
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.681	448.0	64.98
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,088.139	362.4	52.56

Scenario: 2006 - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand Calculated (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,084.950	419.5	60.84
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,084.949	401.6	58.24
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,084.949	398.3	57.77
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.960	398.8	57.84
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,107.999	440.4	63.87
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,107.999	435.1	63.11
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.000	425.5	61.71
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.000	415.8	60.30
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.007	378.3	54.87
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.000	376.6	54.62
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,107.999	413.6	59.99
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,084.858	362.9	52.64
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,084.941	289.8	42.04
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,084.941	269.8	39.12
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,084.939	312.6	45.34
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,084.941	242.3	35.14
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,084.947	279.2	40.49
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,084.936	347.0	50.32
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.945	362.5	52.57
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,084.953	407.6	59.12
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,084.951	400.7	58.11
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,084.953	369.8	53.63
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,084.954	377.1	54.70
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,084.964	376.2	54.57
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,084.956	357.5	51.85
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,084.938	316.3	45.88
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,084.997	366.5	53.15
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,084.954	361.4	52.41
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,085.014	364.4	52.85
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,085.011	350.3	50.80
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,085.089	358.7	52.03
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,085.402	302.0	43.80
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,085.402	301.5	43.72
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,107.963	569.6	82.61
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,107.965	489.1	70.94
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,107.978	438.6	63.61
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,107.973	450.5	65.34
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,107.969	462.4	67.06
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,107.966	474.3	68.79
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,107.963	486.2	70.51
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,084.740	303.0	43.95
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,084.796	363.6	52.74
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.813	361.1	52.38
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,084.858	361.4	52.42
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,084.793	363.6	52.73
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,084.793	361.3	52.40
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,084.793	362.0	52.51
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.752	333.1	48.31
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,084.751	331.0	48.00
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,107.963	553.3	80.24
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,084.958	366.8	53.20

Scenario: 2006 - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,084.965	365.9	53.07
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,085.055	348.9	50.61
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,107.966	525.3	76.19
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,107.977	472.1	68.48
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,084.940	433.3	62.84
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,084.939	419.8	60.89
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,084.939	418.9	60.75
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,084.738	299.3	43.42
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,085.250	340.1	49.33
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,085.007	367.1	53.25
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,084.965	370.2	53.69
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,084.957	371.6	53.89
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,084.951	407.7	59.13
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,084.946	414.2	60.07
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.997	335.4	48.65
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,084.952	351.7	51.02
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,084.958	377.9	54.82
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,084.946	381.8	55.38
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,084.938	330.3	47.90
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.000	442.9	64.24
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.000	423.8	61.46
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,107.991	441.2	64.00
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,085.225	333.9	48.42

Scenario: 2006 - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	990.866	-501.3	-72.71
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	990.834	-519.5	-75.35
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	990.834	-522.8	-75.82
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.960	398.8	57.84
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,107.999	440.4	63.87
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,107.999	435.1	63.11
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.000	425.5	61.71
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.000	415.8	60.30
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.007	378.3	54.87
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.000	376.6	54.62
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,107.999	413.6	59.99
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	990.672	-558.8	-81.05
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	990.947	-630.1	-91.38
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	990.947	-650.1	-94.30
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	990.946	-607.3	-88.08
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	990.948	-677.6	-98.28
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	990.955	-640.7	-92.93
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	990.940	-572.9	-83.10
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	990.862	-558.3	-80.97
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	990.870	-513.1	-74.43
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	990.834	-520.4	-75.48
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	990.828	-551.4	-79.98
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	990.829	-544.1	-78.91
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	990.895	-544.4	-78.96
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	990.887	-563.2	-81.68
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	990.943	-603.6	-87.55
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	990.966	-553.8	-80.32
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	990.802	-560.1	-81.23
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	992.896	-537.2	-77.91
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	992.894	-551.3	-79.95
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	995.141	-521.6	-75.65
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,002.621	-508.2	-73.71
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,002.621	-508.7	-73.78
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,107.963	569.6	82.61
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,107.965	489.1	70.94
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,107.978	438.6	63.61
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,107.973	450.5	65.34
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,107.969	462.4	67.06
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,107.966	474.3	68.79
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,107.963	486.2	70.51
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	990.554	-618.8	-89.75
J-42	1,047.64	Zone	Demand	0	Fixed	0	990.610	-558.2	-80.96
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	990.627	-560.7	-81.32
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	990.672	-560.4	-81.28
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	990.607	-558.2	-80.96
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	990.607	-560.5	-81.29
J-47	1,047.80	Zone	Demand	0	Fixed	0	990.607	-559.7	-81.18
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	990.566	-588.7	-85.38
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	990.565	-590.8	-85.69
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,107.963	553.3	80.24
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	990.806	-554.7	-80.45

Scenario: 2006 - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	990.779	-555.9	-80.63
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	991.081	-570.8	-82.78
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,107.966	525.3	76.19
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,107.977	472.1	68.48
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	990.856	-487.5	-70.71
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	990.854	-500.9	-72.66
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	990.854	-501.9	-72.80
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	990.552	-622.4	-90.28
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	999.246	-501.6	-72.75
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	987.562	-586.6	-85.07
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	990.867	-550.7	-79.88
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	990.860	-549.4	-79.68
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	990.849	-513.3	-74.45
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	990.838	-506.8	-73.51
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	991.014	-584.3	-84.75
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	990.942	-568.3	-82.43
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	990.889	-542.7	-78.71
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	990.863	-539.0	-78.17
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	990.939	-589.7	-85.53
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,107.999	442.9	64.24
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.000	423.8	61.46
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,107.991	441.2	64.00
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	996.861	-530.9	-77.01

Scenario: 2006 - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,084.950	419.5	60.84
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,084.949	401.6	58.24
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,084.949	398.3	57.77
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,052.940	-139.6	-20.25
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,059.752	-31.8	-4.61
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,059.752	-37.0	-5.37
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,059.926	-45.0	-6.53
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,059.936	-54.6	-7.93
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,060.161	-89.9	-13.04
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,059.964	-93.5	-13.57
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,059.897	-57.1	-8.29
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,084.858	362.9	52.64
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,084.941	289.8	42.04
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,084.941	269.8	39.12
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,084.939	312.6	45.34
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,084.941	242.3	35.14
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,084.947	279.2	40.49
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,084.936	347.0	50.32
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.945	362.5	52.57
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,084.953	407.6	59.12
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,084.951	400.7	58.11
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,084.953	369.8	53.63
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,084.954	377.1	54.70
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,084.964	376.2	54.57
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,084.956	357.5	51.84
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,084.938	316.3	45.88
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,084.997	366.5	53.15
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,084.954	361.4	52.41
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,085.014	364.4	52.85
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,085.011	350.3	50.80
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,085.089	358.7	52.03
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,085.402	302.0	43.80
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,085.402	301.5	43.72
J-34	1,049.77	Zone	Demand	4,937,160	Composite	4,937,160	1,048.278	-14.6	-2.11
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,053.310	-45.8	-6.64
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,056.464	-65.6	-9.51
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,055.616	-61.9	-8.98
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,054.563	-60.3	-8.75
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,053.841	-55.5	-8.04
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,052.943	-52.3	-7.59
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,084.740	303.0	43.95
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,084.796	363.6	52.74
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.813	361.1	52.38
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,084.858	361.4	52.42
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,084.793	363.6	52.73
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,084.793	361.3	52.40
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,084.793	362.0	52.51
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.752	333.1	48.31
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,084.751	331.0	48.00
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,049.351	-20.4	-2.95
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,084.958	366.8	53.20

Scenario: 2006 - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,084.965	365.9	53.07
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,085.055	348.9	50.61
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,053.311	-9.6	-1.39
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,056.375	-32.9	-4.77
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,084.940	433.3	62.84
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,084.939	419.8	60.89
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,084.939	418.9	60.75
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,084.738	299.3	43.42
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,085.250	340.1	49.33
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,085.007	367.1	53.25
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,084.965	370.2	53.69
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,084.957	371.6	53.89
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,084.951	407.7	59.13
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,084.946	414.2	60.07
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.997	335.4	48.65
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,084.952	351.7	51.02
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,084.958	377.9	54.82
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,084.946	381.8	55.38
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,084.938	330.3	47.90
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,059.912	-27.7	-4.02
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,059.950	-46.5	-6.74
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,058.596	-42.2	-6.12
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,085.224	333.9	48.42

Scenario: 2006 - High Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,081.012	380.9	55.25
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,081.009	363.0	52.65
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,081.010	359.8	52.18
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,107.065	390.1	56.57
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,107.148	432.1	62.67
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,107.148	426.8	61.90
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,107.149	417.1	60.50
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,107.149	407.4	59.09
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,107.164	370.1	53.68
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,107.150	368.3	53.41
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,107.148	405.3	58.78
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,080.817	323.4	46.90
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,080.992	251.2	36.43
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,080.992	231.1	33.52
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,080.988	273.9	39.73
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,080.993	203.6	29.53
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,081.006	240.6	34.89
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,080.981	308.3	44.71
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,081.000	323.9	46.97
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,081.017	369.1	53.54
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,081.013	362.1	52.52
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,081.018	331.3	48.04
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,081.019	338.6	49.11
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,081.042	337.9	49.00
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,081.025	319.0	46.26
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,080.987	277.6	40.27
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,081.110	328.4	47.63
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,081.019	322.9	46.83
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,081.146	326.5	47.36
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,081.141	312.4	45.31
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,081.305	321.7	46.66
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,081.970	268.4	38.92
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,081.970	267.9	38.85
J-34	1,049.77	Zone	Demand	61,740	Fixed	61,740	1,107.072	560.8	81.34
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,107.076	480.4	69.68
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,107.103	430.0	62.37
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,107.093	441.9	64.09
J-38	1,060.73	Zone	Demand	16,413	Fixed	16,413	1,107.083	453.7	65.80
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,107.078	465.6	67.52
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,107.072	477.4	69.25
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,080.567	262.2	38.02
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,080.685	323.4	46.90
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,080.721	321.1	46.57
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,080.817	321.9	46.68
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,080.679	323.3	46.89
J-46	1,047.88	Zone	Demand	65,599	Fixed	65,599	1,080.678	321.0	46.56
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,080.678	321.8	46.67
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,080.591	292.4	42.40
J-49	1,050.93	Zone	Demand	65,599	Fixed	65,599	1,080.590	290.2	42.10
J-50	1,051.43	Zone	Demand	32,774	Fixed	32,774	1,107.071	544.5	78.98
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,081.028	328.3	47.62

Scenario: 2006 - High Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,081.044	327.5	47.50
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,081.234	311.5	45.18
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,107.078	516.6	74.93
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,107.102	463.6	67.23
J-56	1,040.67	Zone	Demand	65,599	Fixed	65,599	1,080.991	394.6	57.23
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,080.988	381.2	55.29
J-58	1,042.14	Zone	Demand	19,654	Fixed	19,654	1,080.988	380.2	55.14
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,080.562	258.5	37.49
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,081.647	304.9	44.22
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,081.133	329.2	47.75
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,081.043	331.8	48.12
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,081.026	333.1	48.31
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,081.013	369.1	53.54
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,081.003	375.6	54.48
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,081.111	297.4	43.14
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,081.016	313.2	45.43
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,081.028	339.5	49.24
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,081.003	343.2	49.78
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,080.986	291.6	42.29
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,107.149	434.6	63.03
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,107.150	415.4	60.26
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,107.130	432.8	62.77
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,081.593	298.3	43.27

Scenario: 2006 - Improvements - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,083.919	409.4	59.38
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,083.919	391.5	56.78
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,083.919	388.2	56.31
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.759	406.6	58.98
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.745	447.7	64.93
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.745	442.4	64.17
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.745	432.8	62.77
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.745	423.0	61.36
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.745	385.6	55.92
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.745	383.9	55.68
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.745	420.9	61.05
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,083.921	353.8	51.31
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,083.931	279.9	40.60
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,083.940	260.0	37.70
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,083.926	302.7	43.90
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,083.930	232.4	33.70
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,083.929	269.2	39.04
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,083.921	337.0	48.88
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.920	352.5	51.12
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.920	397.5	57.66
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,083.919	390.6	56.65
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,083.920	359.7	52.16
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,083.920	367.0	53.23
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,083.920	366.0	53.09
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,083.920	347.3	50.37
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,083.926	306.4	44.44
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,083.921	355.9	51.62
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,083.920	351.3	50.94
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,083.922	353.7	51.30
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,083.923	339.6	49.26
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,083.923	347.3	50.37
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,083.926	287.5	41.70
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,083.926	287.0	41.63
J-34	1,049.77	Zone	Demand	12,000	Fixed	12,000	1,108.745	577.2	83.72
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.745	496.7	72.05
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.745	446.1	64.70
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.746	458.0	66.43
J-38	1,060.73	Zone	Demand	3,190	Fixed	3,190	1,108.746	470.0	68.16
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.747	481.9	69.89
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.747	493.8	71.62
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,083.947	295.2	42.82
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.923	355.1	51.50
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.922	352.4	51.11
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,083.921	352.2	51.09
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,083.923	355.1	51.50
J-46	1,047.88	Zone	Demand	12,750	Fixed	12,750	1,083.923	352.8	51.17
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,083.923	353.5	51.28
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.932	325.1	47.15
J-49	1,050.93	Zone	Demand	12,750	Fixed	12,750	1,083.932	323.0	46.84
J-50	1,051.43	Zone	Demand	6,370	Fixed	6,370	1,108.746	560.9	81.35
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,083.920	356.6	51.73

Scenario: 2006 - Improvements - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,083.921	355.7	51.58
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,083.923	337.9	49.00
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.745	532.9	77.30
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.745	479.6	69.57
J-56	1,040.67	Zone	Demand	12,750	Fixed	12,750	1,083.918	423.3	61.39
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,083.918	409.9	59.44
J-58	1,042.14	Zone	Demand	3,820	Fixed	3,820	1,083.918	408.9	59.30
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,083.960	291.7	42.31
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,083.924	327.2	47.45
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,083.922	356.5	51.71
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,083.920	360.0	52.21
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,083.920	361.4	52.42
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.919	397.6	57.66
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,083.919	404.1	58.62
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.925	325.0	47.13
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,083.921	341.6	49.55
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,083.920	367.8	53.34
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,083.920	371.7	53.92
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,083.922	320.3	46.46
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.745	450.2	65.30
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.745	431.1	62.52
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.745	448.6	65.07
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,083.925	321.1	46.58
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.964	87.7	12.72
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.962	163.9	23.78
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.962	87.7	12.72
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.955	142.9	20.73
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.948	180.4	26.16
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.759	359.8	52.18

Scenario: 2006 - Improvements - Low Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,083.517	405.4	58.80
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,083.516	387.5	56.21
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,083.517	384.3	55.74
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.745	406.5	58.96
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.615	446.4	64.75
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.615	441.2	63.99
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.614	431.5	62.58
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.614	421.8	61.17
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.617	384.3	55.74
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.614	382.6	55.49
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	419.6	60.86
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,083.531	350.0	50.76
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,083.627	277.0	40.17
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,083.719	257.8	37.39
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,083.584	299.3	43.41
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,083.626	229.4	33.27
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,083.616	266.1	38.60
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,083.538	333.3	48.34
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,083.523	348.6	50.56
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,083.519	393.6	57.09
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,083.518	386.7	56.08
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,083.524	355.8	51.60
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,083.522	363.1	52.66
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,083.524	362.1	52.52
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,083.522	343.4	49.81
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,083.581	303.0	43.95
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,083.535	352.1	51.07
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,083.527	347.4	50.39
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,083.547	350.0	50.76
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,083.557	336.0	48.74
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,083.550	343.7	49.84
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,083.586	284.2	41.22
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,083.586	283.7	41.14
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,108.616	575.9	83.53
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.612	495.4	71.86
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.617	444.9	64.52
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.620	456.8	66.25
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,108.625	468.8	67.99
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.629	480.7	69.73
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.635	492.7	71.46
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,083.787	293.7	42.59
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.551	351.4	50.97
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,083.543	348.7	50.57
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,083.534	348.5	50.54
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,083.552	351.4	50.97
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,083.552	349.2	50.64
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,083.552	349.9	50.75
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,083.638	322.2	46.73
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,083.637	320.1	46.42
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,108.619	559.7	81.17
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,083.527	352.8	51.17

Scenario: 2006 - Improvements - Low Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,083.536	351.9	51.04
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,083.552	334.2	48.47
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.613	531.7	77.11
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	478.4	69.38
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,083.507	419.2	60.81
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,083.505	405.8	58.86
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,083.505	404.8	58.72
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,083.916	291.3	42.25
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,083.565	323.7	46.94
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,083.541	352.8	51.17
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,083.526	356.1	51.65
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,083.522	357.5	51.85
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,083.518	393.6	57.09
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,083.513	400.2	58.04
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,083.575	321.5	46.63
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,083.534	337.9	49.00
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,083.522	363.9	52.78
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,083.520	367.8	53.35
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,083.546	316.6	45.92
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.614	448.9	65.11
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.614	429.8	62.33
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.614	447.3	64.88
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,083.568	317.7	46.07
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.956	87.6	12.71
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.931	163.6	23.73
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.930	87.4	12.68
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.869	142.1	20.61
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.799	178.9	25.95
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.750	359.7	52.17

Scenario: 2006 - Improvements - Low Reservoir - Max Day + School
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,069.913	272.3	39.49
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,069.920	254.5	36.91
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,069.921	251.2	36.44
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.745	406.5	58.96
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.615	446.4	64.75
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.615	441.2	63.99
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.614	431.5	62.58
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.614	421.8	61.17
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.617	384.3	55.74
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.614	382.6	55.49
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	419.6	60.86
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,070.398	221.4	32.11
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,073.842	181.2	26.28
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,076.622	188.3	27.32
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,071.873	184.7	26.79
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,073.654	131.8	19.12
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,073.348	165.6	24.02
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,071.120	211.8	30.71
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,070.398	220.1	31.93
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,069.915	260.5	37.78
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,069.923	253.6	36.78
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,070.091	224.3	32.53
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,069.937	230.2	33.38
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,069.890	228.7	33.17
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,070.287	213.9	31.02
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,072.556	195.1	28.30
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,069.770	217.4	31.54
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,070.201	217.0	31.47
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,070.548	222.8	32.31
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,070.780	211.0	30.60
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,070.804	218.9	31.75
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,071.744	168.3	24.41
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,071.744	167.8	24.34
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,108.616	575.9	83.53
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.612	495.4	71.86
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.617	444.9	64.52
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.620	456.8	66.25
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,108.625	468.8	67.99
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.629	480.7	69.73
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.635	492.7	71.46
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,080.130	257.9	37.40
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,072.396	242.2	35.13
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,071.744	233.2	33.83
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,070.501	220.9	32.04
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,072.509	243.4	35.30
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,072.509	241.1	34.97
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,072.509	241.8	35.07
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,076.130	248.7	36.07
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,076.130	246.6	35.77
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,108.619	559.7	81.17
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,069.923	219.7	31.86

Scenario: 2006 - Improvements - Low Reservoir - Max Day + School
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,069.902	218.5	31.68
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	1,069.545	197.1	28.59
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.613	531.7	77.11
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	478.4	69.38
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,069.903	286.1	41.49
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,069.902	272.7	39.55
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,069.901	271.7	39.41
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,083.028	282.6	40.99
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,071.305	203.7	29.54
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	1,066.336	184.4	26.74
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,069.811	221.9	32.18
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,069.905	224.2	32.52
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,069.916	260.5	37.79
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,069.912	267.1	38.73
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,071.248	200.9	29.14
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,070.526	210.6	30.54
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,070.079	232.3	33.70
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,070.145	236.9	34.37
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,071.606	199.8	28.98
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.614	448.9	65.11
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.614	429.8	62.33
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.614	447.3	64.88
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,070.924	193.9	28.12
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.785	86.0	12.47
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.306	157.5	22.85
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,082.933	77.6	11.26
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,081.100	115.0	16.68
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,078.998	131.9	19.13
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.750	359.7	52.17

Scenario: 2006 - Improvements - Low Reservoir - Peak Hour
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,083.015	400.5	58.09
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,083.014	382.6	55.50
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,083.015	379.4	55.03
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,108.729	406.4	58.94
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,108.452	444.8	64.52
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,108.452	439.6	63.76
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.450	429.9	62.35
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.451	420.2	60.94
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,108.457	382.8	55.51
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,108.451	381.0	55.26
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,108.450	418.0	60.63
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,083.045	345.2	50.07
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,083.249	273.3	39.63
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,083.444	255.1	37.00
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,083.158	295.1	42.81
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,083.246	225.7	32.73
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,083.226	262.3	38.05
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,083.060	328.6	47.66
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,083.029	343.7	49.85
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,083.020	388.7	56.38
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,083.018	381.8	55.37
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,083.031	351.0	50.90
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,083.027	358.3	51.96
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,083.029	357.3	51.82
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,083.027	338.6	49.11
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,083.152	298.8	43.34
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,083.053	347.4	50.39
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,083.037	342.6	49.69
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,083.078	345.4	50.10
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,083.101	331.6	48.09
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,083.086	339.1	49.19
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,083.162	280.0	40.61
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,083.162	279.5	40.54
J-34	1,049.77	Zone	Demand	61,740	Fixed	61,740	1,108.454	574.4	83.30
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,108.446	493.8	71.62
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,108.457	443.3	64.29
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,108.464	455.3	66.03
J-38	1,060.73	Zone	Demand	16,413	Fixed	16,413	1,108.474	467.3	67.78
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,108.482	479.3	69.52
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,108.494	491.4	71.26
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,083.587	291.7	42.31
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.087	346.9	50.31
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,083.071	344.1	49.90
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,083.052	343.7	49.85
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,083.090	346.9	50.31
J-46	1,047.88	Zone	Demand	65,599	Fixed	65,599	1,083.090	344.6	49.99
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,083.090	345.4	50.09
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,083.271	318.6	46.21
J-49	1,050.93	Zone	Demand	65,599	Fixed	65,599	1,083.270	316.5	45.90
J-50	1,051.43	Zone	Demand	32,774	Fixed	32,774	1,108.461	558.1	80.95
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,083.036	348.0	50.47

Scenario: 2006 - Improvements - Low Reservoir - Peak Hour
Steady State Analysis
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,083.055	347.2	50.35
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,083.090	329.7	47.82
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,108.449	530.0	76.88
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,108.451	476.8	69.15
J-56	1,040.67	Zone	Demand	65,599	Fixed	65,599	1,082.994	414.2	60.08
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,082.991	400.8	58.13
J-58	1,042.14	Zone	Demand	19,654	Fixed	19,654	1,082.991	399.8	57.99
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,083.861	290.8	42.17
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,083.118	319.3	46.31
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,083.067	348.1	50.49
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,083.035	351.3	50.95
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,083.027	352.7	51.15
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,083.018	388.7	56.38
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,083.007	395.2	57.32
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,083.139	317.3	46.01
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,083.052	333.1	48.32
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,083.027	359.0	52.08
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,083.021	363.0	52.64
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,083.077	312.0	45.26
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.450	447.3	64.88
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.451	428.2	62.10
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,108.451	445.7	64.65
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,083.125	313.3	45.44
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.945	87.5	12.70
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.892	163.3	23.68
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.892	87.0	12.62
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.762	141.0	20.46
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.612	177.1	25.68
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.739	359.6	52.15

Scenario: 2006 - Improvements - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,088.424	453.5	65.77
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,088.424	435.6	63.17
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,088.424	432.3	62.71
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.759	406.6	58.98
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.745	447.7	64.93
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.745	442.4	64.17
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.745	432.8	62.77
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.745	423.0	61.36
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.745	385.6	55.92
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.745	383.9	55.68
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.745	420.9	61.05
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,088.426	397.9	57.71
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,088.436	324.0	47.00
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,088.445	304.0	44.10
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,088.431	346.8	50.29
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,088.435	276.5	40.10
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,088.434	313.3	45.44
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,088.426	381.1	55.28
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.425	396.5	57.51
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.425	441.6	64.05
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,088.424	434.7	63.04
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,088.425	403.7	58.56
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,088.425	411.1	59.62
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,088.425	410.1	59.48
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,088.425	391.4	56.77
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,088.431	350.5	50.83
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,088.426	400.0	58.02
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,088.425	395.3	57.34
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,088.427	397.8	57.69
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,088.428	383.7	55.65
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,088.428	391.4	56.77
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,088.431	331.6	48.09
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,088.431	331.1	48.02
J-34	1,049.77	Zone	Demand	12,000	Fixed	12,000	1,108.745	577.2	83.72
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.745	496.7	72.05
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.745	446.1	64.70
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.746	458.0	66.43
J-38	1,060.73	Zone	Demand	3,190	Fixed	3,190	1,108.746	470.0	68.16
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.747	481.9	69.89
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.747	493.8	71.62
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,088.452	339.3	49.22
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.428	399.1	57.89
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.427	396.5	57.51
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,088.426	396.3	57.48
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,088.428	399.1	57.89
J-46	1,047.88	Zone	Demand	12,750	Fixed	12,750	1,088.428	396.9	57.56
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,088.428	397.6	57.67
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.437	369.1	53.54
J-49	1,050.93	Zone	Demand	12,750	Fixed	12,750	1,088.436	367.0	53.23
J-50	1,051.43	Zone	Demand	6,370	Fixed	6,370	1,108.746	560.9	81.35
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,088.425	400.7	58.12

Scenario: 2006 - Improvements - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,088.426	399.7	57.98
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,088.428	381.9	55.40
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.745	532.9	77.30
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.745	479.6	69.57
J-56	1,040.67	Zone	Demand	12,750	Fixed	12,750	1,088.423	467.4	67.78
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,088.423	453.9	65.84
J-58	1,042.14	Zone	Demand	3,820	Fixed	3,820	1,088.423	453.0	65.70
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,088.465	335.8	48.71
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,088.429	371.3	53.85
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,088.427	400.6	58.10
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,088.425	404.0	58.60
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,088.425	405.5	58.81
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.424	441.7	64.06
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,088.424	448.2	65.01
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.430	369.0	53.53
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,088.426	385.7	55.95
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,088.425	411.9	59.74
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,088.425	415.8	60.31
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,088.427	364.4	52.85
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.745	450.2	65.30
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.745	431.1	62.52
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.745	448.6	65.07
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,088.429	365.2	52.97
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.469	131.8	19.12
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.466	208.0	30.17
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.466	131.8	19.12
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.460	187.0	27.13
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.453	224.4	32.55
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.759	359.8	52.18

Scenario: 2006 - Improvements - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,088.021	449.5	65.20
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,088.021	431.6	62.60
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,088.022	428.4	62.13
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.745	406.5	58.96
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.615	446.4	64.75
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.615	441.2	63.99
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.614	431.5	62.58
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.614	421.8	61.17
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.617	384.3	55.74
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.614	382.6	55.49
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	419.6	60.86
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,088.036	394.0	57.15
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,088.132	321.1	46.57
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,088.224	301.9	43.78
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,088.089	343.4	49.81
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,088.131	273.5	39.67
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,088.121	310.2	44.99
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,088.043	377.4	54.73
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.028	392.7	56.95
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.024	437.7	63.48
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,088.023	430.7	62.47
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,088.029	399.9	58.00
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,088.027	407.2	59.06
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,088.028	406.2	58.92
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,088.027	387.5	56.20
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,088.086	347.1	50.35
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,088.039	396.2	57.47
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,088.032	391.5	56.78
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,088.051	394.1	57.16
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,088.062	380.1	55.13
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,088.055	387.8	56.24
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,088.091	328.3	47.61
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,088.091	327.8	47.54
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,108.616	575.9	83.53
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.612	495.4	71.86
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.617	444.9	64.52
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.620	456.8	66.25
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,108.625	468.8	67.99
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.629	480.7	69.73
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.635	492.7	71.46
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,088.292	337.8	48.99
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.056	395.5	57.36
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.048	392.8	56.97
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,088.039	392.5	56.93
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,088.057	395.5	57.37
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,088.057	393.3	57.04
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,088.057	394.0	57.14
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.143	366.3	53.12
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,088.142	364.2	52.82
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,108.619	559.7	81.17
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,088.032	396.9	57.56

Scenario: 2006 - Improvements - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,088.041	396.0	57.43
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,088.057	378.3	54.87
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.613	531.7	77.11
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	478.4	69.38
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,088.012	463.3	67.20
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,088.010	449.9	65.25
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,088.010	448.9	65.11
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,088.421	335.4	48.64
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,088.070	367.7	53.34
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,088.046	396.9	57.56
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,088.031	400.2	58.04
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,088.027	401.6	58.25
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.023	437.7	63.49
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,088.018	444.3	64.44
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.080	365.6	53.03
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,088.039	382.0	55.40
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,088.027	408.0	59.17
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,088.024	411.9	59.74
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,088.051	360.7	52.32
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.614	448.9	65.11
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.614	429.8	62.33
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.614	447.3	64.88
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,088.073	361.7	52.47
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.461	131.7	19.11
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.436	207.7	30.13
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.435	131.5	19.07
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.374	186.2	27.00
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.304	223.0	32.34
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.750	359.7	52.17

Scenario: 2006 - Improvements - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,074.418	316.4	45.89
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,074.425	298.6	43.30
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,074.426	295.3	42.83
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.745	406.5	58.96
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.615	446.4	64.75
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.615	441.2	63.99
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.614	431.5	62.58
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.614	421.8	61.17
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.617	384.3	55.74
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.614	382.6	55.49
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	419.6	60.86
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,074.903	265.5	38.51
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,078.347	225.3	32.68
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,081.127	232.4	33.71
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,076.378	228.8	33.18
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,078.159	175.9	25.51
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,077.853	209.7	30.42
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,075.625	255.8	37.11
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,074.903	264.2	38.32
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,074.420	304.5	44.17
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,074.428	297.7	43.18
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,074.596	268.4	38.93
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,074.442	274.2	39.78
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,074.395	272.8	39.57
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,074.792	258.0	37.42
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,077.061	239.2	34.70
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,074.275	261.5	37.93
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,074.706	261.1	37.87
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,075.053	266.9	38.71
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,075.285	255.1	37.00
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,075.309	263.0	38.15
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,076.249	212.4	30.80
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,076.249	211.9	30.73
J-34	1,049.77	Zone	Demand	41,160	Fixed	41,160	1,108.616	575.9	83.53
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.612	495.4	71.86
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.617	444.9	64.52
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.620	456.8	66.25
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,108.625	468.8	67.99
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.629	480.7	69.73
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.635	492.7	71.46
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,084.635	302.0	43.80
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,076.901	286.3	41.53
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,076.249	277.3	40.22
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,075.006	265.0	38.43
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,077.014	287.4	41.69
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,077.014	285.2	41.36
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,077.014	285.9	41.47
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,080.635	292.8	42.47
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,080.635	290.7	42.16
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,108.619	559.7	81.17
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,074.428	263.7	38.25

Scenario: 2006 - Improvements - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,074.407	262.5	38.08
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	1,074.050	241.2	34.99
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.613	531.7	77.11
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.614	478.4	69.38
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,074.408	330.2	47.89
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,074.406	316.8	45.94
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,074.406	315.8	45.80
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,087.533	326.7	47.38
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,075.810	247.8	35.93
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	1,070.841	228.5	33.14
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,074.316	266.0	38.57
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,074.410	268.3	38.92
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,074.421	304.6	44.18
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,074.417	311.2	45.13
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,075.754	245.0	35.53
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,075.031	254.6	36.93
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,074.584	276.4	40.09
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,074.650	281.0	40.76
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,076.111	243.9	35.37
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.614	448.9	65.11
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.614	429.8	62.33
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.614	447.3	64.88
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,075.429	238.0	34.52
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.290	130.1	18.86
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,087.811	201.6	29.24
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,087.438	121.7	17.66
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,085.605	159.1	23.07
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.503	176.0	25.53
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.750	359.7	52.17

Scenario: 2006 - Improvements - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,088.021	449.5	65.20
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,088.021	431.6	62.60
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,088.022	428.4	62.13
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.843	397.7	57.68
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,099.086	353.2	51.22
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,099.086	347.9	50.46
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,099.130	338.7	49.12
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,099.133	329.0	47.71
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,099.207	292.2	42.38
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,099.141	289.9	42.04
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,099.122	326.7	47.39
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,088.036	394.0	57.15
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,088.132	321.1	46.57
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,088.224	301.9	43.78
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,088.089	343.4	49.81
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,088.131	273.5	39.67
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,088.121	310.2	44.99
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,088.043	377.4	54.73
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.028	392.7	56.95
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.024	437.7	63.48
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,088.023	430.7	62.47
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,088.029	399.9	58.00
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,088.027	407.2	59.06
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,088.028	406.2	58.92
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,088.027	387.5	56.20
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,088.086	347.1	50.35
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,088.039	396.2	57.47
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,088.032	391.5	56.78
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,088.051	394.1	57.16
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,088.062	380.1	55.13
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,088.055	387.8	56.24
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,088.091	328.3	47.61
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,088.091	327.8	47.54
J-34	1,049.77	Zone	Demand	4,937,160	Composite	4,937,160	1,092.315	416.4	60.39
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,095.938	371.4	53.87
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,098.822	349.0	50.62
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,098.879	361.5	52.43
J-38	1,060.73	Zone	Demand	10,942	Fixed	10,942	1,098.953	374.1	54.26
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,099.006	386.6	56.07
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,099.075	399.2	57.89
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,088.292	337.8	48.99
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.056	395.5	57.36
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.048	392.8	56.97
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,088.039	392.5	56.93
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,088.057	395.5	57.37
J-46	1,047.88	Zone	Demand	43,733	Fixed	43,732	1,088.057	393.3	57.04
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,088.057	394.0	57.14
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.143	366.3	53.12
J-49	1,050.93	Zone	Demand	43,733	Fixed	43,732	1,088.142	364.2	52.82
J-50	1,051.43	Zone	Demand	21,849	Fixed	21,849	1,093.874	415.4	60.24
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,088.032	396.9	57.56

Scenario: 2006 - Improvements - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,088.041	396.0	57.43
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,088.057	378.3	54.87
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,095.939	407.6	59.12
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,098.170	376.1	54.55
J-56	1,040.67	Zone	Demand	43,733	Fixed	43,732	1,088.012	463.3	67.20
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,088.010	449.9	65.25
J-58	1,042.14	Zone	Demand	13,103	Fixed	13,103	1,088.010	448.9	65.11
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,088.421	335.4	48.64
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,088.070	367.7	53.34
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,088.046	396.9	57.56
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,088.031	400.2	58.04
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,088.027	401.6	58.25
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.023	437.7	63.49
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,088.018	444.3	64.44
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.080	365.6	53.03
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,088.039	382.0	55.40
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,088.027	408.0	59.17
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,088.024	411.9	59.74
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,088.051	360.7	52.32
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,099.126	356.1	51.64
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,099.137	337.0	48.88
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,098.769	351.0	50.91
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,088.073	361.7	52.47
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.461	131.7	19.11
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.436	207.7	30.13
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.435	131.5	19.07
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.374	186.2	27.00
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.304	223.0	32.34
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.140	353.7	51.30

Scenario: 2006 - Improvements - High Reservoir - Peak Hour
Steady State Analysis
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,087.520	444.6	64.49
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,087.519	426.7	61.89
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,087.520	423.5	61.42
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,108.729	406.4	58.94
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,108.452	444.8	64.52
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,108.452	439.6	63.76
J-7	1,064.53	Zone	Demand	0	Fixed	0	1,108.450	429.9	62.35
J-8	1,065.52	Zone	Demand	0	Fixed	0	1,108.451	420.2	60.94
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,108.457	382.8	55.51
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,108.451	381.0	55.26
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,108.450	418.0	60.63
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,087.550	389.3	56.46
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,087.754	317.4	46.03
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,087.948	299.2	43.39
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,087.663	339.2	49.20
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,087.751	269.8	39.13
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,087.731	306.4	44.44
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,087.565	372.7	54.06
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,087.534	387.8	56.25
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,087.525	432.8	62.77
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,087.523	425.9	61.76
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,087.536	395.0	57.30
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,087.532	402.3	58.36
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,087.534	401.4	58.22
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,087.532	382.7	55.50
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,087.657	342.9	49.74
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,087.558	391.5	56.79
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,087.542	386.7	56.09
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,087.583	389.5	56.49
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,087.606	375.7	54.49
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,087.591	383.2	55.58
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,087.667	324.1	47.01
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,087.667	323.6	46.94
J-34	1,049.77	Zone	Demand	61,740	Fixed	61,740	1,108.454	574.4	83.30
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,108.446	493.8	71.62
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,108.457	443.3	64.29
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,108.464	455.3	66.03
J-38	1,060.73	Zone	Demand	16,413	Fixed	16,413	1,108.474	467.3	67.78
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,108.482	479.3	69.52
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,108.494	491.4	71.26
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,088.092	335.8	48.70
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,087.592	391.0	56.71
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,087.576	388.2	56.30
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,087.557	387.8	56.25
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,087.595	391.0	56.71
J-46	1,047.88	Zone	Demand	65,599	Fixed	65,599	1,087.595	388.7	56.38
J-47	1,047.80	Zone	Demand	0	Fixed	0	1,087.595	389.5	56.49
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,087.776	362.7	52.60
J-49	1,050.93	Zone	Demand	65,599	Fixed	65,599	1,087.775	360.6	52.30
J-50	1,051.43	Zone	Demand	32,774	Fixed	32,774	1,108.461	558.1	80.95
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,087.541	392.1	56.87

Scenario: 2006 - Improvements - High Reservoir - Peak Hour
Steady State Analysis
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,087.560	391.3	56.75
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,087.595	373.8	54.21
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,108.449	530.0	76.88
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,108.451	476.8	69.15
J-56	1,040.67	Zone	Demand	65,599	Fixed	65,599	1,087.499	458.3	66.47
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,087.496	444.9	64.52
J-58	1,042.14	Zone	Demand	19,654	Fixed	19,654	1,087.496	443.9	64.38
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,088.366	334.9	48.57
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,087.623	363.4	52.70
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,087.572	392.2	56.89
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,087.540	395.4	57.34
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,087.532	396.8	57.54
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,087.522	432.8	62.78
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,087.512	439.3	63.72
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,087.644	361.3	52.41
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,087.557	377.2	54.71
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,087.532	403.1	58.47
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,087.526	407.0	59.04
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,087.582	356.1	51.65
J-71	1,062.75	Zone	Demand	0	Fixed	0	1,108.450	447.3	64.88
J-72	1,064.70	Zone	Demand	0	Fixed	0	1,108.451	428.2	62.10
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,108.451	445.7	64.65
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,087.630	357.4	51.84
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.450	131.6	19.09
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.397	207.4	30.07
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.397	131.1	19.02
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.267	185.1	26.85
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.117	221.2	32.08
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.739	359.6	52.15

Scenario: 2026 - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,083.613	406.4	58.94
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,083.613	388.5	56.35
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,083.613	385.3	55.88
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.417	403.3	58.49
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.433	444.7	64.49
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.434	439.4	63.73
J-7	1,064.53	Zone	Demand	13,570	Fixed	13,570	1,108.431	429.7	62.32
J-8	1,065.52	Zone	Demand	13,570	Fixed	13,570	1,108.431	420.0	60.91
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.437	382.6	55.49
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.433	380.8	55.23
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.432	417.9	60.61
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,083.605	350.7	50.86
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,083.612	276.8	40.15
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,083.612	256.8	37.24
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,083.612	299.6	43.45
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,083.612	229.3	33.25
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,083.613	266.1	38.60
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,083.612	334.0	48.44
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.613	349.4	50.68
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.614	394.5	57.22
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,083.613	387.6	56.22
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,083.614	356.7	51.73
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,083.614	364.0	52.79
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,083.615	363.0	52.65
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,083.614	344.3	49.94
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,083.612	303.3	43.99
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,083.618	353.0	51.19
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,083.614	348.3	50.51
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,083.620	350.7	50.87
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,083.620	336.7	48.83
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,083.627	344.4	49.95
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,083.659	284.9	41.32
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,083.659	284.4	41.25
J-34	1,049.77	Zone	Demand	12,750	Fixed	12,750	1,108.419	574.0	83.25
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.421	493.6	71.59
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.425	443.0	64.25
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.421	454.9	65.97
J-38	1,060.73	Zone	Demand	111,760	Fixed	111,760	1,108.417	466.7	67.70
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.417	478.7	69.43
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.417	490.6	71.15
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,083.595	291.8	42.32
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.600	351.9	51.04
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.601	349.3	50.66
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,083.605	349.1	50.64
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,083.600	351.9	51.04
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,083.600	349.6	50.71
J-47	1,047.80	Zone	Demand	12,750	Fixed	12,750	1,083.600	350.4	50.82
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.596	321.8	46.67
J-49	1,050.93	Zone	Demand	6,370	Fixed	6,370	1,083.596	319.7	46.36
J-50	1,051.43	Zone	Demand	12,750	Fixed	12,750	1,108.418	557.7	80.89
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,083.614	353.6	51.29

Scenario: 2026 - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,083.615	352.7	51.15
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,083.624	334.9	48.58
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.421	529.8	76.84
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.425	476.5	69.11
J-56	1,040.67	Zone	Demand	3,820	Fixed	3,820	1,083.612	420.3	60.96
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,083.612	406.9	59.01
J-58	1,042.14	Zone	Demand	12,750	Fixed	12,750	1,083.612	405.9	58.87
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,083.595	288.2	41.79
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,083.643	324.4	47.05
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,083.619	353.5	51.28
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,083.615	357.0	51.77
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,083.614	358.4	51.98
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.613	394.6	57.23
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,083.613	401.2	58.18
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.618	321.9	46.69
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,083.613	338.6	49.12
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,083.614	364.8	52.91
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,083.613	368.7	53.48
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,083.612	317.3	46.02
J-71	1,062.75	Zone	Demand	27,140	Fixed	27,140	1,108.431	447.1	64.85
J-72	1,064.70	Zone	Demand	27,140	Fixed	27,140	1,108.431	428.0	62.07
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.430	445.5	64.62
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,083.641	318.4	46.18

Scenario: 2026 - Low Reservoir- Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,080.519	376.1	54.55
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,080.517	358.2	51.95
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,080.518	355.0	51.48
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,105.393	373.7	54.20
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,105.559	416.5	60.41
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,105.559	411.3	59.65
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,105.531	401.3	58.20
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,105.531	391.6	56.80
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,105.592	354.7	51.45
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,105.550	352.6	51.14
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,105.548	389.6	56.51
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,080.440	319.7	46.37
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,080.508	246.4	35.74
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,080.507	226.4	32.83
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,080.506	269.2	39.04
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,080.508	198.9	28.84
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,080.514	235.8	34.20
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,080.502	303.6	44.03
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,080.513	319.1	46.28
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,080.521	364.3	52.83
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,080.519	357.3	51.82
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,080.522	326.4	47.34
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,080.522	333.7	48.41
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,080.533	332.9	48.28
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,080.524	314.1	45.55
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,080.505	272.9	39.58
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,080.564	323.1	46.86
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,080.523	318.0	46.12
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,080.582	321.0	46.56
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,080.580	306.9	44.51
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,080.655	315.3	45.74
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,080.961	258.5	37.49
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,080.961	258.0	37.42
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,105.413	544.6	78.99
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,105.440	464.4	67.36
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,105.476	414.1	60.06
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,105.439	425.7	61.74
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,105.396	437.2	63.41
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,105.396	449.1	65.14
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,105.396	461.0	66.87
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,080.340	259.9	37.70
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,080.386	320.4	46.48
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,080.401	317.9	46.11
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,080.440	318.2	46.15
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,080.384	320.4	46.47
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,080.384	318.2	46.14
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,080.382	318.9	46.25
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,080.352	290.0	42.06
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,080.351	287.9	41.76
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,105.406	528.2	76.61
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,080.527	323.4	46.91

Scenario: 2026 - Low Reservoir- Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,080.536	322.5	46.78
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,080.621	305.5	44.31
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,105.442	500.6	72.61
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,105.476	447.6	64.93
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,080.509	389.9	56.55
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,080.503	376.4	54.60
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,080.502	375.4	54.45
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,080.338	256.3	37.17
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,080.812	296.7	43.03
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,080.576	323.8	46.96
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,080.534	326.8	47.40
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,080.525	328.2	47.60
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,080.519	364.3	52.84
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,080.515	370.8	53.78
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,080.563	292.1	42.36
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,080.519	308.4	44.72
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,080.526	334.6	48.53
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,080.515	338.4	49.08
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,080.505	286.9	41.61
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,105.533	418.8	60.74
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,105.534	399.6	57.96
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,105.529	417.1	60.50
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,080.787	290.4	42.12

Scenario: 2026 - Low Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	899.235	-1,398.1	-202.78
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	898.538	-1,422.8	-206.36
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	898.524	-1,426.2	-206.85
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,105.393	373.7	54.20
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,105.559	416.5	60.41
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,105.559	411.3	59.65
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,105.531	401.3	58.20
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,105.531	391.6	56.80
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,105.591	354.7	51.45
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,105.549	352.6	51.14
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,105.547	389.6	56.51
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	895.046	-1,494.7	-216.79
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	900.346	-1,516.8	-219.99
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	900.349	-1,536.8	-222.90
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	900.354	-1,493.9	-216.68
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	900.356	-1,564.2	-226.87
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	900.373	-1,527.2	-221.51
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	900.311	-1,459.9	-211.74
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	899.245	-1,454.9	-211.02
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	899.253	-1,409.8	-204.47
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	898.510	-1,424.0	-206.53
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	898.175	-1,458.2	-211.49
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	898.175	-1,450.9	-210.43
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	899.415	-1,439.7	-208.81
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	899.407	-1,458.5	-211.54
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	900.313	-1,490.6	-216.19
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	899.928	-1,444.8	-209.55
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	896.934	-1,478.8	-214.48
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	894.946	-1,495.8	-216.95
J-30	1,049.22	Zone	Demand	4,939,733	Composite	4,939,733	881.374	-1,642.7	-238.25
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	900.954	-1,443.4	-209.34
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	920.599	-1,310.9	-190.14
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	920.599	-1,311.4	-190.21
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,105.413	544.6	78.99
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,105.440	464.4	67.36
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,105.475	414.1	60.06
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,105.439	425.7	61.74
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,105.396	437.2	63.41
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,105.396	449.1	65.14
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,105.396	461.0	66.87
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	894.946	-1,554.5	-225.46
J-42	1,047.64	Zone	Demand	0	Fixed	0	894.992	-1,494.0	-216.68
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	895.007	-1,496.5	-217.05
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	895.046	-1,496.2	-217.01
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	894.990	-1,494.0	-216.69
J-46	1,047.88	Zone	Demand	0	Fixed	0	894.990	-1,496.3	-217.02
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	894.988	-1,495.5	-216.91
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	894.958	-1,524.4	-221.10
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	894.958	-1,526.5	-221.40
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,105.406	528.2	76.61
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	896.938	-1,473.3	-213.69

Scenario: 2026 - Low Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	895.142	-1,491.9	-216.38
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	900.667	-1,455.6	-211.12
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,105.441	500.6	72.61
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,105.476	447.6	64.93
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	899.225	-1,384.3	-200.78
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	899.219	-1,397.8	-202.73
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	899.219	-1,398.7	-202.87
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	894.944	-1,558.1	-225.99
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	911.797	-1,357.4	-196.88
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	894.142	-1,500.8	-217.68
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	898.492	-1,454.8	-211.00
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	898.847	-1,449.9	-210.29
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	898.905	-1,413.1	-204.96
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	898.832	-1,407.3	-204.11
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	900.519	-1,470.0	-213.21
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	899.993	-1,458.4	-211.53
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	899.408	-1,438.0	-208.56
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	899.246	-1,435.6	-208.22
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	900.140	-1,478.3	-214.41
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,105.533	418.8	60.74
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,105.533	399.6	57.96
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,105.529	417.1	60.50
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	910.661	-1,374.6	-199.36

Scenario: 2026 - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,076.662	338.4	49.08
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,076.660	320.4	46.48
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,076.661	317.2	46.01
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,101.626	336.8	48.85
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,101.978	381.5	55.33
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,101.978	376.2	54.57
J-7	1,064.53	Zone	Demand	69,818	Fixed	69,818	1,101.919	365.9	53.08
J-8	1,065.52	Zone	Demand	69,818	Fixed	69,818	1,101.919	356.2	51.67
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,102.046	320.0	46.41
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,101.958	317.5	46.04
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,101.953	354.5	51.41
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,076.496	281.1	40.77
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,076.639	208.6	30.25
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,076.639	188.5	27.34
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,076.635	231.3	33.55
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,076.639	161.0	23.35
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,076.652	198.0	28.71
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,076.628	265.7	38.53
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,076.650	281.3	40.80
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,076.667	326.5	47.36
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,076.663	319.6	46.35
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,076.670	288.7	41.87
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,076.670	296.0	42.94
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,076.692	295.3	42.83
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,076.675	276.4	40.09
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,076.633	235.0	34.09
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,076.758	285.8	41.46
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,076.672	280.3	40.66
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,076.797	283.9	41.18
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,076.793	269.8	39.14
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,076.952	279.1	40.48
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,077.600	225.6	32.72
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,077.600	225.1	32.65
J-34	1,049.77	Zone	Demand	65,599	Fixed	65,599	1,101.667	507.9	73.67
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,101.726	428.1	62.08
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,101.801	378.1	54.84
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,101.724	389.3	56.47
J-38	1,060.73	Zone	Demand	575,005	Fixed	575,005	1,101.632	400.3	58.07
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,101.632	412.3	59.79
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,101.632	424.2	61.52
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,076.284	220.2	31.94
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,076.382	281.3	40.79
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,076.413	278.9	40.45
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,076.496	279.6	40.55
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,076.376	281.2	40.78
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,076.376	278.9	40.46
J-47	1,047.80	Zone	Demand	65,599	Fixed	65,599	1,076.373	279.6	40.56
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,076.308	250.4	36.32
J-49	1,050.93	Zone	Demand	32,774	Fixed	32,774	1,076.308	248.3	36.02
J-50	1,051.43	Zone	Demand	65,599	Fixed	65,599	1,101.654	491.5	71.29
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,076.680	285.8	41.45

Scenario: 2026 - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,076.699	285.0	41.33
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,076.879	268.9	39.00
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,101.728	464.3	67.34
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,101.802	411.7	59.71
J-56	1,040.67	Zone	Demand	19,654	Fixed	19,654	1,076.641	352.0	51.06
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,076.629	338.5	49.10
J-58	1,042.14	Zone	Demand	65,599	Fixed	65,599	1,076.628	337.5	48.95
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,076.279	216.6	31.41
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,077.285	262.2	38.03
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,076.783	286.6	41.57
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,076.694	289.2	41.95
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,076.677	290.5	42.14
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,076.663	326.6	47.36
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,076.654	333.0	48.30
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,076.757	254.8	36.96
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,076.663	270.6	39.25
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,076.678	296.9	43.06
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,076.654	300.6	43.60
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,076.633	249.0	36.11
J-71	1,062.75	Zone	Demand	139,635	Fixed	139,635	1,101.922	383.4	55.61
J-72	1,064.70	Zone	Demand	139,635	Fixed	139,635	1,101.924	364.3	52.84
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,101.914	381.8	55.37
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,077.231	255.6	37.08

Scenario: 2026 - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,088.118	450.5	65.34
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,088.118	432.6	62.74
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,088.118	429.3	62.27
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.417	403.3	58.49
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.433	444.7	64.49
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.434	439.4	63.73
J-7	1,064.53	Zone	Demand	13,570	Fixed	13,570	1,108.431	429.7	62.32
J-8	1,065.52	Zone	Demand	13,570	Fixed	13,570	1,108.431	420.0	60.91
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.437	382.6	55.49
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.433	380.8	55.23
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.432	417.9	60.61
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,088.110	394.8	57.26
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,088.117	320.9	46.54
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,088.117	300.8	43.63
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,088.117	343.7	49.85
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,088.117	273.3	39.65
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,088.118	310.2	44.99
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,088.117	378.1	54.84
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.118	393.5	57.08
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.119	438.6	63.62
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,088.118	431.7	62.61
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,088.119	400.7	58.12
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,088.119	408.1	59.19
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,088.120	407.1	59.05
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,088.119	388.4	56.33
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,088.117	347.4	50.39
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,088.123	397.1	57.59
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,088.119	392.3	56.90
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,088.125	394.8	57.26
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,088.125	380.7	55.22
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,088.132	388.5	56.35
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,088.164	329.0	47.71
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,088.164	328.5	47.64
J-34	1,049.77	Zone	Demand	12,750	Fixed	12,750	1,108.419	574.0	83.25
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.421	493.6	71.59
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.425	443.0	64.25
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.421	454.9	65.97
J-38	1,060.73	Zone	Demand	111,760	Fixed	111,760	1,108.417	466.7	67.70
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.417	478.7	69.43
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.417	490.6	71.15
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,088.100	335.9	48.72
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.105	396.0	57.43
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.106	393.4	57.05
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,088.110	393.2	57.03
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,088.105	396.0	57.43
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,088.105	393.7	57.10
J-47	1,047.80	Zone	Demand	12,750	Fixed	12,750	1,088.105	394.5	57.21
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.101	365.9	53.06
J-49	1,050.93	Zone	Demand	6,370	Fixed	6,370	1,088.101	363.8	52.76
J-50	1,051.43	Zone	Demand	12,750	Fixed	12,750	1,108.418	557.7	80.89
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,088.119	397.7	57.69

Scenario: 2026 - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,088.120	396.8	57.54
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,088.129	379.0	54.97
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.421	529.8	76.84
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.425	476.5	69.11
J-56	1,040.67	Zone	Demand	3,820	Fixed	3,820	1,088.117	464.4	67.35
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,088.117	450.9	65.40
J-58	1,042.14	Zone	Demand	12,750	Fixed	12,750	1,088.117	450.0	65.26
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,088.100	332.3	48.19
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,088.148	368.5	53.45
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,088.124	397.6	57.67
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,088.120	401.1	58.17
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,088.119	402.5	58.38
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.118	438.7	63.62
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,088.118	445.2	64.58
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.123	366.0	53.09
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,088.118	382.7	55.51
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,088.119	408.9	59.30
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,088.118	412.8	59.88
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,088.117	361.4	52.41
J-71	1,062.75	Zone	Demand	27,140	Fixed	27,140	1,108.431	447.1	64.85
J-72	1,064.70	Zone	Demand	27,140	Fixed	27,140	1,108.431	428.0	62.07
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.430	445.5	64.62
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,088.146	362.5	52.57

Scenario: 2026 - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,085.023	420.2	60.94
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,085.022	402.3	58.35
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,085.023	399.0	57.88
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,105.393	373.7	54.20
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,105.559	416.5	60.41
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,105.559	411.3	59.65
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,105.531	401.3	58.20
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,105.531	391.6	56.80
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,105.592	354.7	51.45
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,105.550	352.6	51.14
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,105.548	389.6	56.51
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,084.945	363.8	52.76
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,085.012	290.5	42.14
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,085.012	270.5	39.23
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,085.011	313.3	45.44
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,085.013	243.0	35.24
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,085.019	279.9	40.59
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,085.007	347.7	50.43
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,085.018	363.2	52.68
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,085.026	408.3	59.23
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,085.024	401.4	58.22
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,085.027	370.5	53.74
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,085.027	377.8	54.80
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,085.037	377.0	54.67
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,085.029	358.2	51.95
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,085.010	317.0	45.98
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,085.069	367.2	53.25
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,085.028	362.1	52.52
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,085.087	365.1	52.95
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,085.085	351.0	50.91
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,085.160	359.4	52.13
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,085.466	302.6	43.89
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,085.466	302.1	43.81
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,105.413	544.6	78.99
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,105.440	464.4	67.36
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,105.476	414.1	60.06
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,105.439	425.7	61.74
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,105.396	437.2	63.41
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,105.396	449.1	65.14
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,105.396	461.0	66.87
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,084.845	304.0	44.10
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,084.891	364.5	52.87
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.906	362.0	52.51
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,084.945	362.3	52.54
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,084.889	364.5	52.87
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,084.888	362.2	52.54
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,084.887	363.0	52.64
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.857	334.1	48.46
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,084.856	332.0	48.15
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,105.406	528.2	76.61
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,085.032	367.5	53.30

Scenario: 2026 - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,085.041	366.6	53.17
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,085.126	349.6	50.71
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,105.442	500.6	72.61
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,105.476	447.6	64.93
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,085.014	434.0	62.94
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,085.008	420.5	60.99
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,085.007	419.5	60.85
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,084.843	300.4	43.57
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,085.317	340.8	49.43
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,085.081	367.8	53.35
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,085.039	370.9	53.79
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,085.030	372.3	53.99
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,085.024	408.4	59.23
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,085.019	414.9	60.18
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,085.068	336.1	48.75
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,085.024	352.4	51.12
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,085.031	378.7	54.92
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,085.020	382.5	55.48
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,085.010	331.0	48.00
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,105.533	418.8	60.74
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,105.534	399.6	57.96
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,105.529	417.1	60.50
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,085.292	334.5	48.52

Scenario: 2026 - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	903.740	-1,354.0	-196.38
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	903.043	-1,378.7	-199.97
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	903.029	-1,382.1	-200.46
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,105.393	373.7	54.20
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,105.559	416.5	60.41
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,105.559	411.3	59.65
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,105.531	401.3	58.20
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,105.531	391.6	56.80
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,105.591	354.7	51.45
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,105.549	352.6	51.14
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,105.547	389.6	56.51
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	899.551	-1,450.6	-210.40
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	904.851	-1,472.7	-213.60
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	904.854	-1,492.7	-216.50
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	904.859	-1,449.8	-210.28
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	904.861	-1,520.2	-220.48
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	904.878	-1,483.2	-215.11
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	904.816	-1,415.8	-205.35
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	903.750	-1,410.8	-204.63
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	903.758	-1,365.7	-198.08
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	903.015	-1,379.9	-200.14
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	902.680	-1,414.1	-205.10
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	902.680	-1,406.8	-204.03
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	903.920	-1,395.6	-202.42
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	903.911	-1,414.4	-205.14
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	904.818	-1,446.5	-209.80
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	904.433	-1,400.7	-203.15
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	901.439	-1,434.7	-208.08
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	899.451	-1,451.7	-210.55
J-30	1,049.22	Zone	Demand	4,939,733	Composite	4,939,733	885.879	-1,598.6	-231.86
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	905.459	-1,399.3	-202.95
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	925.104	-1,266.9	-183.74
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	925.104	-1,267.4	-183.81
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,105.413	544.6	78.99
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,105.440	464.4	67.36
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,105.475	414.1	60.06
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,105.439	425.7	61.74
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,105.396	437.2	63.41
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,105.396	449.1	65.14
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,105.396	461.0	66.87
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	899.451	-1,510.4	-219.06
J-42	1,047.64	Zone	Demand	0	Fixed	0	899.497	-1,449.9	-210.29
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	899.512	-1,452.4	-210.65
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	899.551	-1,452.2	-210.62
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	899.495	-1,449.9	-210.29
J-46	1,047.88	Zone	Demand	0	Fixed	0	899.495	-1,452.2	-210.62
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	899.493	-1,451.5	-210.52
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	899.463	-1,480.3	-214.70
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	899.462	-1,482.4	-215.01
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,105.406	528.2	76.61
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	901.443	-1,429.2	-207.29

Scenario: 2026 - High Reservoir - Max Day + School Fire
Steady State Analysis
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	899.647	-1,447.8	-209.99
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	905.172	-1,411.6	-204.73
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,105.441	500.6	72.61
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,105.476	447.6	64.93
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	903.730	-1,340.2	-194.38
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	903.724	-1,353.7	-196.33
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	903.724	-1,354.7	-196.48
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	899.449	-1,514.0	-219.59
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	916.302	-1,313.3	-190.48
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	898.647	-1,456.8	-211.28
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	902.997	-1,410.7	-204.61
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	903.352	-1,405.8	-203.89
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	903.409	-1,369.0	-198.56
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	903.337	-1,363.2	-197.71
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	905.024	-1,425.9	-206.81
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	904.498	-1,414.3	-205.13
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	903.913	-1,393.9	-202.17
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	903.751	-1,391.5	-201.82
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	904.644	-1,434.2	-208.02
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,105.533	418.8	60.74
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,105.533	399.6	57.96
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,105.529	417.1	60.50
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	915.166	-1,330.5	-192.97

Scenario: 2026 - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,085.023	420.2	60.94
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,085.022	402.3	58.35
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,085.023	399.0	57.88
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,040.157	-264.8	-38.40
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,047.951	-147.3	-21.36
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,047.951	-152.5	-22.12
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,048.050	-161.3	-23.39
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,048.058	-170.9	-24.78
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,048.460	-204.4	-29.65
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,048.130	-209.3	-30.36
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,048.045	-173.1	-25.11
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,084.945	363.8	52.76
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,085.012	290.5	42.14
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,085.012	270.5	39.23
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,085.011	313.3	45.44
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,085.013	243.0	35.24
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,085.019	279.9	40.59
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,085.007	347.7	50.43
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,085.018	363.2	52.68
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,085.026	408.3	59.23
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,085.024	401.4	58.22
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,085.027	370.5	53.74
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,085.027	377.8	54.80
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,085.037	377.0	54.67
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,085.029	358.2	51.95
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,085.010	317.0	45.98
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,085.069	367.2	53.25
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,085.028	362.1	52.52
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,085.087	365.1	52.95
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,085.085	351.0	50.91
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,085.160	359.4	52.13
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,085.466	302.6	43.89
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,085.466	302.1	43.81
J-34	1,049.77	Zone	Demand	4,939,733	Composite	4,939,733	1,035.687	-137.8	-19.99
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,040.937	-166.9	-24.20
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,044.183	-185.8	-26.94
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,043.087	-184.6	-26.77
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,041.724	-186.0	-26.97
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,041.027	-180.9	-26.23
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,040.161	-177.4	-25.73
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,084.845	304.0	44.10
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,084.891	364.5	52.87
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,084.906	362.0	52.51
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,084.945	362.3	52.54
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,084.889	364.5	52.87
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,084.888	362.2	52.54
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,084.887	363.0	52.64
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,084.856	334.1	48.46
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,084.856	332.0	48.15
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,036.700	-144.2	-20.91
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,085.032	367.5	53.30

Scenario: 2026 - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,085.041	366.6	53.17
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,085.126	349.6	50.71
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,040.938	-130.7	-18.95
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,044.132	-152.7	-22.15
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,085.014	434.0	62.94
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,085.008	420.5	60.99
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,085.007	419.5	60.85
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,084.843	300.4	43.57
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,085.317	340.8	49.43
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,085.081	367.8	53.35
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,085.039	370.9	53.79
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,085.030	372.3	53.99
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,085.024	408.4	59.23
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,085.019	414.9	60.18
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,085.068	336.1	48.75
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,085.024	352.4	51.12
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,085.031	378.7	54.92
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,085.019	382.5	55.48
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,085.010	331.0	48.00
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,048.045	-143.9	-20.87
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,048.080	-162.7	-23.59
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,046.644	-159.2	-23.08
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,085.292	334.5	48.52

Scenario: 2026 - High Reservoir - Peak Hour
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Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,081.167	382.5	55.47
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,081.165	364.5	52.87
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,081.166	361.3	52.40
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,101.626	336.8	48.85
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,101.978	381.5	55.33
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,101.978	376.2	54.57
J-7	1,064.53	Zone	Demand	69,818	Fixed	69,818	1,101.919	365.9	53.08
J-8	1,065.52	Zone	Demand	69,818	Fixed	69,818	1,101.919	356.2	51.67
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,102.046	320.0	46.41
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,101.958	317.5	46.04
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,101.953	354.5	51.41
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,081.001	325.2	47.17
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,081.144	252.7	36.65
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,081.144	232.6	33.73
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,081.140	275.4	39.94
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,081.144	205.1	29.75
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,081.157	242.1	35.11
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,081.133	309.8	44.93
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,081.155	325.4	47.19
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,081.172	370.6	53.76
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,081.168	363.7	52.74
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,081.175	332.8	48.27
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,081.175	340.1	49.33
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,081.197	339.4	49.22
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,081.179	320.5	46.48
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,081.138	279.1	40.48
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,081.263	329.9	47.85
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,081.177	324.4	47.05
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,081.302	328.0	47.58
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,081.298	313.9	45.53
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,081.457	323.2	46.87
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,082.105	269.7	39.11
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,082.105	269.2	39.04
J-34	1,049.77	Zone	Demand	65,599	Fixed	65,599	1,101.667	507.9	73.67
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,101.726	428.1	62.08
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,101.801	378.1	54.84
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,101.724	389.3	56.47
J-38	1,060.73	Zone	Demand	575,005	Fixed	575,005	1,101.632	400.3	58.07
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,101.632	412.3	59.79
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,101.632	424.2	61.52
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,080.789	264.3	38.34
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,080.887	325.3	47.19
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,080.918	323.0	46.85
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,081.001	323.7	46.94
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,080.881	325.3	47.18
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,080.881	323.0	46.85
J-47	1,047.80	Zone	Demand	65,599	Fixed	65,599	1,080.878	323.7	46.95
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,080.813	294.5	42.72
J-49	1,050.93	Zone	Demand	32,774	Fixed	32,774	1,080.813	292.4	42.41
J-50	1,051.43	Zone	Demand	65,599	Fixed	65,599	1,101.654	491.5	71.29
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,081.185	329.9	47.84

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Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,081.204	329.1	47.73
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,081.384	313.0	45.40
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,101.728	464.3	67.34
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,101.802	411.7	59.71
J-56	1,040.67	Zone	Demand	19,654	Fixed	19,654	1,081.146	396.1	57.45
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,081.134	382.6	55.49
J-58	1,042.14	Zone	Demand	65,599	Fixed	65,599	1,081.133	381.6	55.35
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,080.784	260.7	37.80
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,081.790	306.3	44.42
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,081.288	330.7	47.97
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,081.199	333.3	48.34
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,081.182	334.6	48.53
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,081.168	370.7	53.76
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,081.159	377.1	54.70
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,081.262	298.9	43.35
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,081.168	314.7	45.64
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,081.183	341.0	49.46
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,081.159	344.7	50.00
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,081.138	293.1	42.51
J-71	1,062.75	Zone	Demand	139,635	Fixed	139,635	1,101.922	383.4	55.61
J-72	1,064.70	Zone	Demand	139,635	Fixed	139,635	1,101.924	364.3	52.84
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,101.914	381.8	55.37
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,081.736	299.7	43.47

Scenario: 2026 - Improvements - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,083.920	409.4	59.38
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,083.920	391.5	56.78
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,083.920	388.3	56.31
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.754	406.6	58.97
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.694	447.2	64.86
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.694	441.9	64.10
J-7	1,064.53	Zone	Demand	13,570	Fixed	13,570	1,108.690	432.2	62.69
J-8	1,065.52	Zone	Demand	13,570	Fixed	13,570	1,108.690	422.5	61.28
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.695	385.1	55.85
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.692	383.4	55.60
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.692	420.4	60.97
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,083.921	353.8	51.31
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,083.931	279.9	40.60
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,083.940	260.0	37.70
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,083.927	302.7	43.90
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,083.931	232.4	33.70
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,083.930	269.2	39.05
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,083.922	337.0	48.88
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.921	352.5	51.12
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.920	397.5	57.66
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,083.920	390.6	56.65
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,083.921	359.7	52.16
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,083.921	367.0	53.23
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,083.921	366.0	53.09
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,083.921	347.3	50.37
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,083.926	306.4	44.44
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,083.922	355.9	51.62
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,083.921	351.3	50.95
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,083.923	353.7	51.30
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,083.924	339.6	49.26
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,083.923	347.3	50.37
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,083.927	287.5	41.70
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,083.927	287.0	41.63
J-34	1,049.77	Zone	Demand	12,750	Fixed	12,750	1,108.696	576.7	83.65
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.694	496.3	71.98
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.694	445.6	64.63
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.694	457.5	66.36
J-38	1,060.73	Zone	Demand	111,760	Fixed	111,760	1,108.694	469.5	68.09
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.697	481.4	69.82
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.702	493.4	71.56
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,083.948	295.2	42.82
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.924	355.1	51.50
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,083.923	352.4	51.11
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,083.922	352.2	51.09
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,083.924	355.1	51.50
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,083.924	352.8	51.17
J-47	1,047.80	Zone	Demand	12,750	Fixed	12,750	1,083.924	353.5	51.28
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.933	325.1	47.15
J-49	1,050.93	Zone	Demand	6,370	Fixed	6,370	1,083.933	323.0	46.84
J-50	1,051.43	Zone	Demand	12,750	Fixed	12,750	1,108.697	560.4	81.29
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,083.921	356.6	51.73

Scenario: 2026 - Improvements - Low Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,083.922	355.7	51.58
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,083.923	337.9	49.00
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.694	532.4	77.22
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.694	479.1	69.49
J-56	1,040.67	Zone	Demand	3,820	Fixed	3,820	1,083.919	423.3	61.39
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,083.918	409.9	59.44
J-58	1,042.14	Zone	Demand	12,750	Fixed	12,750	1,083.918	408.9	59.30
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,083.960	291.7	42.31
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,083.925	327.2	47.45
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,083.922	356.5	51.71
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,083.921	360.0	52.21
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,083.921	361.4	52.42
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,083.920	397.6	57.66
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,083.920	404.2	58.62
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,083.926	325.0	47.13
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,083.922	341.7	49.55
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,083.921	367.8	53.34
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,083.920	371.8	53.92
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,083.923	320.3	46.46
J-71	1,062.75	Zone	Demand	27,140	Fixed	27,140	1,108.690	449.7	65.22
J-72	1,064.70	Zone	Demand	27,140	Fixed	27,140	1,108.690	430.5	62.44
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.694	448.1	64.99
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,083.925	321.1	46.58
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.964	87.7	12.72
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.962	163.9	23.78
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.962	87.7	12.72
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.955	142.9	20.73
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.948	180.4	26.16
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.756	359.7	52.17

Scenario: 2026 - Improvements - Low Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,083.523	405.5	58.81
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,083.523	387.6	56.22
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,083.523	384.4	55.75
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.702	406.1	58.90
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.112	441.5	64.03
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.112	436.2	63.27
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,108.073	426.2	61.81
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,108.073	416.5	60.40
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.118	379.4	55.03
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.090	377.5	54.75
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.090	414.5	60.12
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,083.538	350.0	50.77
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,083.632	277.0	40.18
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,083.722	257.8	37.39
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,083.589	299.4	43.42
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,083.630	229.4	33.28
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,083.621	266.2	38.61
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,083.544	333.3	48.35
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,083.530	348.6	50.56
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,083.525	393.7	57.10
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,083.524	386.7	56.09
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,083.531	355.9	51.61
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,083.529	363.2	52.67
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,083.530	362.2	52.53
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,083.529	343.5	49.82
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,083.586	303.1	43.96
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,083.541	352.2	51.08
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,083.534	347.5	50.40
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,083.553	350.1	50.77
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,083.563	336.1	48.75
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,083.556	343.7	49.85
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,083.591	284.2	41.22
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,083.591	283.7	41.15
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,108.129	571.2	82.84
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.112	490.6	71.15
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.114	439.9	63.81
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.114	451.9	65.54
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,108.115	463.8	67.27
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.147	476.0	69.04
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.190	488.4	70.83
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,083.795	293.8	42.61
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.561	351.5	50.98
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,083.552	348.8	50.59
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,083.541	348.5	50.55
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,083.562	351.5	50.98
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,083.562	349.3	50.66
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,083.561	350.0	50.76
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,083.655	322.3	46.75
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,083.654	320.2	46.45
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,108.139	555.0	80.49
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,083.533	352.8	51.18

Scenario: 2026 - Improvements - Low Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand Calculated (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,083.542	351.9	51.05
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,083.558	334.3	48.48
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.114	526.8	76.40
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.113	473.4	68.67
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,083.513	419.3	60.81
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,083.507	405.8	58.86
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,083.507	404.8	58.72
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,083.918	291.3	42.25
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,083.571	323.7	46.95
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,083.548	352.8	51.18
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,083.532	356.2	51.66
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,083.529	357.6	51.86
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,083.524	393.7	57.10
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,083.519	400.2	58.05
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,083.581	321.6	46.64
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,083.540	337.9	49.01
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,083.528	364.0	52.79
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,083.526	367.9	53.36
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,083.551	316.7	45.93
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,108.075	443.6	64.34
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,108.075	424.5	61.57
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.112	442.4	64.17
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,083.574	317.7	46.08
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.956	87.7	12.71
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.932	163.7	23.74
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.931	87.4	12.68
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.870	142.1	20.61
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.801	178.9	25.95
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.720	359.4	52.12

Scenario: 2026 - Improvements - Low Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,057.657	152.4	22.10
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,057.628	134.2	19.46
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,057.628	130.9	18.99
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.702	406.1	58.90
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.112	441.5	64.03
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.112	436.2	63.27
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,108.073	426.2	61.81
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,108.073	416.5	60.40
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.118	379.4	55.03
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.090	377.5	54.75
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.090	414.5	60.12
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,058.282	102.9	14.92
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,064.953	94.2	13.66
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,070.126	124.8	18.09
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,060.491	73.3	10.63
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,064.424	41.5	6.01
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,063.974	73.9	10.72
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,059.979	102.7	14.90
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,058.626	104.9	15.22
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,057.662	140.5	20.38
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,057.628	133.3	19.33
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,057.832	104.3	15.13
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,057.624	109.6	15.90
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,057.634	108.8	15.77
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,058.419	97.7	14.18
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,062.627	98.0	14.21
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,057.505	97.4	14.13
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,057.981	97.4	14.13
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,056.828	88.5	12.84
J-30	1,049.22	Zone	Demand	4,939,733	Composite	4,939,733	1,054.984	56.4	8.18
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,057.513	88.8	12.89
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,059.886	52.2	7.58
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,059.886	51.7	7.50
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,108.129	571.2	82.84
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.112	490.6	71.15
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.114	439.9	63.81
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.114	451.9	65.54
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,108.115	463.8	67.27
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.147	476.0	69.04
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.190	488.4	70.83
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,076.917	226.4	32.84
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,062.235	142.8	20.71
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,060.941	127.5	18.49
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,058.439	102.8	14.92
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,062.461	145.0	21.03
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,062.460	142.7	20.70
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,062.459	143.5	20.81
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,069.467	183.5	26.61
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,069.467	181.4	26.31
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,108.139	555.0	80.49
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,057.381	96.9	14.05

Scenario: 2026 - Improvements - Low Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,056.900	91.2	13.23
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	1,057.277	77.1	11.18
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.114	526.8	76.40
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.113	473.4	68.67
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,057.648	166.2	24.10
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,057.642	152.7	22.15
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,057.641	151.7	22.00
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,082.256	275.1	39.89
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,058.800	81.3	11.79
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	1,053.722	60.9	8.84
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,057.424	100.6	14.60
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,057.627	104.1	15.10
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,057.642	140.4	20.36
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,057.631	146.9	21.30
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,060.297	93.7	13.59
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,058.976	97.5	14.14
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,058.017	114.3	16.57
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,058.131	119.4	17.31
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,060.962	95.6	13.87
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,108.075	443.6	64.34
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,108.075	424.5	61.57
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.112	442.4	64.17
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,058.358	70.9	10.29
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.636	84.5	12.26
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,082.764	152.2	22.08
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,082.020	68.7	9.96
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,078.565	90.2	13.08
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,074.604	88.9	12.89
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.720	359.4	52.12

Scenario: 2026 - Improvements - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,083.028	400.7	58.11
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,083.027	382.8	55.51
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,083.029	379.5	55.05
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,108.636	405.4	58.80
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,107.387	434.4	63.01
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,107.387	429.1	62.24
J-7	1,064.53	Zone	Demand	69,818	Fixed	69,818	1,107.304	418.7	60.72
J-8	1,065.52	Zone	Demand	69,818	Fixed	69,818	1,107.304	408.9	59.31
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,107.399	372.4	54.01
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,107.341	370.1	53.68
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,107.340	407.2	59.06
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,083.061	345.4	50.09
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,083.259	273.4	39.65
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,083.451	255.2	37.01
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,083.169	295.3	42.82
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,083.256	225.8	32.75
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,083.236	262.4	38.06
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,083.073	328.7	47.68
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,083.042	343.9	49.87
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,083.033	388.8	56.40
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,083.031	381.9	55.39
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,083.045	351.1	50.92
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,083.041	358.4	51.98
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,083.043	357.4	51.84
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,083.040	338.7	49.12
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,083.163	298.9	43.36
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,083.066	347.6	50.41
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,083.051	342.7	49.71
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,083.092	345.6	50.12
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,083.114	331.7	48.11
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,083.099	339.3	49.20
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,083.173	280.1	40.63
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,083.173	279.6	40.56
J-34	1,049.77	Zone	Demand	65,599	Fixed	65,599	1,107.423	564.3	81.84
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,107.388	483.5	70.12
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,107.391	432.9	62.78
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,107.391	444.8	64.51
J-38	1,060.73	Zone	Demand	575,005	Fixed	575,005	1,107.392	456.7	66.24
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,107.462	469.3	68.07
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,107.553	482.1	69.93
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,083.605	291.9	42.34
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,083.108	347.1	50.34
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,083.090	344.3	49.93
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,083.067	343.9	49.88
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,083.111	347.1	50.34
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,083.111	344.8	50.02
J-47	1,047.80	Zone	Demand	65,599	Fixed	65,599	1,083.108	345.6	50.12
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,083.307	318.9	46.26
J-49	1,050.93	Zone	Demand	32,774	Fixed	32,774	1,083.307	316.8	45.95
J-50	1,051.43	Zone	Demand	65,599	Fixed	65,599	1,107.444	548.2	79.51
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,083.050	348.1	50.49

Scenario: 2026 - Improvements - Low Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand Calculated (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,083.070	347.3	50.37
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,083.103	329.8	47.84
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,107.390	519.7	75.37
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,107.389	466.4	67.64
J-56	1,040.67	Zone	Demand	19,654	Fixed	19,654	1,083.007	414.3	60.10
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,082.995	400.8	58.13
J-58	1,042.14	Zone	Demand	65,599	Fixed	65,599	1,082.994	399.8	57.99
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,083.866	290.8	42.18
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,083.130	319.4	46.32
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,083.081	348.3	50.51
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,083.048	351.4	50.97
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,083.041	352.8	51.17
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,083.031	388.9	56.40
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,083.021	395.4	57.34
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,083.150	317.4	46.03
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,083.065	333.3	48.34
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,083.040	359.2	52.09
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,083.034	363.1	52.66
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,083.089	312.2	45.28
J-71	1,062.75	Zone	Demand	139,635	Fixed	139,635	1,107.308	436.1	63.26
J-72	1,064.70	Zone	Demand	139,635	Fixed	139,635	1,107.308	417.0	60.48
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,107.387	435.3	63.14
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,083.137	313.4	45.46
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,083.946	87.6	12.70
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,083.895	163.3	23.68
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,083.893	87.0	12.62
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.764	141.1	20.46
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,083.617	177.1	25.69
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.676	358.9	52.06

Scenario: 2026 - Improvements - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	12,750	Fixed	12,750	1,088.425	453.5	65.77
J-2	1,043.92	Zone	Demand	6,370	Fixed	6,370	1,088.425	435.6	63.18
J-3	1,044.25	Zone	Demand	3,820	Fixed	3,820	1,088.425	432.3	62.71
J-4	1,067.21	Zone	Demand	12,750	Fixed	12,750	1,108.754	406.6	58.97
J-5	1,063.00	Zone	Demand	6,370	Fixed	6,370	1,108.694	447.2	64.86
J-6	1,063.54	Zone	Demand	12,750	Fixed	12,750	1,108.694	441.9	64.10
J-7	1,064.53	Zone	Demand	13,570	Fixed	13,570	1,108.690	432.2	62.69
J-8	1,065.52	Zone	Demand	13,570	Fixed	13,570	1,108.690	422.5	61.28
J-9	1,069.35	Zone	Demand	12,750	Fixed	12,750	1,108.695	385.1	55.85
J-10	1,069.52	Zone	Demand	12,750	Fixed	12,750	1,108.692	383.4	55.60
J-11	1,065.74	Zone	Demand	12,750	Fixed	12,750	1,108.692	420.4	60.97
J-12	1,047.77	Zone	Demand	6,370	Fixed	6,370	1,088.426	397.9	57.71
J-13	1,055.33	Zone	Demand	6,370	Fixed	6,370	1,088.436	324.0	47.00
J-14	1,057.38	Zone	Demand	6,370	Fixed	6,370	1,088.445	304.0	44.10
J-15	1,053.00	Zone	Demand	12,750	Fixed	12,750	1,088.432	346.8	50.29
J-16	1,060.19	Zone	Demand	12,750	Fixed	12,750	1,088.436	276.5	40.10
J-17	1,056.42	Zone	Demand	12,750	Fixed	12,750	1,088.435	313.3	45.44
J-18	1,049.48	Zone	Demand	12,750	Fixed	12,750	1,088.427	381.1	55.28
J-19	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.426	396.5	57.51
J-20	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.425	441.6	64.05
J-21	1,044.01	Zone	Demand	6,370	Fixed	6,370	1,088.425	434.7	63.05
J-22	1,047.17	Zone	Demand	6,370	Fixed	6,370	1,088.426	403.8	58.56
J-23	1,046.42	Zone	Demand	12,750	Fixed	12,750	1,088.425	411.1	59.62
J-24	1,046.52	Zone	Demand	12,750	Fixed	12,750	1,088.426	410.1	59.48
J-25	1,048.43	Zone	Demand	12,750	Fixed	12,750	1,088.425	391.4	56.77
J-26	1,052.62	Zone	Demand	6,370	Fixed	6,370	1,088.431	350.5	50.84
J-27	1,047.55	Zone	Demand	12,750	Fixed	12,750	1,088.427	400.0	58.02
J-28	1,048.03	Zone	Demand	6,370	Fixed	6,370	1,088.426	395.3	57.34
J-29	1,047.78	Zone	Demand	12,750	Fixed	12,750	1,088.428	397.8	57.69
J-30	1,049.22	Zone	Demand	12,750	Fixed	12,750	1,088.429	383.7	55.65
J-31	1,048.44	Zone	Demand	12,750	Fixed	12,750	1,088.428	391.4	56.77
J-32	1,054.55	Zone	Demand	12,750	Fixed	12,750	1,088.432	331.6	48.10
J-33	1,054.60	Zone	Demand	6,370	Fixed	6,370	1,088.432	331.1	48.02
J-34	1,049.77	Zone	Demand	12,750	Fixed	12,750	1,108.696	576.7	83.65
J-35	1,057.99	Zone	Demand	12,750	Fixed	12,750	1,108.694	496.3	71.98
J-36	1,063.16	Zone	Demand	12,750	Fixed	12,750	1,108.694	445.6	64.63
J-37	1,061.94	Zone	Demand	3,190	Fixed	3,190	1,108.694	457.5	66.36
J-38	1,060.73	Zone	Demand	111,760	Fixed	111,760	1,108.694	469.5	68.09
J-39	1,059.51	Zone	Demand	3,190	Fixed	3,190	1,108.697	481.4	69.82
J-40	1,058.29	Zone	Demand	12,750	Fixed	12,750	1,108.702	493.4	71.56
J-41	1,053.78	Zone	Demand	12,750	Fixed	12,750	1,088.453	339.3	49.22
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.429	399.2	57.89
J-43	1,047.91	Zone	Demand	12,750	Fixed	12,750	1,088.428	396.5	57.51
J-44	1,047.93	Zone	Demand	12,750	Fixed	12,750	1,088.427	396.3	57.48
J-45	1,047.64	Zone	Demand	12,750	Fixed	12,750	1,088.429	399.2	57.89
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,088.429	396.9	57.56
J-47	1,047.80	Zone	Demand	12,750	Fixed	12,750	1,088.429	397.6	57.67
J-48	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.438	369.2	53.54
J-49	1,050.93	Zone	Demand	6,370	Fixed	6,370	1,088.438	367.1	53.24
J-50	1,051.43	Zone	Demand	12,750	Fixed	12,750	1,108.697	560.4	81.29
J-51	1,047.48	Zone	Demand	12,750	Fixed	12,750	1,088.426	400.7	58.12

Scenario: 2026 - Improvements - High Reservoir - Average
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	12,750	Fixed	12,750	1,088.427	399.8	57.98
J-53	1,049.40	Zone	Demand	12,750	Fixed	12,750	1,088.428	381.9	55.40
J-54	1,054.29	Zone	Demand	12,750	Fixed	12,750	1,108.694	532.4	77.22
J-55	1,059.74	Zone	Demand	12,750	Fixed	12,750	1,108.694	479.1	69.49
J-56	1,040.67	Zone	Demand	3,820	Fixed	3,820	1,088.424	467.4	67.78
J-57	1,042.04	Zone	Demand	3,820	Fixed	3,820	1,088.423	453.9	65.84
J-58	1,042.14	Zone	Demand	12,750	Fixed	12,750	1,088.423	453.0	65.70
J-59	1,054.15	Zone	Demand	12,750	Fixed	12,750	1,088.465	335.8	48.71
J-60	1,050.50	Zone	Demand	12,750	Fixed	12,750	1,088.430	371.3	53.85
J-61	1,047.50	Zone	Demand	12,750	Fixed	12,750	1,088.427	400.6	58.10
J-62	1,047.14	Zone	Demand	12,750	Fixed	12,750	1,088.426	404.0	58.60
J-63	1,046.99	Zone	Demand	12,750	Fixed	12,750	1,088.425	405.5	58.81
J-64	1,043.30	Zone	Demand	12,750	Fixed	12,750	1,088.425	441.7	64.06
J-65	1,042.62	Zone	Demand	12,750	Fixed	12,750	1,088.425	448.2	65.01
J-66	1,050.72	Zone	Demand	12,750	Fixed	12,750	1,088.431	369.0	53.53
J-67	1,049.01	Zone	Demand	12,750	Fixed	12,750	1,088.427	385.7	55.95
J-68	1,046.34	Zone	Demand	12,750	Fixed	12,750	1,088.425	411.9	59.74
J-69	1,045.94	Zone	Demand	12,750	Fixed	12,750	1,088.425	415.8	60.31
J-70	1,051.19	Zone	Demand	12,750	Fixed	12,750	1,088.428	364.4	52.85
J-71	1,062.75	Zone	Demand	27,140	Fixed	27,140	1,108.690	449.7	65.22
J-72	1,064.70	Zone	Demand	27,140	Fixed	27,140	1,108.690	430.5	62.44
J-73	1,062.91	Zone	Demand	6,370	Fixed	6,370	1,108.694	448.1	64.99
J-74	1,051.11	Zone	Demand	12,750	Fixed	12,750	1,088.430	365.2	52.97
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.469	131.8	19.12
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.467	208.0	30.17
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.466	131.8	19.12
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.460	187.0	27.13
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.453	224.4	32.55
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.756	359.7	52.17

Scenario: 2026 - Improvements - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,088.028	449.6	65.21
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,088.028	431.7	62.61
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,088.028	428.5	62.14
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.702	406.1	58.90
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.112	441.5	64.03
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.112	436.2	63.27
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,108.073	426.2	61.81
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,108.073	416.5	60.40
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.118	379.4	55.03
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.090	377.5	54.75
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.090	414.5	60.12
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,088.043	394.1	57.16
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,088.137	321.1	46.57
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,088.227	301.9	43.79
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,088.094	343.5	49.82
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,088.135	273.5	39.67
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,088.126	310.3	45.00
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,088.049	377.4	54.74
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.034	392.7	56.96
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.030	437.7	63.49
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,088.029	430.8	62.48
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,088.036	399.9	58.01
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,088.034	407.3	59.07
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,088.035	406.3	58.93
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,088.033	387.6	56.21
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,088.091	347.2	50.35
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,088.046	396.3	57.48
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,088.039	391.6	56.79
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,088.058	394.2	57.17
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,088.068	380.2	55.14
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,088.061	387.8	56.25
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,088.096	328.3	47.62
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,088.096	327.8	47.55
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,108.129	571.2	82.84
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.112	490.6	71.15
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.114	439.9	63.81
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.114	451.9	65.54
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,108.115	463.8	67.27
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.147	476.0	69.04
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.190	488.4	70.83
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,088.300	337.8	49.00
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.066	395.6	57.38
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.057	392.9	56.98
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,088.046	392.6	56.94
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,088.067	395.6	57.38
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,088.067	393.4	57.05
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,088.066	394.1	57.16
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.160	366.4	53.15
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,088.159	364.3	52.84
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,108.139	555.0	80.49
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,088.038	396.9	57.57

Scenario: 2026 - Improvements - High Reservoir - Max Day
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,088.047	396.0	57.44
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,088.063	378.4	54.88
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.114	526.8	76.40
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.113	473.4	68.67
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,088.018	463.4	67.21
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,088.012	449.9	65.26
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,088.012	448.9	65.11
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,088.423	335.4	48.65
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,088.076	367.8	53.34
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,088.053	396.9	57.57
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,088.037	400.2	58.05
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,088.034	401.7	58.26
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.029	437.8	63.50
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,088.024	444.3	64.44
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.086	365.7	53.04
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,088.045	382.0	55.41
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,088.033	408.0	59.18
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,088.031	412.0	59.75
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,088.056	360.8	52.33
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,108.075	443.6	64.34
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,108.075	424.5	61.57
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.112	442.4	64.17
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,088.079	361.8	52.47
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.461	131.7	19.11
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.437	207.7	30.13
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.436	131.5	19.07
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.375	186.2	27.01
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.306	223.0	32.34
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.720	359.4	52.12

Scenario: 2026 - Improvements - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,062.162	196.5	28.49
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,062.133	178.3	25.86
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,062.133	175.0	25.39
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,108.702	406.1	58.90
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,108.112	441.5	64.03
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,108.112	436.2	63.27
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,108.073	426.2	61.81
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,108.073	416.5	60.40
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,108.118	379.4	55.03
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,108.090	377.5	54.75
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,108.090	414.5	60.12
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,062.787	146.9	21.31
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,069.458	138.3	20.06
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,074.631	168.8	24.49
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,064.996	117.4	17.03
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,068.929	85.6	12.41
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,068.479	118.0	17.11
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,064.484	146.8	21.29
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,063.131	149.0	21.61
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,062.166	184.6	26.78
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,062.133	177.4	25.72
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,062.337	148.4	21.53
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,062.129	153.7	22.30
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,062.139	152.8	22.17
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,062.924	141.8	20.57
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,067.132	142.0	20.60
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,062.010	141.5	20.52
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,062.486	141.5	20.52
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,061.333	132.6	19.23
J-30	1,049.22	Zone	Demand	4,939,733	Composite	4,939,733	1,059.489	100.5	14.57
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,062.018	132.9	19.28
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,064.391	96.3	13.97
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,064.391	95.8	13.90
J-34	1,049.77	Zone	Demand	43,733	Fixed	43,732	1,108.129	571.2	82.84
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,108.112	490.6	71.15
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,108.114	439.9	63.81
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,108.114	451.9	65.54
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,108.115	463.8	67.27
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,108.147	476.0	69.04
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,108.190	488.4	70.83
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,081.422	270.5	39.24
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,066.740	186.9	27.11
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,065.446	171.6	24.89
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,062.944	146.9	21.31
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,066.965	189.1	27.43
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,066.965	186.8	27.10
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,066.964	187.6	27.20
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,073.972	227.6	33.01
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,073.972	225.5	32.70
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,108.139	555.0	80.49
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,061.886	141.0	20.45

Scenario: 2026 - Improvements - High Reservoir - Max Day + School Fire
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,061.405	135.3	19.62
J-53	1,049.40	Zone	Demand	4,939,733	Composite	4,939,733	1,061.782	121.2	17.57
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,108.114	526.8	76.40
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,108.113	473.4	68.67
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,062.153	210.2	30.49
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,062.147	196.8	28.54
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,062.146	195.8	28.40
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,086.761	319.2	46.29
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,063.305	125.4	18.18
J-61	1,047.50	Zone	Demand	4,939,733	Composite	4,939,733	1,058.227	105.0	15.23
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,061.929	144.7	20.99
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,062.132	148.2	21.49
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,062.147	184.5	26.76
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,062.136	191.0	27.70
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,064.802	137.8	19.99
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,063.481	141.6	20.54
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,062.522	158.4	22.97
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,062.635	163.4	23.71
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,065.467	139.7	20.26
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,108.075	443.6	64.34
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,108.075	424.5	61.57
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,108.112	442.4	64.17
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,062.863	115.0	16.68
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.141	128.6	18.65
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,087.269	196.3	28.47
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,086.525	112.8	16.36
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,083.070	134.3	19.48
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,079.108	133.0	19.29
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.720	359.4	52.12

Scenario: 2026 - Improvements - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	43,733	Fixed	43,732	1,088.028	449.6	65.21
J-2	1,043.92	Zone	Demand	21,849	Fixed	21,849	1,088.028	431.7	62.61
J-3	1,044.25	Zone	Demand	13,103	Fixed	13,103	1,088.028	428.5	62.14
J-4	1,067.21	Zone	Demand	43,733	Fixed	43,732	1,107.631	395.6	57.38
J-5	1,063.00	Zone	Demand	21,849	Fixed	21,849	1,096.631	329.1	47.74
J-6	1,063.54	Zone	Demand	43,733	Fixed	43,732	1,096.631	323.9	46.98
J-7	1,064.53	Zone	Demand	46,545	Fixed	46,545	1,096.628	314.2	45.57
J-8	1,065.52	Zone	Demand	46,545	Fixed	46,545	1,096.629	304.5	44.16
J-9	1,069.35	Zone	Demand	43,733	Fixed	43,732	1,096.783	268.5	38.94
J-10	1,069.52	Zone	Demand	43,733	Fixed	43,732	1,096.659	265.6	38.52
J-11	1,065.74	Zone	Demand	43,733	Fixed	43,732	1,096.636	302.4	43.86
J-12	1,047.77	Zone	Demand	21,849	Fixed	21,849	1,088.043	394.1	57.16
J-13	1,055.33	Zone	Demand	21,849	Fixed	21,849	1,088.137	321.1	46.57
J-14	1,057.38	Zone	Demand	21,849	Fixed	21,849	1,088.227	301.9	43.79
J-15	1,053.00	Zone	Demand	43,733	Fixed	43,732	1,088.094	343.5	49.82
J-16	1,060.19	Zone	Demand	43,733	Fixed	43,732	1,088.135	273.5	39.67
J-17	1,056.42	Zone	Demand	43,733	Fixed	43,732	1,088.126	310.3	45.00
J-18	1,049.48	Zone	Demand	43,733	Fixed	43,732	1,088.049	377.4	54.74
J-19	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.034	392.7	56.96
J-20	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.030	437.7	63.49
J-21	1,044.01	Zone	Demand	21,849	Fixed	21,849	1,088.029	430.8	62.48
J-22	1,047.17	Zone	Demand	21,849	Fixed	21,849	1,088.036	399.9	58.01
J-23	1,046.42	Zone	Demand	43,733	Fixed	43,732	1,088.034	407.3	59.07
J-24	1,046.52	Zone	Demand	43,733	Fixed	43,732	1,088.035	406.3	58.93
J-25	1,048.43	Zone	Demand	43,733	Fixed	43,732	1,088.033	387.6	56.21
J-26	1,052.62	Zone	Demand	21,849	Fixed	21,849	1,088.091	347.2	50.35
J-27	1,047.55	Zone	Demand	43,733	Fixed	43,732	1,088.046	396.3	57.48
J-28	1,048.03	Zone	Demand	21,849	Fixed	21,849	1,088.039	391.6	56.79
J-29	1,047.78	Zone	Demand	43,733	Fixed	43,732	1,088.058	394.2	57.17
J-30	1,049.22	Zone	Demand	43,733	Fixed	43,732	1,088.068	380.2	55.14
J-31	1,048.44	Zone	Demand	43,733	Fixed	43,732	1,088.061	387.8	56.25
J-32	1,054.55	Zone	Demand	43,733	Fixed	43,732	1,088.096	328.3	47.62
J-33	1,054.60	Zone	Demand	21,849	Fixed	21,849	1,088.096	327.8	47.55
J-34	1,049.77	Zone	Demand	4,939,733	Composite	4,939,733	1,089.907	392.8	56.98
J-35	1,057.99	Zone	Demand	43,733	Fixed	43,732	1,093.507	347.6	50.42
J-36	1,063.16	Zone	Demand	43,733	Fixed	43,732	1,096.377	325.1	47.15
J-37	1,061.94	Zone	Demand	10,942	Fixed	10,942	1,096.429	337.5	48.95
J-38	1,060.73	Zone	Demand	383,337	Fixed	383,337	1,096.496	350.1	50.77
J-39	1,059.51	Zone	Demand	10,942	Fixed	10,942	1,096.630	363.3	52.69
J-40	1,058.29	Zone	Demand	43,733	Fixed	43,732	1,096.802	376.9	54.67
J-41	1,053.78	Zone	Demand	43,733	Fixed	43,732	1,088.300	337.8	49.00
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,088.066	395.6	57.38
J-43	1,047.91	Zone	Demand	43,733	Fixed	43,732	1,088.057	392.9	56.98
J-44	1,047.93	Zone	Demand	43,733	Fixed	43,732	1,088.046	392.6	56.94
J-45	1,047.64	Zone	Demand	43,733	Fixed	43,732	1,088.067	395.6	57.38
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,088.067	393.4	57.05
J-47	1,047.80	Zone	Demand	43,733	Fixed	43,732	1,088.066	394.1	57.16
J-48	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.160	366.4	53.15
J-49	1,050.93	Zone	Demand	21,849	Fixed	21,849	1,088.159	364.3	52.84
J-50	1,051.43	Zone	Demand	43,733	Fixed	43,732	1,091.478	391.9	56.84
J-51	1,047.48	Zone	Demand	43,733	Fixed	43,732	1,088.038	396.9	57.57

Scenario: 2026 - Improvements - High Reservoir - Max Day + Fire in Uplands
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	43,733	Fixed	43,732	1,088.047	396.0	57.44
J-53	1,049.40	Zone	Demand	43,733	Fixed	43,732	1,088.063	378.4	54.88
J-54	1,054.29	Zone	Demand	43,733	Fixed	43,732	1,093.508	383.8	55.67
J-55	1,059.74	Zone	Demand	43,733	Fixed	43,732	1,095.725	352.2	51.08
J-56	1,040.67	Zone	Demand	13,103	Fixed	13,103	1,088.018	463.4	67.21
J-57	1,042.04	Zone	Demand	13,103	Fixed	13,103	1,088.012	449.9	65.26
J-58	1,042.14	Zone	Demand	43,733	Fixed	43,732	1,088.012	448.9	65.11
J-59	1,054.15	Zone	Demand	43,733	Fixed	43,732	1,088.423	335.4	48.65
J-60	1,050.50	Zone	Demand	43,733	Fixed	43,732	1,088.076	367.8	53.34
J-61	1,047.50	Zone	Demand	43,733	Fixed	43,732	1,088.053	396.9	57.57
J-62	1,047.14	Zone	Demand	43,733	Fixed	43,732	1,088.037	400.2	58.05
J-63	1,046.99	Zone	Demand	43,733	Fixed	43,732	1,088.034	401.7	58.26
J-64	1,043.30	Zone	Demand	43,733	Fixed	43,732	1,088.029	437.8	63.50
J-65	1,042.62	Zone	Demand	43,733	Fixed	43,732	1,088.024	444.3	64.44
J-66	1,050.72	Zone	Demand	43,733	Fixed	43,732	1,088.086	365.7	53.04
J-67	1,049.01	Zone	Demand	43,733	Fixed	43,732	1,088.045	382.0	55.41
J-68	1,046.34	Zone	Demand	43,733	Fixed	43,732	1,088.033	408.0	59.18
J-69	1,045.94	Zone	Demand	43,733	Fixed	43,732	1,088.031	412.0	59.75
J-70	1,051.19	Zone	Demand	43,733	Fixed	43,732	1,088.056	360.8	52.33
J-71	1,062.75	Zone	Demand	93,090	Fixed	93,090	1,096.628	331.6	48.10
J-72	1,064.70	Zone	Demand	93,090	Fixed	93,090	1,096.635	312.5	45.33
J-73	1,062.91	Zone	Demand	21,849	Fixed	21,849	1,096.318	327.0	47.43
J-74	1,051.11	Zone	Demand	43,733	Fixed	43,732	1,088.079	361.8	52.47
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.461	131.7	19.11
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.437	207.7	30.13
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.436	131.5	19.07
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.375	186.2	27.01
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.306	223.0	32.34
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,107.996	352.3	51.10

Scenario: 2026 - Improvements - High Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-1	1,042.09	Zone	Demand	65,599	Fixed	65,599	1,087.533	444.8	64.51
J-2	1,043.92	Zone	Demand	32,774	Fixed	32,774	1,087.532	426.8	61.91
J-3	1,044.25	Zone	Demand	19,654	Fixed	19,654	1,087.534	423.6	61.44
J-4	1,067.21	Zone	Demand	65,599	Fixed	65,599	1,108.636	405.4	58.80
J-5	1,063.00	Zone	Demand	32,774	Fixed	32,774	1,107.387	434.4	63.01
J-6	1,063.54	Zone	Demand	65,599	Fixed	65,599	1,107.387	429.1	62.24
J-7	1,064.53	Zone	Demand	69,818	Fixed	69,818	1,107.304	418.7	60.72
J-8	1,065.52	Zone	Demand	69,818	Fixed	69,818	1,107.304	408.9	59.31
J-9	1,069.35	Zone	Demand	65,599	Fixed	65,599	1,107.399	372.4	54.01
J-10	1,069.52	Zone	Demand	65,599	Fixed	65,599	1,107.341	370.1	53.68
J-11	1,065.74	Zone	Demand	65,599	Fixed	65,599	1,107.340	407.2	59.06
J-12	1,047.77	Zone	Demand	32,774	Fixed	32,774	1,087.566	389.4	56.48
J-13	1,055.33	Zone	Demand	32,774	Fixed	32,774	1,087.764	317.5	46.04
J-14	1,057.38	Zone	Demand	32,774	Fixed	32,774	1,087.955	299.3	43.40
J-15	1,053.00	Zone	Demand	65,599	Fixed	65,599	1,087.674	339.3	49.22
J-16	1,060.19	Zone	Demand	65,599	Fixed	65,599	1,087.761	269.9	39.14
J-17	1,056.42	Zone	Demand	65,599	Fixed	65,599	1,087.741	306.5	44.45
J-18	1,049.48	Zone	Demand	65,599	Fixed	65,599	1,087.578	372.8	54.07
J-19	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,087.547	388.0	56.27
J-20	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,087.538	432.9	62.79
J-21	1,044.01	Zone	Demand	32,774	Fixed	32,774	1,087.536	426.0	61.78
J-22	1,047.17	Zone	Demand	32,774	Fixed	32,774	1,087.550	395.2	57.32
J-23	1,046.42	Zone	Demand	65,599	Fixed	65,599	1,087.546	402.5	58.38
J-24	1,046.52	Zone	Demand	65,599	Fixed	65,599	1,087.548	401.5	58.24
J-25	1,048.43	Zone	Demand	65,599	Fixed	65,599	1,087.545	382.8	55.52
J-26	1,052.62	Zone	Demand	32,774	Fixed	32,774	1,087.668	343.0	49.75
J-27	1,047.55	Zone	Demand	65,599	Fixed	65,599	1,087.571	391.6	56.80
J-28	1,048.03	Zone	Demand	32,774	Fixed	32,774	1,087.556	386.8	56.11
J-29	1,047.78	Zone	Demand	65,599	Fixed	65,599	1,087.597	389.6	56.51
J-30	1,049.22	Zone	Demand	65,599	Fixed	65,599	1,087.619	375.8	54.50
J-31	1,048.44	Zone	Demand	65,599	Fixed	65,599	1,087.604	383.3	55.60
J-32	1,054.55	Zone	Demand	65,599	Fixed	65,599	1,087.678	324.2	47.03
J-33	1,054.60	Zone	Demand	32,774	Fixed	32,774	1,087.678	323.7	46.95
J-34	1,049.77	Zone	Demand	65,599	Fixed	65,599	1,107.423	564.3	81.84
J-35	1,057.99	Zone	Demand	65,599	Fixed	65,599	1,107.388	483.5	70.12
J-36	1,063.16	Zone	Demand	65,599	Fixed	65,599	1,107.391	432.9	62.78
J-37	1,061.94	Zone	Demand	16,413	Fixed	16,413	1,107.391	444.8	64.51
J-38	1,060.73	Zone	Demand	575,005	Fixed	575,005	1,107.392	456.7	66.24
J-39	1,059.51	Zone	Demand	16,413	Fixed	16,413	1,107.462	469.3	68.07
J-40	1,058.29	Zone	Demand	65,599	Fixed	65,599	1,107.553	482.1	69.93
J-41	1,053.78	Zone	Demand	65,599	Fixed	65,599	1,088.110	336.0	48.73
J-42	1,047.64	Zone	Demand	0	Fixed	0	1,087.613	391.2	56.73
J-43	1,047.91	Zone	Demand	65,599	Fixed	65,599	1,087.595	388.3	56.33
J-44	1,047.93	Zone	Demand	65,599	Fixed	65,599	1,087.572	388.0	56.27
J-45	1,047.64	Zone	Demand	65,599	Fixed	65,599	1,087.616	391.2	56.74
J-46	1,047.88	Zone	Demand	0	Fixed	0	1,087.616	388.9	56.41
J-47	1,047.80	Zone	Demand	65,599	Fixed	65,599	1,087.613	389.6	56.51
J-48	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,087.812	363.0	52.65
J-49	1,050.93	Zone	Demand	32,774	Fixed	32,774	1,087.812	360.9	52.35
J-50	1,051.43	Zone	Demand	65,599	Fixed	65,599	1,107.444	548.2	79.51
J-51	1,047.48	Zone	Demand	65,599	Fixed	65,599	1,087.555	392.2	56.89

Scenario: 2026 - Improvements - High Reservoir - Peak Hour
Steady State Analysis
Junction Report

Label	Elevation (m)	Zone	Type	Base Flow (l/d)	Pattern	Demand (Calculated) (l/d)	Calculated Hydraulic Grade (m)	Pressure (kPa)	Pressure (psi)
J-52	1,047.58	Zone	Demand	65,599	Fixed	65,599	1,087.575	391.4	56.77
J-53	1,049.40	Zone	Demand	65,599	Fixed	65,599	1,087.608	373.9	54.23
J-54	1,054.29	Zone	Demand	65,599	Fixed	65,599	1,107.390	519.7	75.37
J-55	1,059.74	Zone	Demand	65,599	Fixed	65,599	1,107.389	466.4	67.64
J-56	1,040.67	Zone	Demand	19,654	Fixed	19,654	1,087.512	458.4	66.49
J-57	1,042.04	Zone	Demand	19,654	Fixed	19,654	1,087.500	444.9	64.53
J-58	1,042.14	Zone	Demand	65,599	Fixed	65,599	1,087.499	443.9	64.39
J-59	1,054.15	Zone	Demand	65,599	Fixed	65,599	1,088.371	334.9	48.57
J-60	1,050.50	Zone	Demand	65,599	Fixed	65,599	1,087.635	363.5	52.72
J-61	1,047.50	Zone	Demand	65,599	Fixed	65,599	1,087.586	392.4	56.91
J-62	1,047.14	Zone	Demand	65,599	Fixed	65,599	1,087.553	395.5	57.36
J-63	1,046.99	Zone	Demand	65,599	Fixed	65,599	1,087.546	396.9	57.56
J-64	1,043.30	Zone	Demand	65,599	Fixed	65,599	1,087.536	433.0	62.80
J-65	1,042.62	Zone	Demand	65,599	Fixed	65,599	1,087.526	439.4	63.74
J-66	1,050.72	Zone	Demand	65,599	Fixed	65,599	1,087.655	361.5	52.43
J-67	1,049.01	Zone	Demand	65,599	Fixed	65,599	1,087.570	377.4	54.73
J-68	1,046.34	Zone	Demand	65,599	Fixed	65,599	1,087.545	403.3	58.49
J-69	1,045.94	Zone	Demand	65,599	Fixed	65,599	1,087.539	407.2	59.06
J-70	1,051.19	Zone	Demand	65,599	Fixed	65,599	1,087.594	356.2	51.67
J-71	1,062.75	Zone	Demand	139,635	Fixed	139,635	1,107.308	436.1	63.26
J-72	1,064.70	Zone	Demand	139,635	Fixed	139,635	1,107.308	417.0	60.48
J-73	1,062.91	Zone	Demand	32,774	Fixed	32,774	1,107.387	435.3	63.14
J-74	1,051.11	Zone	Demand	65,599	Fixed	65,599	1,087.642	357.5	51.85
J-75	1,075.00	Zone	Demand	0	Fixed	0	1,088.451	131.6	19.09
J-76	1,067.21	Zone	Demand	0	Fixed	0	1,088.400	207.4	30.08
J-77	1,075.00	Zone	Demand	0	Fixed	0	1,088.398	131.1	19.02
J-78	1,069.35	Zone	Demand	0	Fixed	0	1,088.269	185.2	26.86
J-79	1,065.52	Zone	Demand	0	Fixed	0	1,088.122	221.2	32.08
J-80	1,072.00	Zone	Demand	0	Fixed	0	1,108.676	358.9	52.06

Appendix G – Water Distribution System Cost Estimates

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Town of Milk River - Water Distribution Analysis
Water Main - Summary

Cost Estimate

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Summary					
1	Railway Street Loop	1	L.S.	$ 293,000.00	$ 293,000.00
2	4th Ave N Loop	1	L.S.	$ 353,000.00	$ 353,000.00
3	Centre Ave Loop	1	L.S.	$ 244,000.00	$ 244,000.00
4	4th Street E Loop	1	L.S.	$ 193,000.00	$ 193,000.00
5	250 mm Water Main for Pressure Zone	1	L.S.	$ 640,000.00	$ 640,000.00
6	250 mm Water Main for Gravity Fed Zone #1	1	L.S.	$ 633,000.00	$ 633,000.00
7	250 mm Water Main for Gravity Fed Zone #2	1	L.S.	$ 977,000.00	$ 977,000.00
	TOTAL				**$ 3,333,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Water Distribution Analysis
Water Main - Railway Street from 1st Ave N to 3rd Ave N

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 75,000.00	$ 75,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 80,000.00
CONTINGENCY (15%)					$ 12,000.00
GEOTECHNICAL (3.5%)					$ 3,200.00
ENGINEERING (12%)					$ 11,000.00
		TOTAL			**$ 106,000.00**
Water Works					
1	Supply and Install 150 mm PVC DR-18 C900 Pipe & Fittings	220	m	$ 200.00	$ 44,000.00
2	150 mm Valves	4	ea	$ 2,000.00	$ 8,000.00
		SUBTOTAL			$ 52,000.00
CONTINGENCY (15%)					$ 7,800.00
GEOTECHNICAL (3.5%)					$ 2,100.00
ENGINEERING (12%)					$ 7,200.00
		TOTAL			**$ 69,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	1,700	m^2	$ 27.00	$ 45,900.00
2	Remove & Replace Asphalt (75 mm compacted depth)	1,700	m^2	$ 25.00	$ 42,500.00
		SUBTOTAL			$ 88,400.00
CONTINGENCY (15%)					$ 13,300.00
GEOTECHNICAL (3.5%)					$ 3,600.00
ENGINEERING (12%)					$ 12,200.00
		TOTAL			**$ 118,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	50	m^3	$ 25.00	$ 1,250.00
2	Additional Pipe Haunching Material	50	m^3	$ 25.00	$ 1,250.00
		SUBTOTAL			$ 2,500.00
CONTINGENCY (15%)					$ 400.00
GEOTECHNICAL (3.5%)					$ 100.00
ENGINEERING (12%)					$ 300.00
		TOTAL			**$ 3,000.00**
		GRAND SUBTOTAL			**$ 220,400.00**
TOTAL CONTINGENCY (15%)					$ 33,100.00
TOTAL GEOTECHNICAL (3.5%)					$ 8,900.00
TOTAL ENGINEERING (12%)					$ 30,400.00
		GRAND TOTAL			**$ 293,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Water Distribution Analysis
Water Main - 4th Ave N from 1st St E to 3rd St E

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 75,000.00	$ 75,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 80,000.00
CONTINGENCY (15%)					$ 12,000.00
GEOTECHNICAL (3.5%)					$ 3,200.00
ENGINEERING (12%)					$ 11,000.00
		TOTAL			**$ 106,000.00**
Water Works					
1	Supply and Install 150 mm PVC DR-18 C900 Pipe & Fittings	290	m	$ 200.00	$ 58,000.00
2	150 mm Valves	4	ea	$ 2,000.00	$ 8,000.00
		SUBTOTAL			$ 66,000.00
CONTINGENCY (15%)					$ 9,900.00
GEOTECHNICAL (3.5%)					$ 2,700.00
ENGINEERING (12%)					$ 9,100.00
		TOTAL			**$ 88,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	2,300	m^2	$ 27.00	$ 62,100.00
2	Remove & Replace Asphalt (75 mm compacted depth)	2,300	m^2	$ 25.00	$ 57,500.00
		SUBTOTAL			$ 119,600.00
CONTINGENCY (15%)					$ 17,900.00
GEOTECHNICAL (3.5%)					$ 4,800.00
ENGINEERING (12%)					$ 16,500.00
		TOTAL			**$ 159,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	50	m^3	$ 25.00	$ 1,250.00
2	Additional Pipe Haunching Material	50	m^3	$ 25.00	$ 1,250.00
		SUBTOTAL			$ 2,500.00
CONTINGENCY (15%)					$ 400.00
GEOTECHNICAL (3.5%)					$ 100.00
ENGINEERING (12%)					$ 300.00
		TOTAL			**$ 3,000.00**
		GRAND SUBTOTAL			**$ 265,600.00**
TOTAL CONTINGENCY (15%)					$ 39,800.00
TOTAL GEOTECHNICAL (3.5%)					$ 10,700.00
TOTAL ENGINEERING (12%)					$ 36,600.00
		GRAND TOTAL			**$ 353,000.00**

Town of Milk River - Water Distribution Analysis
Water Main - Centre Ave from 4th St E to 5th St E

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 75,000.00	$ 75,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 80,000.00
CONTINGENCY (15%)					$ 12,000.00
GEOTECHNICAL (3.5%)					$ 3,200.00
ENGINEERING (12%)					$ 11,000.00
		TOTAL			**$ 106,000.00**
Water Works					
1	Supply and Install 150 mm PVC DR-18 C900 Pipe & Fittings	160	m	$ 200.00	$ 32,000.00
2	150 mm Valves	2	ea	$ 2,000.00	$ 4,000.00
		SUBTOTAL			$ 36,000.00
CONTINGENCY (15%)					$ 5,400.00
GEOTECHNICAL (3.5%)					$ 1,400.00
ENGINEERING (12%)					$ 5,000.00
		TOTAL			**$ 48,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	1,300	m^2	$ 27.00	$ 35,100.00
2	Remove & Replace Asphalt (75 mm compacted depth)	1,300	m^2	$ 25.00	$ 32,500.00
		SUBTOTAL			$ 67,600.00
CONTINGENCY (15%)					$ 10,100.00
GEOTECHNICAL (3.5%)					$ 2,700.00
ENGINEERING (12%)					$ 9,300.00
		TOTAL			**$ 90,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	50	m^3	$ 25.00	$ 1,250.00
2	Additional Pipe Haunching Material	50	m^3	$ 25.00	$ 1,250.00
		SUBTOTAL			$ 2,500.00
CONTINGENCY (15%)					$ 400.00
GEOTECHNICAL (3.5%)					$ 100.00
ENGINEERING (12%)					$ 300.00
		TOTAL			**$ 3,000.00**
		GRAND SUBTOTAL			**$ 183,600.00**
TOTAL CONTINGENCY (15%)					$ 27,500.00
TOTAL GEOTECHNICAL (3.5%)					$ 7,400.00
TOTAL ENGINEERING (12%)					$ 25,300.00
		GRAND TOTAL			**$ 244,000.00**

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Town of Milk River - Water Distribution Analysis
Water Main - 4th St E from Centre Ave to 1st Ave S

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 75,000.00	$ 75,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 80,000.00
CONTINGENCY (15%)					$ 12,000.00
GEOTECHNICAL (3.5%)					$ 3,200.00
ENGINEERING (12%)					$ 11,000.00
		TOTAL			**$ 106,000.00**
Water Works					
1	Supply and Install 150 mm PVC DR-18 C900 Pipe & Fittings	100	m	$ 200.00	$ 20,000.00
2	150 mm Valves	2	ea	$ 2,000.00	$ 4,000.00
		SUBTOTAL			$ 24,000.00
CONTINGENCY (15%)					$ 3,600.00
GEOTECHNICAL (3.5%)					$ 1,000.00
ENGINEERING (12%)					$ 3,300.00
		TOTAL			**$ 32,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	800	m^2	$ 27.00	$ 21,600.00
2	Remove & Replace Asphalt (75 mm compacted depth)	800	m^2	$ 25.00	$ 20,000.00
		SUBTOTAL			$ 41,600.00
CONTINGENCY (15%)					$ 6,200.00
GEOTECHNICAL (3.5%)					$ 1,700.00
ENGINEERING (12%)					$ 5,700.00
		TOTAL			**$ 55,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	50	m^3	$ 25.00	$ 1,250.00
2	Additional Pipe Haunching Material	50	m^3	$ 25.00	$ 1,250.00
		SUBTOTAL			$ 2,500.00
CONTINGENCY (15%)					$ 400.00
GEOTECHNICAL (3.5%)					$ 100.00
ENGINEERING (12%)					$ 300.00
		TOTAL			**$ 3,000.00**
		GRAND SUBTOTAL			**$ 145,600.00**
TOTAL CONTINGENCY (15%)					$ 21,800.00
TOTAL GEOTECHNICAL (3.5%)					$ 5,900.00
TOTAL ENGINEERING (12%)					$ 20,100.00
		GRAND TOTAL			**$ 193,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Water Distribution Analysis
Water Main - from Booster Station to North End of Main St

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 75,000.00	$ 75,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 80,000.00
CONTINGENCY (15%)					$ 12,000.00
GEOTECHNICAL (3.5%)					$ 3,200.00
ENGINEERING (12%)					$ 11,000.00
		TOTAL			**$ 106,000.00**
Water Works					
1	Supply and Install 250 mm PVC DR-18 C900 Pipe & Fittings	500	m	$ 375.00	$ 187,500.00
2	250 mm Valves	2	ea	$ 3,000.00	$ 6,000.00
		SUBTOTAL			$ 193,500.00
CONTINGENCY (15%)					$ 29,000.00
GEOTECHNICAL (3.5%)					$ 7,800.00
ENGINEERING (12%)					$ 26,700.00
		TOTAL			**$ 257,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	4,000	m^2	$ 27.00	$ 108,000.00
2	Remove & Replace Asphalt (75 mm compacted depth)	4,000	m^2	$ 25.00	$ 100,000.00
		SUBTOTAL			$ 208,000.00
CONTINGENCY (15%)					$ 31,200.00
GEOTECHNICAL (3.5%)					$ 8,400.00
ENGINEERING (12%)					$ 28,700.00
		TOTAL			**$ 276,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	100	m^3	$ 25.00	$ 2,500.00
2	Additional Pipe Haunching Material	100	m^3	$ 25.00	$ 2,500.00
		SUBTOTAL			$ 5,000.00
CONTINGENCY (15%)					$ 800.00
GEOTECHNICAL (3.5%)					$ 200.00
ENGINEERING (12%)					$ 700.00
		TOTAL			**$ 7,000.00**
		GRAND SUBTOTAL			**$ 481,500.00**
TOTAL CONTINGENCY (15%)					$ 72,200.00
TOTAL GEOTECHNICAL (3.5%)					$ 19,400.00
TOTAL ENGINEERING (12%)					$ 66,400.00
		GRAND TOTAL			**$ 640,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Water Distribution Analysis
Water Main - From WTP to Intersection of 1st St W and 8th Ave N

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 20,000.00	$ 20,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 25,000.00
CONTINGENCY (15%)					$ 3,800.00
GEOTECHNICAL (3.5%)					$ 1,000.00
ENGINEERING (12%)					$ 3,500.00
		TOTAL			**$ 33,000.00**
Water Works					
1	Supply and Install 250 mm PVC DR-18 C900 Pipe & Fittings	1050	m	$ 375.00	$ 393,750.00
2	250 mm Valves	2	ea	$ 3,000.00	$ 6,000.00
		SUBTOTAL			$ 399,800.00
CONTINGENCY (15%)					$ 60,000.00
GEOTECHNICAL (3.5%)					$ 16,100.00
ENGINEERING (12%)					$ 55,200.00
		TOTAL			**$ 531,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	1,000	m^2	$ 27.00	$ 27,000.00
2	Remove & Replace Asphalt (75 mm compacted depth)	1,000	m^2	$ 25.00	$ 25,000.00
		SUBTOTAL			$ 52,000.00
CONTINGENCY (15%)					$ 7,800.00
GEOTECHNICAL (3.5%)					$ 2,100.00
ENGINEERING (12%)					$ 7,200.00
		TOTAL			**$ 69,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	100	m^3	$ 25.00	$ 2,500.00
2	Additional Pipe Haunching Material	100	m^3	$ 25.00	$ 2,500.00
		SUBTOTAL			$ 5,000.00
CONTINGENCY (15%)					$ 800.00
GEOTECHNICAL (3.5%)					$ 200.00
ENGINEERING (12%)					$ 700.00
		TOTAL			**$ 7,000.00**
		GRAND SUBTOTAL			**$ 476,800.00**
TOTAL CONTINGENCY (15%)					$ 71,500.00
TOTAL GEOTECHNICAL (3.5%)					$ 19,200.00
TOTAL ENGINEERING (12%)					$ 65,800.00
		GRAND TOTAL			**$ 633,000.00**

Town of Milk River - Water Distribution Analysis
Water Main - From WTP to Intersection of 5th St E and 4th Ave N

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 25,000.00	$ 25,000.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 30,000.00
CONTINGENCY (15%)					$ 4,500.00
GEOTECHNICAL (3.5%)					$ 1,200.00
ENGINEERING (12%)					$ 4,100.00
		TOTAL			**$ 40,000.00**
Water Works					
1	Supply and Install 250 mm PVC DR-18 C900 Pipe & Fittings	1450	m	$ 375.00	$ 543,750.00
2	250 mm Valves	2	ea	$ 3,000.00	$ 6,000.00
		SUBTOTAL			$ 549,800.00
CONTINGENCY (15%)					$ 82,500.00
GEOTECHNICAL (3.5%)					$ 22,100.00
ENGINEERING (12%)					$ 75,900.00
		TOTAL			**$ 730,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	3,000	m^2	$ 27.00	$ 81,000.00
2	Remove & Replace Asphalt (75 mm compacted depth)	3,000	m^2	$ 25.00	$ 75,000.00
		SUBTOTAL			$ 156,000.00
CONTINGENCY (15%)					$ 23,400.00
GEOTECHNICAL (3.5%)					$ 6,300.00
ENGINEERING (12%)					$ 21,500.00
		TOTAL			**$ 207,000.00**
Provisional Items					
1	Additional Pipe Bedding Material	25	m^3	$ 25.00	$ 625.00
2	Additional Pipe Haunching Material	25	m^3	$ 25.00	$ 625.00
		SUBTOTAL			$ 1,300.00
CONTINGENCY (15%)					$ 200.00
GEOTECHNICAL (3.5%)					$ 100.00
ENGINEERING (12%)					$ 200.00
		TOTAL			**$ 2,000.00**
		GRAND SUBTOTAL			**$ 735,800.00**
TOTAL CONTINGENCY (15%)					$ 110,400.00
TOTAL GEOTECHNICAL (3.5%)					$ 29,600.00
TOTAL ENGINEERING (12%)					$ 101,500.00
		GRAND TOTAL			**$ 977,000.00**

Appendix H – Sewage Collection System Analysis

Existing Sanitary System Manhole Data - Wet Weather Flow
(DWF @ 525 Lpcd peaked + I/I @ 2440 Lpcd)

Label	Rim Elev. (m)	Sump Elev. (m)	Total Flow (l/s)	HGL (m)
MH-1	1,040.36	1,038.89	40.52	1,039.08
MH-10	1,043.30	1,040.84	0.38	1,042.11
MH-100	1,061.00	1,057.82	0.00	1,057.82
MH-11	1,043.30	1,040.37	5.43	1,042.11
MH-12	1,045.94	1,042.97	0.56	1,043.04
MH-13	1,047.91	1,045.17	0.00	1,045.17
MH-14	1,049.47	1,048.10	3.74	1,048.16
MH-14A	1,049.67	1,048.12	3.74	1,048.22
MH-15	1,047.17	1,045.15	0.00	1,045.15
MH-16	1,046.42	1,043.44	33.66	1,044.97
MH-17	1,046.99	1,044.07	1.34	1,044.97
MH-18	1,046.52	1,043.59	2.57	1,043.65
MH-19	1,046.34	1,044.62	1.34	1,044.65
MH-1A	1,049.99	1,047.27	40.52	1,047.46
MH-1B	1,050.56	1,046.84	40.52	1,047.02
MH-1C	1,048.68	1,046.27	40.52	1,046.43
MH-2	1,041.05	1,038.91	40.52	1,039.19
MH-20	1,048.43	1,045.29	0.00	1,045.29
MH-21	1,050.32	1,048.36	3.48	1,048.42
MH-22	1,048.03	1,046.18	0.00	1,046.18
MH-23	1,047.48	1,043.83	31.21	1,045.80
MH-24	1,047.14	1,044.56	4.82	1,045.83
MH-25	1,047.55	1,045.10	3.58	1,045.85
MH-26	1,049.01	1,046.00	2.46	1,046.06
MH-27	1,051.19	1,048.69	1.12	1,048.72
MH-28	1,052.62	1,049.59	3.48	1,049.66
MH-29	1,047.77	1,045.18	0.00	1,046.26
MH-3	1,040.49	1,039.29	40.52	1,039.74
MH-30	1,047.93	1,045.00	0.51	1,046.26
MH-31	1,047.58	1,044.36	23.47	1,046.26
MH-32	1,047.50	1,045.04	3.49	1,046.28
MH-33	1,049.40	1,046.71	2.70	1,046.75
MH-34	1,050.72	1,048.49	1.90	1,048.53
MH-35	1,056.42	1,053.89	0.00	1,053.89
MH-36	1,055.33	1,052.13	3.48	1,052.18
MH-37	1,047.88	1,045.97	0.00	1,046.26
MH-38	1,047.64	1,045.88	0.26	1,046.26
MH-39	1,047.91	1,045.57	0.29	1,046.26
MH-4	1,041.78	1,039.57	40.52	1,040.38
MH-40	1,047.78	1,045.12	15.95	1,046.48
MH-41	1,049.22	1,046.07	0.00	1,046.48
MH-42	1,053.00	1,050.07	0.67	1,050.09
MH-43	1,060.19	1,059.89	0.00	1,059.89
MH-44	1,057.38	1,054.62	2.70	1,054.66
MH-46	1,048.44	1,045.48	13.83	1,046.64
MH-47	1,050.50	1,047.18	0.00	1,047.18
MH-48	1,058.80	1,055.97	2.24	1,056.01
MH-49	1,049.77	1,046.41	11.81	1,046.76
MH-5	1,042.09	1,039.96	40.48	1,042.09
MH-50	1,054.29	1,051.13	4.03	1,051.18
MH-51	1,057.99	1,055.03	0.22	1,055.04
MH-52	1,060.16	1,057.34	2.24	1,057.38
MH-53	1,050.72	1,047.17	0.26	1,047.19

Label	Rim Elev. (m)	Sump Elev. (m)	Total Flow (l/s)	HGL (m)
MH-54	1,051.58	1,049.28	0.00	1,049.28
MH-55	1,051.43	1,047.33	6.33	1,047.40
MH-56	1,059.74	1,057.03	2.57	1,057.07
MH-57	1,062.91	1,059.79	0.22	1,059.80
MH-58	1,064.17	1,061.22	0.22	1,061.24
MH-59	1,066.26	1,060.78	1.01	1,060.81
MH-6	1,042.62	1,040.44	34.25	1,042.62
MH-60	1,062.75	1,060.01	1.23	1,060.04
MH-60A	1,063.47	1,059.76	1.23	1,059.79
MH-61	1,064.53	1,059.37	2.24	1,059.41
MH-63	1,053.78	1,049.41	0.20	1,049.42
MH-64	1,054.15	1,050.78	0.10	1,050.79
MH-65	1,054.61	1,051.49	0.04	1,051.50
MH-66	1,058.29	1,055.08	4.03	1,055.13
MH-67	1,063.16	1,060.11	1.12	1,060.14
MH-68	1,069.01	1,065.83	0.00	1,065.83
MH-69	1,069.35	1,066.96	0.00	1,066.96
MH-7	1,043.92	1,040.90	33.79	1,043.92
MH-70	1,069.89	1,066.44	0.67	1,066.46
MH-71	1,068.92	1,065.96	1.01	1,065.99
MH-71A	1,064.70	1,063.08	1.01	1,063.11
MH-72	1,065.52	1,062.52	1.01	1,062.55
MH-73	1,064.75	1,061.84	0.90	1,061.86
MH-74	1,067.21	1,064.42	0.00	1,064.42
MH-75	1,049.18	1,047.80	3.74	1,047.86
MH-76	1,049.83	1,047.53	3.74	1,047.59
MH-77	1,050.30	1,047.18	3.74	1,047.24
MH-78	1,050.41	1,046.86	3.74	1,046.92
MH-79	1,049.41	1,046.49	3.74	1,046.55
MH-8	1,044.25	1,041.13	33.79	1,044.25
MH-80	1,048.68	1,046.21	3.74	1,046.26
MH-81	1,049.06	1,046.01	3.74	1,046.09
MH-82	1,048.20	1,045.88	44.26	1,046.04
MH-83	1,047.57	1,045.39	44.26	1,045.55
MH-84	1,046.51	1,044.31	44.26	1,044.47
MH-85	1,044.60	1,043.10	44.26	1,043.26
MH-86	1,042.96	1,041.43	44.26	1,041.62
MH-87	1,042.88	1,041.27	44.26	1,041.46
MH-88	1,042.80	1,040.85	44.26	1,041.26
MH-9	1,044.01	1,041.38	33.77	1,044.01
MH-C1	1,041.15	1,038.77	0.04	1,038.78
MH-C2	1,040.95	1,038.45	0.04	1,038.46
MH-C3	1,040.67	0.00	0.04	1,038.18

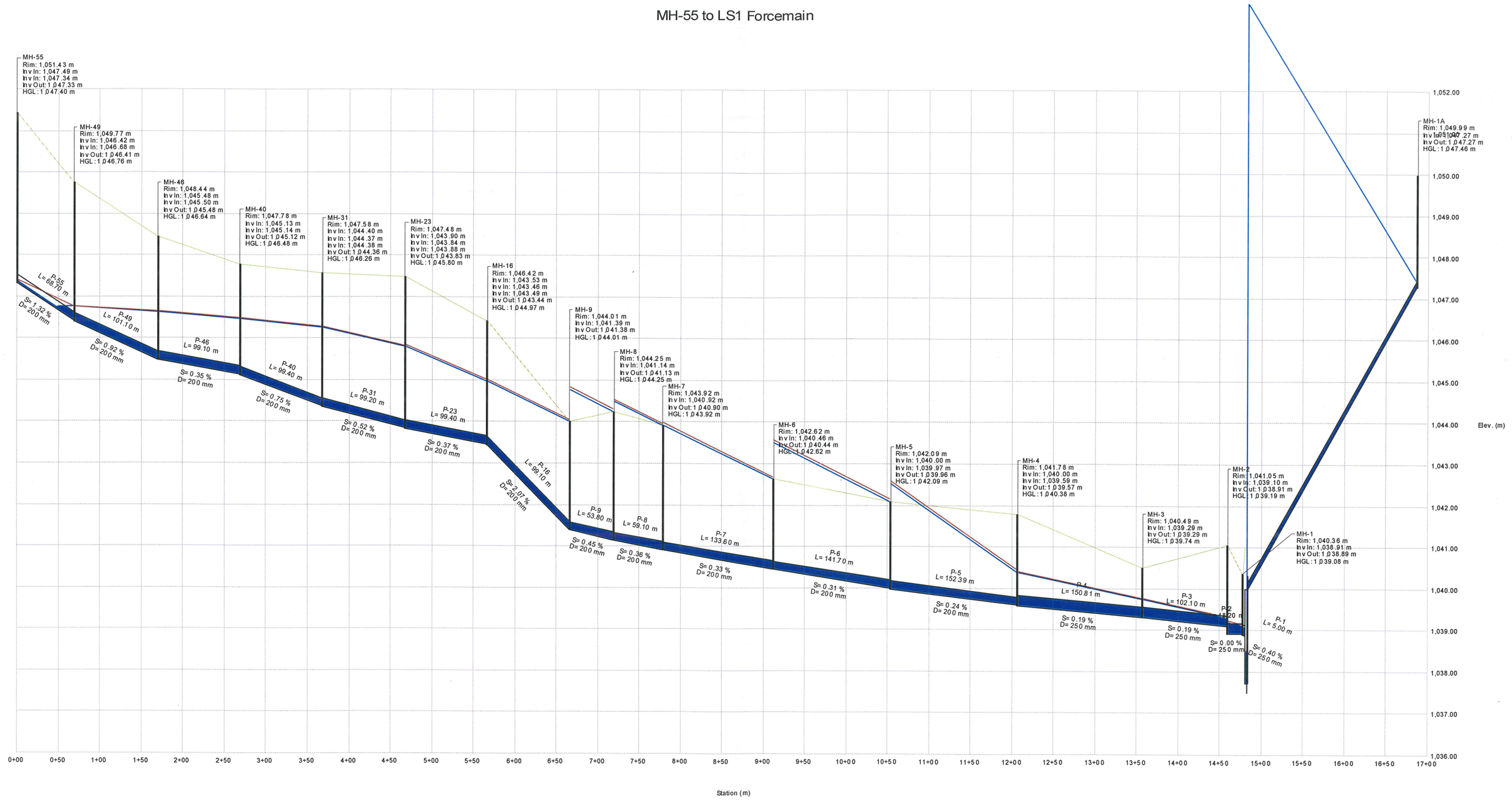
Existing Sanitary System Pipe Data - Wet Weather Flow
(DWF @ 430 Lpcd peaked + I/I @ 3000 Lpcd)

Label	U/S MH	U/S Inv (m)	D/S MH	D/S Inv (m)	Slope (%)	Length (m)	Material	Diameter (mm)	Total Flow (l/s)	Capacity (l/s)
P-1	MH-1	1,038.89	LS-1	1,038.87	0.40	5.00	PVC	250	40.52	38.35
P-10	MH-9	1,041.45	MH-10	1,040.86	0.35	169.80	VCT	200	0.00	19.71
P-100	MH-100	1,057.82	MH-66	1,055.22	2.75	94.40	VCT	200	0.00	55.51
P-11	MH-10	1,040.84	MH-11	1,040.37	0.33	141.80	VCT	200	0.38	19.26
P-11A	MH-11	1,040.37	MH-5	1,039.97	0.40	100.60	VCT	200	5.43	21.09
P-12	MH-12	1,043.02	MH-11	1,040.46	1.81	141.60	VCT	200	0.56	44.97
P-13	MH-13	1,045.17	MH-12	1,042.97	1.55	142.00	VCT	200	0.00	41.63
P-14	MH-14	1,048.10	MH-75	1,047.83	0.39	69.80	PVC	200	3.74	20.80
P-14A	MH-14A	1,048.12	MH-14	1,048.12	0.00	29.80	PVC	200	3.74	1.94
P-15	MH-15	1,045.15	MH-16	1,043.53	1.37	118.40	VCT	200	0.00	39.12
P-16	MH-16	1,043.44	MH-9	1,041.39	2.07	99.10	VCT	200	33.66	48.10
P-17	MH-17	1,044.07	MH-16	1,043.49	0.34	172.60	VCT	200	1.34	19.39
P-18	MH-18	1,044.59	MH-17	1,044.08	0.38	135.80	VCT	200	0.00	20.50
P-18A	MH-18	1,043.61	MH-11	1,040.43	3.23	98.60	VCT	200	2.57	60.06
P-19	MH-19	1,044.62	MH-18	1,043.62	0.70	141.90	VCT	200	1.34	28.08
P-1A	MH-1A	1,047.27	MH-1B	1,046.84	0.31	137.10	Concrete	300	40.52	55.22
P-1B	MH-1B	1,046.84	MH-1C	1,046.33	0.35	144.80	PVC	300	40.52	58.52
P-1C	MH-1C	1,046.27	MH-82	1,045.90	0.59	62.70	Concrete	300	40.52	75.75
P-2	MH-2	1,038.91	MH-1	1,038.91	0.00	18.20	PVC	250	40.52	0.00
P-20	MH-20	1,045.29	MH-19	1,044.64	0.46	141.50	VCT	200	0.00	22.67
P-21	MH-21	1,048.36	MH-14A	1,048.17	0.27	70.40	PVC	200	3.48	17.38
P-22	MH-22	1,046.18	MH-23	1,043.90	1.36	167.40	VCT	200	0.00	39.03
P-23	MH-23	1,043.83	MH-16	1,043.46	0.37	99.40	VCT	200	31.21	20.41
P-24	MH-24	1,044.56	MH-23	1,043.88	0.39	172.60	VCT	200	4.82	20.99
P-25	MH-25	1,045.10	MH-24	1,044.57	0.37	141.70	VCT	200	3.58	20.45
P-26	MH-26	1,046.02	MH-25	1,045.11	0.64	142.10	VCT	200	2.46	26.76
P-27	MH-27	1,048.69	MH-26	1,046.00	1.53	176.10	VCT	200	1.12	41.34
P-28	MH-28	1,049.59	MH-27	1,048.69	0.78	115.10	VCT	200	0.00	29.57
P-28A	MH-28	1,049.61	MH-21	1,048.41	1.38	87.00	PVC	200	3.48	39.28
P-29	MH-29	1,045.18	MH-30	1,045.02	0.46	35.00	VCT	200	0.00	22.61
P-3	MH-3	1,039.29	MH-2	1,039.10	0.19	102.10	PVC	250	40.52	26.16
P-30	MH-30	1,045.00	MH-31	1,044.40	0.35	172.70	VCT	200	0.51	19.71
P-31	MH-31	1,044.36	MH-23	1,043.84	0.52	99.20	VCT	200	23.47	24.21
P-32	MH-32	1,045.04	MH-31	1,044.38	0.38	172.50	VCT	200	3.49	20.69
P-33	MH-33	1,046.71	MH-32	1,045.05	1.17	141.50	VCT	200	2.70	36.23
P-34	MH-34	1,048.49	MH-33	1,046.73	1.24	142.10	VCT	200	1.90	37.22
P-35	MH-35	1,053.89	MH-34	1,048.50	3.13	172.40	VCT	200	0.00	59.14
P-35A	MH-35	1,053.90	MH-36	1,052.36	1.23	125.50	VCT	200	0.00	37.05
P-36A	MH-36	1,052.13	MH-28	1,049.66	2.48	99.60	Concrete	200	3.48	52.67
P-37	MH-37	1,045.97	MH-38	1,045.89	0.41	19.60	VCT	200	0.00	21.37
P-38	MH-38	1,045.88	MH-39	1,045.57	0.68	45.40	VCT	200	0.26	27.64
P-39	MH-39	1,045.57	MH-30	1,045.03	0.55	99.00	VCT	200	0.29	24.70
P-4	MH-4	1,039.57	MH-3	1,039.29	0.19	150.81	PVC	250	40.52	26.13
P-40	MH-40	1,045.12	MH-31	1,044.37	0.75	99.40	VCT	200	15.95	29.05
P-41	MH-41	1,046.07	MH-40	1,045.14	0.54	172.60	VCT	200	0.00	24.55
P-42	MH-42	1,050.07	MH-34	1,048.70	1.39	98.60	VCT	200	0.67	39.42
P-43	MH-43	1,059.89	MH-42	1,050.07	5.69	172.50	VCT	200	0.00	79.80
P-44	MH-43	1,059.89	MH-44	1,054.62	4.24	124.40	Concrete	200	0.00	68.84
P-44A	MH-44	1,054.62	MH-36	1,052.13	2.50	99.50	Concrete	200	2.70	52.91
P-46	MH-46	1,045.48	MH-40	1,045.13	0.35	99.10	VCT	200	13.83	19.88
P-47	MH-47	1,047.18	MH-46	1,045.50	0.97	172.50	VCT	200	0.00	33.01
P-48	MH-48	1,055.97	MH-44	1,054.64	1.33	100.10	PVC	200	2.24	38.55
P-49	MH-49	1,046.41	MH-46	1,045.48	0.92	101.10	VCT	200	11.81	32.08
P-5	MH-5	1,039.96	MH-4	1,039.59	0.24	152.39	VCT	200	40.48	16.48
P-50	MH-50	1,051.13	MH-49	1,046.68	2.58	172.60	VCT	200	4.03	53.70

Label	U/S MH	U/S Inv (m)	D/S MH	D/S Inv (m)	Slope (%)	Length (m)	Material	Diameter (mm)	Total Flow (l/s)	Capacity (l/s)
P-51	MH-51	1,055.03	MH-50	1,051.14	3.64	106.90	VCT	200	0.22	63.80
P-52	MH-52	1,057.34	MH-48	1,056.00	1.33	100.90	PVC	200	2.24	38.54
P-53	MH-53	1,047.17	MH-38	1,045.91	0.47	267.40	VCT	200	0.26	22.96
P-54	MH-54	1,049.28	MH-53	1,047.23	1.33	153.70	VCT	200	0.00	38.63
P-54A	MH-54	1,049.28	MH-55	1,047.49	1.07	167.60	VCT	200	0.00	34.56
P-55	MH-55	1,047.33	MH-49	1,046.42	1.32	68.70	VCT	200	6.33	38.49
P-56	MH-56	1,057.03	MH-50	1,051.38	5.38	105.00	VCT	200	2.57	77.58
P-57	MH-57	1,059.79	MH-56	1,057.07	2.53	107.40	VCT	200	0.22	53.23
P-58	MH-58	1,061.22	MH-59	1,060.82	0.33	119.50	PVC	200	0.22	19.35
P-59	MH-59	1,060.78	MH-60	1,060.05	0.63	115.70	PVC	200	1.01	26.57
P-6	MH-6	1,040.44	MH-5	1,040.00	0.31	141.70	VCT	200	34.25	18.64
P-60	MH-60	1,060.01	MH-60A	1,059.78	0.34	67.60	PVC	200	1.23	19.51
P-60A	MH-60A	1,059.76	MH-61	1,059.40	0.50	72.60	PVC	200	1.23	23.55
P-61	MH-61	1,059.37	MH-52	1,057.35	1.95	103.70	PVC	200	2.24	46.68
P-63	MH-63	1,049.41	MH-53	1,047.22	0.83	262.40	VCT	200	0.20	30.55
P-64	MH-64	1,050.78	MH-63	1,049.43	0.94	143.10	VCT	200	0.10	32.49
P-65	MH-65	1,051.49	MH-64	1,050.78	0.56	126.60	VCT	200	0.04	25.05
P-66	MH-66	1,055.70	MH-65	1,051.49	3.04	138.60	VCT	200	0.00	58.29
P-66A	MH-66	1,055.08	MH-55	1,047.34	3.42	226.60	VCT	200	4.03	61.81
P-67	MH-67	1,060.55	MH-100	1,057.82	2.68	102.00	VCT	200	0.00	54.72
P-67A	MH-67	1,060.11	MH-56	1,057.04	2.87	106.80	VCT	200	1.12	56.71
P-68	MH-68	1,065.83	MH-67	1,060.60	3.62	144.60	VCT	200	0.00	63.61
P-69	MH-69	1,066.96	MH-70	1,066.47	0.53	93.20	PVC	200	0.00	24.25
P-7	MH-7	1,040.90	MH-6	1,040.46	0.33	133.60	VCT	200	33.79	19.19
P-70	MH-70	1,066.44	MH-71	1,065.99	0.48	94.00	PVC	200	0.67	23.14
P-71	MH-71	1,065.96	MH-71A	1,064.11	1.96	94.30	PVC	200	1.01	46.85
P-71A	MH-71A	1,063.08	MH-72	1,062.52	0.40	139.40	PVC	200	1.01	21.20
P-72	MH-72	1,062.52	MH-61	1,060.00	2.58	97.70	PVC	200	1.01	53.71
P-73	MH-73	1,061.84	MH-66	1,055.09	4.26	158.30	VCT	200	0.90	69.06
P-74	MH-74	1,064.42	MH-73	1,061.85	2.54	101.10	PVC	200	0.00	53.32
P-75	MH-75	1,047.80	MH-76	1,047.55	0.34	73.20	PVC	200	3.74	19.55
P-76	MH-76	1,047.53	MH-77	1,047.20	0.33	100.90	PVC	250	3.74	34.68
P-77	MH-77	1,047.18	MH-78	1,046.89	0.26	110.30	PVC	250	3.74	31.09
P-78	MH-78	1,046.86	MH-79	1,046.49	0.34	109.20	PVC	250	3.74	35.30
P-79	MH-79	1,046.49	MH-80	1,046.23	0.29	88.90	PVC	250	3.74	32.79
P-8	MH-8	1,041.13	MH-7	1,040.92	0.36	59.10	VCT	200	33.79	19.94
P-80	MH-80	1,046.21	MH-81	1,046.06	0.51	29.50	PVC	250	3.74	43.24
P-81	MH-81	1,046.01	MH-82	1,045.95	0.07	80.60	PVC	250	3.74	16.55
P-82	MH-82	1,045.88	MH-83	1,045.42	0.72	64.10	Concrete	300	44.26	83.53
P-83	MH-83	1,045.39	MH-84	1,044.41	0.66	147.70	Concrete	300	44.26	80.32
P-84	MH-84	1,044.31	MH-85	1,043.20	1.46	75.80	Concrete	300	44.26	119.33
P-85	MH-85	1,043.10	MH-86	1,041.46	1.88	87.40	Concrete	300	44.26	135.08
P-86	MH-86	1,041.43	MH-87	1,041.30	0.36	36.60	Concrete	300	44.26	58.77
P-87	MH-87	1,041.27	MH-88	1,040.93	0.37	92.90	Concrete	300	44.26	59.66
P-88	MH-88	1,040.85	Outlet	1,040.72	0.39	33.20	Concrete	300	44.26	61.70
P-9	MH-9	1,041.38	MH-8	1,041.14	0.45	53.80	VCT	200	33.77	22.34
P-C1	MH-C1	1,038.77	MH-C2	1,038.47	0.74	40.70	VCT	200	0.04	28.71
P-C2	MH-C2	1,038.45	MH-C3	1,038.18	0.92	29.50	VCT	200	0.04	32.00
P-C3	MH-C3	1,038.17	LS-Camp	1,038.10	0.43	16.30	VCT	200	0.04	21.92

Profile
Scenario: 2006 (Existing) - WWF

MH-55 to LS1 Forcemain



Upgraded - Sanitary System Manhole Data - Wet Weather Flow
(DWF @ 525 Lpcd peaked + I/I @ 2440 Lpcd for existing & 500 Lpcd for new)

Label	Rim Elev. (m)	Sump Elev. (m)	Total Flow (l/s)	HGL (m)
MH-1	1040.36	1038.89	42.81	1039.05
MH-10	1043.30	1040.84	0.38	1040.86
MH-100	1061.00	1057.82	0.00	1057.82
MH-11	1043.30	1040.37	5.39	1040.44
MH-12	1045.94	1042.97	0.55	1043.04
MH-13	1047.91	1045.17	0.00	1045.17
MH-14	1049.47	1048.10	9.57	1048.20
MH-14A	1049.67	1048.12	9.57	1048.27
MH-15	1047.17	1045.15	0.00	1045.15
MH-16	1046.42	1043.26	36.01	1043.41
MH-17	1046.99	1044.07	1.33	1044.11
MH-18	1046.52	1043.59	2.55	1043.65
MH-19	1046.34	1044.62	1.33	1044.65
MH-1A	1049.99	1047.27	42.81	1047.47
MH-1B	1050.56	1046.84	42.81	1047.03
MH-1C	1048.68	1046.27	42.81	1046.43
MH-2	1041.05	1038.96	42.81	1039.15
MH-20	1048.43	1045.29	0.00	1045.29
MH-21	1050.32	1048.36	9.31	1048.46
MH-22	1048.03	1046.18	0.00	1046.18
MH-23	1047.48	1043.83	33.58	1043.99
MH-24	1047.14	1044.56	4.78	1044.63
MH-25	1047.55	1045.10	3.55	1045.16
MH-26	1049.01	1046.00	2.44	1046.06
MH-27	1051.19	1048.69	1.11	1048.72
MH-28	1052.62	1049.59	9.31	1049.69
MH-29	1047.77	1045.18	0.00	1045.18
MH-3	1040.49	1039.21	42.81	1039.40
MH-30	1047.93	1045.00	0.51	1045.02
MH-31	1047.58	1044.35	25.90	1044.49
MH-32	1047.50	1045.04	3.46	1045.10
MH-33	1049.40	1046.71	2.68	1046.75
MH-34	1050.72	1048.49	1.89	1048.53
MH-35	1056.42	1053.89	0.00	1053.89
MH-36	1055.33	1052.13	9.31	1052.21
MH-37	1047.88	1045.97	0.00	1045.97
MH-38	1047.64	1045.88	0.26	1045.89
MH-39	1047.91	1045.57	0.28	1045.59
MH-4	1041.78	1039.56	42.81	1039.75
MH-40	1047.78	1045.12	18.45	1045.24
MH-41	1049.22	1046.07	0.00	1046.07
MH-42	1053.00	1050.07	0.67	1050.09
MH-43	1060.19	1059.89	0.00	1059.89
MH-44	1057.38	1054.62	8.53	1054.70
MH-46	1048.44	1045.48	16.34	1045.62
MH-47	1050.50	1047.18	0.00	1047.18
MH-48	1058.80	1055.97	8.07	1056.05
MH-49	1049.77	1046.41	14.34	1046.51
MH-5	1042.09	1039.91	42.77	1040.10
MH-50	1054.29	1051.13	4.00	1051.18
MH-51	1057.99	1055.03	0.22	1055.04
MH-52	1060.16	1057.34	8.07	1057.42
MH-53	1050.72	1047.17	0.26	1047.18

Label	Rim Elev. (m)	Sump Elev. (m)	Total Flow (l/s)	HGL (m)
MH-54	1051.58	1049.28	0.00	1049.28
MH-55	1051.43	1047.33	8.90	1047.41
MH-56	1059.74	1057.03	2.55	1057.07
MH-57	1062.91	1059.79	0.22	1059.80
MH-58	1064.17	1061.22	0.22	1061.24
MH-59	1066.26	1060.78	1.00	1060.81
MH-6	1042.62	1040.37	36.59	1040.55
MH-60	1062.75	1060.01	1.22	1060.04
MH-60A	1063.47	1059.76	1.22	1059.79
MH-61	1064.53	1059.37	8.07	1059.45
MH-63	1053.78	1049.41	0.20	1049.42
MH-64	1054.15	1050.78	0.10	1050.79
MH-65	1054.61	1051.49	0.04	1051.50
MH-66	1058.29	1055.08	6.62	1055.15
MH-67	1063.16	1060.11	1.11	1060.14
MH-68	1069.01	1065.83	0.00	1065.83
MH-69	1069.35	1066.96	0.00	1066.96
MH-7	1043.92	1040.81	36.14	1040.99
MH-70	1069.89	1066.44	0.67	1066.46
MH-71	1068.92	1065.96	1.00	1065.99
MH-71A	1064.70	1063.08	1.00	1063.11
MH-72	1065.52	1062.52	6.85	1062.59
MH-73	1064.75	1061.84	3.52	1061.89
MH-74	1067.21	1064.42	2.63	1064.46
MH-75	1049.18	1047.80	9.57	1047.90
MH-76	1049.83	1047.53	9.57	1047.62
MH-77	1050.30	1047.18	9.57	1047.28
MH-78	1050.41	1046.86	9.57	1046.95
MH-79	1049.41	1046.49	9.57	1046.58
MH-8	1044.25	1041.02	36.14	1041.20
MH-80	1048.68	1046.21	9.57	1046.29
MH-81	1049.06	1046.01	9.57	1046.14
MH-82	1048.20	1045.88	52.38	1046.06
MH-83	1047.57	1045.39	52.38	1045.57
MH-84	1046.51	1044.31	52.38	1044.49
MH-85	1044.60	1043.10	52.38	1043.28
MH-86	1042.96	1041.43	52.38	1041.65
MH-87	1042.88	1041.27	52.38	1041.52
MH-88	1042.80	1040.85	52.38	1041.29
MH-9	1044.01	1041.21	36.11	1041.39
MH-C1	1041.15	1038.77	0.04	1038.78
MH-C2	1040.95	1038.45	0.04	1038.46
MH-C3	1040.67	0.00	0.04	1038.18

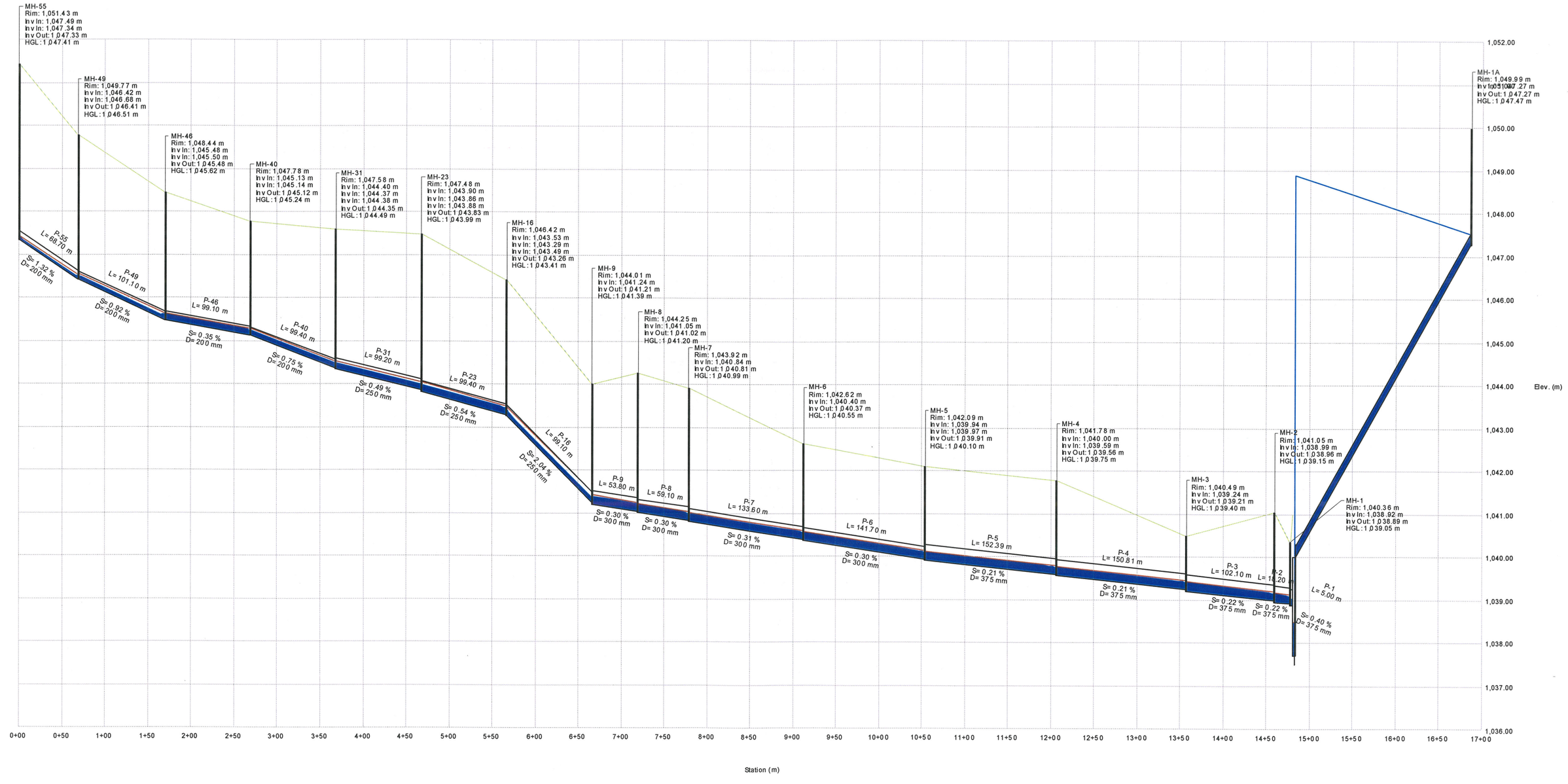
Upgraded - Sanitary System Pipe Data - Wet Weather Flow
(DWF @ 525 Lpcd peaked + I/I @ 2440 Lpcd for existing & 500 Lpcd for new)

Label	U/S MH	U/S Inv (m)	D/S MH	D/S Inv (m)	Slope (%)	Length (m)	Material	Diameter (mm)	Total Flow (l/s)	Capacity (l/s)
P-1	MH-1	1,038.89	LS-1	1,038.87	0.40	5.00	PVC	375	42.81	113.08
P-10	MH-9	1,041.45	MH-10	1,040.86	0.35	169.80	VCT	200	0.00	19.71
P-100	MH-100	1,057.82	MH-66	1,055.22	2.75	94.40	VCT	200	0.00	55.51
P-11	MH-10	1,040.84	MH-11	1,040.37	0.33	141.80	VCT	200	0.38	19.26
P-11A	MH-11	1,040.37	MH-5	1,039.97	0.40	100.60	VCT	200	5.39	21.09
P-12	MH-12	1,043.02	MH-11	1,040.46	1.81	141.60	VCT	200	0.55	44.97
P-13	MH-13	1,045.17	MH-12	1,042.97	1.55	142.00	VCT	200	0.00	41.63
P-14	MH-14	1,048.10	MH-75	1,047.83	0.39	69.80	PVC	200	9.57	20.80
P-14A	MH-14A	1,048.12	MH-14	1,048.12	0.00	29.80	PVC	200	9.57	1.94
P-15	MH-15	1,045.15	MH-16	1,043.53	1.37	118.40	VCT	200	0.00	39.12
P-16	MH-16	1,043.26	MH-9	1,041.24	2.04	99.10	PVC	250	36.01	86.58
P-17	MH-17	1,044.07	MH-16	1,043.49	0.34	172.60	VCT	200	1.33	19.39
P-18	MH-18	1,044.59	MH-17	1,044.08	0.38	135.80	VCT	200	0.00	20.50
P-18A	MH-18	1,043.61	MH-11	1,040.43	3.23	98.60	VCT	200	2.55	60.06
P-19	MH-19	1,044.62	MH-18	1,043.62	0.70	141.90	VCT	200	1.33	28.08
P-1A	MH-1A	1,047.27	MH-1B	1,046.84	0.31	137.10	Concrete	300	42.81	55.22
P-1B	MH-1B	1,046.84	MH-1C	1,046.33	0.35	144.80	PVC	300	42.81	58.52
P-1C	MH-1C	1,046.27	MH-82	1,045.90	0.59	62.70	Concrete	300	42.81	75.75
P-2	MH-2	1,038.96	MH-1	1,038.92	0.22	18.20	PVC	375	42.81	83.82
P-20	MH-20	1,045.29	MH-19	1,044.64	0.46	141.50	VCT	200	0.00	22.67
P-21	MH-21	1,048.36	MH-14A	1,048.17	0.27	70.40	PVC	200	9.31	17.38
P-22	MH-22	1,046.18	MH-23	1,043.90	1.36	167.40	VCT	200	0.00	39.03
P-23	MH-23	1,043.83	MH-16	1,043.29	0.54	99.40	PVC	250	33.58	44.70
P-24	MH-24	1,044.56	MH-23	1,043.88	0.39	172.60	VCT	200	4.78	20.99
P-25	MH-25	1,045.10	MH-24	1,044.57	0.37	141.70	VCT	200	3.55	20.45
P-26	MH-26	1,046.02	MH-25	1,045.11	0.64	142.10	VCT	200	2.44	26.76
P-27	MH-27	1,048.69	MH-26	1,046.00	1.53	176.10	VCT	200	1.11	41.34
P-28	MH-28	1,049.59	MH-27	1,048.69	0.78	115.10	VCT	200	0.00	29.57
P-28A	MH-28	1,049.61	MH-21	1,048.41	1.38	87.00	PVC	200	9.31	39.28
P-29	MH-29	1,045.18	MH-30	1,045.02	0.46	35.00	VCT	200	0.00	22.61
P-3	MH-3	1,039.21	MH-2	1,038.99	0.22	102.10	PVC	375	42.81	82.99
P-30	MH-30	1,045.00	MH-31	1,044.40	0.35	172.70	VCT	200	0.51	19.71
P-31	MH-31	1,044.35	MH-23	1,043.86	0.49	99.20	PVC	250	25.90	42.62
P-32	MH-32	1,045.04	MH-31	1,044.38	0.38	172.50	VCT	200	3.46	20.69
P-33	MH-33	1,046.71	MH-32	1,045.05	1.17	141.50	VCT	200	2.68	36.23
P-34	MH-34	1,048.49	MH-33	1,046.73	1.24	142.10	VCT	200	1.89	37.22
P-35	MH-35	1,053.89	MH-34	1,048.50	3.13	172.40	VCT	200	0.00	59.14
P-35A	MH-35	1,053.90	MH-36	1,052.36	1.23	125.50	VCT	200	0.00	37.05
P-36A	MH-36	1,052.13	MH-28	1,049.66	2.48	99.60	Concrete	200	9.31	52.67
P-37	MH-37	1,045.97	MH-38	1,045.89	0.41	19.60	VCT	200	0.00	21.37
P-38	MH-38	1,045.88	MH-39	1,045.57	0.68	45.40	VCT	200	0.26	27.64
P-39	MH-39	1,045.57	MH-30	1,045.03	0.55	99.00	VCT	200	0.28	24.70
P-4	MH-4	1,039.56	MH-3	1,039.24	0.21	150.81	PVC	375	42.81	82.36
P-40	MH-40	1,045.12	MH-31	1,044.37	0.75	99.40	VCT	200	18.45	29.05
P-41	MH-41	1,046.07	MH-40	1,045.14	0.54	172.60	VCT	200	0.00	24.55
P-42	MH-42	1,050.07	MH-34	1,048.70	1.39	98.60	VCT	200	0.67	39.42
P-43	MH-43	1,059.89	MH-42	1,050.07	5.69	172.50	VCT	200	0.00	79.80
P-44	MH-43	1,059.89	MH-44	1,054.62	4.24	124.40	Concrete	200	0.00	68.84
P-44A	MH-44	1,054.62	MH-36	1,052.13	2.50	99.50	Concrete	200	8.53	52.91
P-46	MH-46	1,045.48	MH-40	1,045.13	0.35	99.10	VCT	200	16.34	19.88
P-47	MH-47	1,047.18	MH-46	1,045.50	0.97	172.50	VCT	200	0.00	33.01
P-48	MH-48	1,055.97	MH-44	1,054.64	1.33	100.10	PVC	200	8.07	38.55
P-49	MH-49	1,046.41	MH-46	1,045.48	0.92	101.10	VCT	200	14.34	32.08
P-5	MH-5	1,039.91	MH-4	1,039.59	0.21	152.39	PVC	375	42.77	81.93
P-50	MH-50	1,051.13	MH-49	1,046.68	2.58	172.60	VCT	200	4.00	53.70

Label	U/S MH	U/S Inv (m)	D/S MH	D/S Inv (m)	Slope (%)	Length (m)	Material	Diameter (mm)	Total Flow (l/s)	Capacity (l/s)
P-51	MH-51	1,055.03	MH-50	1,051.14	3.64	106.90	VCT	200	0.22	63.80
P-52	MH-52	1,057.34	MH-48	1,056.00	1.33	100.90	PVC	200	8.07	38.54
P-53	MH-53	1,047.17	MH-38	1,045.91	0.47	267.40	VCT	200	0.26	22.96
P-54	MH-54	1,049.28	MH-53	1,047.23	1.33	153.70	VCT	200	0.00	38.63
P-54A	MH-54	1,049.28	MH-55	1,047.49	1.07	167.60	VCT	200	0.00	34.56
P-55	MH-55	1,047.33	MH-49	1,046.42	1.32	68.70	VCT	200	8.90	38.49
P-56	MH-56	1,057.03	MH-50	1,051.38	5.38	105.00	VCT	200	2.55	77.58
P-57	MH-57	1,059.79	MH-56	1,057.07	2.53	107.40	VCT	200	0.22	53.23
P-58	MH-58	1,061.22	MH-59	1,060.82	0.33	119.50	PVC	200	0.22	19.35
P-59	MH-59	1,060.78	MH-60	1,060.05	0.63	115.70	PVC	200	1.00	26.57
P-6	MH-6	1,040.37	MH-5	1,039.94	0.30	141.70	PVC	300	36.59	54.32
P-60	MH-60	1,060.01	MH-60A	1,059.78	0.34	67.60	PVC	200	1.22	19.51
P-60A	MH-60A	1,059.76	MH-61	1,059.40	0.50	72.60	PVC	200	1.22	23.55
P-61	MH-61	1,059.37	MH-52	1,057.35	1.95	103.70	PVC	200	8.07	46.68
P-63	MH-63	1,049.41	MH-53	1,047.22	0.83	262.40	VCT	200	0.20	30.55
P-64	MH-64	1,050.78	MH-63	1,049.43	0.94	143.10	VCT	200	0.10	32.49
P-65	MH-65	1,051.49	MH-64	1,050.78	0.56	126.60	VCT	200	0.04	25.05
P-66	MH-66	1,055.70	MH-65	1,051.49	3.04	138.60	VCT	200	0.00	58.29
P-66A	MH-66	1,055.08	MH-55	1,047.34	3.42	226.60	VCT	200	6.62	61.81
P-67	MH-67	1,060.55	MH-100	1,057.82	2.68	102.00	VCT	200	0.00	54.72
P-67A	MH-67	1,060.11	MH-56	1,057.04	2.87	106.80	VCT	200	1.11	56.71
P-68	MH-68	1,065.83	MH-67	1,060.60	3.62	144.60	VCT	200	0.00	63.61
P-69	MH-69	1,066.96	MH-70	1,066.47	0.53	93.20	PVC	200	0.00	24.25
P-7	MH-7	1,040.81	MH-6	1,040.40	0.31	133.60	PVC	300	36.14	54.63
P-70	MH-70	1,066.44	MH-71	1,065.99	0.48	94.00	PVC	200	0.67	23.14
P-71	MH-71	1,065.96	MH-71A	1,064.11	1.96	94.30	PVC	200	1.00	46.85
P-71A	MH-71A	1,063.08	MH-72	1,062.52	0.40	139.40	PVC	200	1.00	21.20
P-72	MH-72	1,062.52	MH-61	1,060.00	2.58	97.70	PVC	200	6.85	53.71
P-73	MH-73	1,061.84	MH-66	1,055.09	4.26	158.30	VCT	200	3.52	69.06
P-74	MH-74	1,064.42	MH-73	1,061.85	2.54	101.10	PVC	200	2.63	53.32
P-75	MH-75	1,047.80	MH-76	1,047.55	0.34	73.20	PVC	200	9.57	19.55
P-76	MH-76	1,047.53	MH-77	1,047.20	0.33	100.90	PVC	250	9.57	34.68
P-77	MH-77	1,047.18	MH-78	1,046.89	0.26	110.30	PVC	250	9.57	31.09
P-78	MH-78	1,046.86	MH-79	1,046.49	0.34	109.20	PVC	250	9.57	35.30
P-79	MH-79	1,046.49	MH-80	1,046.23	0.29	88.90	PVC	250	9.57	32.79
P-8	MH-8	1,041.02	MH-7	1,040.84	0.30	59.10	PVC	300	36.14	54.42
P-80	MH-80	1,046.21	MH-81	1,046.06	0.51	29.50	PVC	250	9.57	43.24
P-81	MH-81	1,046.01	MH-82	1,045.95	0.07	80.60	PVC	250	9.57	16.55
P-82	MH-82	1,045.88	MH-83	1,045.42	0.72	64.10	Concrete	300	52.38	83.53
P-83	MH-83	1,045.39	MH-84	1,044.41	0.66	147.70	Concrete	300	52.38	80.32
P-84	MH-84	1,044.31	MH-85	1,043.20	1.46	75.80	Concrete	300	52.38	119.33
P-85	MH-85	1,043.10	MH-86	1,041.46	1.88	87.40	Concrete	300	52.38	135.08
P-86	MH-86	1,041.43	MH-87	1,041.30	0.36	36.60	Concrete	300	52.38	58.77
P-87	MH-87	1,041.27	MH-88	1,040.93	0.37	92.90	Concrete	300	52.38	59.66
P-88	MH-88	1,040.85	Outlet	1,040.72	0.39	33.20	Concrete	300	52.38	61.70
P-9	MH-9	1,041.21	MH-8	1,041.05	0.30	53.80	PVC	300	36.11	53.78
P-C1	MH-C1	1,038.77	MH-C2	1,038.47	0.74	40.70	VCT	200	0.04	28.71
P-C2	MH-C2	1,038.45	MH-C3	1,038.18	0.92	29.50	VCT	200	0.04	32.00
P-C3	MH-C3	1,038.17	LS-Camp	1,038.10	0.43	16.30	VCT	200	0.04	21.92

Profile
Scenario: 2026 (Upgraded) - WWF

MH-55 to LS1 Forcemain



Appendix I – Sewage Collection System Cost Estimates

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
Summary

Cost Estimate

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
Summary					
1	Phase 1 (Lift Station to Manhole 5)	1	L.S.	$ 236,000.00	$ 236,000.00
2	Phase 2 (Manhole 5 to Manhole 9)	1	L.S.	$ 391,000.00	$ 391,000.00
3	Phase 3 (Manhole 9 to Manhole 31)	1	L.S.	$ 346,000.00	$ 346,000.00
		SUBTOTAL			$ 973,000.00
CONTINGENCY (15%)					$ 146,000.00
GEOTECHNICAL (3.5%)					$ 39,200.00
ENGINEERING (12%)					$ 134,300.00
		TOTAL			**$ 1,293,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
Phase 1 - Trunk from Lift Station 1 to Manhole 5

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 40,000.00	$ 40,000.00
		SUBTOTAL			$ 40,000.00
CONTINGENCY (15%)					$ 6,000.00
GEOTECHNICAL (3.5%)					$ 1,600.00
ENGINEERING (12%)					$ 5,500.00
		TOTAL			**$ 53,000.00**
Sanitary Sewer Work					
1	Supply and Install 375 mm PVC Sanitary Sewer Pipe and Fittings	405	m	$ 350.00	$ 141,750.00
2	Supply and Install Type I Standard Precast Manhole 1220 Diameter	9.5	vm	$ 1,500.00	$ 14,250.00
3	Tie-in to Existing	3	ea	$ 5,000.00	$ 15,000.00
		SUBTOTAL			$ 171,000.00
CONTINGENCY (15%)					$ 25,700.00
GEOTECHNICAL (3.5%)					$ 6,900.00
ENGINEERING (12%)					$ 23,600.00
		TOTAL			**$ 227,000.00**
Miscellaneous					
1	Supply and Install Topsoil & Sod	2,500	m^2	$ 10.00	$ 25,000.00
		SUBTOTAL			$ 25,000.00
CONTINGENCY (15%)					$ 3,800.00
GEOTECHNICAL (3.5%)					$ 1,000.00
ENGINEERING (12%)					$ 3,500.00
		TOTAL			**$ 33,000.00**
		GRAND SUBTOTAL			**$ 236,000.00**
TOTAL CONTINGENCY (15%)					$ 35,400.00
TOTAL GEOTECHNICAL (3.5%)					$ 9,500.00
TOTAL ENGINEERING (12%)					$ 32,600.00
		GRAND TOTAL			**$ 314,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
Phase 2 - Trunk from Manhole 5 to Manhole 9

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 65,000.00	$ 65,000.00
2	Traffic Accommodation	1	LS	$ 10,000.00	$ 10,000.00
		SUBTOTAL			$ 75,000.00
CONTINGENCY (15%)					$ 11,300.00
GEOTECHNICAL (3.5%)					$ 3,000.00
ENGINEERING (12%)					$ 10,400.00
		TOTAL			**$ 100,000.00**
Sanitary Sewer Work					
1	Supply and Install 300 mm PVC Sanitary Sewer Pipe and Fittings	390	m	$ 300.00	$ 117,000.00
2	Supply and Install Type I Standard Precast Manhole 1220 Diameter	11	vm	$ 1,500.00	$ 16,500.00
3	Sanitary Service Connections, complete	18	ea	$ 2,000.00	$ 36,000.00
		SUBTOTAL			$ 170,000.00
CONTINGENCY (15%)					$ 25,500.00
GEOTECHNICAL (3.5%)					$ 6,800.00
ENGINEERING (12%)					$ 23,500.00
		TOTAL			**$ 226,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	2,800	m^2	$ 27.00	$ 75,600.00
2	Remove & Replace Asphalt (75 mm compacted depth)	2,800	m^2	$ 25.00	$ 70,000.00
		SUBTOTAL			$ 146,000.00
CONTINGENCY (15%)					$ 21,900.00
GEOTECHNICAL (3.5%)					$ 5,900.00
ENGINEERING (12%)					$ 20,100.00
		TOTAL			**$ 194,000.00**
		GRAND SUBTOTAL			**$ 391,000.00**
TOTAL CONTINGENCY (15%)					$ 58,700.00
TOTAL GEOTECHNICAL (3.5%)					$ 15,700.00
TOTAL ENGINEERING (12%)					$ 54,000.00
		GRAND TOTAL			**$ 519,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
Phase 3 - Trunk from Manhole 9 to Manhole 31

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 58,000.00	$ 58,000.00
2	Traffic Accommodation	1	LS	$ 10,000.00	$ 10,000.00
		SUBTOTAL			$ 68,000.00
CONTINGENCY (15%)					$ 10,200.00
GEOTECHNICAL (3.5%)					$ 2,700.00
ENGINEERING (12%)					$ 9,400.00
		TOTAL			**$ 90,000.00**
Sanitary Sewer Work					
1	Supply and Install 250 mm PVC Sanitary Sewer Pipe and Fittings	300	m	$ 260.00	$ 78,000.00
3	Supply and Install Type I Standard Precast Manhole 1220 Diameter	10	vm	$ 1,500.00	$ 15,000.00
4	Sanitary Service Connections, complete	30	ea	$ 2,000.00	$ 60,000.00
		SUBTOTAL			$ 153,000.00
CONTINGENCY (15%)					$ 23,000.00
GEOTECHNICAL (3.5%)					$ 6,200.00
ENGINEERING (12%)					$ 21,100.00
		TOTAL			**$ 203,000.00**
Road Work					
1	Remove & Replace Road Structure (300 mm subgrade prep, 500 mm sub-base, 100 mm base)	2,400	m^2	$ 27.00	$ 64,800.00
2	Remove & Replace Asphalt (75 mm compacted depth)	2,400	m^2	$ 25.00	$ 60,000.00
		SUBTOTAL			$ 125,000.00
CONTINGENCY (15%)					$ 18,800.00
GEOTECHNICAL (3.5%)					$ 5,000.00
ENGINEERING (12%)					$ 17,300.00
		TOTAL			**$ 166,000.00**
		GRAND SUBTOTAL			**$ 346,000.00**
TOTAL CONTINGENCY (15%)					$ 51,900.00
TOTAL GEOTECHNICAL (3.5%)					$ 13,900.00
TOTAL ENGINEERING (12%)					$ 47,700.00
		GRAND TOTAL			**$ 460,000.00**

Appendix J – Sewage Pumping & Treatment Cost Estimates

mpe ENGINEERING LTD.

Milk River Sewage Treatment System - Proposed Lift Station No. 1 & Forcemain Upgrades

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mob/demob/bonding/insurance	1	LS	$ 30,000.00	$ 30,000.00
		SUBTOTAL			$ 30,000.00
Lift Station No.1					
1	Supply and Install Submersible Sewage Pumps, complete	3	LS	$ 12,000.00	$ 36,000.00
2	Mechanical Piping and Valves	1	LS	$ 20,000.00	$ 20,000.00
3	Magnetic Flow Meter	1	LS	$ 5,000.00	$ 5,000.00
4	Building Sensors (Low Temp, Smoke, Heat, Intrusion)	1	LS	$ 3,000.00	$ 3,000.00
5	Misc. Sensors and Switches	1	LS	$ 3,000.00	$ 3,000.00
6	Electrical	1	LS	$ 10,000.00	$ 10,000.00
7	Programable Logic Controller (PLC)	1	LS	$ 5,000.00	$ 5,000.00
8	Supervisory Control and Data Acquisition (SCADA)	1	LS	$ 5,000.00	$ 5,000.00
9	Panel View	1	LS	$ 3,000.00	$ 3,000.00
10	Radio Link To Town Shop	1	LS	$ 5,000.00	$ 5,000.00
11	Programming	1	LS	$ 15,000.00	$ 15,000.00
12	Misc. Building Upgrades	1	LS	$ 15,000.00	$ 15,000.00
		SUBTOTAL			$ 125,000.00
Forcemain					
1	Supply and Install 250 mm PVC SDR 41 Pipe & Fittings	215	m	$ 275.00	$ 59,000.00
2	Existing Manhole Connection	1	LS	$ 5,000.00	$ 5,000.00
3	Work Site Restoration	430	m^2	$ 10.00	$ 4,000.00
4	Road Crossing (Open Cut)	1	LS	$ 10,000.00	$ 10,000.00
		SUBTOTAL			$ 78,000.00
		GRAND SUBTOTAL			**$ 233,000.00**
TOTAL CONTINGENCY (15%)					$ 35,000.00
TOTAL ENGINEERING (12%)					$ 32,000.00
		GRAND TOTAL			**$ 300,000.00**

mpe ENGINEERING LTD.

Milk River Sewage Treatment System - Proposed Campground Lift Station Upgrades

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mob/demob/bonding/insurance	1	LS	$ 10,000.00	$ 10,000.00
	SUBTOTAL				$ 10,000.00
Campgroumd Lift Station					
1	Supply and Install Submersible Sewage Pumps, complete	2	LS	$ 10,000.00	$ 20,000.00
2	Mechanical Piping and Valves	1	LS	$ 10,000.00	$ 10,000.00
3	Building Sensors (Low Temp, Smoke, Heat, Intrusion)	1	LS	$ 3,000.00	$ 3,000.00
4	Misc. Sensors and Switches	1	LS	$ 3,000.00	$ 3,000.00
5	Electrical	1	LS	$ 6,000.00	$ 6,000.00
6	Radio Link To Town Shop	1	LS	$ 10,000.00	$ 10,000.00
7	Programming and SCADA	1	LS	$ 10,000.00	$ 10,000.00
8	Misc. Building Upgrades	1	LS	$ 5,000.00	$ 5,000.00
	SUBTOTAL				$ 67,000.00
	GRAND SUBTOTAL				**$ 77,000.00**
TOTAL CONTINGENCY (15%)					$ 12,000.00
TOTAL ENGINEERING (12%)					$ 11,000.00
	GRAND TOTAL				**$ 100,000.00**

ENGINEERING LTD.

Milk River Sewage Treatment System - Proposed Lagoon System Upgrades

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mob/demob/bonding/insurance	1	LS	$ 80,000.00	$ 80,000.00
		SUBTOTAL			$ 80,000.00
Anaerobic Cells					
1	Replacement of Interconnecting pipe, complete	1	LS	$ 50,000.00	$ 50,000.00
2	Level Control Wier	1	LS	$ 20,000.00	$ 20,000.00
3	Desludging	3	LS	$ 7,500.00	$ 23,000.00
4	Site Work	1	LS	$ 10,000.00	$ 10,000.00
		SUBTOTAL			$ 103,000.00
Facultative Cells					
1	Level Control Wier	1	LS	$ 20,000.00	$ 20,000.00
2	Desludging	1	LS	$ 40,000.00	$ 40,000.00
3	Site Work	1	LS	$ 20,000.00	$ 20,000.00
		SUBTOTAL			$ 80,000.00
Proposed Storage Cell (45 000 m^3)					
1	Common Excavation	50000	m3	$ 4.00	$ 200,000.00
2	Compacted Embankment	20000	m3	$ 4.00	$ 80,000.00
3	Stripping Excavation	8000	m3	$ 3.50	$ 28,000.00
4	Supply and install clay liner	25000	m2	$ 5.50	$ 138,000.00
5	Supply and install amour gravel	1500	m3	$ 40.00	$ 60,000.00
6	Supply and install rip rap	1200	m3	$ 65.00	$ 78,000.00
7	Misc. Piping	1	LS	$ 10,000.00	$ 10,000.00
8	Fencing	800	m	$ 30.00	$ 24,000.00
9	Land Purchase	8	ac	$ 4,000.00	$ 32,000.00
10	GeoTechnical Pre-Design Report	1	LS	$ 15,000.00	$ 15,000.00
		SUBTOTAL			$ 665,000.00
Existing Lagoon Upgrade					
1	Common Excavation	1	LS	$ 100,000.00	$ 100,000.00
		SUBTOTAL			$ 100,000.00
		GRAND SUBTOTAL			**$ 1,028,000.00**
GEO TECH (2.5%)					$ 26,000.00
TOTAL CONTINGENCY (15%)					$ 158,000.00
TOTAL ENGINEERING (12%)					$ 145,000.00
		GRAND TOTAL			**$ 1,357,000.00**

Appendix K – Storm Water System Cost Estimates

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
3rd Avenue North and Highway 4 - Drainage Improvement

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 2,500.00	$ 2,500.00
2	Traffic Accommodation	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 7,500.00
CONTINGENCY (15%)					$ 1,100.00
GEOTECHNICAL (3.5%)					$ 300.00
ENGINEERING (12%)					$ 1,000.00
		TOTAL			**$ 9,900.00**
Swale/Ditch					
1	Remove & Replace topsoil, seed	200	m^2	$ 8.00	$ 1,600.00
2	Waste excavation	50	m^3	$ 15.00	$ 750.00
3	Shaping/grading	16	hr	$ 100.00	$ 1,600.00
		SUBTOTAL			$ 4,000.00
CONTINGENCY (15%)					$ 600.00
GEOTECHNICAL (3.5%)					$ 200.00
ENGINEERING (12%)					$ 600.00
		TOTAL			**$ 5,400.00**
Road Work					
1	Remove & Replace Asphalt (75mm compacted depth)	60	m^2	$ 25.00	$ 1,500.00
2	Remove & Replace Road Structure (300mm subgrade prep, 500 mm sub-base, 100 mm base)	60	m^2	$ 27.00	$ 1,620.00
3	1.0m concrete swale	15	m	$ 125.00	$ 1,875.00
		SUBTOTAL			$ 5,000.00
CONTINGENCY (15%)					$ 800.00
GEOTECHNICAL (3.5%)					$ 200.00
ENGINEERING (12%)					$ 700.00
		TOTAL			**$ 6,700.00**
		GRAND SUBTOTAL			**$ 17,000.00**
TOTAL CONTINGENCY (15%)					$ 2,600.00
TOTAL GEOTECHNICAL (3.5%)					$ 700.00
TOTAL ENGINEERING (12%)					$ 2,400.00
		GRAND TOTAL			**$ 23,000.00**

mpe ENGINEERING LTD.

Town of Milk River - Infrastructure Master Plan
Stormwater Management Facility

COST ESTIMATE

	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	COST
General Items					
1	Mobilization / Demobilization / Bonding & Insurance / Profit	1	LS	$ 30,000.00	$ 30,000.00
		SUBTOTAL			$ 30,000.00
CONTINGENCY (15%)					$ 4,500.00
GEOTECHNICAL (3.5%)					$ 1,200.00
ENGINEERING (12%)					$ 4,100.00
		TOTAL			**$ 39,800.00**
Swale					
1	Common Excavation & Compacted Embankment	1000	m^3	$ 15.00	$ 15,000.00
2	Remove and Replace Topsoil, Seed	2000	m^2	$ 8.00	$ 16,000.00
3	Riprap	5	m^3	$ 65.00	$ 325.00
4	Remove and Replace CSP	3	ea	$ 1,500.00	$ 4,500.00
		SUBTOTAL			$ 35,800.00
CONTINGENCY (15%)					$ 5,400.00
GEOTECHNICAL (3.5%)					$ 1,400.00
ENGINEERING (12%)					$ 4,900.00
		TOTAL			**$ 47,500.00**
Storm Water Management Facility					
1	Common Excavation & Compacted Embankment	5,500	m^3	$ 15.00	$ 82,500.00
2	Remove and Replace Topsoil, Seed	2,600	m^2	$ 8.00	$ 20,800.00
3	Outlet Structure	1	LS	$ 5,000.00	$ 5,000.00
		SUBTOTAL			$ 108,300.00
CONTINGENCY (15%)					$ 16,200.00
GEOTECHNICAL (3.5%)					$ 4,400.00
ENGINEERING (12%)					$ 14,900.00
		TOTAL			**$ 143,800.00**
		GRAND SUBTOTAL			**$ 174,000.00**
TOTAL CONTINGENCY (15%)					$ 26,100.00
TOTAL GEOTECHNICAL (3.5%)					$ 7,000.00
TOTAL ENGINEERING (12%)					$ 24,000.00
		GRAND TOTAL			**$ 231,000.00**