

Town of Stony Plain

Sanitary Master Plan Update

Final Report

August 2026

ISL Engineering and Land Services Ltd. is an award-winning full-service consulting firm dedicated to working with all levels of government and the private sector to deliver planning and design solutions for transportation, water, and land projects.

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August 5, 2026
ISL Reference: 28974

Town of Stony Plain
4905 – 51 Avenue, Stony Plain, AB T7Z 1Y1

Attention: Fernando Sacluti, P.Eng., Utilities Engineer

Dear F. Sacluti:

Reference: Sanitary Master Plan Update – Final Report

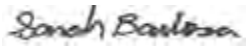
Enclosed is the Final Report for the Town of Stony Plain's Sanitary Master Plan Update. We trust that it meets your needs.

The key objective of the Sanitary Master Plan Update is to complete a review of the Town's existing sanitary system and assess its capacity to convey the current and future growth sanitary flow volumes effectively.

The Sanitary Master Plan Update will provide the Town of Stony Plain with direction on infrastructure implementation and associated timelines to service future growth, while ensuring infrastructure remains fully functional in providing an appropriate level of service. This information will aid in making informed decisions on capital projects and will provide solutions for efficient, economic, and sustainable municipal services to residents and businesses.

We sincerely appreciate the opportunity to undertake this project on behalf of the Town of Stony Plain. Should you have any questions or concerns, please do not hesitate to contact the undersigned at 403.254.5044

Sincerely,



Sarah Barbosa, P.Eng., ENV SP
Partner | Manager, Municipal Infrastructure Planning

Corporate Authorization

This document entitled “Sanitary Master Plan Update” has been prepared by ISL Engineering and Land Services Ltd. (ISL) for the use of Town of Stony Plain. The information and data provided herein represent ISL’s professional judgment at the time of preparation. ISL denies any liability whatsoever to any other parties who may obtain this report and use it, or any of its contents, without prior written consent from ISL.

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Executive Summary

Introduction

The Town of Stony Plain (the Town) retained ISL Engineering and Land Services Ltd. (ISL) to complete an update to its Sanitary Master Plan (SMP). The purpose of this study was to review and update the Town's existing hydraulic model, assess the condition and capacity of the sanitary sewer system under current and future conditions, and identify infrastructure upgrades required to support anticipated growth.

The updated SMP incorporates revised population projections, updated GIS and infrastructure data, recent flow monitoring information, and a refined hydraulic model. The study provides a framework to guide future development, prioritize capital upgrades, and maintain acceptable levels of service for residents and businesses.

Population Allocations and Growth Projections

Historical population growth from 2015 to 2024 averaged approximately 2.19% annually. The Town of Stony Plain Population and Employment Forecast (Applications Management Consulting Ltd., 2022) was reviewed, and the high-growth scenario was selected for this study, corresponding to an approximate annual population growth rate of 2.4%. Although the long-term historical growth rate is slightly lower, the Town has experienced strong growth in recent years and continues to have significant planned residential and employment development.

The following growth horizons were considered as part of the assessment:

- Short-term
- 5-Year
- 10-Year
- 25-Year
- Ultimate

Future development parcels were assigned growth horizons and land use classifications using the Municipal Development Plan (MDP), approved Area Structure Plans (ASPs), and discussions with the Town. Population and employment projections were allocated to future parcels based on density assumptions from the Town's Design and Construction Standards. The resulting projected population growth is summarized in **Table E.1**.

Table E.1: Population and Employment Projections by Growth Horizon

Growth Horizon	Year	Population	Employment
		c	c
Existing	2025	19,300	7,600
Short-term	2026	20,516	8,277
5-year	2030	22,557	9,316
10-year	2035	25,397	10,799
25-year	2050	36,248	16,825
Ultimate	-	58,999	26,505

Level of Service and Assessment Criteria

The sanitary system was assessed under a range of design storm events derived from the City of Edmonton IDF curves. The IDF curves are based on rainfall data collected from eleven City of Edmonton rain gauges between 1984 and 2020, in accordance with the EPCOR Stormwater Management and Design Manual (April 2025). The following design storms were evaluated:

- 5-year, 25-year, 50-year, and 100-year 24-hour Huff distribution design storms
- 5-year, 25-year, 50-year, and 100-year 4-hour Chicago distribution design storms

System performance was evaluated based on:

- Maximum hydraulic grade line (HGL) relative to ground elevation
- Peak discharge relative to sewer capacity
- Spare sewer capacity
- Lift station and forcemain operating conditions

The primary objective of the assessment was to identify locations where surcharging or basement flooding risk may occur under wet weather conditions, and to determine infrastructure requirements needed to maintain acceptable levels of service.

Existing Sanitary System

The Town's sanitary collection system consists of approximately 99 km of gravity sanitary sewer and 1.2 km of forcemains. Pipe diameters range from 100 mm to 1,050 mm, with the majority of the system consisting of 200 mm PVC pipe constructed during the 2000s and 2010s.

Wastewater from the Town discharges into the ARROW Utilities Parkland Sanitary Trunk Sewer, which conveys wastewater from Stony Plain, Spruce Grove, Acheson, and Parkland County to the regional wastewater treatment plant.

The Town also operates four public lift stations:

- Quantz Lift Station
- South Ridge Lift Station
- Country Plains Lift Station
- North Business Park Lift Station

CCTV Condition and Inflow-Infiltration System Assessment

Available CCTV inspection data provided by the Town was reviewed to assess the structural and operational condition of the sanitary system. CCTV inspection results were combined with pipe material and installation age to develop a high-level condition assessment.

Several areas were identified for future rehabilitation or replacement consideration, particularly within older neighbourhoods and portions of the Central Trunk. Higher-risk pipes identified through the condition assessment should be considered for rehabilitation or replacement in conjunction with future roadway rehabilitation and utility projects where feasible. A detailed summary of the condition and inflow and infiltration (I&I) assessment is provided in the CCTV and I&I System Assessment Technical Memorandum (ISL, 2026). The condition assessment presented in this report provides a high-level overview of the sanitary sewer system, with a summary of findings shown in **Figure 5.1**.

Hydraulic Model Development

PCSWMM (Version 7.4) was used to develop a hydraulic model of the Town's sanitary collection system. The model was constructed using updated GIS information provided by the Town, supplemented with record drawings, the previous MIKE URBAN model, and engineering assumptions where required to resolve data gaps. The model includes downstream boundary conditions representing the ARROW Utilities trunk system, which were obtained from the most recent version of the ARROW Utilities MIKE+ 2024 model.

The model was calibrated under both dry weather flow (DWF) and wet weather flow (WWF) conditions using recent rainfall and flow monitoring data collected between June and August 2025.

The following periods were used for model calibration and validation:

- DWF Calibration Period: July 27 to August 3, 2025
- WWF Calibration Event: August 3, 2025
- WWF Validation Event: June 18, 2025

Calibration targets were based on the Chartered Institution of Water and Environmental Management (CIWEM) guidelines, summarized below:

DWF Calibration

- Volume errors within ±10%
- Peak flow errors within ±10%

WWF Calibration

- Volume errors within +20% to -10%
- Peak flow errors within +25% to -15%

Overall, the model was deemed successfully calibrated based on visual inspection and by statistical analysis of the peak flow and volume results.

Existing System Assessment and Recommendations

Observed inflow and infiltration (I&I) rates were generally within acceptable Alberta Environment and Protected Areas (AEPA) guideline limits of 0.28 L/s/ha, although elevated I&I rates were identified in localized areas, particularly within the Flow Monitor #3 catchment (0.32 L/s/ha).

As for capacity, multiple segments of the central trunk are surcharging, with several locations experiencing hydraulic grade lines (HGLs) near ground elevation. North of Highway 16A, the trunk is shallow, with less than 1.0 m of cover, and the HGL exceeds pipe obvert during the 50- and 100-year, 4-hour Chicago storms.

Hydraulic modelling also indicates potential downstream capacity constraints within the ARROW Utilities Parkland Sanitary Trunk Sewer (ARROW Trunk) during larger design storm events. These results are based on downstream boundary conditions derived from the ARROW Utilities regional hydraulic model and warrant further review in coordination with ARROW Utilities.

All lift stations were found to have adequate capacity to convey peak WWF under existing conditions.

Three upgrade options were developed and evaluated to address the Central Trunk capacity deficiencies:

- Option #1 – Diversion to East Trunk
- Option #2 – Twinning along Golf Course Road
- Option #3 – Super Pipe

An evaluation matrix considering level of service, operational risks, capital cost, constructability, future implications, and operational flexibility identified **Option #2 – Twinning along Golf Course Road** as the preferred alternative.

Replacement concepts were developed for the Town's existing low-pressure systems to reduce ongoing operational and maintenance concerns. These upgrades are considered optional and opportunistic, as they are not required to address existing capacity deficiencies, but they address maintenance and reliability issues identified by Town operations staff. Implementation could be considered in conjunction with future roadway, utility, or Central Trunk improvement projects where feasible (i.e. lifecycle replacement).

Future System Assessment and Recommendations

A future sanitary servicing concept was developed to accommodate projected growth through the Ultimate development horizon. The servicing concept was developed by delineating future subcatchments and identifying appropriate trunk sewer alignments and tie-in locations to the existing sanitary system. Proposed servicing strategies were based on existing topography, proximity to existing infrastructure, and anticipated development staging. Where approved ASPs were available, proposed trunk sewer alignments generally followed the planned infrastructure corridors. For areas without ASPs, conceptual alignments were developed for planning purposes and assigned a higher contingency in the cost estimates to reflect the additional uncertainty.

The proposed future system was assessed under the 1:100-year 4-hour Chicago design storm. The assessment assumed that the recommended Central Trunk upgrade (Option #2 – Twinning along Golf Course Road) has been implemented.

Results indicate that the proposed future servicing concept performs adequately under all future growth horizons provided the recommended Central Trunk upgrades are completed. The only upgrades triggered by future development within the Town's existing system occur along the downstream end of the East Trunk. In this area, the existing trunk sewer is shallow and the hydraulic grade line approaches ground elevation under Ultimate growth conditions.

To reduce surcharge levels to within the pipe obvert, it is recommended that approximately 500 m of the trunk be twinned with a 750 mm sewer.

Upgrades to the section of the ARROW Trunk within Town boundaries are expected to be triggered by the 25-year growth horizon to accommodate future development. The Town should engage with ARROW Utilities to confirm future capacity requirements and coordinate long-range planning for any required upgrades.

Phasing Plan and Funding Strategies

A phased capital implementation strategy was developed to align sanitary upgrades with projected growth horizons.

Key recommendations include:

- Proceeding with the recommended Central Trunk upgrade
- Advancing future servicing infrastructure in accordance with development staging
- Monitoring East Trunk capacity as growth progresses
- Coordinate with ARROW Utilities to review potential existing downstream capacity constraints in the regional trunk and to confirm the timing and requirements for future upgrades, including upgrades anticipated to the section of the ARROW Utilities trunk within Town limits by the 25-year growth horizon.

A summary of the costs per growth horizon in summary in **Table E.2**.

Table E.2: Capital Planning Horizons Summary (2026 $)

Growth Horizon	Description	Classification	Total Cost[1,2]
Existing System	Central Trunk Upgrades (Option #2)	Capacity-Related	$3,540,000
	Low-Pressure System Replacements	Operation/Maintenance Improvements (Opportunistic)	$8,970,000
		Existing System Total	**$12,510,000**
5-Year	New Gravity Infrastructure	Growth-Related	$5,580,000
	New Forcemain	Growth-Related	$810,000
	New Lift Station	Growth-Related	$1,540,000
		5-Year Total	**$7,930,000**
10-Year	New Gravity Infrastructure	Growth-Related	$6,140,000
		10-Year Total	**$6,140,000**
25-Year	New Gravity Infrastructure	Growth-Related	$11,850,000
	New Forcemain	Growth-Related	$90,000
	New Lift Station	Growth-Related	$3,130,000
		25-Year Total	**$15,070,000**
Ultimate	New Gravity Infrastructure	Growth-Related	$16,110,000
	East Trunk Upgrades	Growth-Related	$1,180,000
		Ultimate Total	**$17,290,000**

[1] Total cost represents both servicing and upgrading costs.

[2] Costs are representative of 2026 dollar.

Regulatory Compliance

Implementation of the recommended sanitary infrastructure will be subject to applicable municipal, provincial, and federal regulatory requirements. The specific approvals required should be confirmed during detailed design based on project scope and location. Early engagement with regulatory agencies is recommended to confirm requirements and support timely approvals.

Conclusions and Recommendations

Key conclusions from the sanitary system assessment are as follows:

- The hydraulic model was successfully updated and calibrated under both DWF and WWF conditions, providing a reliable tool for system assessment and future planning.
- Observed inflow and infiltration (I&I) rates were generally within acceptable AEPA guideline limits (0.28 L/s/ha), although localized areas of elevated I&I were identified and warrant further investigation.
- The existing sanitary system performs adequately under dry weather conditions; however, capacity limitations occur under wet weather events.
- The Central Trunk was identified as the primary capacity constraint, with surcharging occurring under multiple design storm scenarios. In some locations, shallow pipe depths result in HGLs approaching ground elevation.
- Additional localized surcharging was observed in other areas of the network. However, the risk of basement backups is low, as these locations are primarily within commercial and industrial areas where basements are not typically present, and hydraulic grade lines remain sufficiently below ground elevation.
- Condition assessment identified several areas requiring rehabilitation or replacement, particularly within older neighbourhoods and along the Central Trunk.

- Existing lift stations were found to have sufficient capacity to convey peak wet weather flows, with only minor operational considerations noted.
- The recommended upgrade strategy for the Central Trunk is twinning along Golf Course Road (Option #2), which provides improved system performance and long-term operational benefits.
- The proposed future servicing concept, together with the recommended Central Trunk upgrades, can accommodate projected growth up to the Ultimate development horizon.
- Capacity upgrades to the East Trunk are required under Ultimate growth conditions, particularly at downstream locations where the system becomes shallow.

Potential downstream capacity constraints within the ARROW Utilities Parkland Sanitary Trunk Sewer were identified under existing conditions. The Town should coordinate with ARROW Utilities to confirm existing capacity constraints and long-term upgrade requirements, including upgrades anticipated to the section of the trunk within Town limits by the 25-year growth horizon.

Based on the findings of this study, the following recommendations are provided:

- **Central Trunk Upgrades:**
  Proceed with implementation of the recommended upgrade option (twinning along Golf Course Road). Coordinate construction with planned roadway improvements where feasible.
- **Condition and Capacity Coordination:**
  Prioritize rehabilitation of pipes identified through CCTV inspections in conjunction with capacity-related upgrades to minimize future disruption and cost.
- **Flow Monitoring Program:**
  Expand and maintain flow monitoring across the system, including installation of permanent monitors on the Central and East Trunks. Relocate Flow Monitor #2 to a new location on the West Trunk to improve data quality and retain Flow Monitor #3 as a permanent monitoring location to support ongoing assessment of I&I trends.
- **Inflow and Infiltration Management:**
  Undertake targeted field investigations (e.g., smoke testing, dye testing, CCTV inspections) in areas with elevated I&I, such as the Flow Monitor #3 catchment, and implement mitigation measures where required. Where acceptable I&I rates and sufficient pipe capacity are confirmed, sump pump tie-ins may be considered on a case-by-case basis in accordance with Town policy.
- **Future Servicing Implementation:**
  Implement the recommended servicing concept in alignment with development staging. Design new infrastructure to accommodate ultimate build-out where feasible.
- **East Trunk Upgrades:**
  Monitor system performance and implement upgrades to the downstream East Trunk as development progresses. Twinning is recommended as the preferred upgrade approach.
- **Low-Pressure System Replacement:**
  Consider replacement of existing low-pressure systems with gravity systems in areas experiencing operational challenges, recognizing these upgrades are opportunistic and may be coordinated with lifecycle replacements.
- **Coordination with ARROW Utilities:**
  Coordinate with ARROW Utilities to confirm timing and requirements for regional trunk upgrades and ensure downstream capacity is addressed.
- **Development Servicing:**
  Allow flexibility for interim servicing solutions where required, subject to detailed modelling and verification that no adverse impacts occur to the existing system.
- **Ongoing Model Maintenance:**
  Update the hydraulic model periodically (recommended every five years or following significant development) to reflect updated data, growth projections, and completed infrastructure upgrades.

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ACRONYMS

Acronym	Description
AEPA	Alberta Environment and Protected Areas
ACRWC	Alberta Capital Region Wastewater Commission
ASP	Area Structure Plan
CCTV	Closed-Circuit Television
CIWEM	Chartered Institution of Water and Environmental Management
COP	Code of Practice
DWF	Dry Weather Flow
EPEA	Environmental Protection and Enhancement Act
FM	Flow Monitor
GIS	Geographic Information System
HGL	Hydraulic Grade Line
ICI	Industrial, Commercial, Institutional
I&I	Inflow and Infiltration
IDF	Intensity Duration Frequency
LiDAR	Light Detection and Ranging
LOS	Level of Service
LUB	Land Use Bylaw
MDP	Municipal Development Plan
O&M	Operation and Maintenance
PF	Peaking Factor
Q/Qman	Peak Discharge Relative to Pipe Capacity Ratio
RDII	Rainfall Derived Inflow and Infiltration
SCADA	Supervisory Control and Data Acquisition
URW	Utility Right-of-Way
WWF	Wet Weather Flow
WWTP	Wastewater Treatment Plant

UNITS

Unit	Description
c	Capita
c/ha	Capita per Hectares
mm	Millimetres
m	Metres
m^2	Square Metres
m^3	Cubic Metres
m/s	Metres per Second
m^3/d	Cubic Metres per Day
$m^3/ha/d$	Cubic Metres per Hectare per Day
ha	Hectares
L/p/d	Litres per Person per Day
L/ha/d	Litres per Hectare per Day
L/s/ha	Litres per Second per Hectare
L/s	Litres per Second
%	Percent
$	Dollars

1.0 Introduction

1.1 Authorization

The Town of Stony Plain (the Town) retained ISL Engineering and Land Services Ltd. (ISL) to undertake the Sanitary Master Plan Update. The focus was to update the existing model based on a review of the most updated GIS database, integrate updated growth projections and future land use scenarios, and evaluate the wastewater sewer system and provide recommendations for existing system upgrades and future system expansion to support growth. The analysis of existing and future sanitary sewer systems was completed using the PCSWMM modelling software (Version 7.4). This study will inform decision making processes for Town staff and Council on capital projects, and will provide solutions for efficient, economic, and sustainable municipal services to residents.

1.2 Background

1.2.1 2019 Sanitary Master Plan

The 2019 Water and Sanitary Master Plan (Associated Engineering, 2019) developed a hydraulic model of the Town's sanitary system and assessed performance under a range of design storm events. The study identified capacity limitations in the Central Trunk, which exceeded capacity during a 1:25-year, 4-hour storm, while the East and West Trunks were generally adequate for existing and short-term growth conditions.

To address the Central Trunk constraints, the plan evaluated storage-based solutions, including a storage tank and an in-line "super pipe". The study also emphasized the need for ongoing asset renewal, inflow and infiltration (I&I) reduction, and improved data collection.

The 2019 Master Plan provides the baseline for this update, which incorporates updated infrastructure data, revised growth projections, and a refined hydraulic model to reassess system performance and identify required upgrades.

1.2.2 ARROW Utilities Parkland Sanitary Trunk Sewer

The ARROW Utilities (formerly the Alberta Capital Region Wastewater Commission (ACRWC)) Parkland Sanitary Trunk Sewer is the major regional sanitary sewer that conveys wastewater from Stony Plain, Spruce Grove, Acheson, St. Albert, Sturgeon Valley, and other areas in Parkland County to the Wastewater Treatment Plant (WWTP) located at 23262 Township Road 540. This sewer trunk was integrated into the modelling assessment to ensure the regional trunk's capacity was considered as part of the capacity assessments.

1.3 Purpose of Study

The updated Sanitary Master Plan provides a detailed road map for assessing the status of the existing sanitary system and the extent of upgrades required to accommodate future growth. The study achieves the following objectives:

- Convert the Town's existing MIKE URBAN sanitary system model to PCSWMM
- Refine the model using updated GIS and infrastructure data to accurately represent the Town's existing sanitary collection system
- Calibrate the model under dry weather flow (DWF) conditions and wet weather flow (WWF) conditions
- Use the calibrated model to prepare a capacity assessment of the existing sanitary system under current and future conditions
- Review available CCTV inspection data and conduct a condition assessment of the system
- Determine what upgrades are required for the existing system and recommend future servicing options
- Develop recommendations for operations and maintenance (O&M), including strategies to address inflow and infiltration (I&I), reduce risk of surcharge or overflow, and improve overall system reliability
- Provide a framework for future sanitary capital planning, through cost estimates and staging of infrastructure

2.0 Population Allocations and Growth Projections

Population and employment projections form the basis for estimating wastewater flows and assessing the capacity of the sanitary system under existing and future conditions. This section outlines the historical population trends within the Town of Stony Plain, establishes the current population baseline used for model calibration, and summarizes projected growth over the planning horizon. These projections are used to allocate flows within the hydraulic model and to evaluate infrastructure requirements to support future development.

2.1 Historical Population

The historical population of Stony Plain for the past ten years is presented in **Table 2.1**. Based on the data, the average annual growth rate was approximately 2.19% from 2015 to 2024. This is less than the 3.35% growth rate assumed in the 2019 Water and Sanitary Master Plan (Associated Engineering, 2019). Historical population values were compiled from municipal, provincial, and federal sources based on data availability. While minor differences may exist between these sources, the overall population trend remains consistent. Due to the variability in data sources, multiple design storms were simulated to verify the range of impacts to the existing system. Based on this, the proposed upgrading considered a wide range of return periods to account for this uncertainty in populations and growth projections.

Table 2.1: Historical Population of Stony Plain

Year	Population	Source[1]
2015	16,127	Municipal
2016	17,189	Federal
2017	18,008	Provincial
2018	18,174	Provincial
2019	17,842	Municipal
2020	18,273	Provincial
2021	17,993	Federal
2022	18,737	Provincial
2023	19,054	Provincial
2024	19,300	Provincial

[1] Municipal and federal populations are from the Town of Stony Plain website. Provincial populations are from the Alberta Regional Dashboard (Government of Alberta, 2025).

2.2 Existing Population Allocations

The 2024 Provincial projection of 19,300 was used as the baseline for existing system assessment as this correlates the strongest with the flow monitoring data that was used for DWF calibration (see **Section 6.8**). Each residential parcel was first assigned a unit count. A capita-per-unit density was calculated such that the total sum of populations across all parcels matches the 2024 census value of 19,300. This ensures that lot-level population densities are accurate relative to one another, while ensuring the overall population is consistent with the census data.

2.3 Future Population Projections

2.3.1 Town of Stony Plain Population and Employment Forecast

The Town of Stony Plain Population and Employment Forecast (Applications Management Consulting Ltd., 2022) projects population and employment growth in the Town over a 20-year period. The analysis uses 2021 as the starting point for the forecast.

Three scenarios were considered:

- **Low-Growth Scenario**: Represents slow economic growth in the Town, including reduced overall growth after the Covid-19 transitioning phase due to the prolonged long term economic effects to the Covid-19 pandemic.
- **Medium-Growth Scenario**: Represents an estimated level of growth that is expected for the Town and assumes a relatively normal continuation of economic growth after the Covid-19 transitioning phase.
- **High-Growth Scenario**: Represents an 'optimistic' picture of future growth that can be expected for the Town, including an increase in economic growth rates after the Covid-19 transitioning phase.

Between 2011 and 2021, the Town's population increased from 15,051 to 17,993. This represents an average annual growth rate of about 1.7% between 2011 and 2021. This was used as the growth rate for the medium-growth scenario. **Table 2.2** below shows base year (2021) population in the Town, as well as the projected populations in 2031 and 2041 for each of the three growth scenarios.

Table 2.2: Stony Plain Total Population Forecast, 2021 to 2041 (from the Population and Employment Forecast)

Scenario	2021	2031	2041	Average Annual Change (2021-2041)
	c	c	c	%
Low-Growth	17,993	19,917	21,769	1.0%
Medium-Growth	17,993	21,297	25,056	1.7%
High-Growth	17,993	22,794	28,807	2.4%

For this study, the high-growth scenario (**2.4%** population growth rate) was used as it is most similar to the historic rate of 2.19% seen over the past ten years (2015-2024). Although the historical growth rate is slightly lower, the Town has experienced strong growth in recent years and continues to have significant planned residential and employment development. Employment projections assume a growth rate of **3%**, consistent with the high-growth scenario identified in the Population and Employment Forecast.

2.3.2 Future Growth Plan

A Future Growth Plan was developed to organize anticipated development by land use and staging horizons. The following growth horizons were considered for this study:

- Short-term
- 5-Year
- 10-Year
- 25-Year
- Ultimate

All developable parcels were assigned a growth horizon based on the staging identified during Workshop #1, and through discussions with the Town. Workshop #1 was held in December 2025 to review the model update, existing sewer assessment, condition assessment, and future growth plan.

The short-term scenario consists of recently developed/currently developing land flagged in Workshop #1. These are not considered in the existing scenario as they were not included in the model at the time of calibration. The population and employment projections for these areas were calculated using the population densities listed in the Town of Stony Plain Design and Construction Standards, as shown in **Table 2.3**.

The 5-year, 10-year, and 25-year growth horizons follow the 2.4% population growth rate and 3% employment growth rate.

The remaining future developable areas were assigned to the Ultimate growth scenario. As no ultimate population forecast is provided in the Town's Population and Employment Forecast, population and employment projections for these areas were calculated using the density assumptions in **Table 2.3**.

Table 2.3: Population and Employment Densities from Design and Construction Standards

Land Use	Population Density	Employment Population Density
	c/ha	c/ha
Low-Density Residential	40	-
Medium-Density Residential	80	-
High-Density Residential	200	-
Commercial	-	37
Industrial	-	30
Institutional	-	37

The resulting population and employment projections by growth horizon are summarized in **Table 2.4** and shown graphically in **Figure 2.1**.

Table 2.4: Population and Employment Projections by Growth Horizon

Growth Horizon	Year	Population	Employment
		c	c
Existing	2025	19,300	7,600
Short-term[1]	2026	20,516	8,277
5-year[2]	2030	22,557	9,316
10-year[2]	2035	25,397	10,799
25-year[2]	2050	36,248	16,825
Ultimate[1]	-	58,999	26,505

[1] Calculated using densities in Table 2.3.
[2] Calculated using 2.4% population growth rate and 3% employment growth rate.

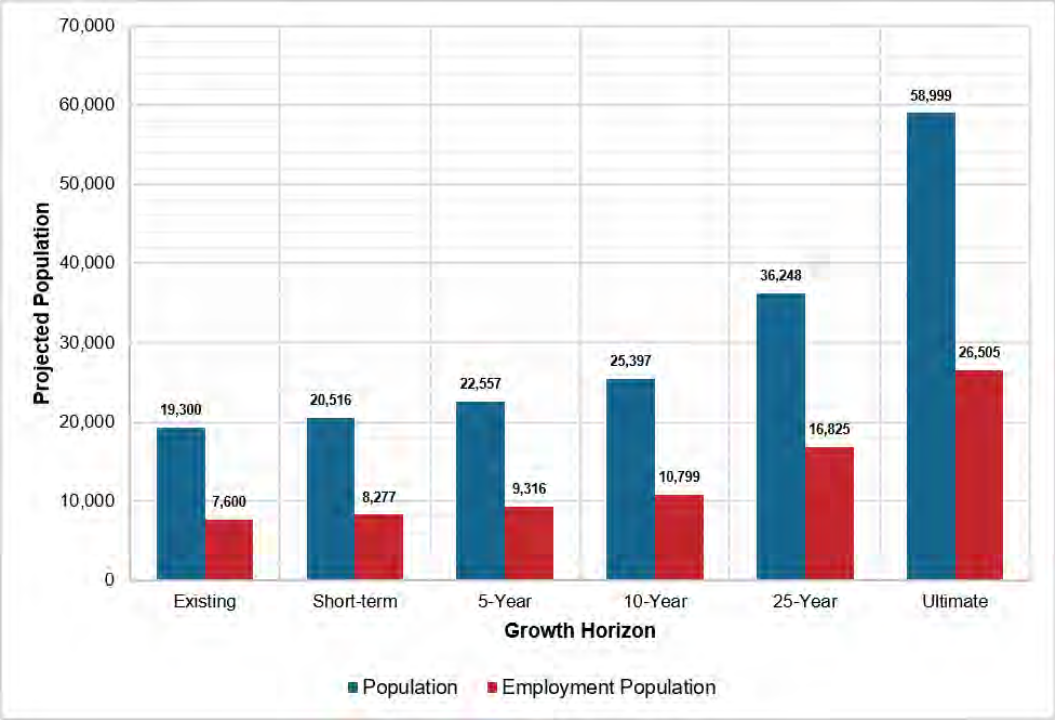
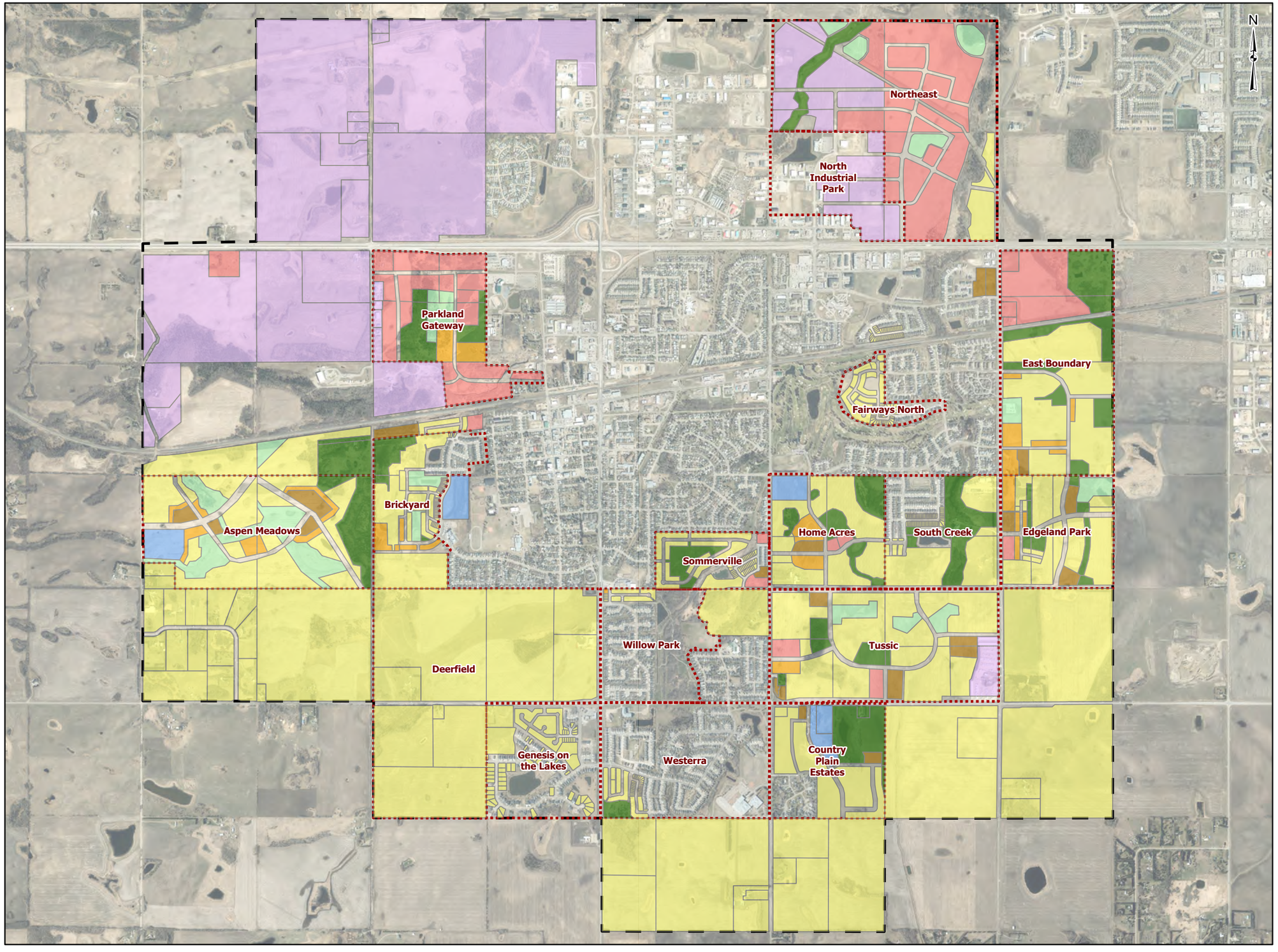


Figure 2.1: Population and Employment Projections by Growth Horizon

2.4 Future Land Use Assignment

Land uses were assigned to future developable parcels by using the 2024 Municipal Development Plan (MDP) as a baseline. Where more detailed planning information was available, the MDP land use polygons were further refined using approved Area Structure Plans (ASPs) found on the Town's website. Future land use classifications are shown on **Figure 2.2**. These land use classifications form the basis for allocating populations and equivalent employment populations in the sanitary model.

For future developable areas without detailed polygons, an area reduction of 30% was applied to account for road right of ways, municipal reserve, and parks. This way the population densities were applied to the net area and not the gross area.



LEGEND

- ASP
- Town Boundary

Land Use

- Commercial
- Low Density Residential
- Medium Density Residential
- High Density Residential
- Industrial
- Institutional
- Utility District
- Parks District

TITLE

GROWTH PLAN LAND USE

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 330 660

1:27,000 Meters

FIGURE	2.2
DATE	4/1/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Growth Plan_Land Use

2.5 Allocation of Growth to Future Development Parcels

For the short-term and ultimate growth horizons, population and employment projections were calculated using the population densities listed in the Town of Stony Plain Design and Construction Standards, as shown in **Table 2.3** above.

For the 5-year, 10-year, and 25-year growth horizons, the projected population and employment totals from **Table 2.4** were treated as control values. The incremental growth between successive horizons represents the additional population or employment to be accommodated within parcels assigned to that horizon.

The incremental populations and employment populations were distributed across the assigned parcels based on their anticipated land use designation (low-, medium-, or high-density residential; commercial; industrial; or institutional). Target population and employment densities from the Town of Stony Plain Standards (**Table 2.3**) were used as guidance to ensure resulting densities remained realistic and consistent with municipal planning expectations.

In cases where the initial parcel assignments resulted in densities outside of reasonable ranges, parcels were reallocated between adjacent growth horizons. This iterative process was repeated until the projected population and employment totals for each horizon were achieved while maintaining realistic density assumptions for each land use type.

The resulting growth horizon classifications are shown in **Figure 2.3**. The resulting population and employment densities for each growth horizon are summarized in **Tables 2.5** and **2.6**. These values represent the final, reconciled density assumptions used for model build-out and future scenario evaluation.

Table 2.5: Resulting Future Population Density Assumptions by Growth Horizon

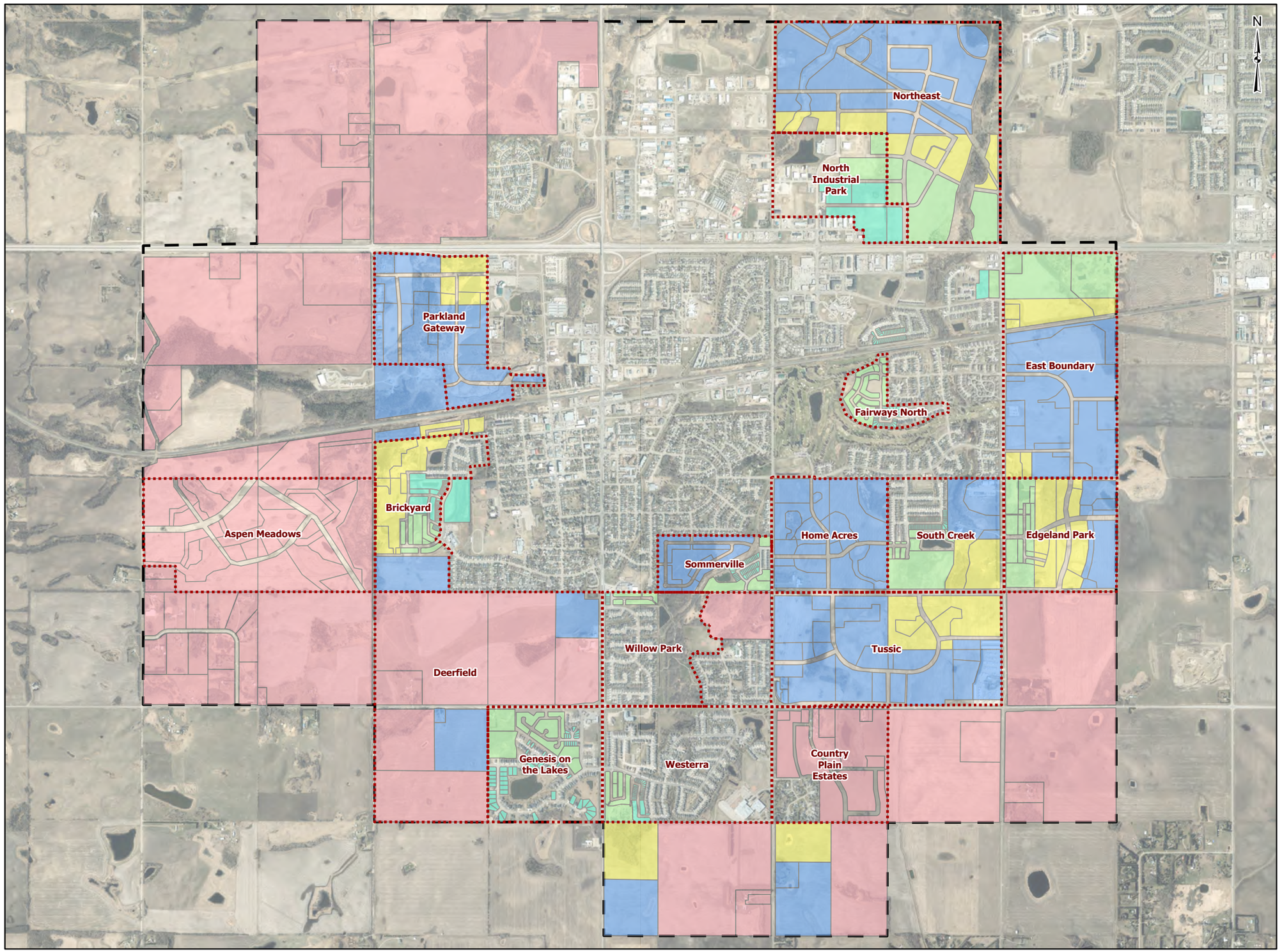
Growth Horizon	Total Population (c)	Additional Population (c)	Additional Area (ha)			Population Density (c/ha)		
			LD[1]	MD[1]	HD[1]	LD[1]	MD[1]	HD[1]
Existing	19,300	0	-	-	-	-	-	-
Short-term	20,516	1,216	22	0.1	2	40	80	200
5-Year	22,557	2,042	55	6	4	24	60	120
10-Year	25,397	2,840	85	4	4	24	60	120
25-Year	36,248	10,851	226	18	11	33	70	180
Ultimate	58,999	22,751	513	8	8	40	80	200

[1] LD = low-density, MD = medium-density, HD = high-density

Table 2.6: Resulting Future Employment Population Density Assumptions by Growth Horizon

Growth Horizon	Total Employment Population (c)	Additional Employment Population (c)	Additional Employment Area (ha)			Employment Population Density (c/ha)		
			C[1]	Ind[1]	Inst[1]	C[1]	Ind[1]	Inst[1]
Existing	7,600	0	-	-	-	-	-	-
Short-term	8,277	677	-	16	5	-	30	37
5-Year	9,316	1,039	33	7	-	27	20	-
10-Year	10,799	1,484	33	4	-	41	34	-
25-Year	16,825	6,026	83	52	4	47	37	48
Ultimate	26,505	9,680	3	305	12	37	30	37

[1] C = commercial, Ind = industrial, Inst = institutional



LEGEND

- Town Boundary
- ASP

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

GROWTH PLAN STAGING

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 330 660

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FIGURE	2.3
DATE	4/1/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Growth Plan_Staging

3.0 Level of Service and Assessment Criteria

3.1 Level of Service

The existing and future wastewater system capacity was assessed based on the following design storms, derived from the City of Edmonton IDF curve. The IDF curves are based on rainfall data collected from 11 City of Edmonton rain gauges between 1984 and 2020, in accordance with the EPCOR Stormwater Management and Design Manual (April 2025). The following design storms were evaluated:

- 5-year 4-hour Chicago distribution design storm
- 25-year 4-hour Chicago distribution design storm
- 50-year 4-hour Chicago distribution design storm
- 100-year 4-hour Chicago distribution design storm
- 5-year 24-hour Huff distribution design storm
- 25-year 24-hour Huff distribution design storm
- 50-year 24-hour Huff distribution design storm
- 100-year 24-hour Huff distribution design storm

A comparison of the 5-year, 25-year, 50-year, and 100-year 24-hour Huff storms is shown in **Figure 3.1**. A comparison of the 5-year, 25-year, 50-year, and 100-year 4-hour Chicago storms is shown in **Figure 3.2**. A comparison of the 100-year Huff and Chicago storms is shown in **Figure 3.3**.

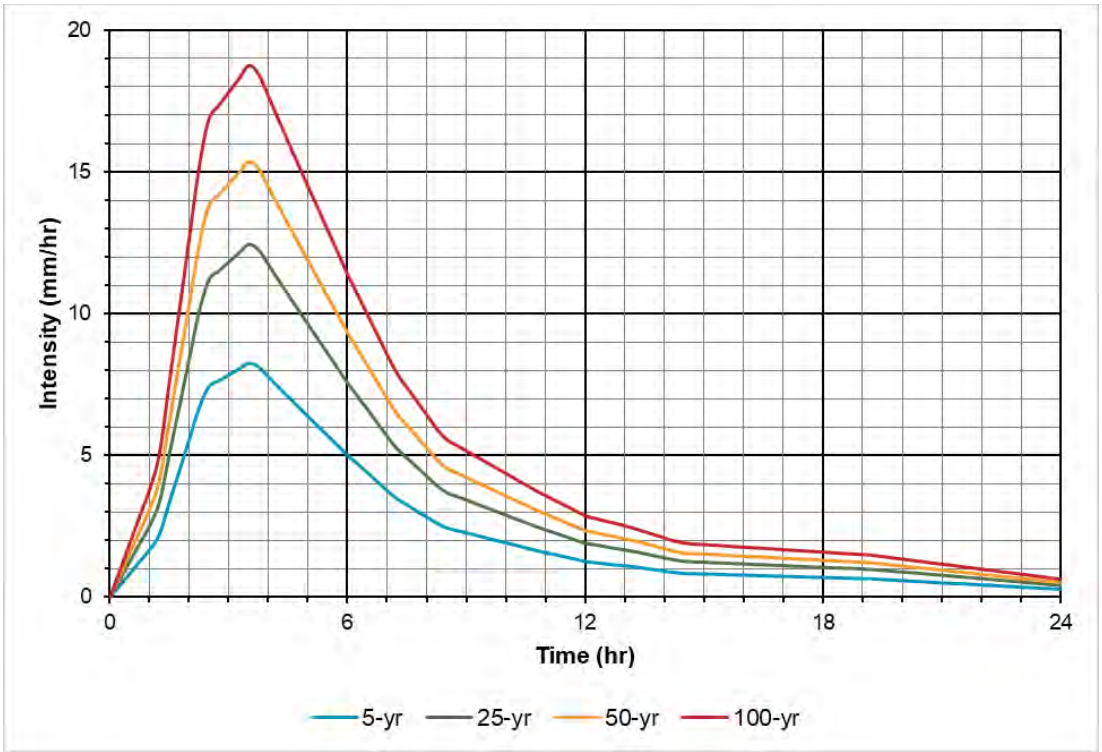


Figure 3.1: Huff Design Storm Comparison

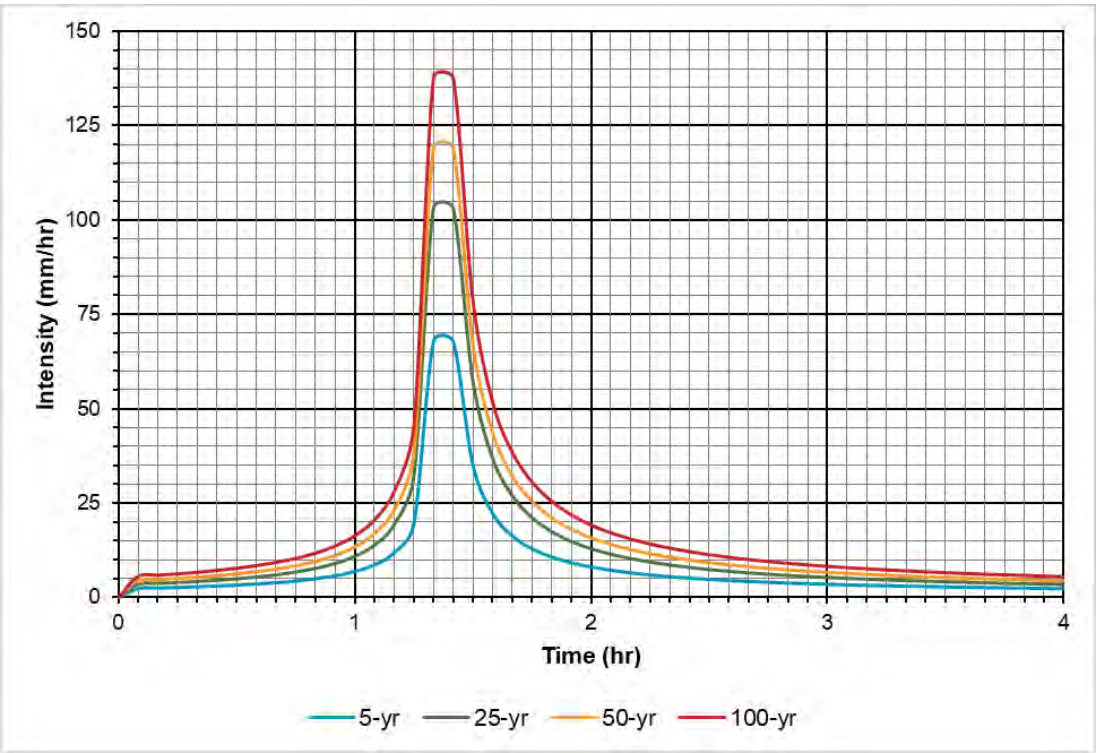


Figure 3.2: Chicago Design Storm Comparison

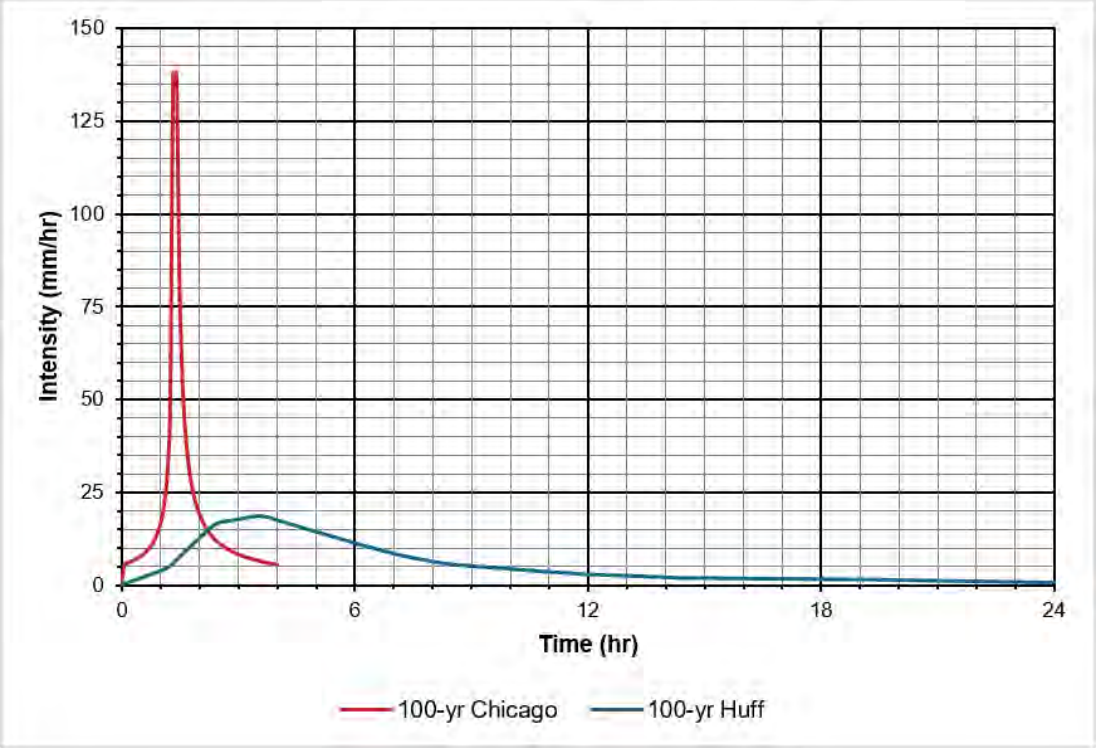


Figure 3.3: 100-Year Chicago and Huff Design Storm Comparison

3.2 Assessment Criteria

The following assessment criteria were used to evaluate the performance of the sanitary sewer system.

3.2.1 Maximum HGL Relative to Ground

Maximum hydraulic grade line (HGL) elevation relative to the ground is the amount of freeboard between the maximum water elevation and ground elevation at each manhole at the moment when maximum flow passes through. Hence, the maximum HGL elevation relative to the ground with a value of:

- Greater than 0.0 m is denoted as a red dot – indicating surcharge/back-up to surface.
- Between -1.5 m and 0.0 m is denoted as an orange dot – maximum HGL peaks within 1.5 m below the ground elevation indicating likely basement back-ups.
- Between -2.5 m and -1.5 m is denoted as a yellow dot – maximum HGL peaks within 1.5 m and 2.5 m below the ground elevation indicating possible basement back-ups.
- Less than -2.5 m is denoted as a green dot – maximum HGL peaks over 2.5 m below the ground elevation.

3.2.2 Peak Discharge Relative to Sewer Capacity

Peak discharge relative to pipe capacity indicates the ratio of peak flow to pipe capacity in wet weather conditions; as a corollary to this, the data can be interpreted to indicate the amount of spare capacity during peak flows. This is calculated by taking the ratio of the modelled peak flow in a pipe and its corresponding capacity. Pipes with ratios higher than 1.00 are considered to have no spare capacity thus indicating a section of pipe that may require upgrading, particularly where the length of the section is long enough to cause surcharge conditions immediately in the upstream reach.

Hence, the peak discharge relative to sewer capacity with a ratio of:

- Greater than 1.20 is denoted with a red line – significantly over capacity.
- Between 1.00 and 1.20 is denoted as an orange line – over capacity, or in another words the capacity is diminishing as the maximum flow theoretically occurs at roughly 93% of the pipe's diameter. This means that in principle, sewers with a Q/Q_{man} (peak discharge relative to pipe capacity) ratio equal to or less than 1.05 have their flow still contained within the pipe's diameter.
- Between 0.86 and 1.00 is denoted as a yellow line – less than 14% of spare capacity available.
- Less than 0.86 is denoted as a green line – spare capacity available.

Both relationships should be evaluated in conjunction to pinpoint any potential capacity deficiencies in the system. For example:

- The maximum HGL elevation relative to the ground elevation with a value that is between -2.5 m and 0.0 m (a yellow or orange dot) may indicate a location with a possible basement back-up, however the peak discharge relative to pipe capacity ratio at the same location could have a value of less than 0.86 (a green line) indicating the pipe is not surcharged. This could suggest a relatively shallow pipe.

In addition to these two scenarios, the spare capacity of each pipe was determined. This indicates the amount of additional flow each pipe can convey before it becomes completely utilized. The amount of spare capacity ranges from less than 0 L/s to over 100 L/s, with the least capacity illustrated in red and the most capacity illustrated in green. In determining the spare capacity, it becomes evident which pipes are available to convey any additional flows due to future development, and which pipes should remain untouched.

Existing forcemains should be analyzed to maintain a minimum velocity of 0.76 m/s and not exceeding a velocity of 1.50 m/s (Town of Stony Plain, 2025).

3.3 Future System Design Criteria

The criteria used to develop the future servicing concept were based on the Town's Design and Construction Standards, and are summarized below:

- Minimum depth of cover of 3.0 m.
- Minimum grades as presented in **Table 3.1**, as per the Town's Design and Construction Standards.

Table 3.1: Minimum Pipe Grades

Pipe Diameter	Minimum Grade
mm	%
200	0.40
250	0.28
300	0.22
375	0.15
450	0.12
525	0.10
600 and greater	0.10

3.3.1 Future Flow Projections

Flow projections were based on a generation rate of 300 L/c/d, as stipulated in the Town's Design and Construction Standards. While some municipalities have adopted lower wastewater generation rates to reflect declining per-capita water use (e.g., EPCOR's current guideline is 220 L/c/d), others continue to use more conservative design criteria. For example, the City of Spruce Grove uses 300 L/c/d, while Parkland County uses 350 L/c/d.

Lower generation rates may better represent current wastewater production and can reduce the size and cost of future infrastructure. Conversely, higher generation rates provide additional capacity for future growth and uncertainty but can result in oversized sewers with lower flow velocities, increasing the potential for solids buildup, sedimentation, blockages, odour generation, hazardous gas buildup (H_2S), and corrosion concerns. Given these trade-offs, and because 300 L/c/d is the Town's adopted design criterion, this value was retained for the current analysis.

Peaking factors (PF) were derived based on Harmon's formula:

$$PF = 1 + \frac{14}{4 + P^{\frac{1}{2}}}$$

- Where, P is the design contributing population in thousands; and
- Maximum PF is 3.8.

It should be noted that this generation rate is considered conservative, as historic wastewater generation rates are typically lower and are trending downwards. Although actual generation rates and peaking factors in the wastewater system may be less than those outlined above for some areas, the use of these rates is a more conservative approach for future design over adopting historic peaking trends, which are subject to change.

A constant I&I allowance of 0.28 L/s/ha was applied to simulate the wet weather response. This is in alignment with the Alberta Environment and Protected Areas (AEPA) Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems for new development.

4.0 Existing Sanitary System

4.1 Existing Conveyance System

The Town is currently serviced by approximately 99.5 km of gravity sewers and 1.2 km of forcemains. The system discharges into the ARROW Utilities Trunk on the north end of town, which is described in **Section 4.2**. The diameter, material, and installation period of the existing sanitary sewer system are illustrated in **Figures 4.1**, **4.2**, and **4.3**, and summarized in **Tables 4.1**, **4.2**, and **4.3**, respectively. As shown, the majority of Stony Plain consists of 200 mm PVC pipe and the Town experienced the most significant growth in the 2000s and 2010s.

Table 4.1: Existing Sanitary Sewer Diameter Summary

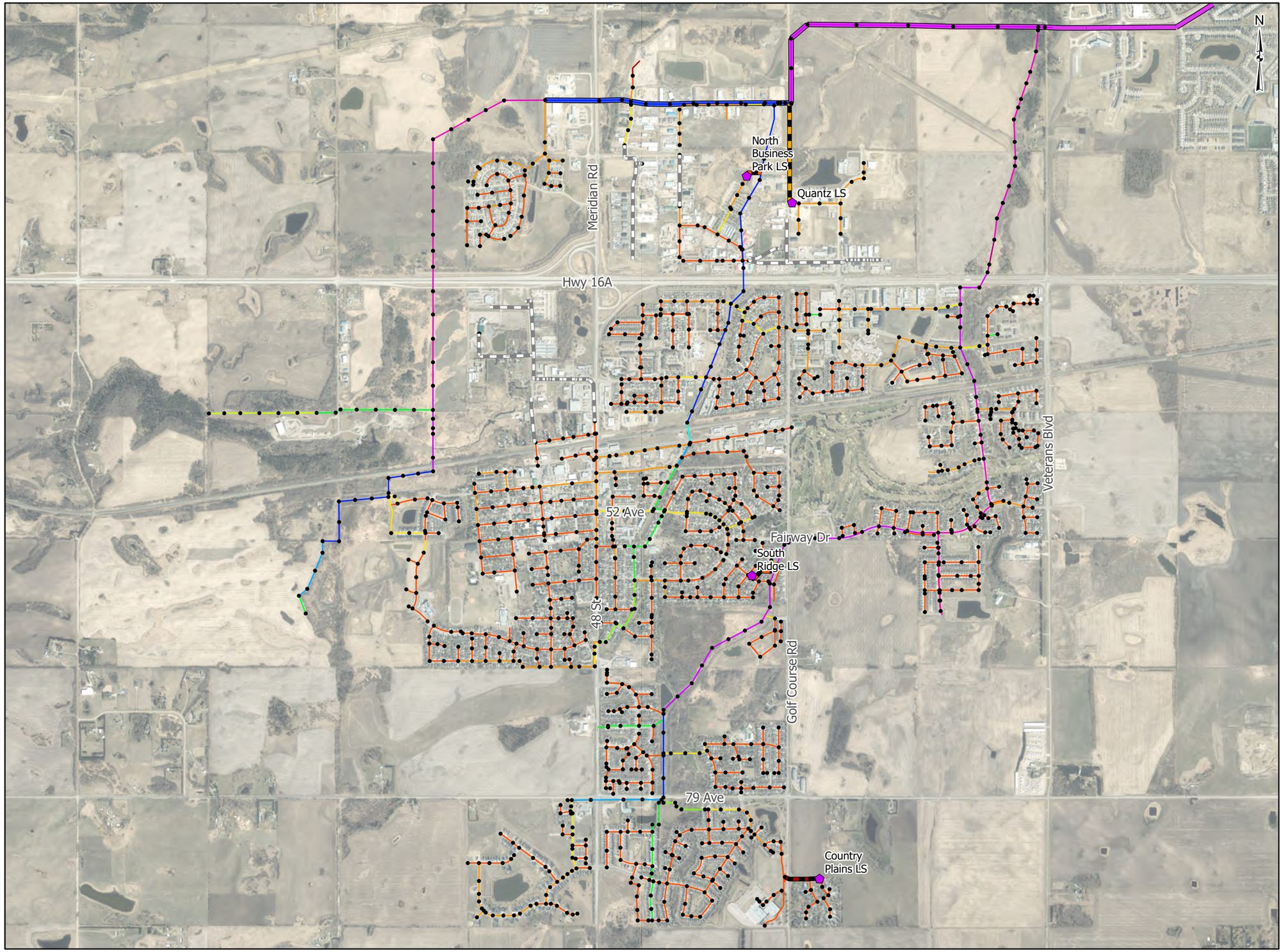
Diameter	Length	Percentage of Total
mm	m	%
Gravity Sewers		
Unknown	3,261	3.28
100	133	0.13
150	65	0.07
200	56,742	57.04
250	12,508	12.57
300	4,353	4.38
375	676	0.68
400	861	0.87
450	3,124	3.14
500	128	0.13
525	1,145	1.15
600	5,093	5.12
750	5,796	5.83
900	5,379	5.41
1,050	210	0.21
Total	**99,474**	**100.00**
Forcemains		
100	220	18.71
150	314	26.70
200	642	54.59
Total	**1,176**	**100.00**

Table 4.2: Existing Sanitary Sewer Material Summary

Material	Length	Percentage of Total
	m	%
Gravity Sewers		
Unknown	11,059	11.12
Asbestos Cement (AC)	3,747	3.77
Concrete	10,942	11.00
Clay	7,127	7.16
Polyethylene (PE)	2,028	2.04
Polyvinyl Chloride (PVC)	63,687	64.02
Steel	884	0.89
Total	**99,474**	**100.00**
Forcemains		
Polyethylene (PE)	534	45.41
Polyvinyl Chloride (PVC)	642	54.59
Total	**1,176**	**100.00**

Table 4.3: Existing Sanitary Sewer Installation Period Summary

Installation Period	Length	Percentage of Total
	m	%
Gravity Sewers		
Unknown	10,775	10.83
1950s	3,426	3.44
1960s	109	0.11
1970s	16,531	16.62
1980s	13,911	13.98
1990s	11,514	11.57
2000s	22,795	22.92
2010s	19,555	19.66
2020s	858	0.86
Total	**99,474**	**100.00**
Forcemains		
1990s	433	36.82
2010s	642	54.59
2020s	101	8.59
Total	**1,176**	**100.00**



LEGEND

- Manhole
- Lift Station
- Low-Pressure System

Gravity Main Diameter

- 100 mm
- 150 mm
- 200 mm
- 250 mm
- 300 mm
- 375 mm
- 400 mm
- 450 mm
- 500 mm
- 525 mm
- 600 mm
- 750 mm
- 900 mm
- 1050 mm

Forcemain Diameter

- 100 mm
- 150 mm
- 200 mm

ARROW Utilities Trunk Sewer Diameter

- 600 mm
- 750 mm

TITLE

PIPE DIAMETER

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

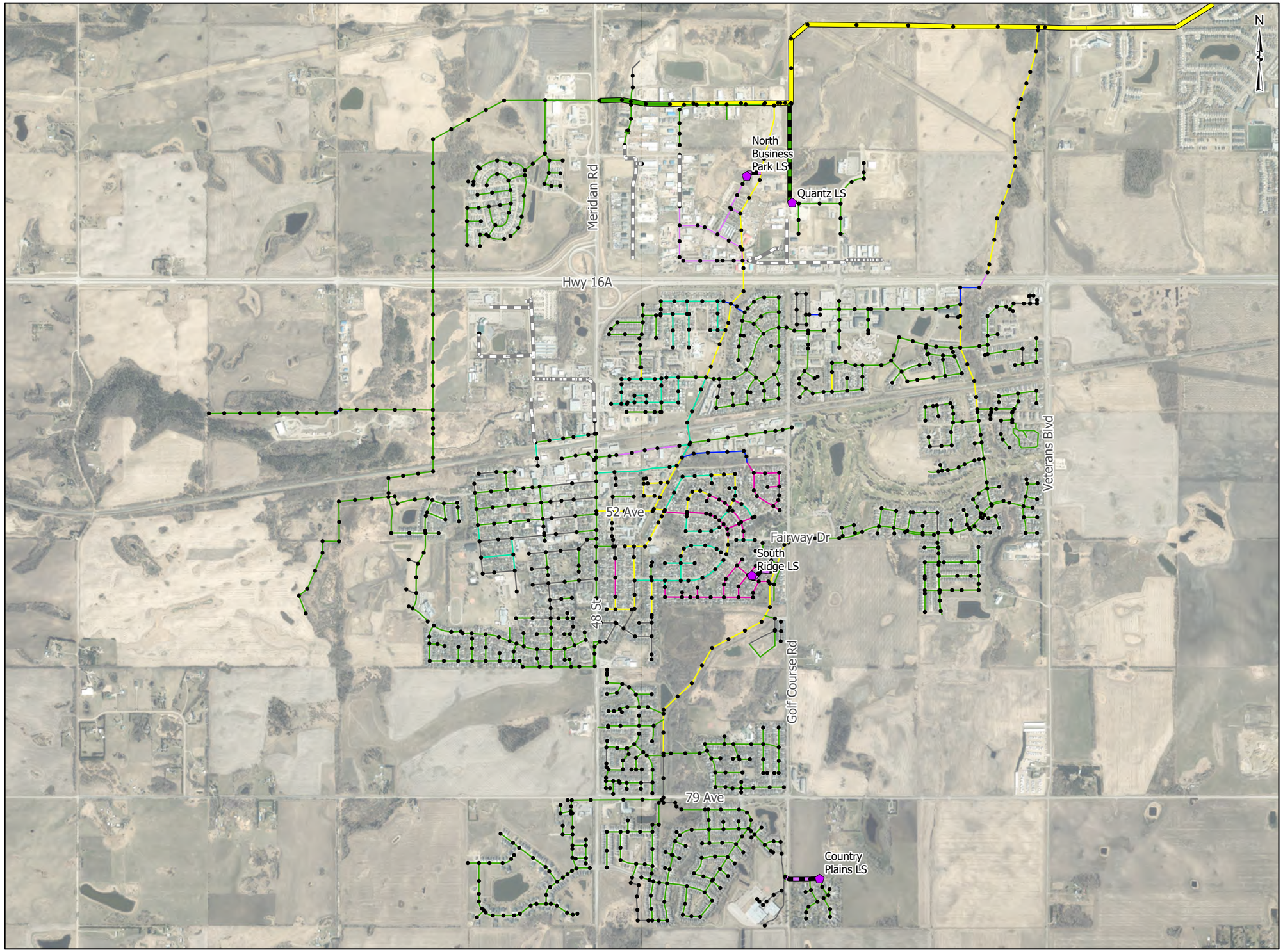
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FIGURE	4.1
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PROJECT NO.	28974
AUTHOR	jlalonde-bester

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LEGEND

- Manhole
- Lift Station
- Low-Pressure System

Gravity Main Material

- Asbestos Cement
- Concrete
- Clay
- Polyethylene
- Polyvinyl Chloride
- Steel
- Unknown

Forcemain Material

- Polyethylene
- Polyvinyl Chloride

ARROW Utilities Trunk Sewer

- Concrete
- Polyvinyl Chloride

TITLE

PIPE MATERIAL

PROJECT

2025 SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

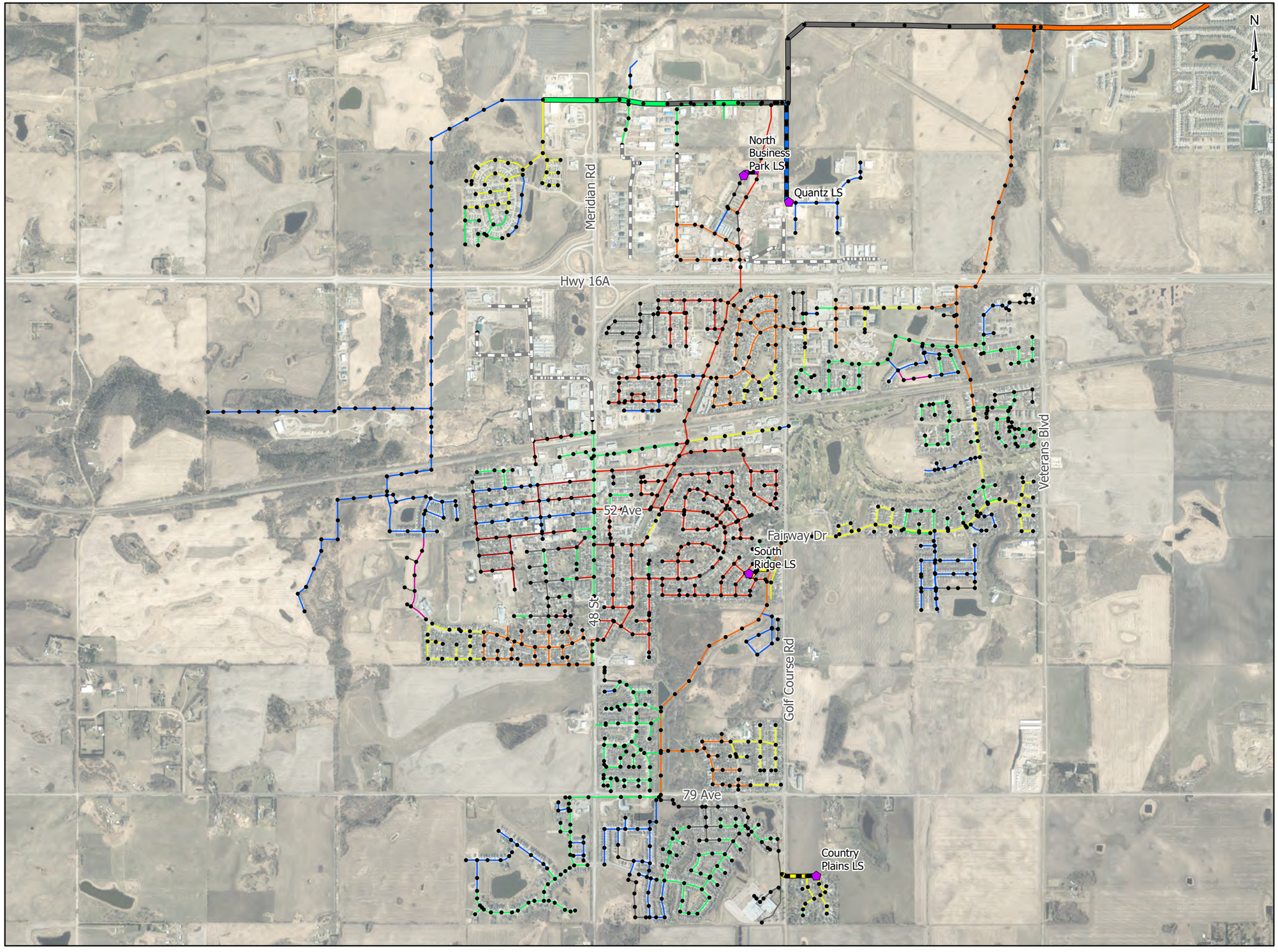
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FIGURE	4.2
DATE	7/20/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Pipe Material



LEGEND

- Manhole
- Lift Station
- Low-Pressure System

Gravity Main Installation Period

- 1950 - 1959
- 1960 - 1969
- 1970 - 1979
- 1980 - 1989
- 1990 - 1999
- 2000 - 2009
- 2010 - 2019
- 2020 - 2022
- Unknown

Forcemain Installation Period

- 1990 - 1999
- 2010 - 2019
- 2020 - 2022

ARROW Utilities Trunk Sewer Installation Period

- 1980 - 1989
- 2000 - 2009
- Unknown

TITLE

PIPE INSTALLATION PERIOD

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	4.3
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Pipe Installation Period

4.2 Trunk Sewers

The three primary trunk sewers servicing the Town are shown on **Figure 4.4**. All three trunks ultimately discharge to the ARROW Utilities Trunk. The trunk sewers are summarized below:

- **Central Trunk**: Services the central portion of Town. The trunk begins at 52 Avenue and extends north approximately 2.6 km to Boulder Boulevard, where it discharges into the ARROW Utilities Trunk.
- **East Trunk**: Services the east side of Town. The trunk begins at 79 Avenue and extends northeast approximately 5.6 km before connecting to the ARROW Utilities Trunk before it crosses Veterans Boulevard.
- **West Trunk**: Services the new developments on the west side of Town. The trunk begins west of the Brickyard neighbourhood and extends approximately 3.7 km north and then east, where it connects to the upstream end of the ARROW Utilities Trunk at Meridian Road.

4.2.1 ARROW Utilities Trunk Sewer

The ARROW Utilities Trunk Sewer (also known as the Parkland Gravity Sewer) is the major regional sanitary sewer that conveys wastewater from Stony Plain, Spruce Grove, Acheson, and Parkland County to the Wastewater Treatment Plant (WWTP) located at 23262 Township Road 540.

The upstream end of the trunk is located just west of Meridian Road (Highway 779), beginning at a diameter of 600 mm. From there, it runs east along Boulder Boulevard and increases to 750 mm at Range Road 280, where it turns northeast toward Spruce Grove. As it passes through Spruce Grove, the trunk expands to 1,050 mm, and downstream of the city it increases further to 1,350 mm as it continues east along Township Road 532A. Along this section, flows from Acheson and several smaller communities discharge into the system. The trunk then leads to the Parkland Lift Station, where wastewater is pumped through a 900 mm forcemain and eventually to the WWTP.

4.3 Existing Lift Stations

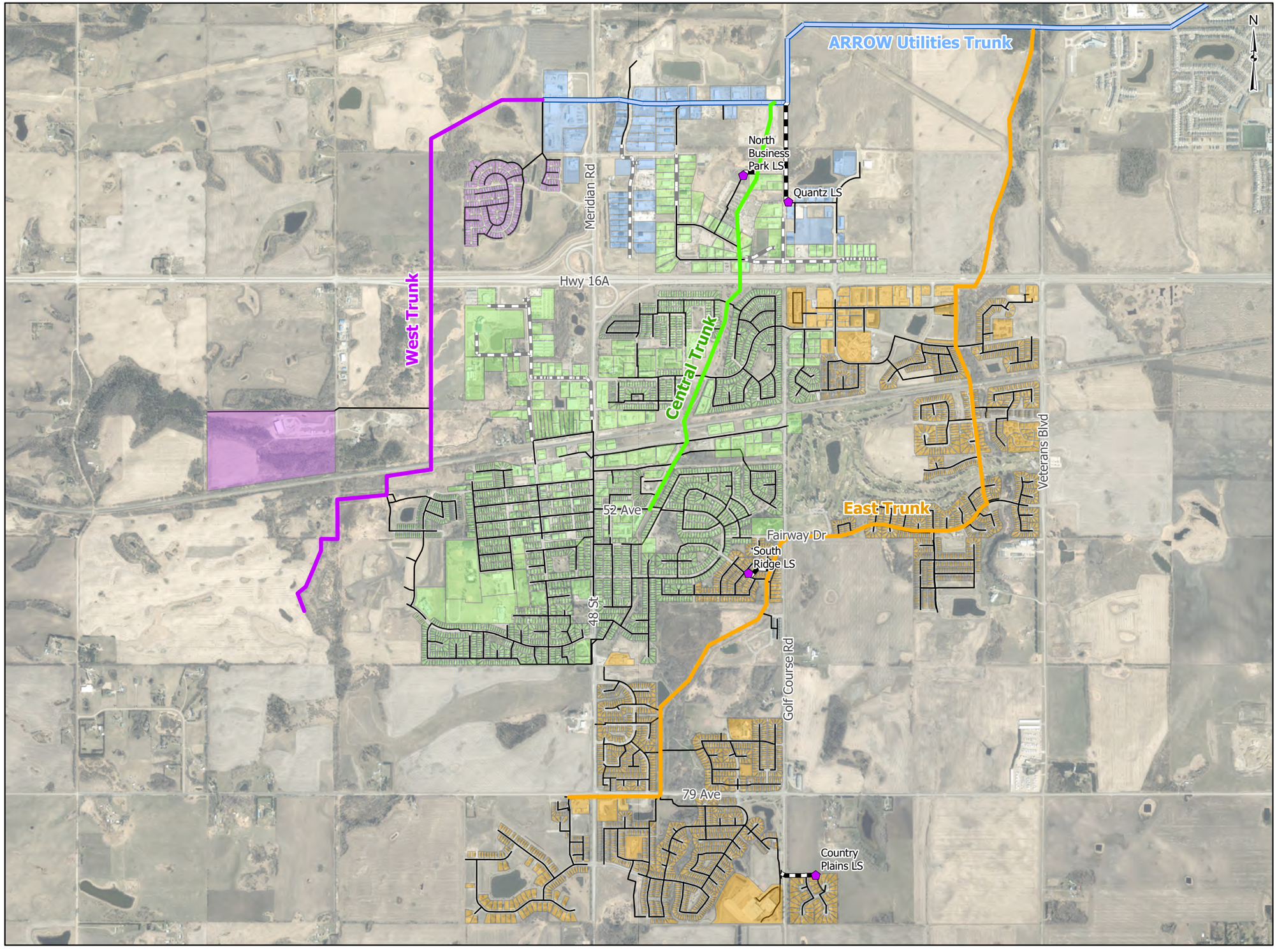
There are four public sanitary lift stations in the Town, including:

- Quantz Lift Station
- South Ridge Lift Station
- Country Plains Lift Station
- North Business Park Lift Station (reconstructed in 2022)

4.4 Existing Low-Pressure Systems

There are three low-pressure systems in the Town, including:

- **Quantz Low-Pressure System:** Services the industrial area along Boulder Boulevard, east of Granite Drive.
- **Goertz Low-Pressure System:** Services the industrial area along Goertz Avenue.
- **South Industrial Low-Pressure System:** Services the industrial area south of Highway 16A.



LEGEND

- Lift Station
- Gravity Main
- Low-Pressure System
- Forcemain
- West Trunk
- Central Trunk
- East Trunk
- ARROW Utilities Trunk

Trunk Catchment

- West
- Central
- East
- ARROW Utilities

TITLE

TRUNK SEWERS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

NAD 1983 CSRS 3TM 114

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FIGURE	4.4
DATE	7/16/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Trunk Sewers

5.0 Condition Assessment

5.1 Condition Assessment

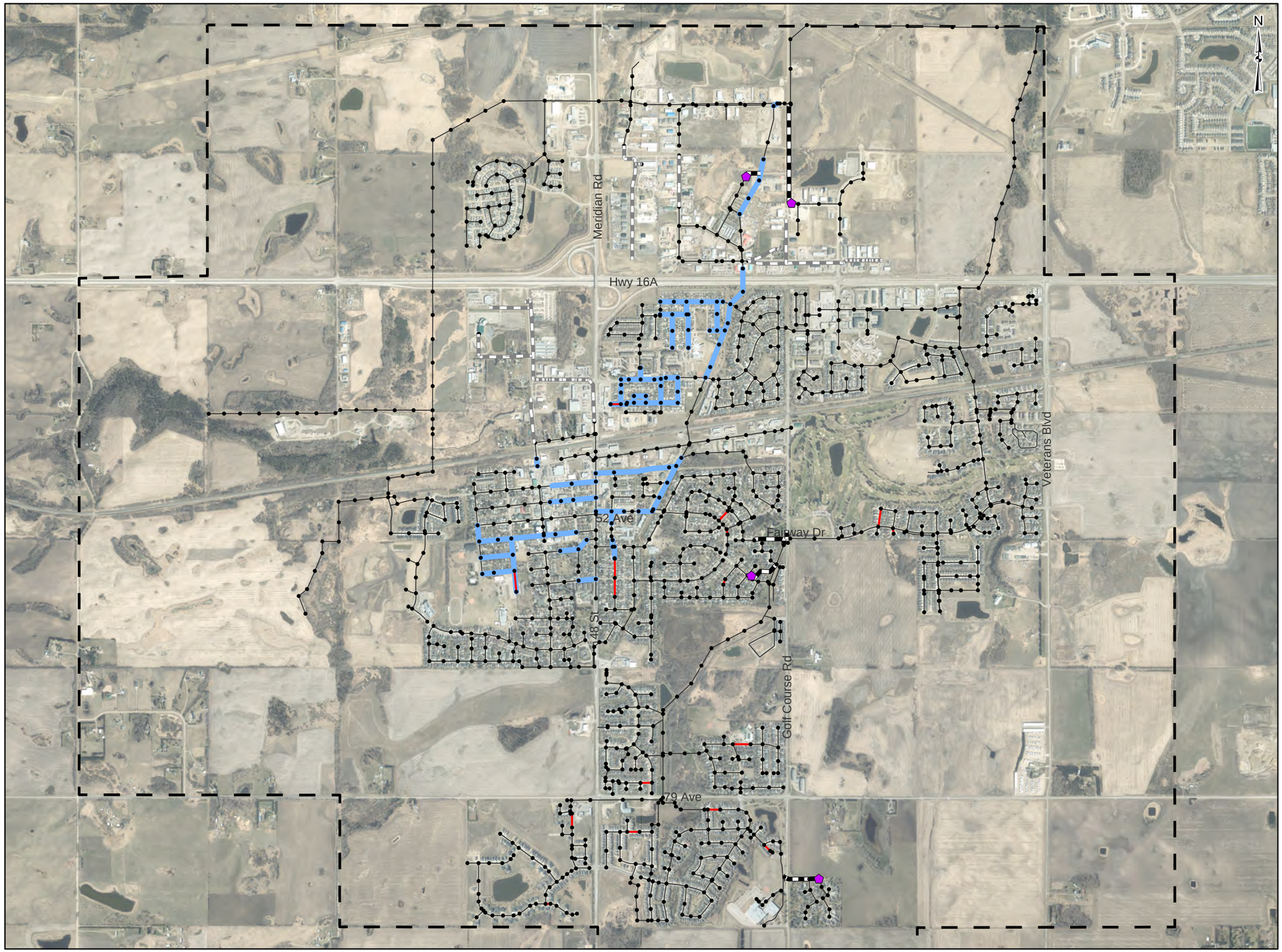
The Town has completed CCTV inspections of portions of the sanitary sewer system through multiple inspection programs since 2019 as part of its ongoing asset management program. These inspections provide information on the structural condition of pipes and manholes, identify evidence of I&I, and support long-term asset management planning. The Town's objective is to complete condition assessments of the existing sanitary sewer system, including trunk sewers, by 2030 to support proactive rehabilitation and replacement planning.

As part of this Master Plan, available CCTV inspection records were reviewed alongside asset age and material to develop an overall understanding of system condition. A detailed summary of the condition and I&I assessment is provided in the CCTV and I&I System Assessment Technical Memorandum (ISL, 2026). The condition assessment presented in this report provides a high-level overview of the sanitary sewer system, with a summary of findings shown in **Figure 5.1**. These findings were considered alongside the hydraulic capacity assessment when identifying rehabilitation and replacement priorities.

5.2 Recommendations

The Town should continue implementing its ongoing CCTV inspection and asset management program to support completion of the network-wide condition assessment and improve understanding of system condition over time. Rehabilitation and replacement priorities should consider both physical condition and hydraulic performance to maximize the value of capital investments.

Sections of the Central Trunk have exceeded their expected service life and should be prioritized for rehabilitation or replacement. As discussed in **Section 7.2**, the capacity assessment also identified deficiencies along the Central Trunk under wet weather conditions. Coordinating renewal of this critical asset with capacity upgrades would address both condition and performance objectives while minimizing future construction impacts and lifecycle costs.



LEGEND

- Manhole
- Lift Station
- Gravity Main
- Gravity Main with Overall CCTV Index Greater or Equal to 3
- Gravity Main Past Useful Life (Based on Material and Age)
- Forcemain
- Low-Pressure System
- Town Boundary

TITLE

CONDITION ASSESSMENT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	5.1
DATE	5/20/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251 Figures\28974_Stony_Plain_SMP.aprx - Figure X_Condition Assessment

6.0 Hydraulic Model Development

6.1 Missing GIS Data

The GIS data received from the Town was reviewed to determine any data gaps and additional information required. A package of record drawings was received on October 10th, 2025, and the GIS data has been updated since then with information extracted from the drawings.

Table 6.1 below summarizes the number of total key network conveyance elements and the corresponding missing count and percentages. This table reflects the missing information following the update from record drawings received on October 10th.

Table 6.1: Sanitary Conveyance Network Summary

Network Element	Count		Percent Missing
	Total	Missing	
Manhole Rim Elevation	1,293	495	38%
Manhole Sump Elevation	1,293	687	53%
Pipe Upstream and Downstream Inverts	1,569	304	19%
Pipe Upstream Invert Elevation	1,569	328	21%
Pipe Downstream Invert Elevation	1,569	851	54%
Pipe Diameter	1,569	106	7%
Pipe Material	1,569	198	13%
Pipe Installation Period	1,569	153	10%

With regards to the pipe downstream invert elevation, at first glance it appeared that there were numerous missing attributes. However, at most of these locations, the upstream invert of the following pipe was available, so these values were inferred using the method described in **Section 6.2.4**.

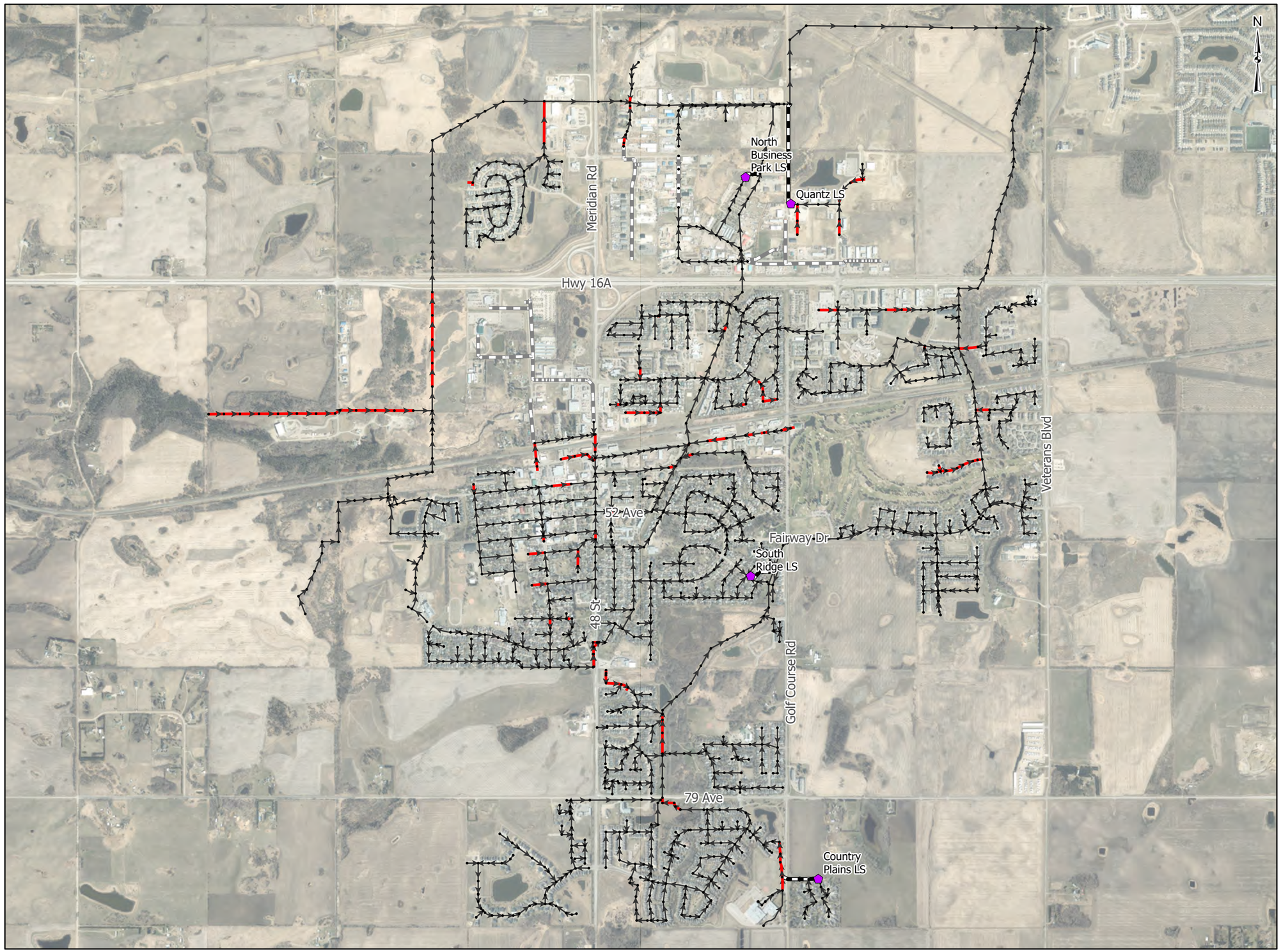
Missing invert elevations are illustrated in **Figure 6.1** and missing pipe information is shown in **Figure 6.2**.

Shown below in **Table 6.2** is a list of all identified sanitary lift stations within the Town and indicates whether information pertaining to the critical modelling parameters were provided or not. The lift stations were not included in the 2019 MIKE URBAN model, thus, the model could not be used to fill data gaps for the pressurized system.

Table 6.2: Lift Station Information Status

Lift Station	Record Drawings Obtained?	Pump Curves Obtained?
Quantz Lift Station	No[1]	No
South Ridge Lift Station	Yes	No
Country Plains Lift Station	Yes	No
North Business Park Lift Station	Yes	Yes

[1] Pump plates were obtained for Quantz.



LEGEND

- Manhole
- Lift Station
- Gravity Main
- Missing Invert Elevations
- Forcemain
- Low-Pressure System
- Town Boundary

TITLE

MISSING INVERT ELEVATIONS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

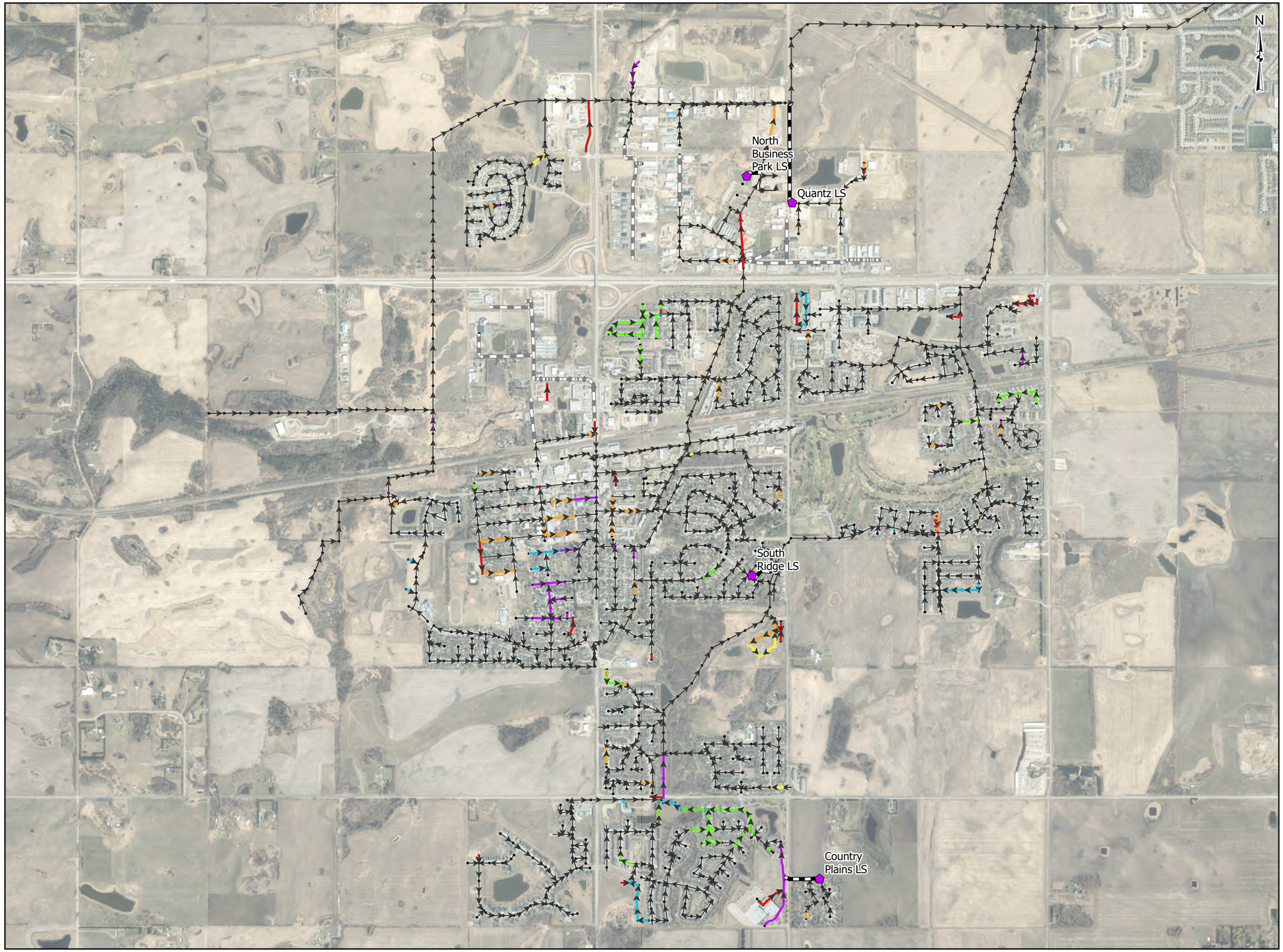
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FIGURE	6.1
DATE	5/20/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Missing Invert Elevations



LEGEND

- Manhole
- Lift Station
- Gravity Main
- Forcemain
- Low-Pressure System
- Missing Diameter, Material, and Installation Year
- Missing Diameter and Material
- Missing Diameter
- Missing Diameter and Installation Year
- Missing Material and Installation Year
- Missing Material
- Missing Installation Year

TITLE

MISSING PIPE INFORMATION

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	6.2
DATE	7/16/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Missing Pipe Information

6.2 Data Gap Resolution

The data gaps that were identified in **Section 6.1** required an approach to fill in any pertinent parameters. This section summarizes the methodology and justification for resolving data gaps in the model for the conveyance system and the lift stations.

6.2.1 Missing Manhole Rim Elevations

Approximately 38% of the manholes are missing rim elevations. Rim elevations are one of the key parameters required for modelling, to determine the depth of the manhole shaft and indicate when flooding to surface, or surcharging if a manhole is sealed, is prevalent. Thus, missing rim elevations were populated as part of the model development.

These were obtained from the LiDAR data provided by the Town, which has a resolution of 0.5 m by 0.5 m. This LiDAR is very accurate, making this modelling approach acceptable. There are tools in both ArcGIS and PCSWMM that extract the elevation at a given point and assign it to an attribute of the point, thus making this an efficient process.

6.2.2 Missing Manhole Sump Elevations

For manholes with missing sump elevations, it was assumed that the sump is equal to the lowest invert elevation of all connected pipes. The downside of this method is that this would not account for any drops in manholes providing additional storage.

6.2.3 Missing Pipe Information

For pipes with missing diameters, these were conservatively estimated based on adjacent pipe diameters. Missing pipe materials and installation periods were assigned based on neighbouring pipes and the general characteristics of the surrounding neighbourhood.

6.2.4 Missing Upstream and Downstream Pipe Invert Elevations

Approximately 19% of the pipes in the system are missing upstream and downstream invert elevations. To fill in these gaps, the following assumptions were made:

- Invert elevations were assumed to ensure continuity with other inverts within the same manhole.
- Where available, the manhole sump elevation was used as the connecting pipe invert elevation.
- For consecutive pipes with missing invert data, inverts were linearly interpolated between the nearest known elevations.
- Missing upstream invert elevations for pipes at the furthest upstream ends of the system were extrapolated using the minimum design slope from the Town's Design and Construction Standards, as stipulated in **Table 3.1**.
- For the west–east branch of the sewer crossing Glory Hills Road, near the Parkland Country Transfer Station, invert elevations were extrapolated from the tie-in point with the north–south sewer. Applying the minimum design slope produced unrealistic invert depths (greater than 10 m below ground level). Therefore, the inverts were adjusted to maintain a consistent depth of cover with known depths downstream.
- A large portion of the GIS invert elevations in the Old Town neighbourhood were consistently 12.5 m lower than expected (compared to other known invert/sump elevations). These were adjusted by adding 12.5 m to ensure proper connectivity with surrounding pipes.

After applying these engineering assumptions, a survey was deemed unnecessary, as there were no critical locations that could not be reasonably estimated. **Figure 6.3** illustrates all assumptions incorporated into the model. As additional information becomes available, or as field survey data is collected in the future, the model can be updated and refined as needed.

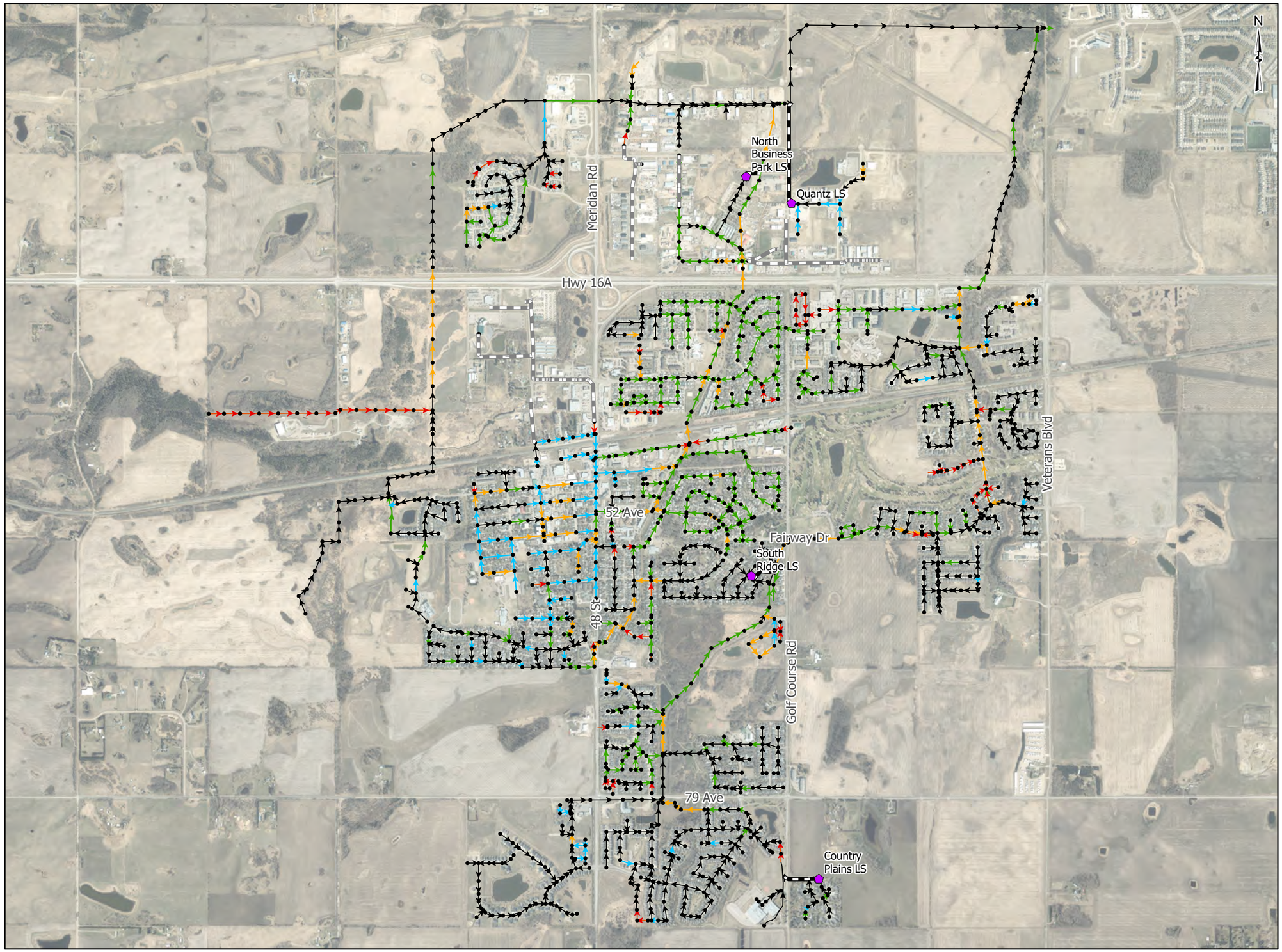
6.2.5 Missing Lift Station Parameters

The assumptions used to fill in the data gaps for the lift stations are summarized in **Table 6.3**. Most of the assumptions for the Quantz Lift Station were inferred from the SCADA data.

Table 6.3: Lift Station Data Gap Assumptions

Lift Station	Data Gap	Assumptions
Quantz Lift Station	Wet Well Top Elevation	Ground elevation from LiDAR
	Wet Well Bottom Elevation	687.8 m
	Wet Well Area	1.15 m^2
	Pump Stop Level	0.75 m
	Pump Start Level	1.5 m
	Forcemain Discharge Elevation	Equal to manhole sump elevation
Country Plains Lift Station	Forcemain Discharge Elevation	Equal to manhole sump elevation

Where pump curves were not provided (Quantz, South Ridge, and Country Plain Lift Stations), they were obtained from publicly available manufacturer data using the identified pump model numbers.



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System

Gravity Main Assumption

- No assumptions made
- One invert inferred from neighbouring pipe
- Both inverts inferred from neighbouring pipes, or engineering assumption made
- Inverts interpolated
- Inverts extrapolated

TITLE

MODELLING ASSUMPTIONS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

NAD 1983 CSRS 3TM 114

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FIGURE	6.3
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Modelling Assumptions

6.3 Model Set-Up

The model was constructed from scratch by using the GIS data provided by the Town in September 2025 and filling in data gaps using record drawings, the previous MIKE URBAN model, and making assumptions, as described in **Section 6.2**. Once imported into PCSWMM, a verification process was completed by producing longitudinal profiles of every pipe segment in the system to ensure proper connectivity and review elevations, diameters, and slopes to verify the accuracy of the input data.

Pipes were assigned roughness coefficients based on material, as outlined in **Table 6.4**. These coefficients are based on industry best practices.

Table 6.4: Pipe Roughness Coefficients

Material	Manning's 'n' Coefficient	Hazen William's C Factor
Asbestos Cement	0.013	-
Concrete	0.013	-
Clay	0.015	-
Polyethylene	0.012	120
Polyvinyl Chloride	0.011	130
Steel	0.013	-
Unknown	0.013	-

6.4 Boundary Conditions

To properly represent downstream system constraints, detailed boundary conditions were developed for the downstream end of the Stony Plain sewer network to reflect the current utilization of the ARROW Utilities Parkland Sanitary Trunk Sewer.

The most recent version of the ARROW Utilities MIKE+ 2024 model, provided by Arrow Utilities on November 19, 2025, was run using various design storm scenarios. No detailed QA/QC of the model was completed as part of this work, and no modifications were made to the model. The resulting hydraulic grade line (HGL) elevations were extracted at the location where the trunk exits Stony Plain, as shown in **Figure 6.4**. These HGLs were then applied in the Stony Plain model as fixed stage boundary conditions at the most downstream node for each corresponding design storm, as summarized in **Table 6.5**.



Figure 6.4: Boundary Condition Location

Table 6.5: Arrow Utilities Trunk Boundary Conditions

Scenario	HGL Elevation
	m
DWF	683.940
5-Year, 4-Hour Chicago Distribution	684.176
25-Year, 4-Hour Chicago Distribution	684.463
50-Year, 4-Hour Chicago Distribution	685.987
100-Year, 4-Hour Chicago Distribution	686.449
5-Year, 24-Hour Huff Distribution	684.086
25-Year, 24-Hour Huff Distribution	684.160
50-Year, 24-Hour Huff Distribution	684.237
100-Year, 24-Hour Huff Distribution	684.697

It should be noted that the boundary conditions derived from the ARROW Utilities model for the 50-year and 100-year 4-hour Chicago storm events result in hydraulic grade line elevations above the ground surface at the downstream boundary location. As the ARROW Utilities model was externally developed and no detailed QA/QC or sensitivity assessment of the regional model was completed as part of this study, these boundary conditions were adopted as provided. The elevated HGLs may reflect conservative assumptions within the regional model or downstream capacity constraints outside the Town's sanitary system. Further review and refinement of the regional model and corresponding boundary conditions is recommended in coordination with ARROW Utilities as part of future detailed assessments.

6.5 Lift Stations

The lift stations were input in the model using data provided from the Town, consisting of record drawings, pump curves, and SCADA data. Record drawings were used to obtain pertinent lift station characteristics such as wet well dimensions and elevations, incoming pipe invert elevations, and discharge elevations. Head discharge tables were extracted from the pump curves for input into the model. The pump curves used in the model are shown in **Figure 6.5**.

In the model, the lift station sites include a storage node representing a wet well, pumps, a dummy node for connectivity at the downstream end of the pumps, and a forcemain. Wet well dimensions, level control settings, pump curves, forcemain diameters and all required inverts were then populated from the sources noted above. The tables below summarize characteristics of the lift stations (**Table 6.6**), and pump parameters and control settings (**Table 6.7**).

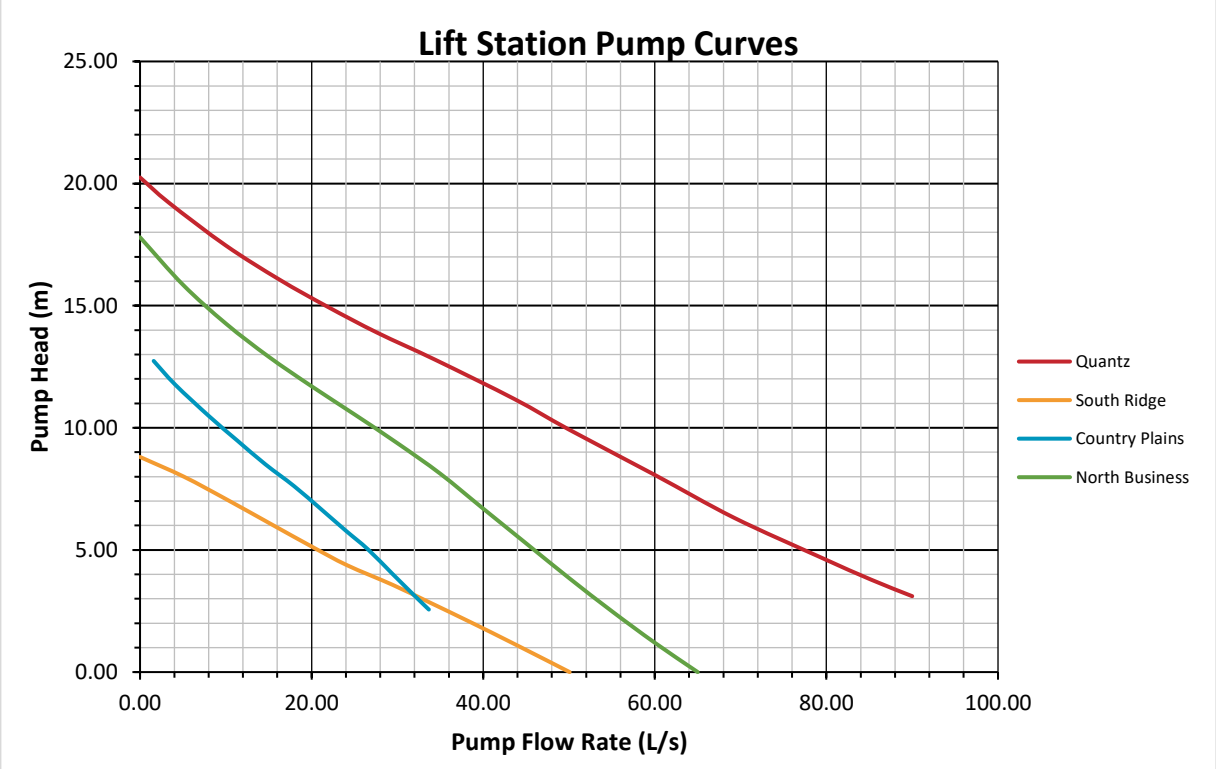


Figure 6.5: Model Pump Curve Information

Table 6.6: Lift Station and Forcemain Parameters and Capacities

Lift Station	Wet Well Area	Forcemain Type	Forcemain Length	Forcemain Capacity[1]
	m^2		m	L/s
Quantz Lift Station	1.2	200 mm PVC	642	47
South Ridge Lift Station	6.2	150 mm HDPE	214	27
Country Plains Lift Station	2.6	100 mm HDPE	228	12
North Business Park Lift Station	4.5	150 mm HDPE	98	27

[1] Forcemain capacity determined based on the velocity of 1.5 m/s.

Table 6.7: Pump Parameters and Control Settings

Lift Station	Number of Pumps	Pump Model	Pump 1 Levels		Pump 2 Levels	
			Start	Stop	Start	Stop
			m	m	m	m
Quantz Lift Station	2 (alternating)	Flygt 3127-MT-438	1.50	0.75	1.50	0.75
South Ridge Lift Station	2	Flygt 3127-MT-436	1.27	0.66	1.42	0.66
Country Plains Lift Station	2	Zoeller 6123	2.12	1.06	2.49	1.06
North Business Park Lift Station	2	Flygt NP 3102-462	1.70	0.70	1.85	0.70

6.6 Subcatchments

The legal shapefile provided by the Town was used as a baseline to derive subcatchments. A working copy of the shapefile was clipped such that only the parcels that are serviced by the Town's wastewater collection system were included. This generally required removing any undeveloped land parcels.

The remaining parcels underwent a visual inspection to remove any parcels not requiring a sanitary service. This included parcels such as utility easements, parks, transportation corridors, and vacant land. Visual inspection was completed through a combination of reviewing the base mapping provided within ArcGIS, Google Maps, and Google Street View.

During Workshop #1, the Town identified several parcels that were either developed or anticipated to be developed but were not included in the subcatchments. Based on the available aerial imagery (Google Maps, 2025), these parcels were not yet developed at the time of model setup. For calibration purposes, the land use conditions corresponding to the mid-2025 flow monitoring period were assumed. As a result, parcels identified by the Town that were developed after this period were not included in the calibration subcatchments. These parcels were included in a 2026 (i.e., Short-term) scenario in the future system assessment.

The existing land use is based on the Land Use Bylaw (LUB) shapefile (September 2025) provided by the Town and was used to assign land use classifications to the subcatchments developed from the legal shapefile. Land uses were generalized for the purpose of calibration, as shown in **Table 6.8** and **Figure 6.6**.

Table 6.8: Generalized Land Use for Calibration

Generalized Land Use	LUB District
Residential	Comprehensively Planned Residential District
	Detached Dwelling Residential District
	High Density Residential District
	Large Lot Detached Dwelling Residential District
	Mixed Form Residential District
	Multi-Unit Building Residential District
	Small Lot Mixed-Form Residential District
Commercial	General Commercial District
	Local Commercial District
Institutional	Community Services District
	Utility District
Industrial	Business Industrial District
Varies	Central Mixed Use District[1]

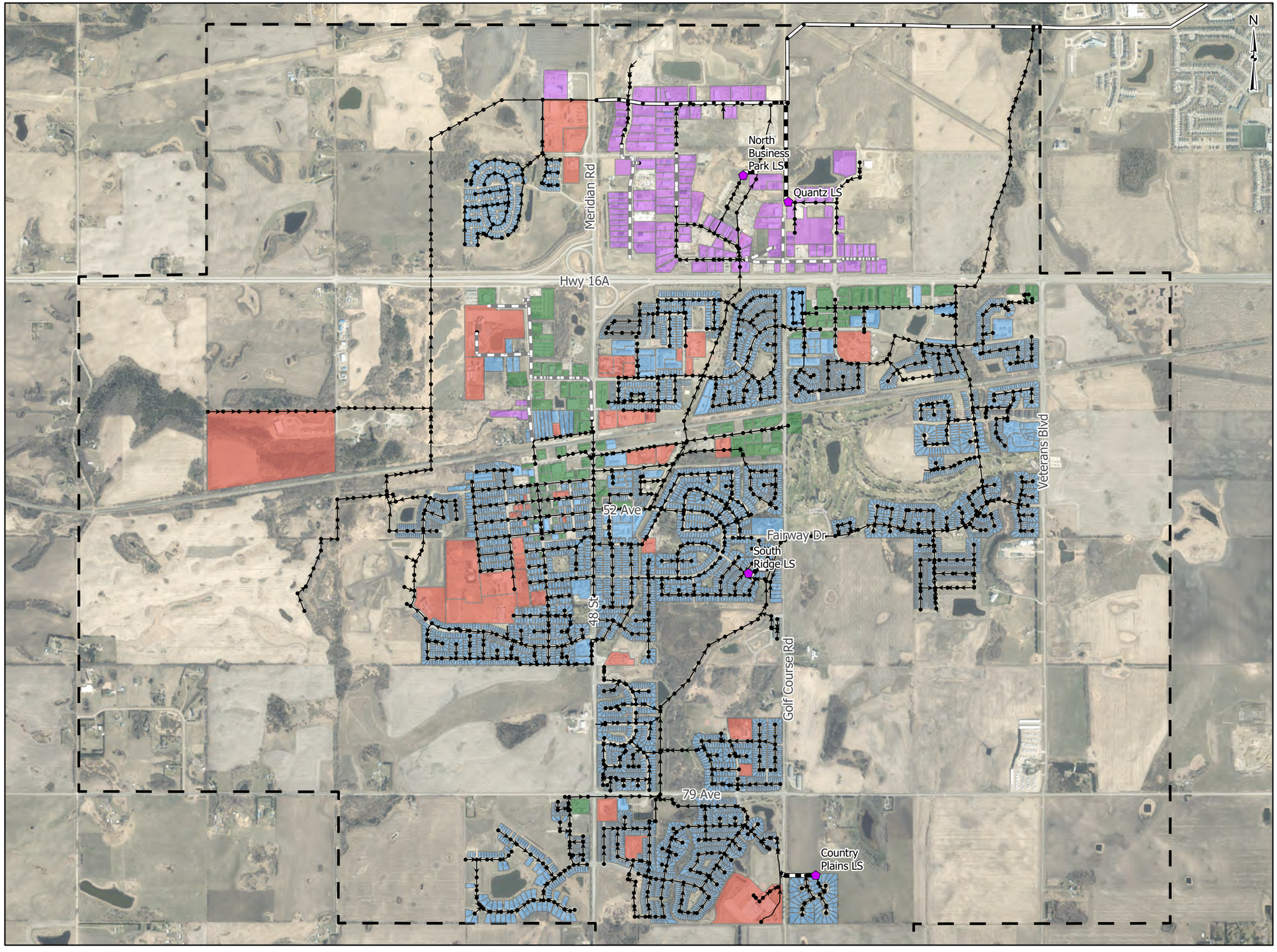
[1] Central Mixed Use District contains residential, commercial, and institutional parcels. These were assigned manually using Google Street View.

Each residential parcel was assigned a number of units. All low-density parcels were assigned 1 unit. Medium and high-density parcels were assigned unit counts on a lot-per-lot basis using Google Street View and other online sources. A person-per-unit density was then calculated so the total sum of population aligned with the 2024 census population of 19,300. This density was approximately 2.32 people per unit. A map showing the distribution of population among the parcels is provided in **Figure 6.7**.

For non-residential parcels, lot areas were determined and sewage generation was estimated using an area-based method. Unit flow rates for commercial, institutional, and industrial land uses were established during calibration and applied to the corresponding parcels.

Subcatchments were also digitized to represent road polygons. Including roads was necessary to account for inflow and infiltration (I&I) for WWF calibration. To accomplish this, a roads polygon shapefile was created by adding a 20 m buffer to the pipe shapefile and then clipping it to the void space of the parcel shapefile. This method ensured that only roads with sanitary sewers buried underneath were accounted for, as these would be the sections contributing to I&I. A validation process was undertaken to remove any green spaces or utility easements. Finally, the shapefile was divided into Thiessen polygons for each manhole within the system.

Subcatchment connections to the pipe network were completed using a tool in PCSWMM, which connects subcatchments to the nearest node. The connections were verified and adjusted manually as needed.



LEGEND

- Manhole
- Lift Station
- ARROW Utilities Trunk Sewer
- Gravity Main
- Forcemain
- Low-Pressure System
- Town Boundary

Generalized Land Use

- Commercial
- Industrial
- Institutional
- Residential

TITLE

EXISTING SUBCATCHMENTS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

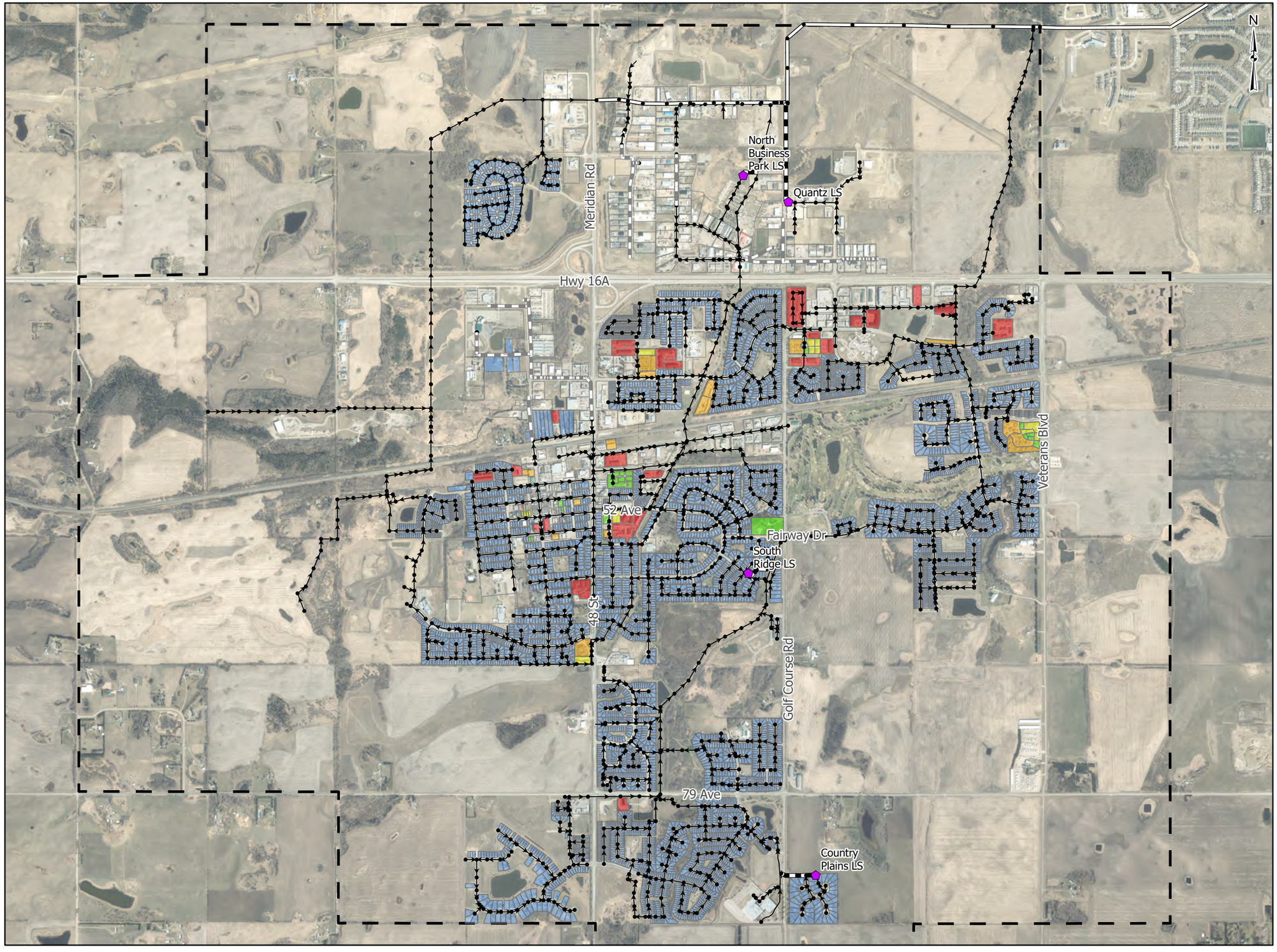
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FIGURE	6.6
DATE	5/20/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Subcatchments



LEGEND

- Manhole
- Lift Station
- ARROW Utilities Trunk Sewer
- Gravity Main
- Forcemain
- Low-Pressure System
- Town Boundary
- Non-Residential Parcel

Allocated Population

- Less than 3
- 3 - 15
- 15 - 50
- 50 - 100
- Greater than 100

TITLE

POPULATION ALLOCATION

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 300 600

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FIGURE	6.7
DATE	5/20/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Population Allocation

6.7 Flow Monitoring and Rain Gauge Review

There are two (2) rain gauges and four (4) temporary flow monitors within the Town of Stony Plain. The rain gauges and flow monitors, as well as their respective catchments, are shown in **Figure 6.8**. Each of the rain gauge and flow monitoring locations are summarized below:

- **Public Works Rain Gauge (Public Works):** This rain gauge is located at the Stony Plain Public Works building at 4505 50 Avenue. The rain gauge is located within the centre of the Town and provides a representative location for model calibration.
- **Westerra Rain Gauge (Westerra):** This rain gauge is located near 1708 Westerra Loop.
- **Flow Monitor #1 (FM #1):** This flow monitor is located along the 600 mm sanitary sewer just north of the intersection of Brown Street and 49 Avenue. The 600 mm sewer conveys sewage for a significant portion of the Town including the neighbourhoods of Old Town, The Glens, Woodlands, Forest Green, and 49th Avenue Corridor.
- **Flow Monitor #2 (FM #2):** This flow monitor is located along the 600 mm sanitary sewer along Boulder Boulevard just west of Range Road 280. This sewer conveys sewage from Umbach Business Park and Meridian Meadows.
- **Flow Monitor #3 (FM #3):** This flow monitor is located along the 200 mm sanitary sewer along Brickyard Point. This sewer conveys flows from the Brickyard neighbourhood.
- **Flow Monitor #4 (FM #4):** This flow monitor is located along the 900 mm sanitary sewer along Briarwood Way. The 900 mm sewer conveys sewage for a significant portion of the Town including the neighbourhoods of South Creek, Fairways, Willow Park, High Park, Genesis on the Lakes, Country Plain Estates, and Westerra.

Rainfall data was provided for the Public Works and Westerra rain gauges from July 2020 to October 2025. Flow monitoring data for four flow monitors was provided from June 2025 to August 2025.

The rainfall depth for the period of June 2025 to August 2025 is plotted on **Figure 6.9**. Various storm events were selected from the data, using minimum interevent times of six hours. The intensity and duration of each storm was then compared to the City of Edmonton Intensity-Duration-Frequency (IDF) curves to determine a corresponding return period. The IDF curves with major rainfall events from both rain gauges are shown on **Figure 6.10**. The Town noted that the data from the Westerra rain gauge for the month of June 2025 is compromised and should not be relied upon. Thus, model calibration can use data from the Public Works rain gauge for the month of June.

Figures 6.11 through **6.14** show the flow monitoring data for each of the flow monitors for the months of June 2025 through August 2025 with rain gauge information superimposed on the graphs. **Figure 6.12** shows that FM #2 is unreliable with data frequently dropping to zero with no consistent diurnal pattern. Because of this, this flow monitor was not used for model calibration. Similarly, FM #3 was also excluded from calibration because it represents a very small catchment area (less than 4 ha, approximately 100 parcels), making it not worthwhile for model calibration purposes. However, the data was still used for the I&I assessment within this neighbourhood.

Based on an analysis of **Figures 6.9** through **6.14**, dry-weather flow (DWF) and wet-weather flow (WWF) periods for model calibration were determined. Dry-weather periods of at least seven (7) days where the flow monitoring data shows consistent diurnal patterns have been identified in **Table 6.9**.

Table 6.9: Potential DWF Calibration Periods

Dry-Weather Period	Data Quality			
	FM #1	FM #2	FM #3	FM #4
June 26 to July 3	High	Very Low	Moderate	High
July 27 to August 3	High	Very Low	Low	High
August 17 to 24	High	Very Low	Low	High

Table 6.10 summarizes the potential WWF calibration periods where substantial rainfall and a noticeable wet-weather response in the flow monitoring data were observed.

Table 6.10: Potential WWF Calibration Events

Rainfall Date	Maximum Return Period		Data Quality			
	Public Works	Westerra	FM #1	FM #2	FM #3	FM #4
June 13 2:10 PM	5-yr	-	Very Low	Very Low	Moderate	Moderate
June 18 9:30 PM	5-yr	-	Very Low	Very Low	Moderate	High
July 5 9:50 PM	<2-yr	<2-yr	Very Low	Very Low	Moderate	Moderate
August 3 1:50 PM	<2-yr	10-yr	High	Very Low	Low	High

Based on this assessment, the following periods were applied DWF and WWF calibration:

- **DWF Calibration Period**: July 27 to August 3 for both FM #1 and #4.
- **WWF Calibration Event**: August 3. This was estimated as a 10-yr return period at the Westerra rain gauge. The response in the monitoring data for both FM #1 and FM #4 shows a rapid peak I&I response.
- **WWF Validation Event**: June 18. This was estimated as a 5-yr return period at the Public Works rain gauge. The response in the monitoring data for FM #4 shows a more drawn-out I&I response. No validation event was selected for FM #1 due to poor data quality.

Figures 6.15, **6.16**, and **6.17** show the data for the recommended DWF calibration period, WWF calibration event, and WWF verification event, respectively.

6.7.1 Flow Monitoring Recommendations

To support ongoing performance assessment, ISL recommends the following:

- Install permanent flow monitors at the locations of FM #1 and FM #4, on the Central and East Trunks.
- Install additional permanent flow monitors on the Central and East trunks at the locations marked on **Figure 6.18**, to further discretize contributing catchments.
- Install a permanent flow monitor one manhole upstream of FM #2 location on the West Trunk to improve data quality, as the location used in the 2025 flow monitoring program had poor hydraulic conditions possibly due to the local sewer tying in at that manhole.
- Install a permanent flow monitor at the location of FM #3, as this neighbourhood exhibited elevated I&I during the 2025 flow monitoring program.

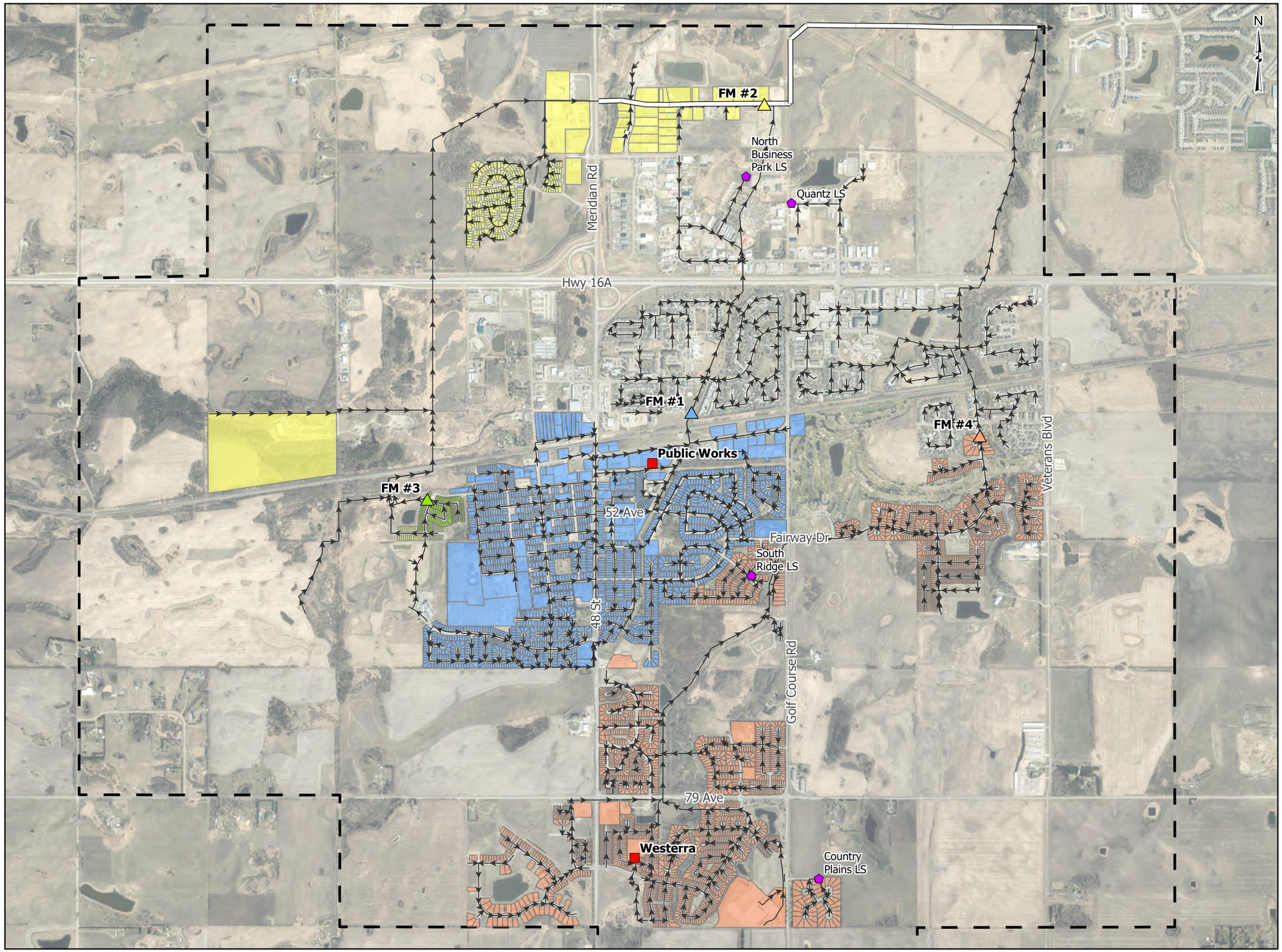
Although ARROW Utilities has historically maintained flow monitors near the downstream end of the trunk sewers where they connect to the commission trunk, the current locations and operational status of these monitors have not been confirmed. If active flow monitoring is not currently being undertaken at these locations, ISL recommends that permanent flow monitors be installed. Regardless, the Town should install additional monitors further upstream, near Highway 16A. Monitoring at these locations will help further discretize the sewershed catchments and enable the Town to quantify I&I for specific areas, such as the region between Highway 16A and the commission trunk.

A more discretized flow monitoring program will improve the Town's ability to identify neighbourhoods that meet I&I allowance criteria.

6.7.2 Sump-Pump Tie-in Policy Recommendations

Once the recommendations from **Section 6.7.1** have been implemented and comprehensive flow monitoring data is available, I&I rates can be recalculated for each sewershed. Where I&I rates are determined to be acceptable and sufficient pipe capacity exists, specifically where I&I rates are below 0.28 L/s/ha, sump pump tie-ins may be considered on a case-by-case basis. However, the Town's current Design and Construction Standards (Town of Stony Plain, 2025) direct foundation drains to discharge to the storm system rather than the sanitary system and recognize existing sump pump or weeping tile connections to the sanitary system as contributors to I&I. As such, disconnection to surface drainage or connection to a nearby storm drainage system would generally be the preferred approach where feasible.

The 2025 flow monitoring program indicated that the FM #4 catchment was the only monitored area with an I&I rate below the Town's target of 0.28 L/s/ha. However, the observed rainfall events during the monitoring period were all below the 5-year return period, and higher I&I rates may occur during more severe wet weather events. Consequently, sump-pump tie-ins should only be considered within the FM #4 catchment following implementation of the recommended flow monitoring program and confirmation that acceptable I&I rates and available pipe capacity are maintained.



LEGEND

- Manhole
- Lift Station
- Rain Gauge
- ARROW Utilities Trunk Sewer
- Low-Pressure System
- Gravity Main
- Forcemain
- Town Boundary

Existing Flow Monitor

- FM #1
- FM #2
- FM #3
- FM #4

Flow Monitor Catchment

- FM #1
- FM #2
- FM #3
- FM #4

TITLE

FLOW MONITOR CATCHMENTS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

NAD 1983 CSRS 3TM 114

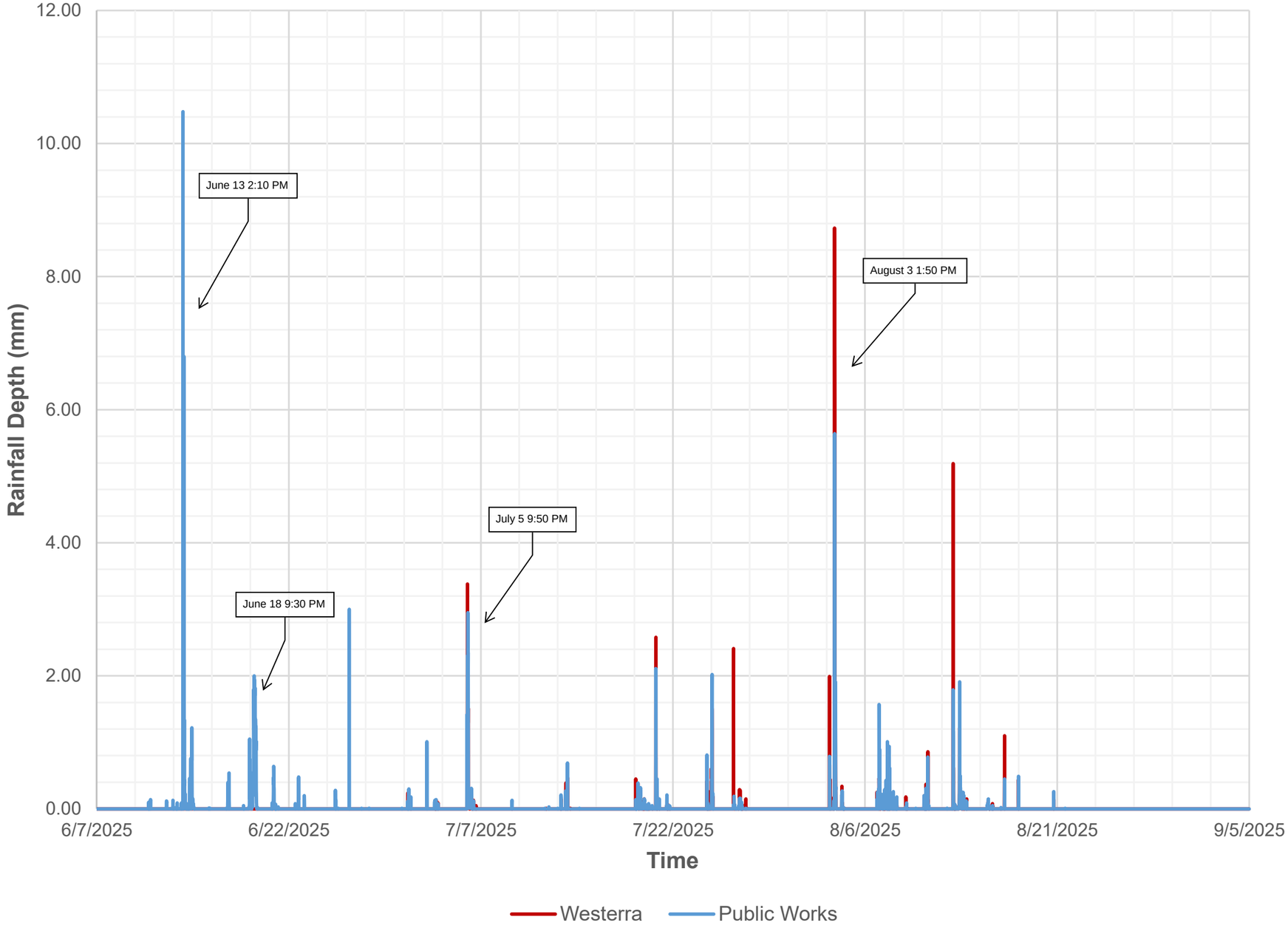
0 300 600

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FIGURE	6.8
DATE	7/15/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Flow Monitoring Catchments

Summary of Rainfall Data
June to August, 2025



TITLE
RAIN GAUGE DATA

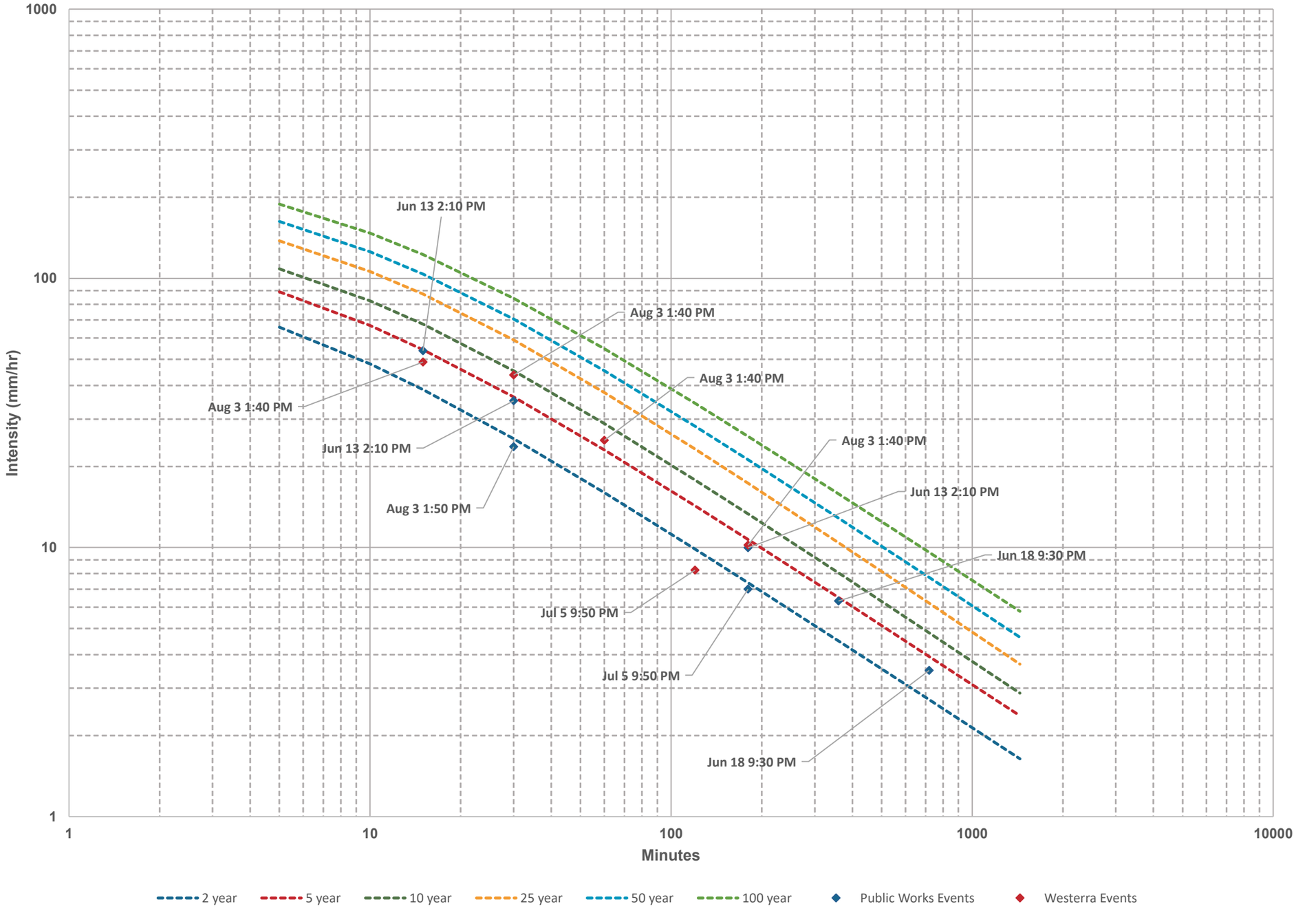
PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	6.9
DATE	10/6/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Rainfall Data

Edmonton Intensity-Duration Frequency (IDF) Curve



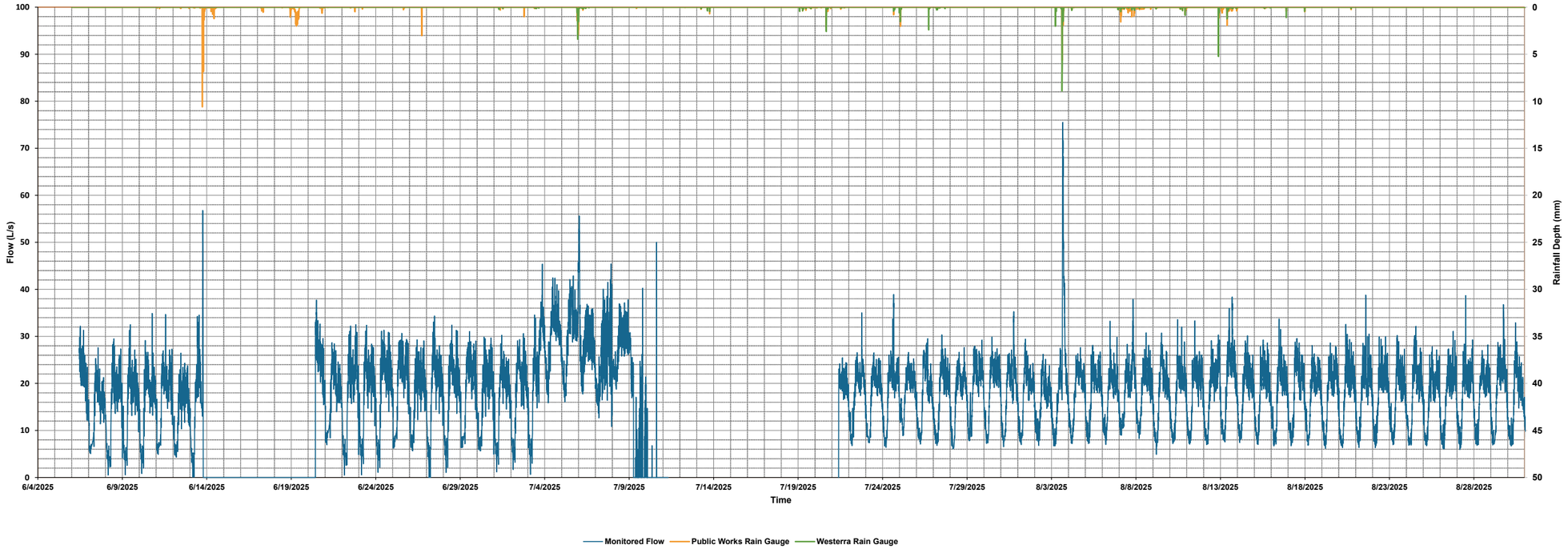
TITLE
EDMONTON IDF CURVE WITH MAJOR EVENTS SUPERIMPOSED

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	6.10
DATE	10/6/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_IDF Curve



TITLE

FLOW MONITOR #1 DATA

PROJECT

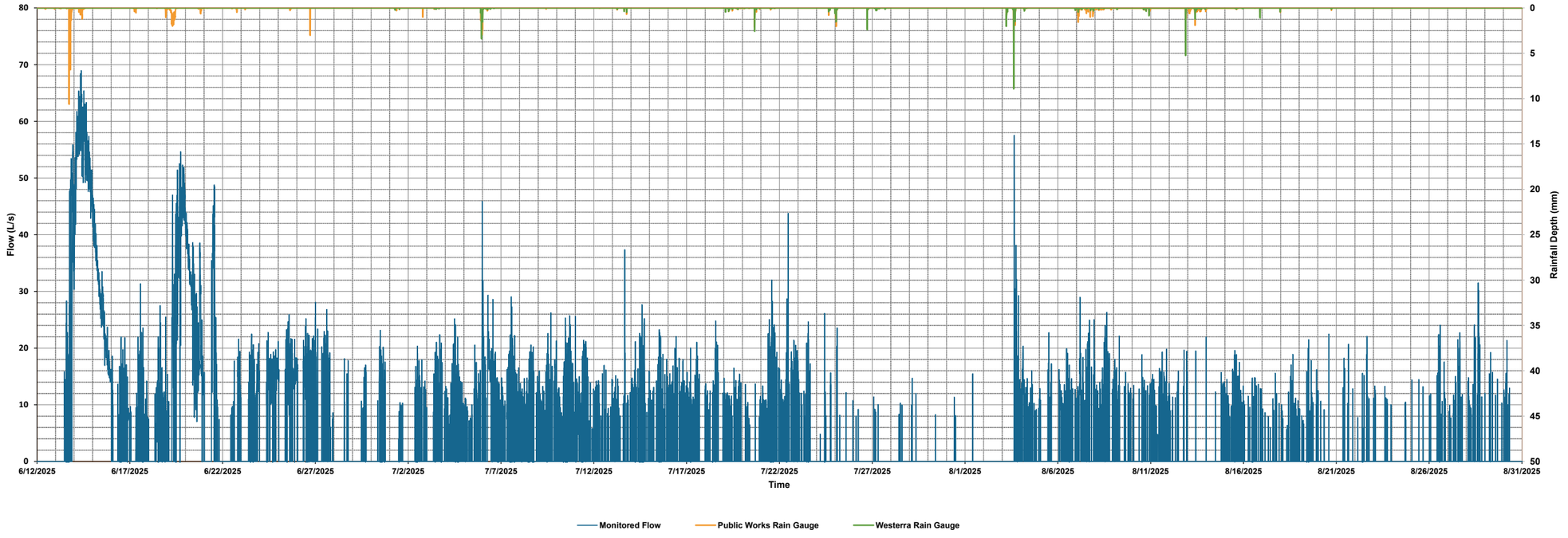
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	6.11
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMPaprx - Figure X_FM #1 Data



TITLE

FLOW MONITOR #2 DATA

PROJECT

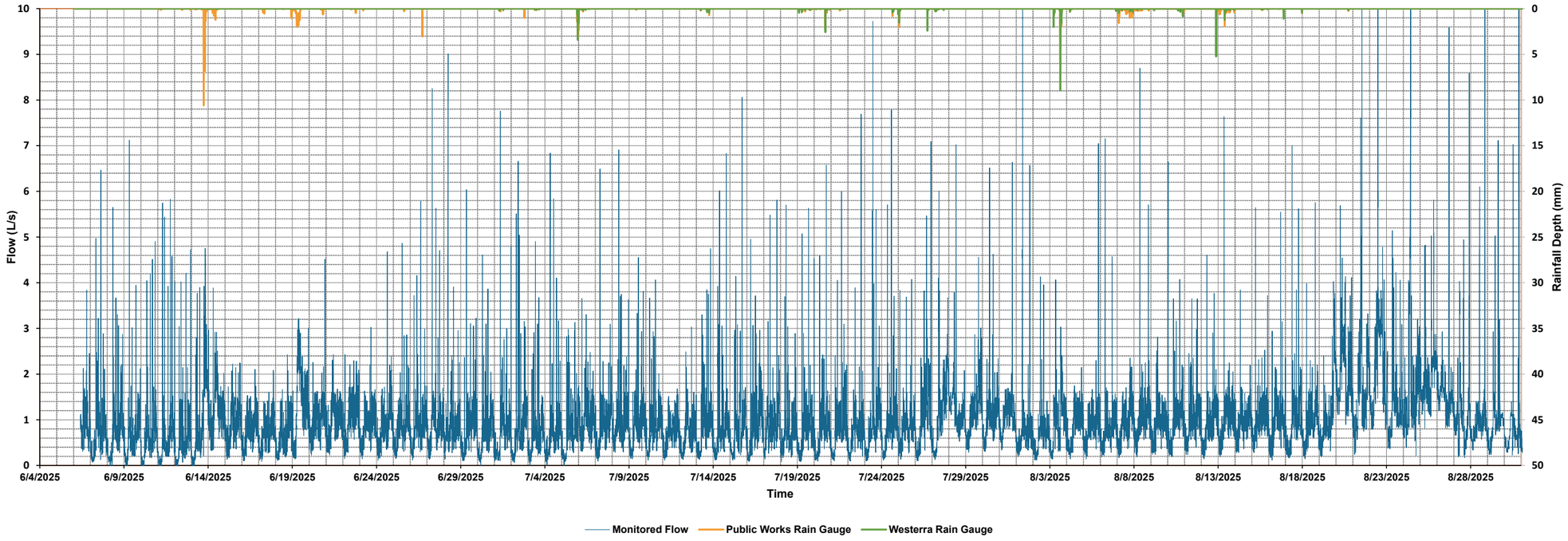
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	6.12
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FM #2 Data



TITLE

FLOW MONITOR #3 DATA

PROJECT

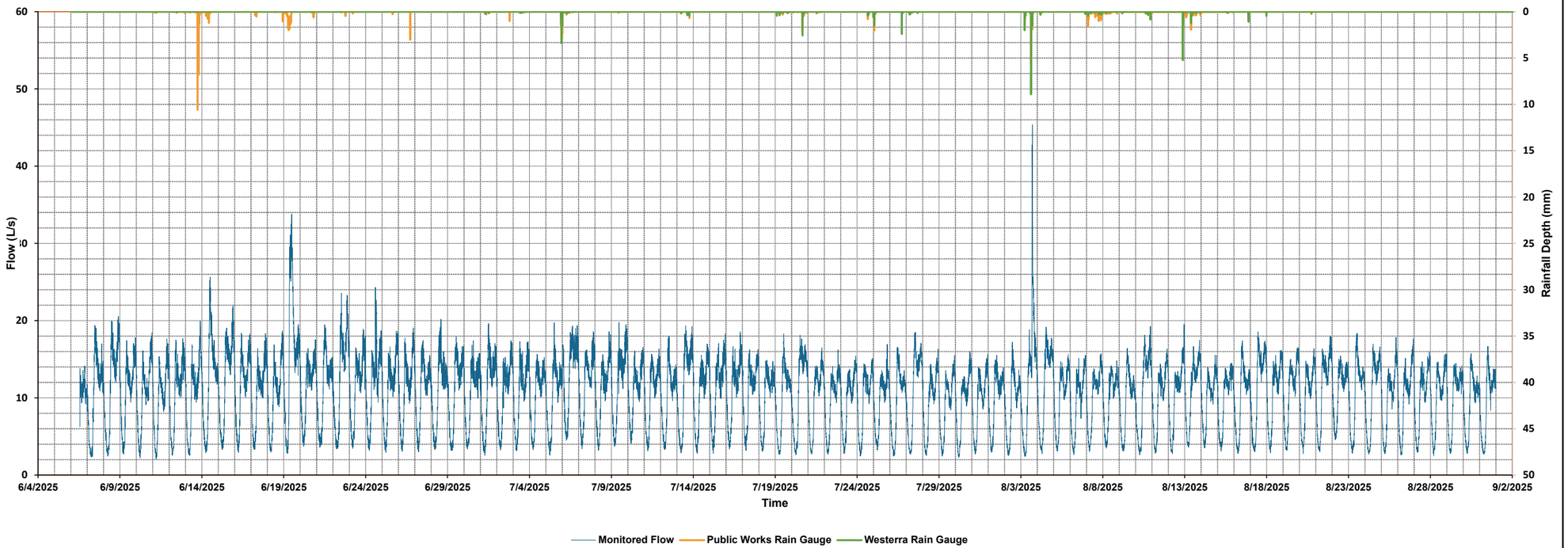
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	6.13
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FM #3 Data



TITLE

FLOW MONITOR #4 DATA

PROJECT

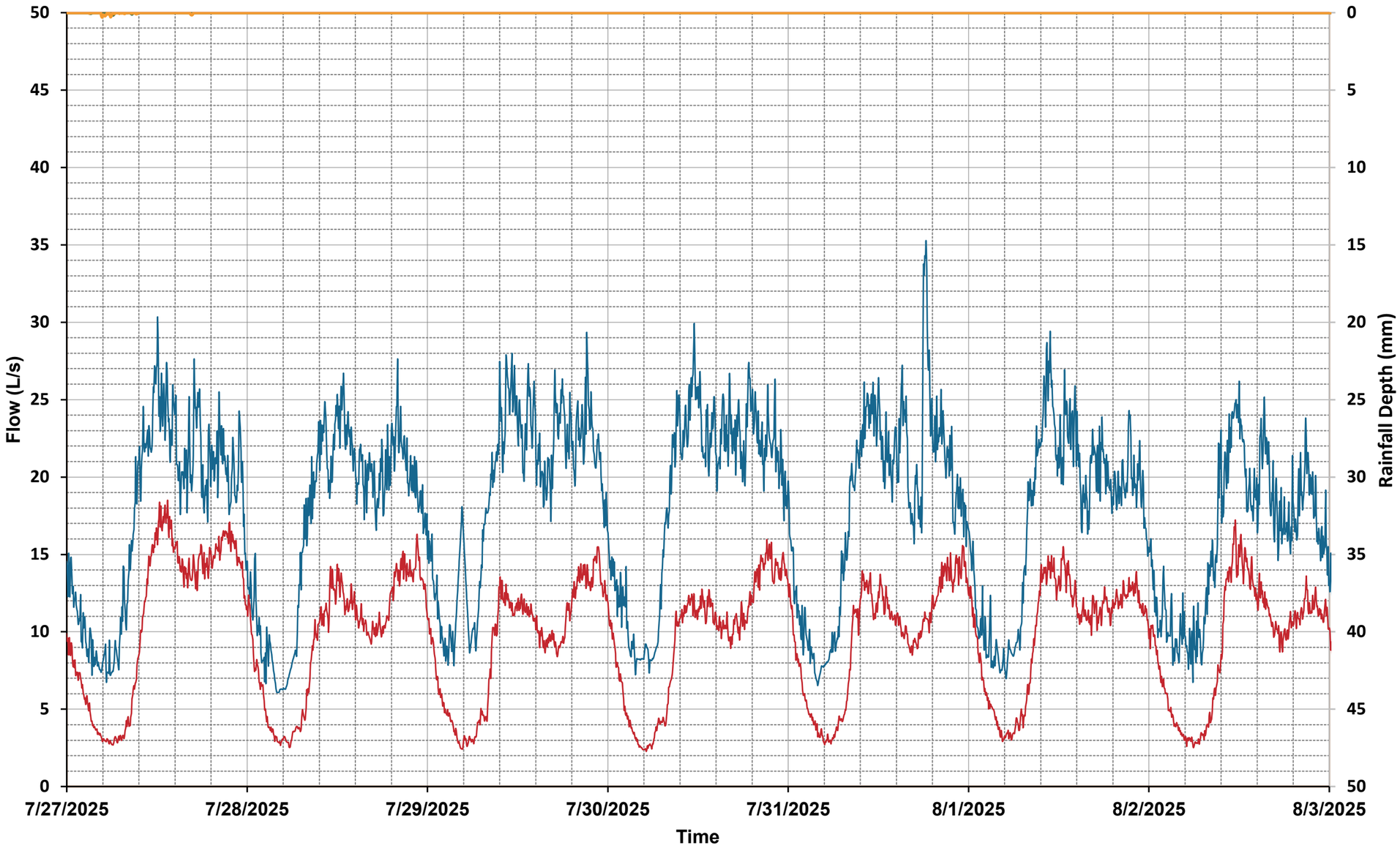
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	6.14
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FM #4 Data



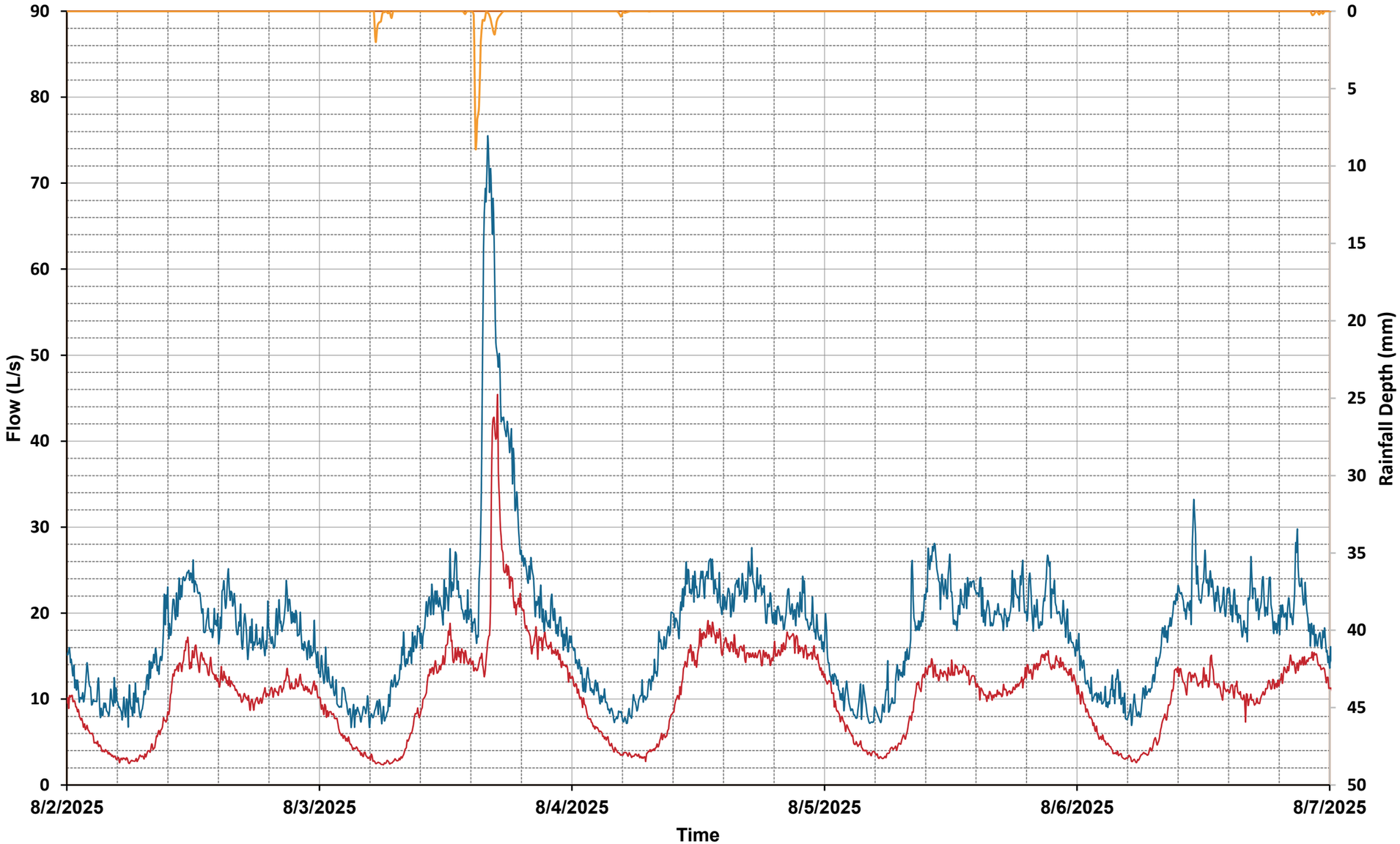
TITLE
DWF CALIBRATION PERIOD JULY 27 TO AUGUST 3

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	6.15
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_DWF Calibration FM Data



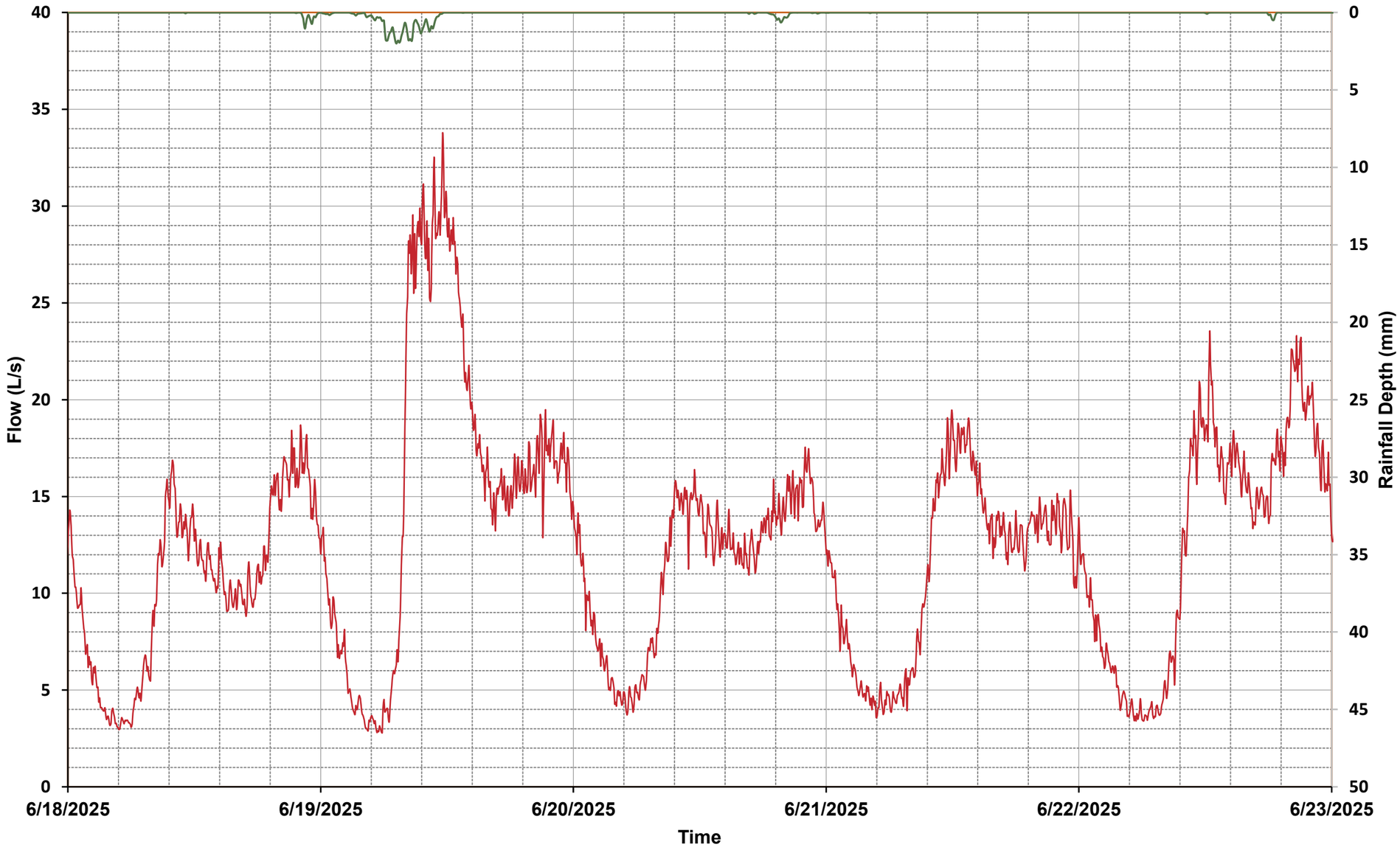
TITLE
WWF CALIBRATION EVENT AUGUST 3

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	6.16
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\25_Figures\28974_Stony_Plain_SMP.aprx - Figure X_WWF Calibration FM Data



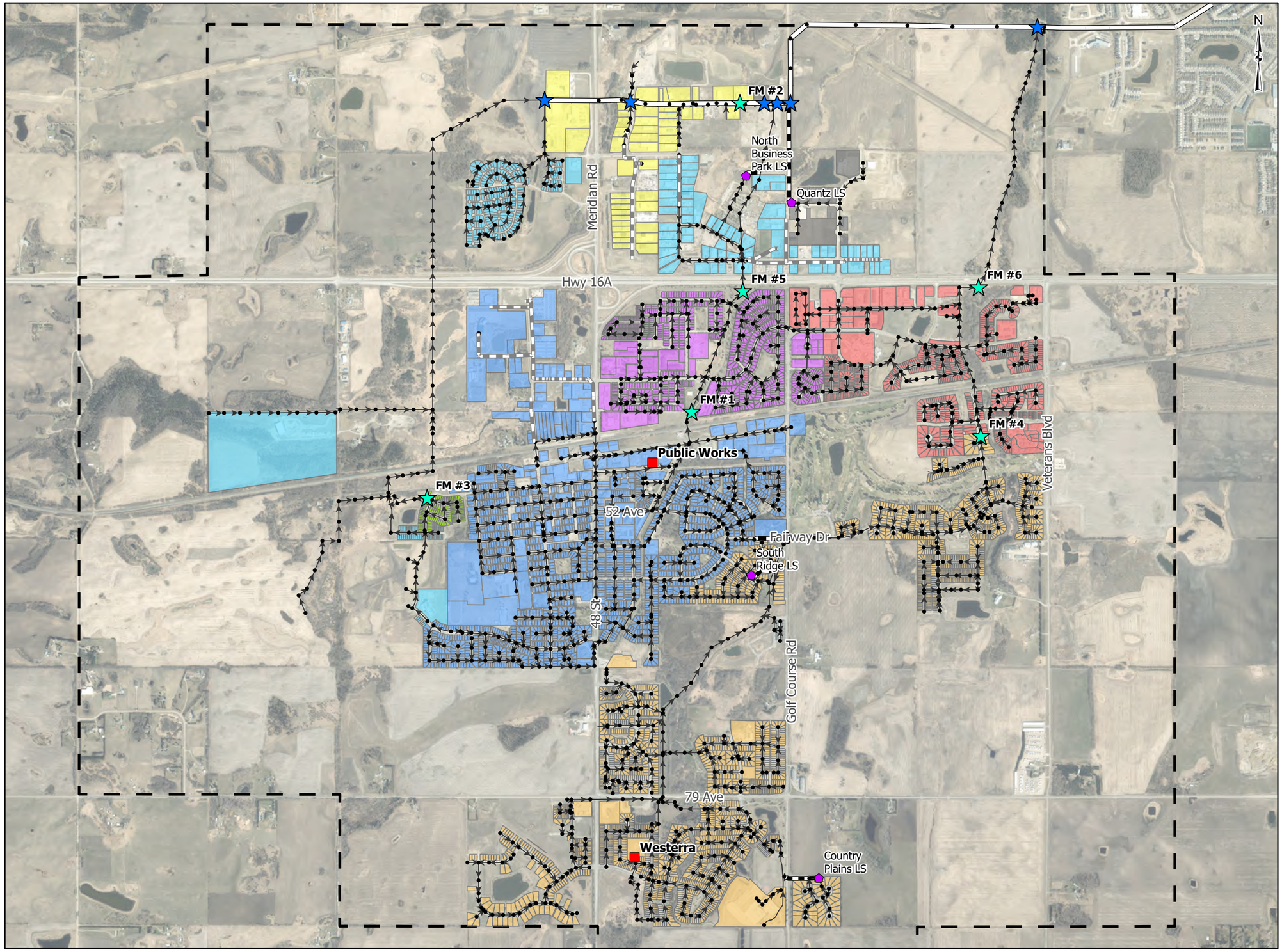
TITLE
WWF VALIDATION EVENT JUNE 18

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	6.17
DATE	10/23/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_WWF Validation FM Data



LEGEND

- Manhole
- Recommended Flow Monitor Location
- ARROW Flow Monitor
- Lift Station
- Rain Gauge
- Gravity Main
- Forcemain
- Low-Pressure System
- ARROW Utilities Trunk Sewer

Flow Monitor Catchment

- FM #1
- FM #2
- FM #3
- FM #4
- FM #5
- FM #6
- ARROW Monitor
- Unmonitored

Note: Exact location of ARROW flow monitors should be confirmed with ARROW Utilities

TITLE

FLOW MONITORING RECOMMENDATIONS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	6.18
DATE	7/31/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Recommended Flow Monitors

6.8 Calibration

The next step was to establish DWF and WWF within the model. The guidelines outlined by the Chartered Institution of Water and Environmental Management (CIWEM) were targeted for successful calibration. The targeted volume and peak flow errors are summarized below in **Table 6.11**.

Table 6.11: Targeted Volume and Peak Flow Errors based on CIWEM Guidelines (CIWEM, 2017)

Scenario	DWF	WWF
Volume	±10%	-10% to 20%
Peak Flow	±10%	-15% to 25%

The flow monitor catchment areas and populations are summarized in **Table 6.12**.

Table 6.12: Flow Monitoring Sites and Catchment Summary

Flow Monitor	Catchment Area	Catchment Population
	ha	c
1	170	5,770
4	151	5,666

6.8.1 DWF Calibration

The week of July 27 to August 3, 2025 was used for DWF calibration.

Baseflows were established for both FM #1 FM #4, which generally represent infiltration to the wastewater system. These baseflows are derived independently from the sanitary generation rates, providing a more conservative overall estimate to the wastewater flows in the system. Baseflows were initially assumed to be 80% of minimum flows (typically nighttime flows) and were adjusted as needed to derive accurate diurnals.

Diurnals were derived for each sewershed by taking the difference between recorded flow rates and the determined baseflow, dividing this value by the average flow from each day, and deducing the average per hour. With this, weekday and weekend diurnals were produced for each flow monitoring site. Diurnals were adjusted slightly to meet the peak flows that were observed in the monitored data. The final calibrated diurnal curves are provided in **Appendix A**.

Once the baseflows were defined, the residential sewage flow generation rates were adjusted. Dry weather sewage generation rates were first estimated by considering the difference between the average flow rates and the defined baseflows, then taking the difference and dividing it by upstream residential populations. The generation rates were then adjusted iteratively to achieve agreement between the modelled and monitored flows.

Industrial, commercial, and institutional catchments were assigned preliminary generation rates and adjusted as needed to achieve agreement between the modelled and monitored flows.

Generally, calibration resulted in lower residential and non-residential wastewater generation rates than those stipulated in the Town's Design and Construction Standards. The standard rates are 300 L/c/d for residential and 9 – 11 m^3/ha/d for non-residential. The final calibrated values are 120 – 170 L/c/d for residential development and 3 m^3/ha/d for non-residential development. This discrepancy is typically observed during calibration exercises as design standard values are inherently conservative. **Table 6.13** summarizes the calibrated parameters and compares them with the standard design values, which were retained for the unmonitored subcatchments.

The resulting peak flow and volume calibration results are shown in **Table 6.14**, which indicates that the recommended values were achieved at both sites. A generalized peak flow was estimated for the monitored data for

FM #1 to remove any irregularities in the data that cannot be replicated in the model. These irregularities may be due to lift stations turning on/off at certain times, short periods of rainfall, or unusual increases in discharge from parcels at various times. Note that there are no calibrated industrial generation rates, as neither flow monitoring catchment contained industrial parcels.

Final DWF comparison hydrographs (monitored versus modelled) are provided in **Appendix B**.

Table 6.13: DWF Calibration Parameters

Flow Monitor	DWF Period	Minimum Flow	Baseflow		G[1]	Non-Residential Rates		
						C[2]	Ind[2]	Inst[2]
		L/s	L/s	L/s/ha	L/c/d	m^3/ha/d		
1	July 27 to August 3	8	1.33	0.008	170	3	-	3
4	July 27 to August 3	3	1.20	0.008	120	3	-	3
Unmonitored	-	-	-	0.008[3]	300[4]	11[4]	9[4]	11[4]

[1] G = Residential Generation Rate.
[2] C = Commercial; Ind = Industrial; Inst = Institutional Land Use Generation Rate.
[3] Baseflow for unmonitored catchments is the average of baseflows for monitored catchments.
[4] Generation rates for unmonitored catchments were estimated using the design flows from Stony Plain's Design and Construction Standards.

Table 6.14: DWF Calibration Results – Peak Flows and Volume

Flow Monitor	Peak Flow			Volume		
	Monitor	Model	Difference	Monitor	Model	Difference
	L/s		%	m^3		%
1	27.0[1]	27.3	1.1	10,713	11,173	4.3
4	18.5	19.2	3.8	5,863	5,885	0.4

[1] Generalized peak flow.

6.8.2 WWF Calibration

WWF calibration was undertaken to ensure the model accurately represents the I&I response of the wastewater collection system during wet weather events. To do so, wet weather periods, during which a response to wet weather was observed in the flow monitoring data, were established.

The rainfall events selected for calibration are listed in **Table 6.15**. These events had the largest and most consistent wet weather responses in the flow monitors. Although two rainfall events were targeted for each monitor, one as the primary event and one as the validation event, FM #1 could only be calibrated to one event due to the quality of the flow monitoring data.

Table 6.15: Rainfall Events used for WWF Calibration

Flow Monitor	Primary Rainfall Event	Validation Rainfall Event
1	August 3	-
4	August 3	June 18

WWF calibration in PCSWMM was achieved by using the RTK method. This method accounts for the effects of rainfall derived infiltration and inflow (RDII) entering the network. The RTK method assumes three unit hydrographs, one for the fast-response, medium-response, and slow-response of I&I into the sanitary sewer collection system. Each unit hydrograph consists of three parameters that were adjusted as part of WWF calibration, including:

- **R** – Area under the graph representing the proportion of rainfall that enters the sanitary sewer collection system.
- **T** – The time it takes the rainfall to reach the peak of the hydrograph.
- **K** – The ratio between time to recession and time to peak.

Following successful calibration of the primary calibration event, the validation event was used to assess the accuracy of the calibration. The calibration's RTK parameters were then adjusted to better align with the validation event and to strike a balance between both calibration and validation events for FM #4.

Table 6.16 provides a summary of the primary calibration and validation event calibration results, along with the RTK parameters for each. The final WWF comparison hydrographs (modelled versus monitored) for the primary calibration and validation event calibrations are provided in **Appendix C**.

Table 6.16: WWF Calibration Results

Parameter		Site 1	Site 4	
		Calibration	Calibration	Validation
R1		0.0050	0.0044	0.0044
T1		1	2	2
K1		1	1	1
R2		0.002	0.002	0.002
T2		3	4	4
K2		2	2	2
R3		0.001	0.002	0.002
T3		12	12	12
K3		7	7	7
Monitored Peak Flow	L/s	76	45	34
Modelled Peak Flow	L/s	79	42	38
Difference	%	4.66	-7.98	11.57
Monitored Volume	m^3	20,995	12,556	14,179
Modelled Volume	m^3	23,224	12,938	13,639
Difference	%	10.62	3.04	-3.81

7.0 Existing System Assessment and Recommendations

7.1 Inflow and Infiltration Review

I&I rates were estimated based on the flow monitoring data and are summarized in **Table 7.1**. The monitored I&I rates represent the measured peak WWF minus the measured peak DWF divided by the corresponding gross total upstream catchment area.

Table 7.1: Observed I&I Rates Based on Flow Monitoring Data

Flow Monitor Site	Peak DWF	Peak WWF	Difference	WWF/DWF Ratio	Gross Upstream Area	I&I Rate[1]
	L/s	L/s	L/s		ha	L/s/ha
1	28.3	75.5	47.2	2.7	169.9	0.28
3	2.0	3.2	1.2	1.6	3.8	0.32
4	15.7	45.4	29.7	2.9	150.7	0.20
					Average	0.26

[1] Green shading indicates I&I rates that fall within acceptable AEPA guideline ranges.

The AEPA Standards and Guidelines for Municipal Waterworks, Wastewater, and Storm Drainage Systems recommends accommodating an I&I rate of no larger than 0.28 L/s/ha (design criterion for new development) (AEPA, 2021). Based on **Table 7.1,** the allowable I&I rate is exceeded at Site 3.

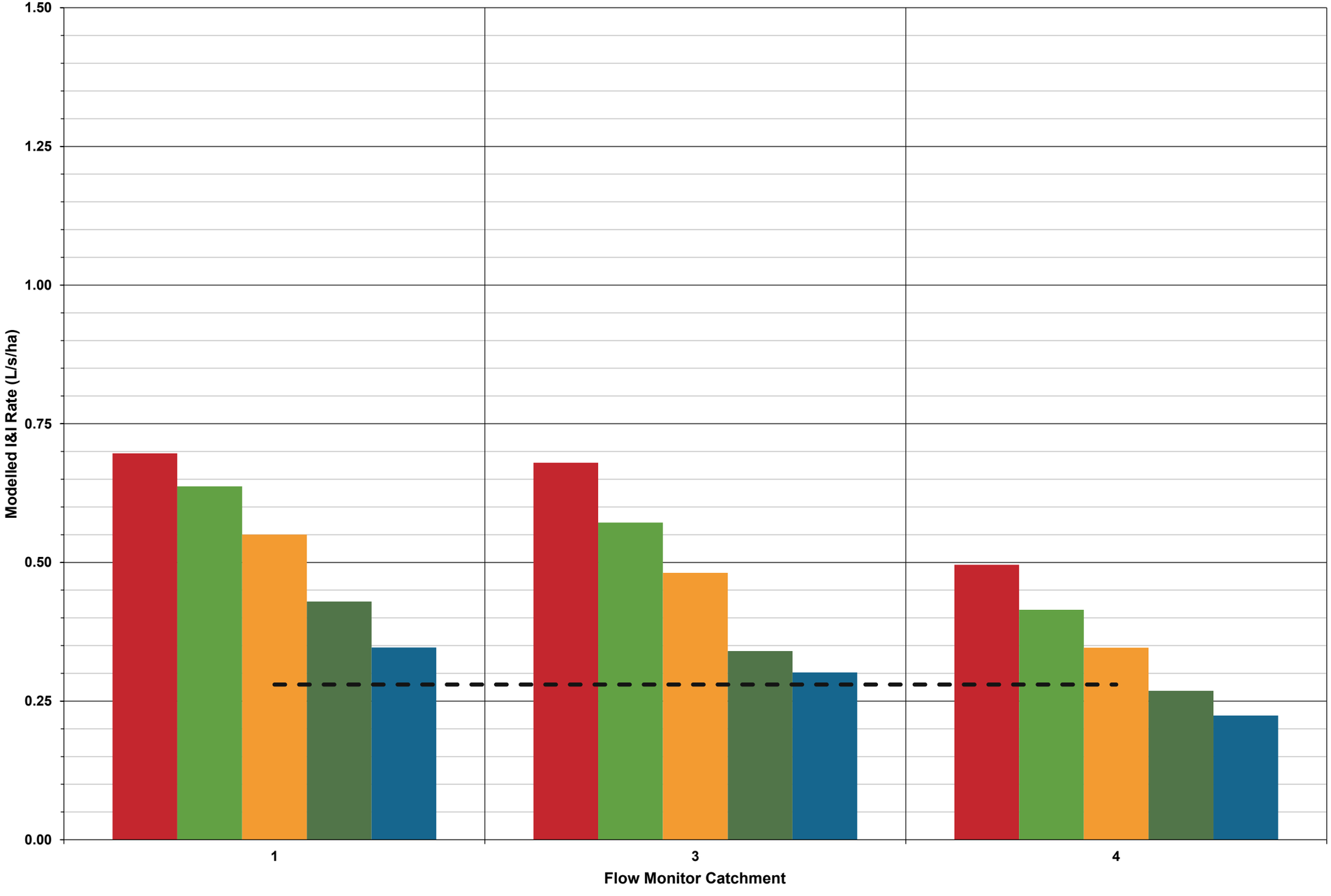
The I&I rates established in the calibrated model for the 1:5, 1:10, 1:25, 1:50, and 1:100-year design storm events are summarized in **Table 7.2**. An I&I rate comparison of the monitored and modelled rates is illustrated in **Figure 7.1**.

Table 7.2: Modelled I&I Rates Based on Chicago Design Storm Model Simulations

Flow Monitor Site	Peak Rainfall Derived Inflow-Infiltration Rate				
	1:5 Year	1:10 Year	1:25 Year	1:50 Year	1:100 Year
	L/s/ha	L/s/ha	L/s/ha	L/s/ha	L/s/ha
1	0.35	0.43	0.55	0.64	0.70
3	0.30	0.34	0.48	0.57	0.68
4	0.22	0.27	0.35	0.41	0.50
Average	**0.29**	**0.35**	**0.46**	**0.54**	**0.62**

The following has been concluded:

- The observed I&I rates for Sites 1 and 4 are based on a 10-year return period storm. Comparing monitored and modelled I&I rates (for a 10-year simulation), the results are similar but slightly higher in the model. The modelled I&I rate is especially high for Site 1, which is expected as the parameters used for WWF calibration are on the conservative side.
- The observed I&I rate for Site 3 is based on a 5-year return period storm. Comparing monitored and modelled I&I rates (for a 5-year simulation), the results are similar but slightly higher in the model.



TITLE
MODELLED INFLOW AND INFILTRATION RATE SUMMARY

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	7.1
DATE	5/21/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_I-I Summary

7.2 Capacity Assessment

The capacity assessment results for the dry weather, 5-, 25-, 50-, and 100-year return periods for the 4-hour Chicago and 24-hour Huff storms are shown on the figures summarized in **Table 7.3** for peak discharge relative to pipe capacity (Q/Qman) and maximum HGL elevation relative to ground (Max HGL), and spare capacity, respectively.

Table 7.3: Summary of Capacity Assessment Figures

Scenario	Max HGL and Q/Q_{man}	Spare Capacity
Dry Weather	**Figure 7.2**	**Figure 7.3**
5-Year, 4-Hour Chicago	**Figure 7.4**	**Figure 7.5**
25-Year, 4-Hour Chicago	**Figure 7.6**	**Figure 7.7**
50-Year, 4-Hour Chicago	**Figure 7.8**	**Figure 7.9**
100-Year, 4-Hour Chicago	**Figure 7.10**	**Figure 7.11**
5-Year, 24-Hour Huff	**Figure 7.12**	**Figure 7.13**
25-Year, 24-Hour Huff	**Figure 7.14**	**Figure 7.15**
50-Year, 24-Hour Huff	**Figure 7.16**	**Figure 7.17**
100-Year, 24-Hour Huff	**Figure 7.18**	**Figure 7.19**

7.2.1 Existing System Deficiencies

Multiple segments of the Central Trunk are surcharging, with several locations experiencing hydraulic grade lines (HGLs) within 2.5 m of ground elevation. A longitudinal profile of the Central Trunk comparing the Chicago storm events is provided in **Figure 7.20**, and the corresponding Huff storm comparisons are shown in **Figure 7.21**. Key observations are summarized below:

- **Highway 16A to the ARROW Utilities Trunk:**
  This section is surcharging and the HGL approaches ground elevation during the 25-, 50-, and 100-year, 4-hour Chicago storms, as well as the 100-year 24-hour Huff storm. Several segments in this reach are very shallow, resulting in HGLs peaking within 2.5 m of ground elevation even under dry-weather conditions.
- **Upstream of Highway 16A to 51 Avenue:**
  This section surcharges under all modelled scenarios. However, the HGL remains more than 2.5 m below ground elevation, even during the most intense rainfall event (100-year 4-hour storm).

Additional locations of interest include:

- **48 Street from 54 Avenue to 52 Avenue:**
  This sewer segment surcharges during the 50- and 100-year 4-hour Chicago storms. The HGL peaks within 2.5 m of ground elevation since this is a shallow sewer, however in the 50-year event it remains fully contained within the pipe. Given that surcharging is limited to extreme storm events and is localized in extent, upgrades to this segment are not recommended at this time. A longitudinal profile of this segment with Chicago storm events is provided in **Figure 7.22**.
- **50 Avenue from 48 Street to Brown Street:**
  This sewer segment surcharges during the 50- and 100-year 4-hour Chicago storms. However, the surcharging is contained within the pipe and the peak HGL is more than 2.5 m below ground, so this is not an area of concern.

ARROW Utilities Trunk Sewer

Modelling results indicate that the HGL exceeds ground elevation at the town boundary during the 50-year and 100-year, 4-hour Chicago design storms. This is a result of the downstream boundary conditions adopted from the ARROW Utilities regional model, as described in **Section 6.4**. Based on these results, it is recommended that downstream capacity constraints within the ARROW Trunk be further investigated and that any required downstream improvements be implemented to eliminate surcharging at the town boundary.

Results also indicate that surcharging occurs under existing conditions at the Quantz forcemain discharge location. However, the HGL remains more than 2.5 m below ground surface and is therefore considered a lower risk to basement back-ups.

7.2.2 Lift Station and Forcemain Assessment

The results for the four lift stations in terms of incoming peak dry weather flow under existing conditions are summarized in **Table 7.4**.

Table 7.4: Lift Station DWF Conditions

Lift Station	Forcemain Type	Incoming Peak DWF[1]	Forcemain Peak DWF[2]		Meets Design Criteria?
			Flow	Velocity	
		L/s	L/s	m/s	
Quantz	200 mm PVC	3.35	46.5	1.48	Yes
South Ridge	150 mm HDPE	0.75	18.9	1.11	Yes
Country Plains	100 mm HDPE	0.32	10.0	1.27	Yes
North Business Park	150 mm HDPE	7.32	30.6	1.73	No

[1] Peak flow entering the wet well under dry weather conditions.
[2] Peak flow pumped through the forcemain under dry weather conditions.

The results from **Table 7.4** suggest that most of the lift stations operate within recommended velocity ranges (0.76 – 1.50 m/s). The North Business Park forcemain peak velocity slightly exceeds the maximum allowable value. However, the exceedance is minor and is unlikely to result in operational issues. Monitoring of lift station performance is recommended to confirm acceptable operation.

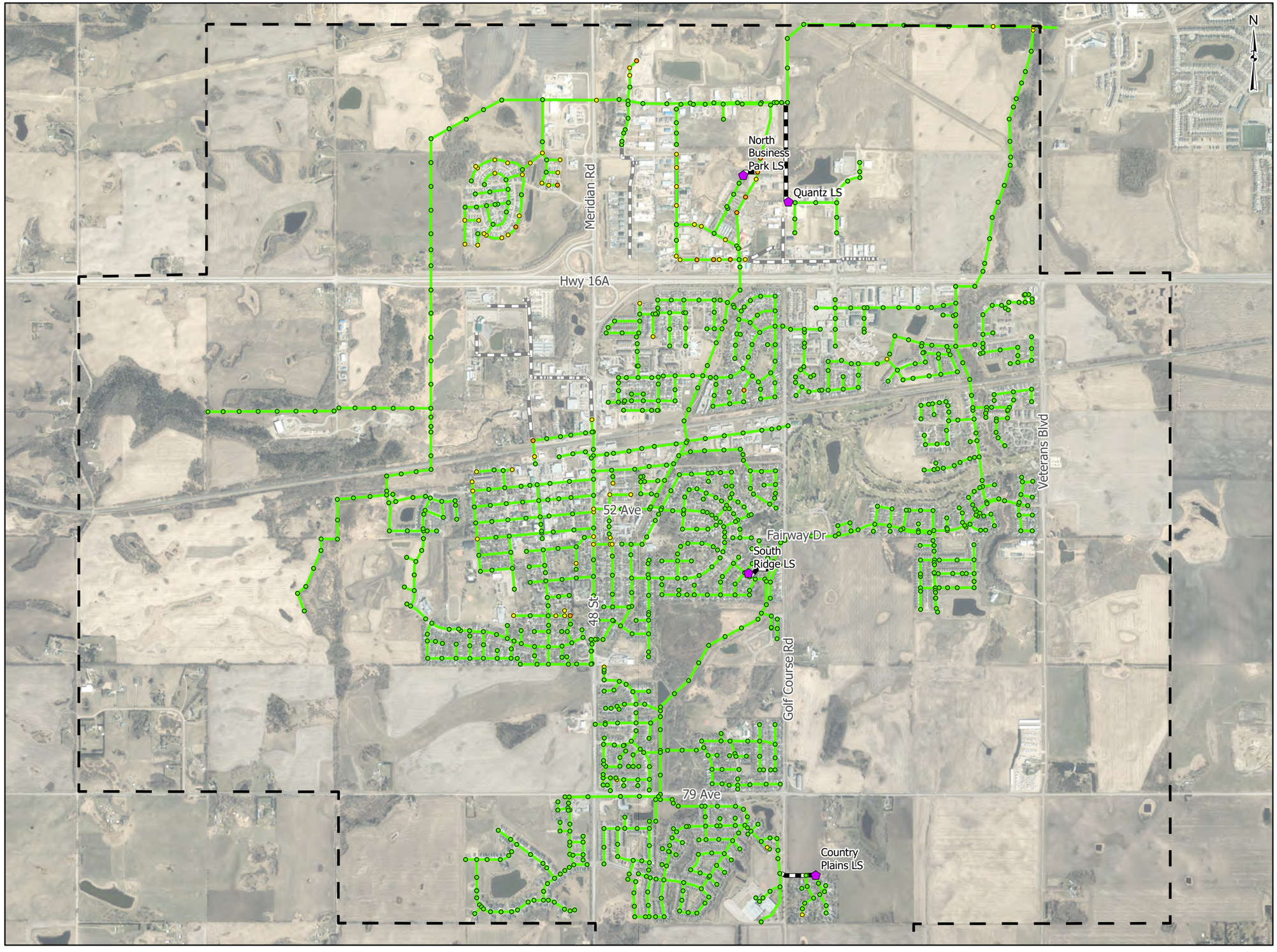
The results for the four lift stations in terms of incoming peak wet weather flows under the 5-, 25-, 50-, and 100-year 4-hour storm events are summarized in **Table 7.5**. The Chicago storm distribution was used for the lift station assessment, as it produced higher rainfall intensities and correspondingly higher peak wet weather flows than the Huff distribution, and therefore governed the analysis.

Table 7.5: Lift Station WWF Results

Lift Station	Pumping Capacity[1]	Firm Capacity[2]	Incoming Peak WWF				Sufficient Capacity?[3]
			5-yr	25-yr	50-yr	100-yr	
	L/s	L/s	L/s	L/s	L/s	L/s	
Quantz	54	54[4]	6.9	9.2	10.4	11.8	Yes
South Ridge	60	30[4]	2.3	3.3	3.8	4.4	Yes
Country Plains	30	15	1.9	2.9	3.4	4.0	Yes
North Business Park	40	20	12.3	15.5	17.2	19.1	Yes

[1] Pumping capacity was obtained from the best efficiency point of the performance curves multiplied by the number of pumps at the lift station.
[2] Firm capacity was taken at the best efficiency point of the performance curve where available while assuming the largest pump is out of service.
[3] The capacity assessment is based on firm pump station capacity.
[4] Best efficiency point was determined by estimating the system headloss assuming 1 m of free discharge.

Based on these results, all lift stations have adequate capacity to convey the peak incoming WWF.



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS CAPACITY UTILIZATION AND PEAK HGL DRY WEATHER

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

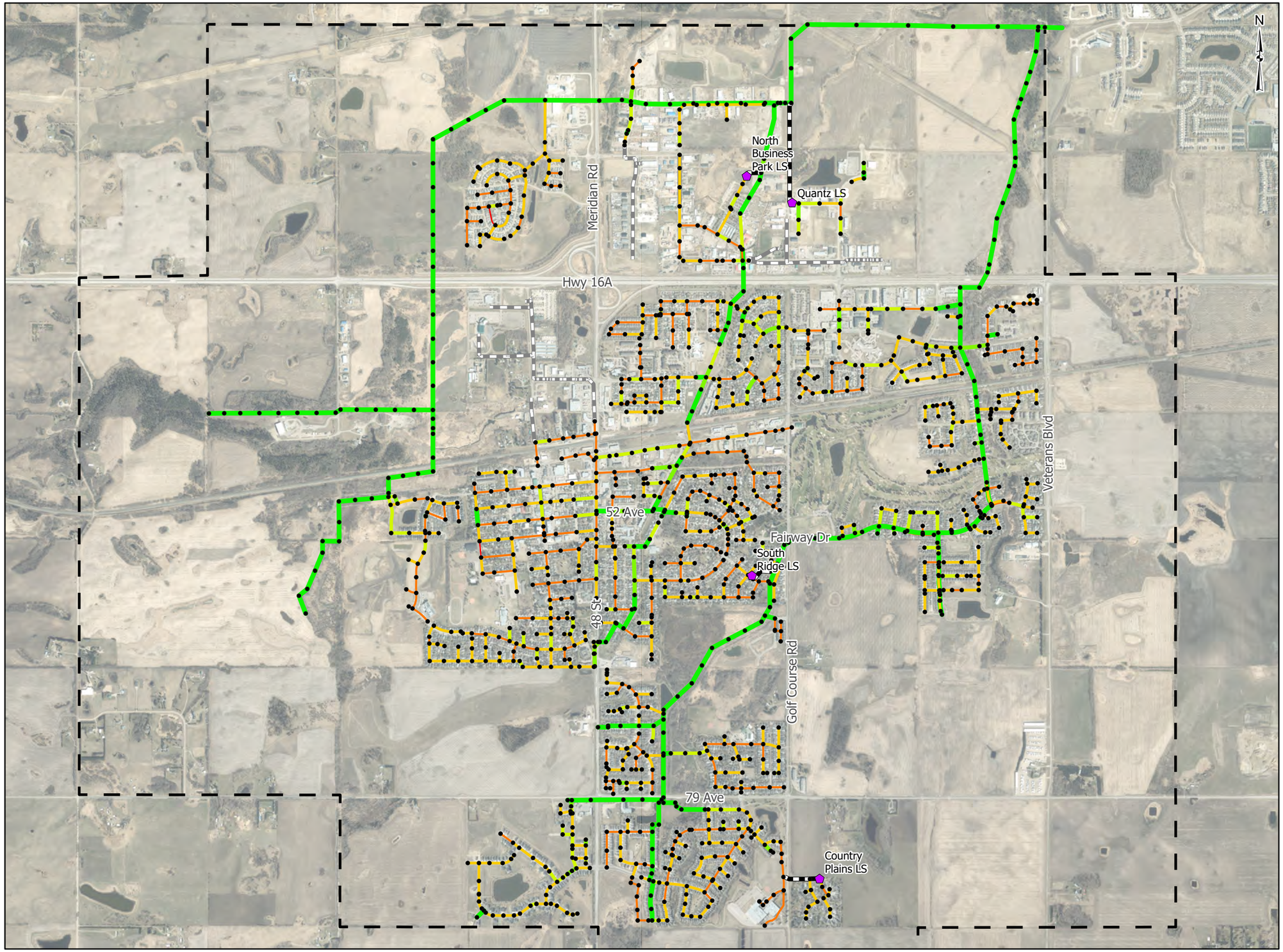
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.2
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Dry Weather Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
DRY WEATHER

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

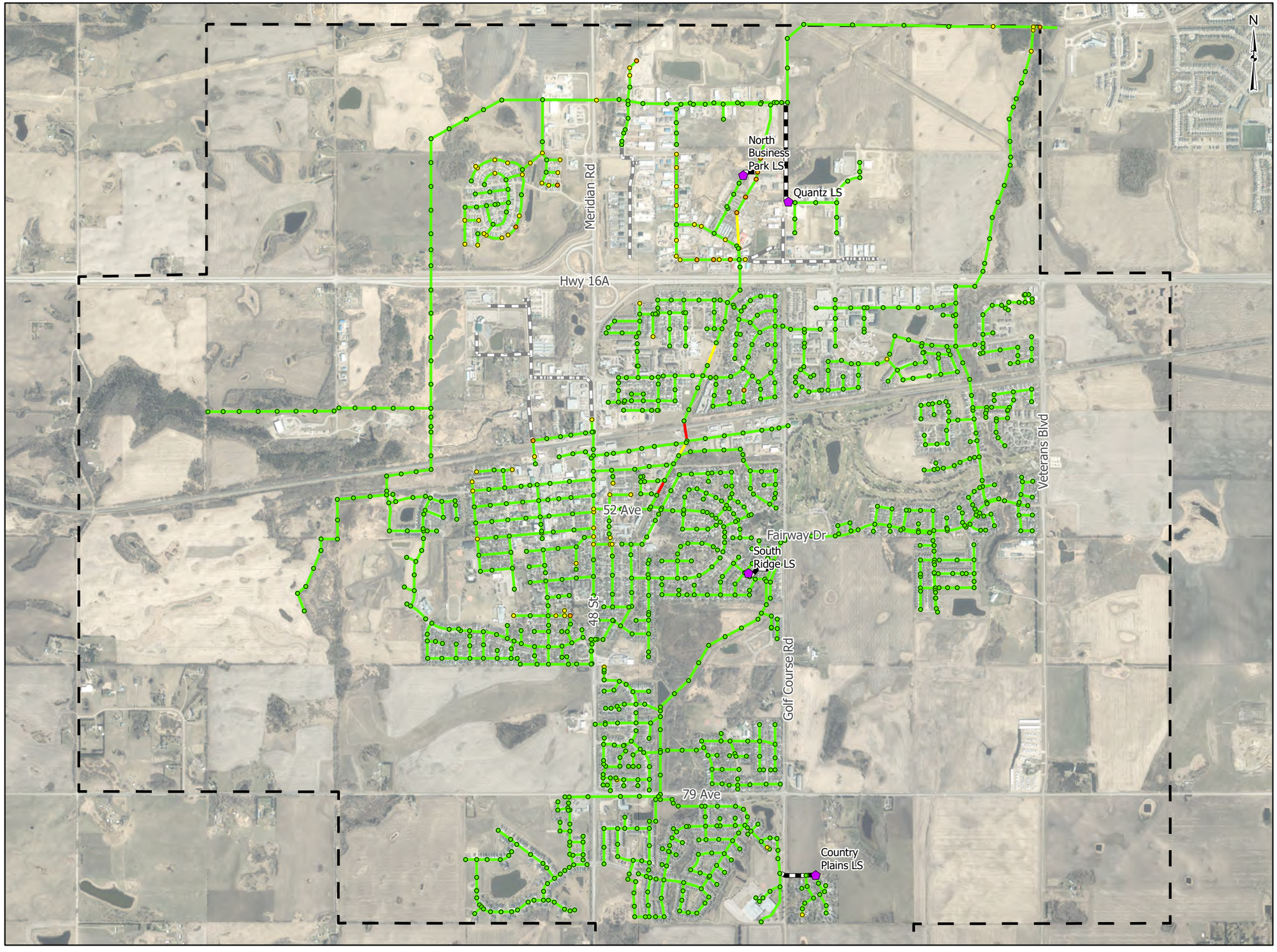
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.3
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX Dry Weather SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
5-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

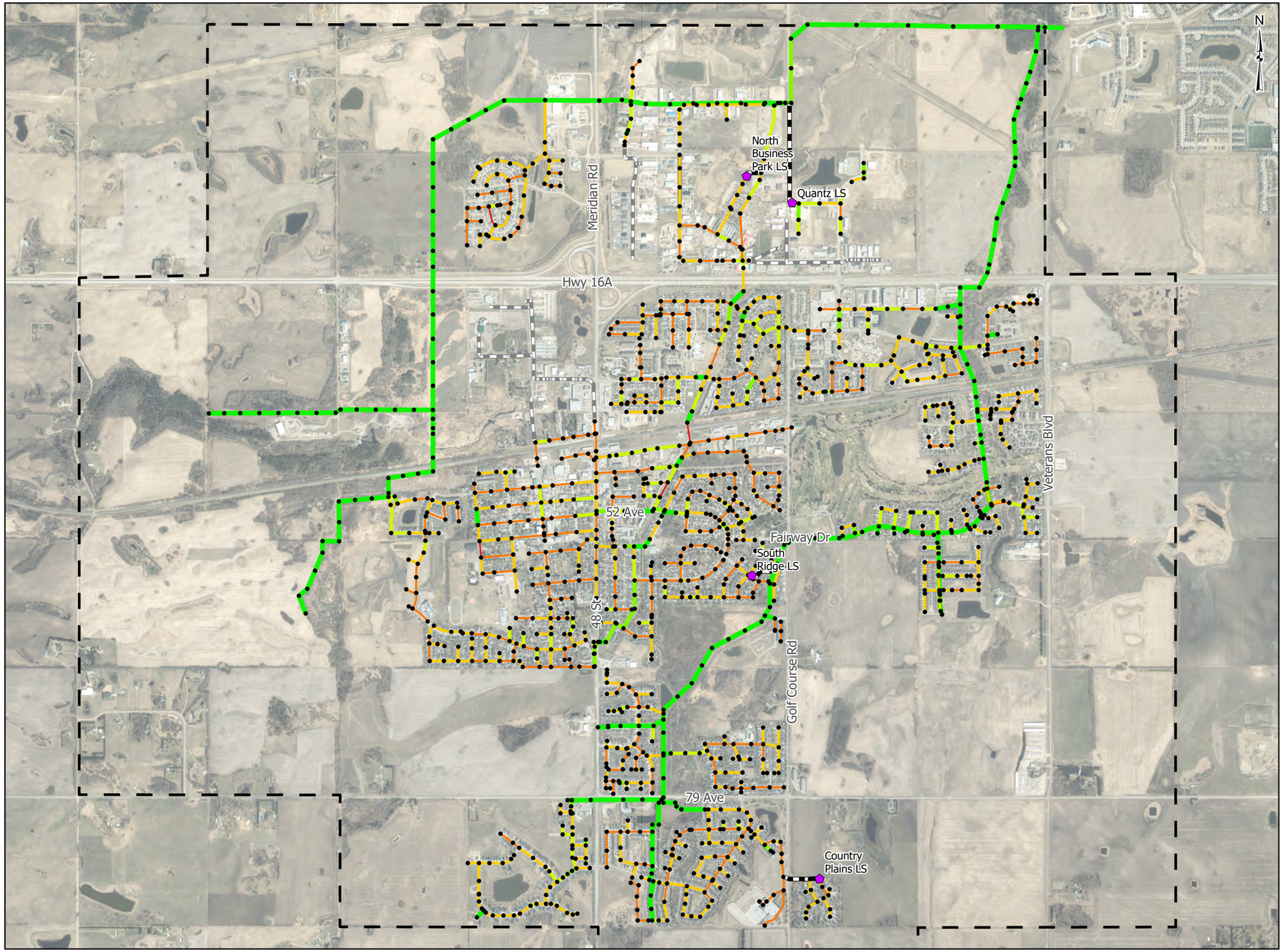
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.4
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 5-yr 4-hr Chicago Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
5-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

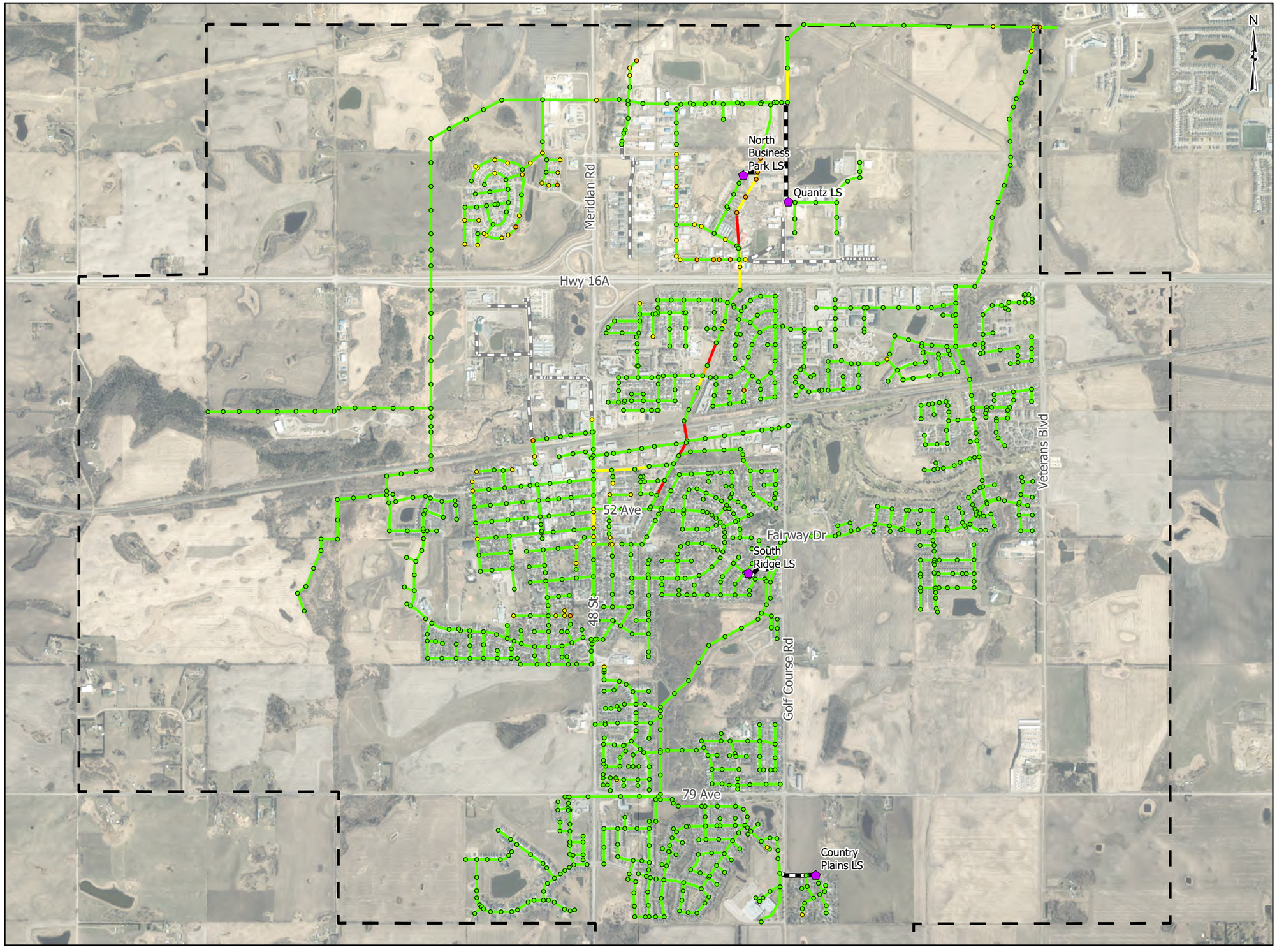
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.5
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 5-yr 4-hr Chicago SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
25-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

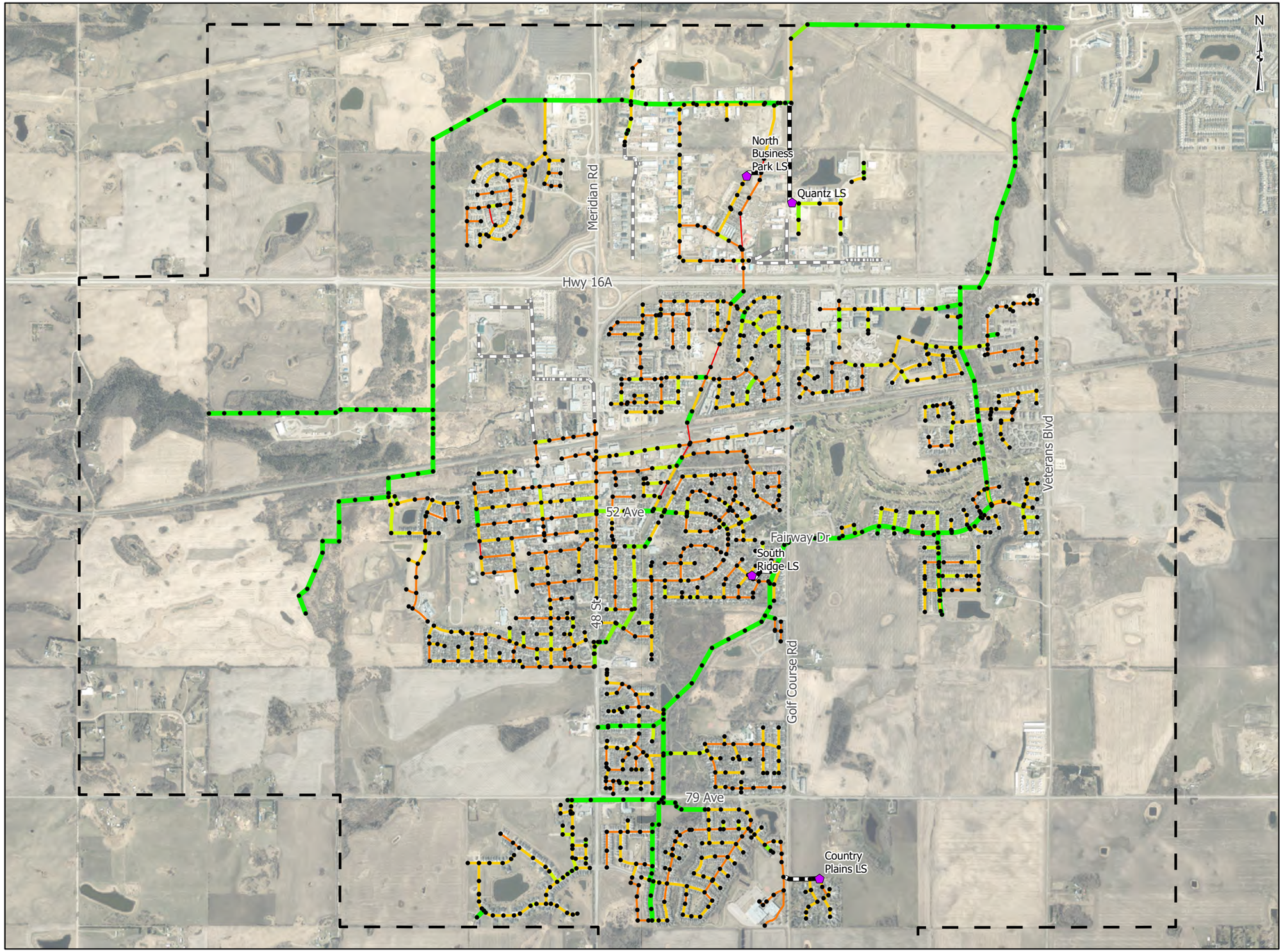
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.6
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 25-yr 4-hr Chicago Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
25-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

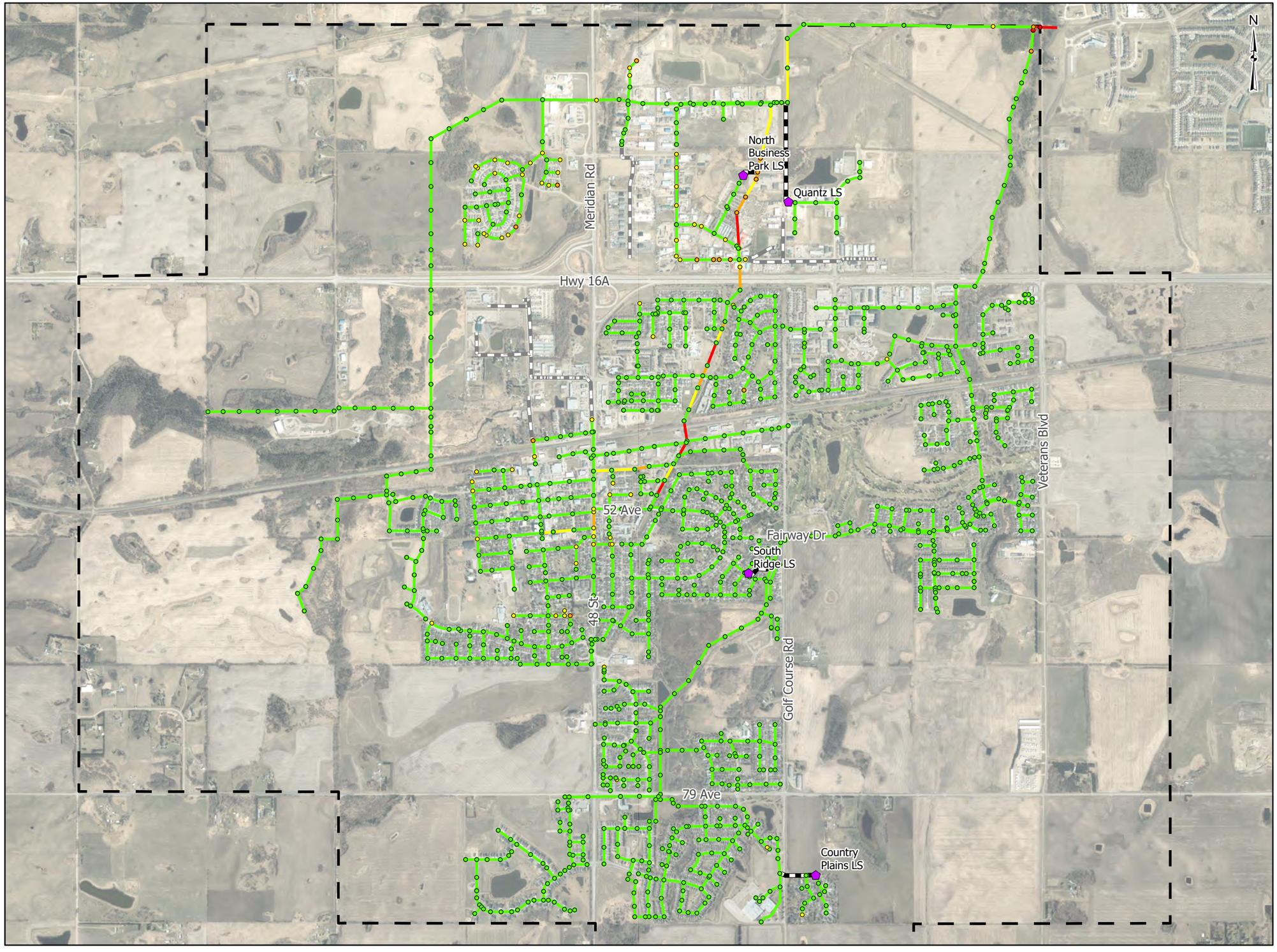
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.7
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 25-yr 4-hr Chicago SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
50-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

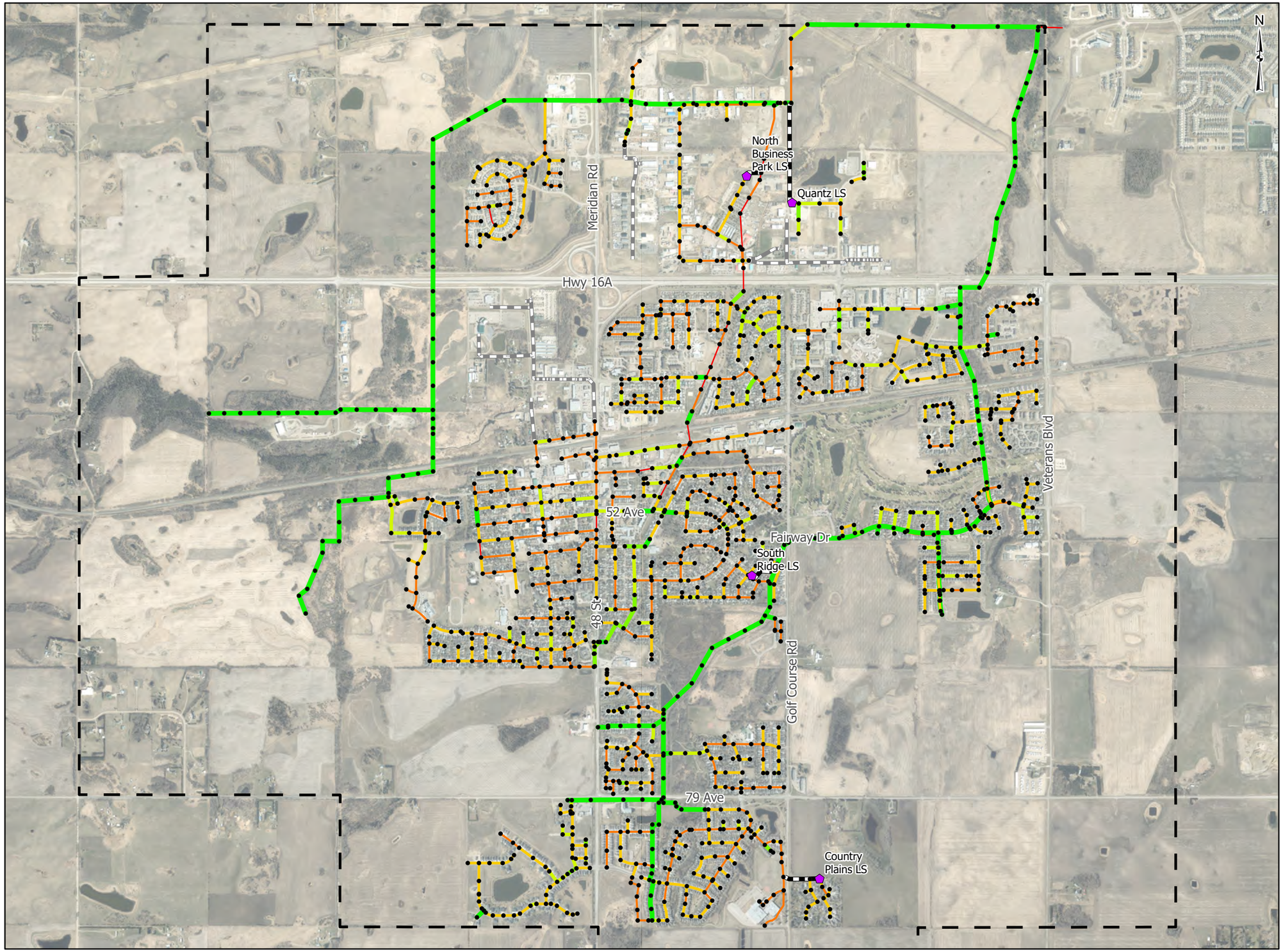
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.8
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 50-yr 4-hr Chicago Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
50-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

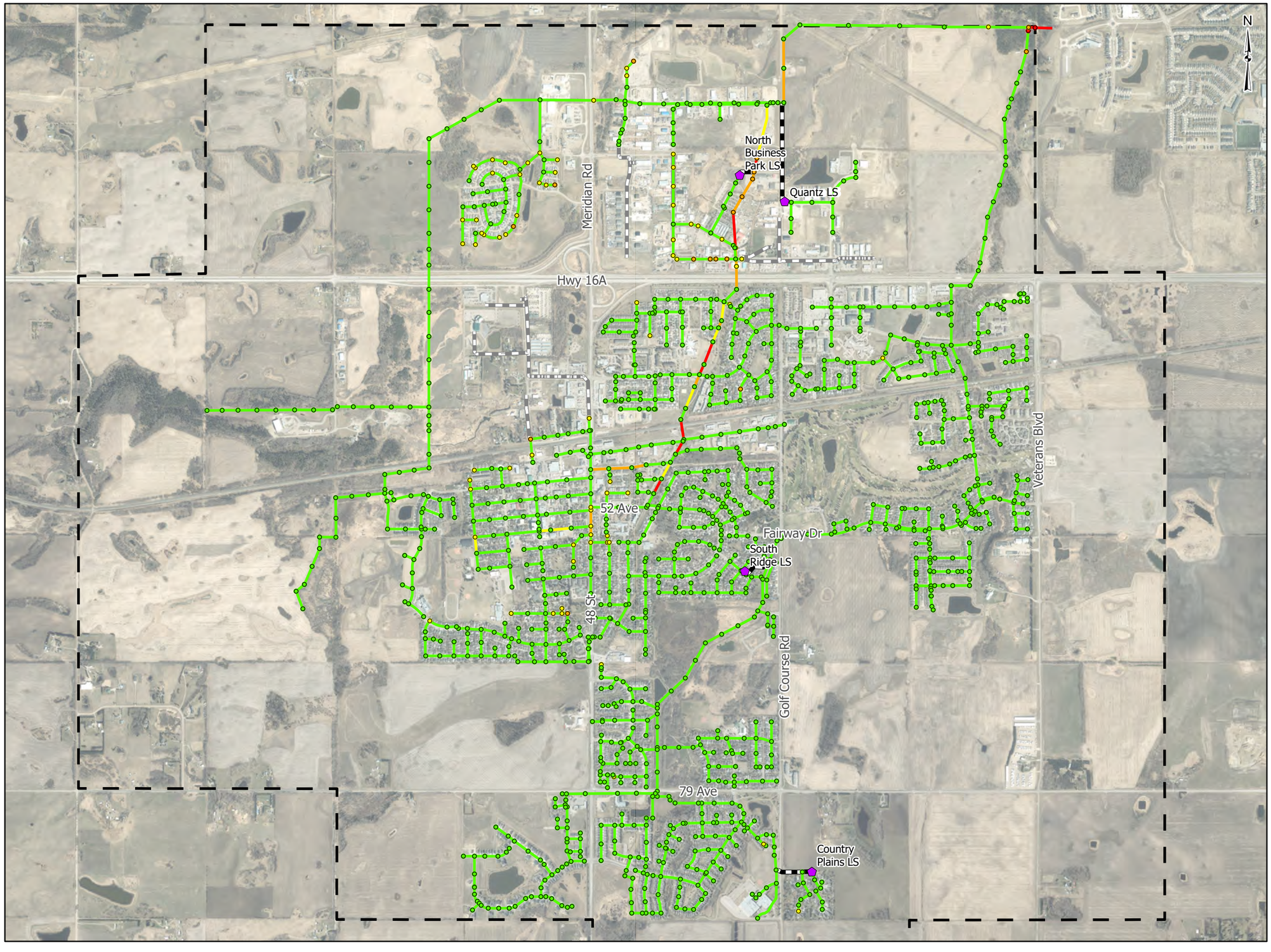
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.9
DATE	5/21/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 50-yr 4-hr Chicago SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

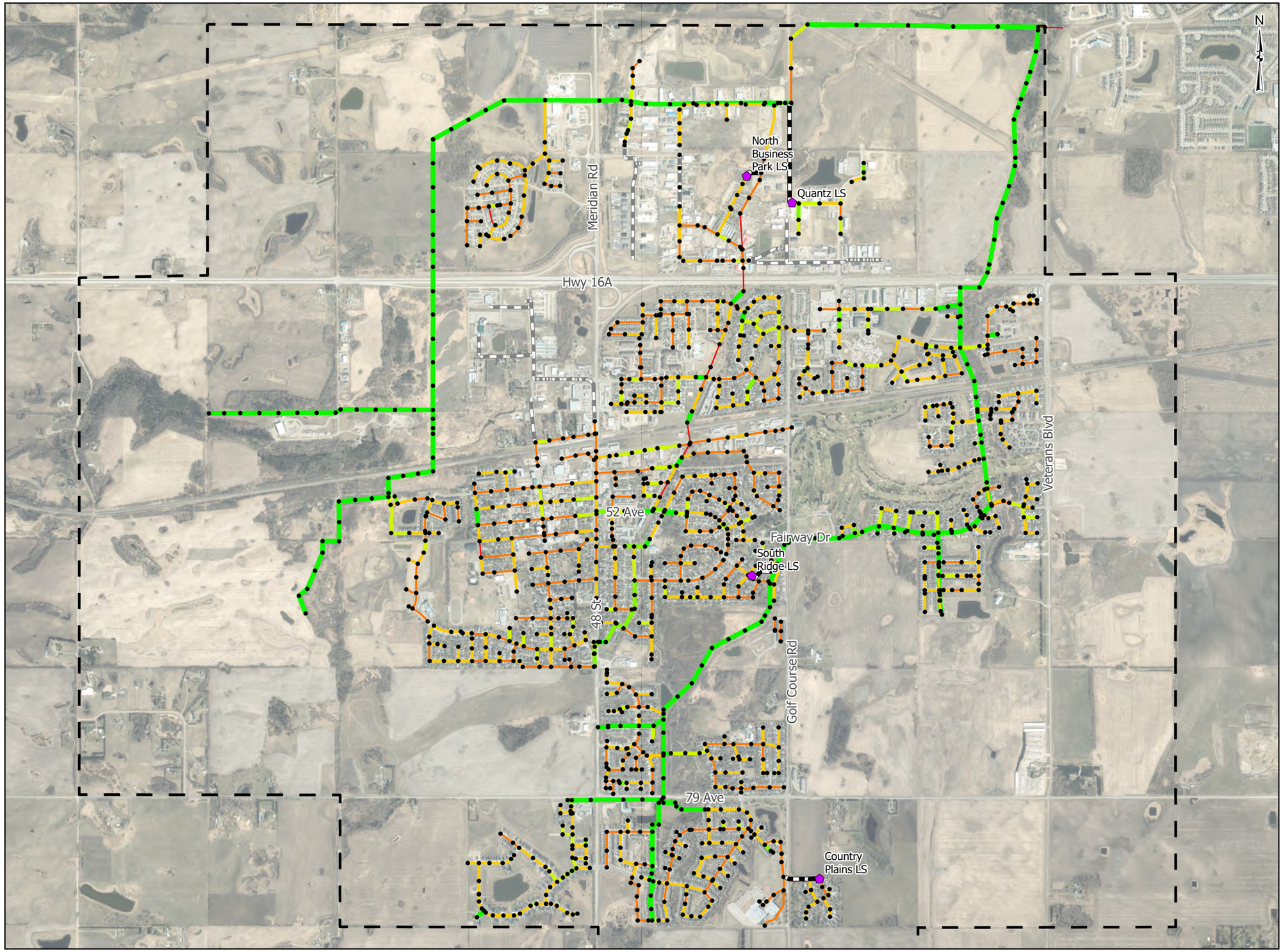
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.10
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 100-yr 4-hr Chicago Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

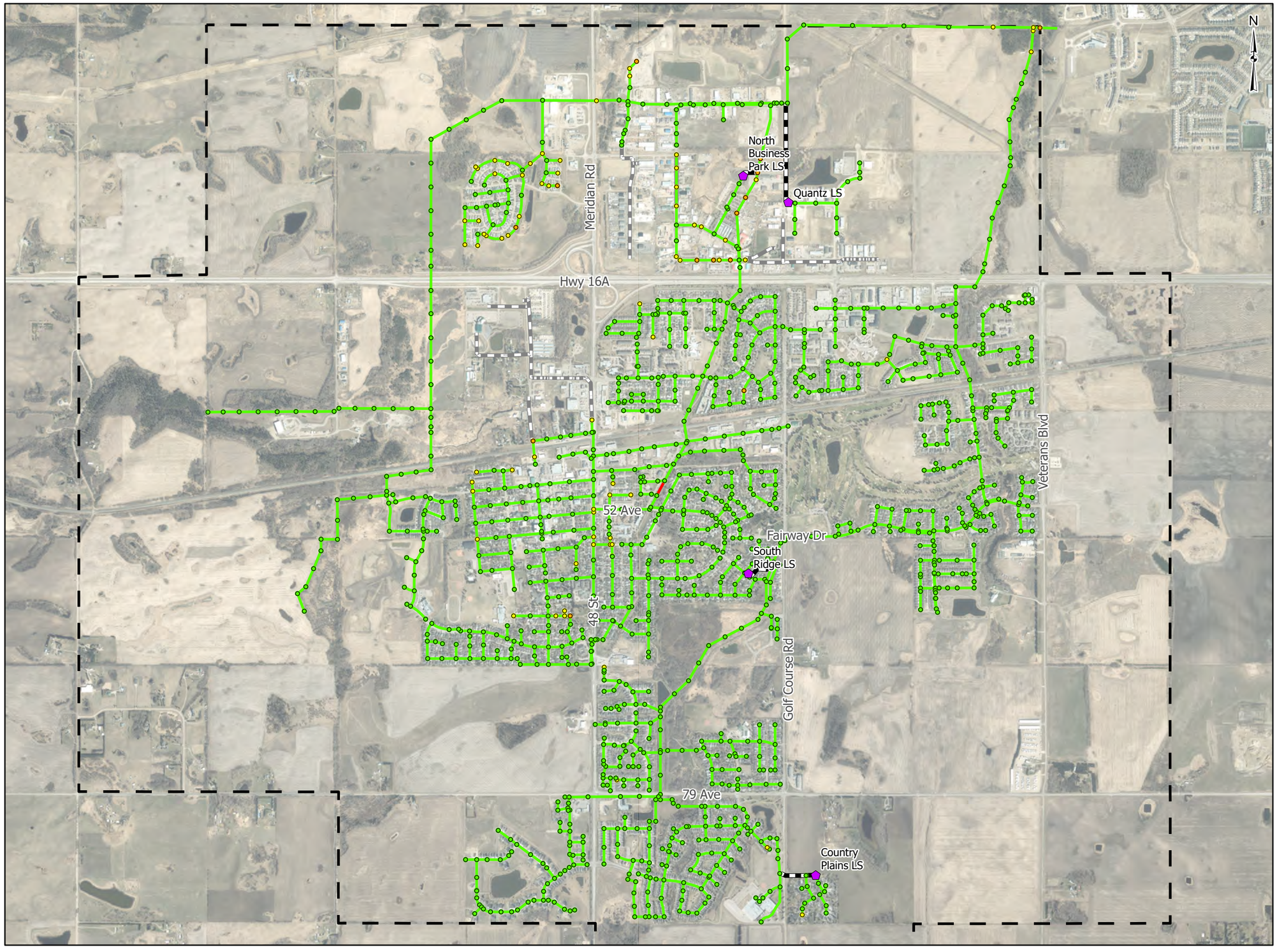
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.11
DATE	5/21/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 100-yr 4-hr Chicago SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
5-YR 24-HR HUFF

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

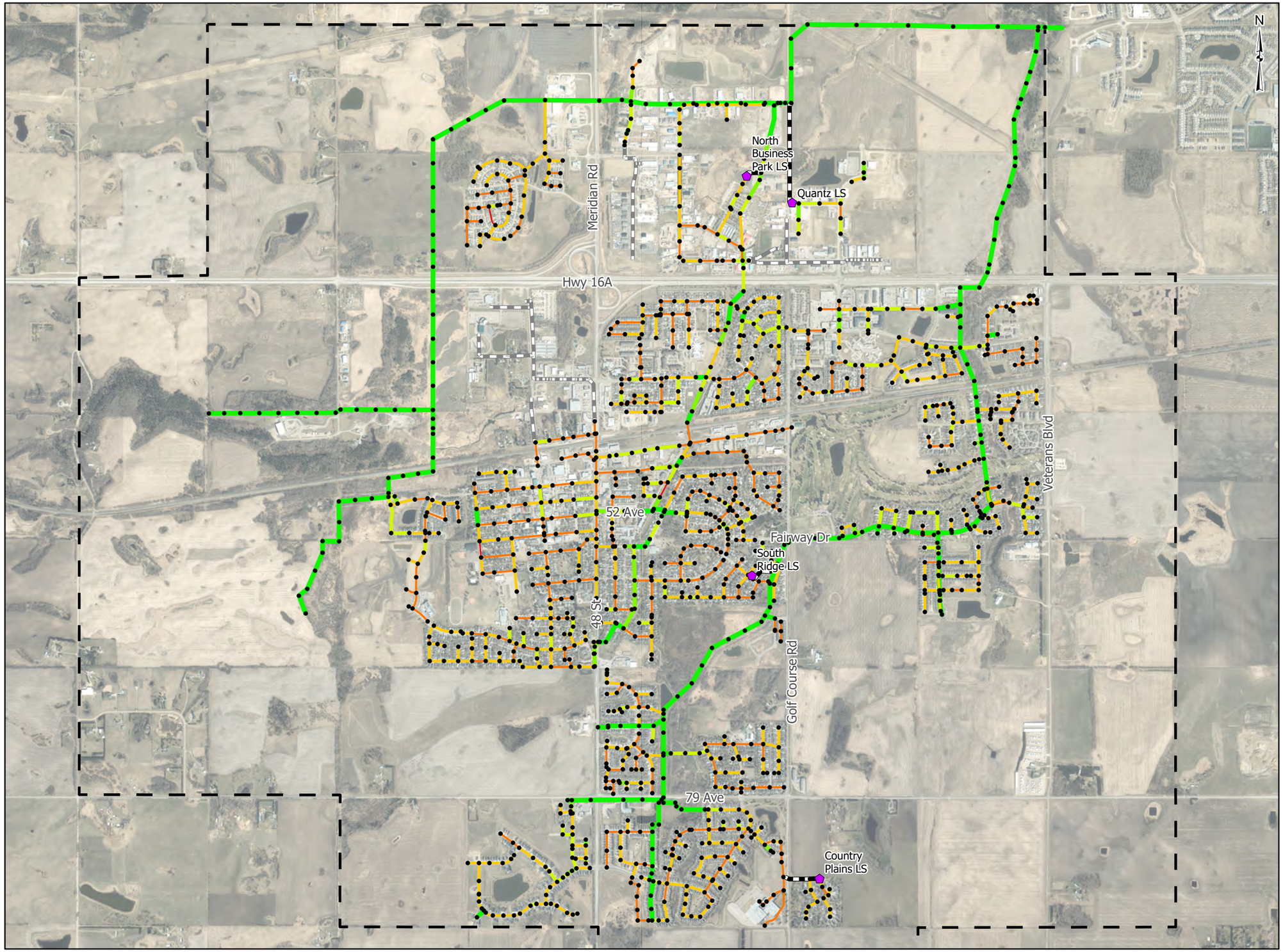
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.12
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 5-yr 24-hr Huff Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
5-YR 24-HR HUFF

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

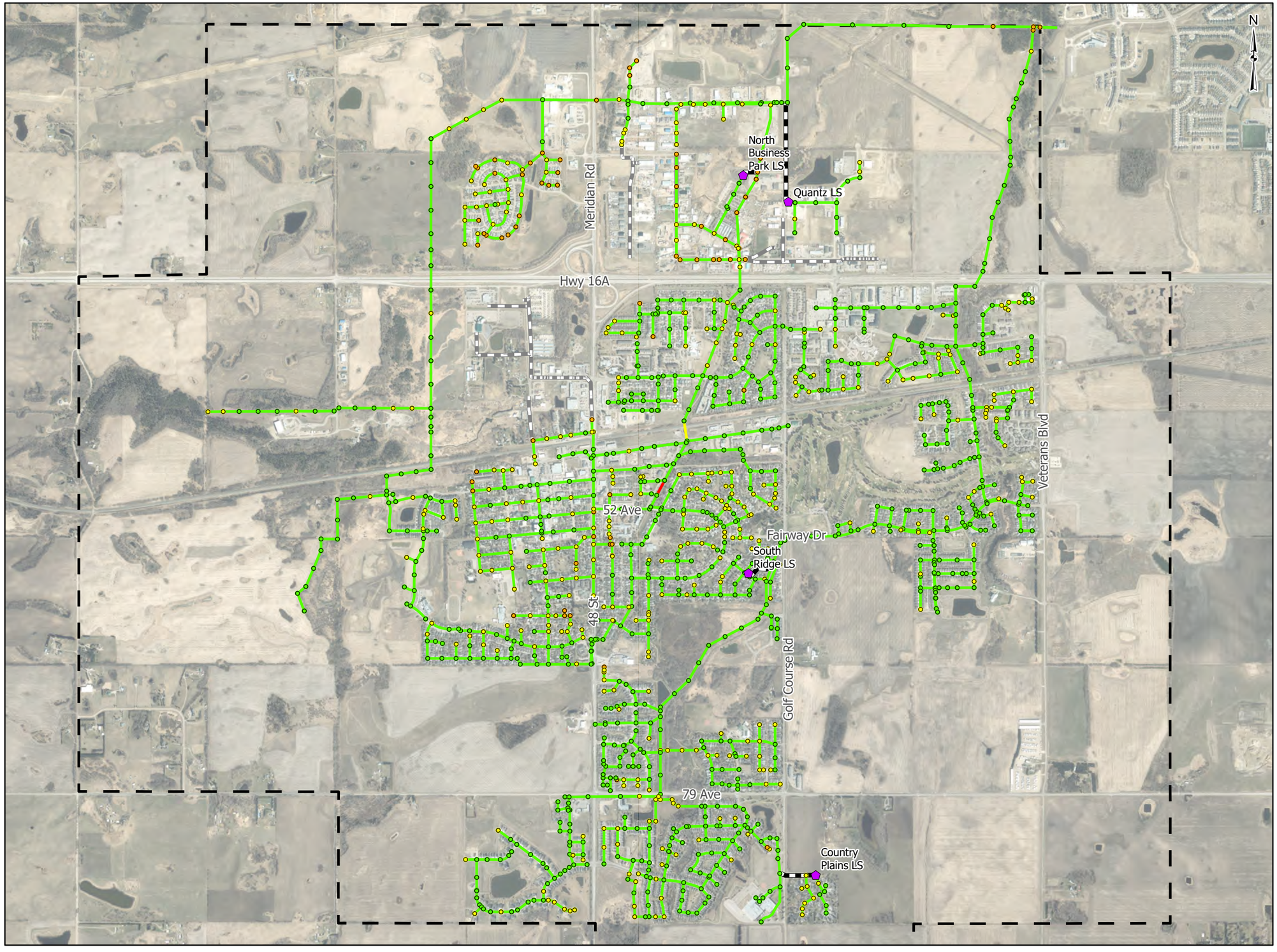
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.13
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 5-yr 24-hr Huff SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0m
- Between -2.4m and 0.0m
- Between -3.5m and -2.4m
- Less than -3.5m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS CAPACITY UTILIZATION AND PEAK HGL 25-YR 24-HR HUFF

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

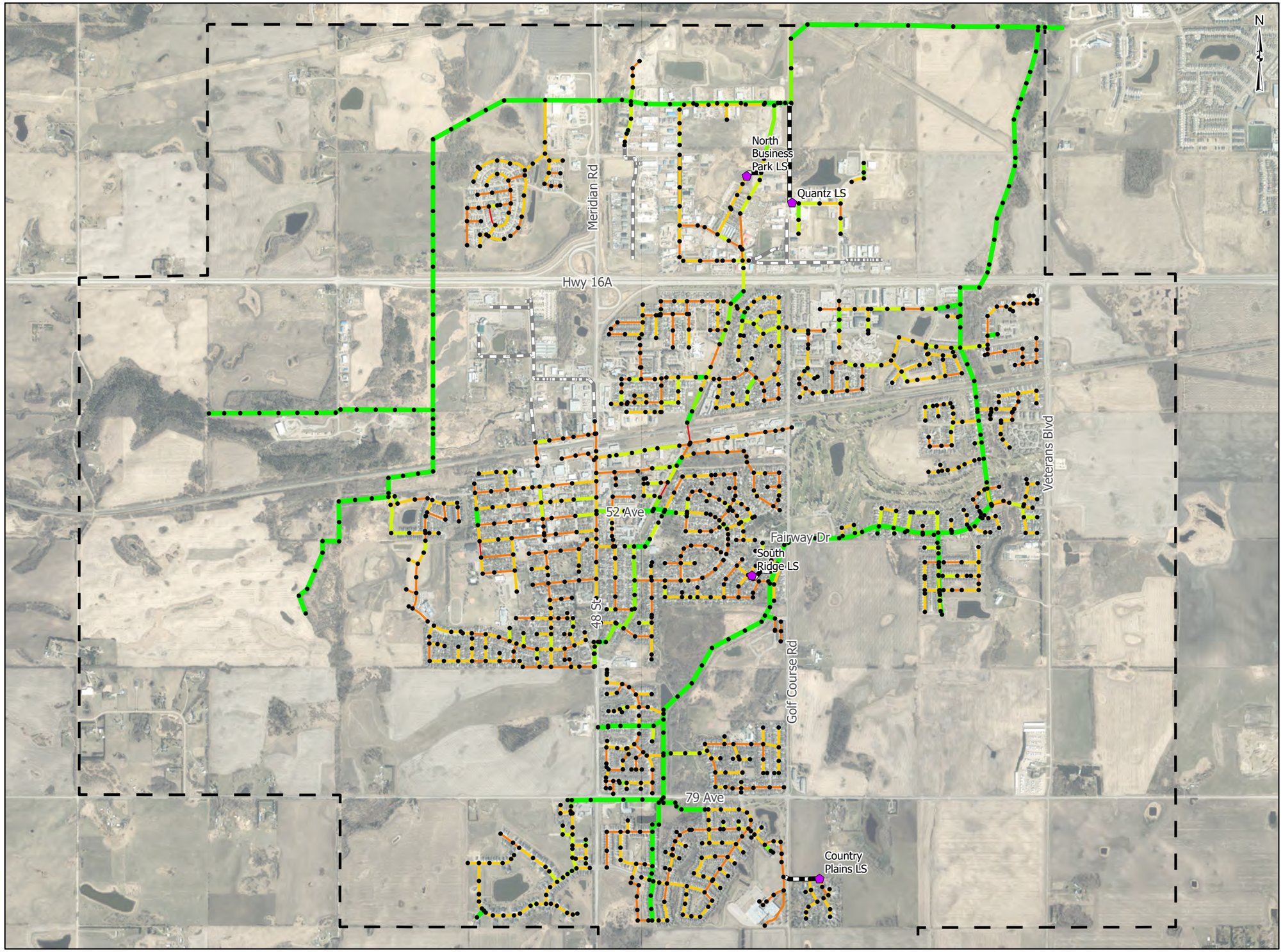
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.14
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 25-yr 24-hr Huff Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
25-YR 24-HR HUFF

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

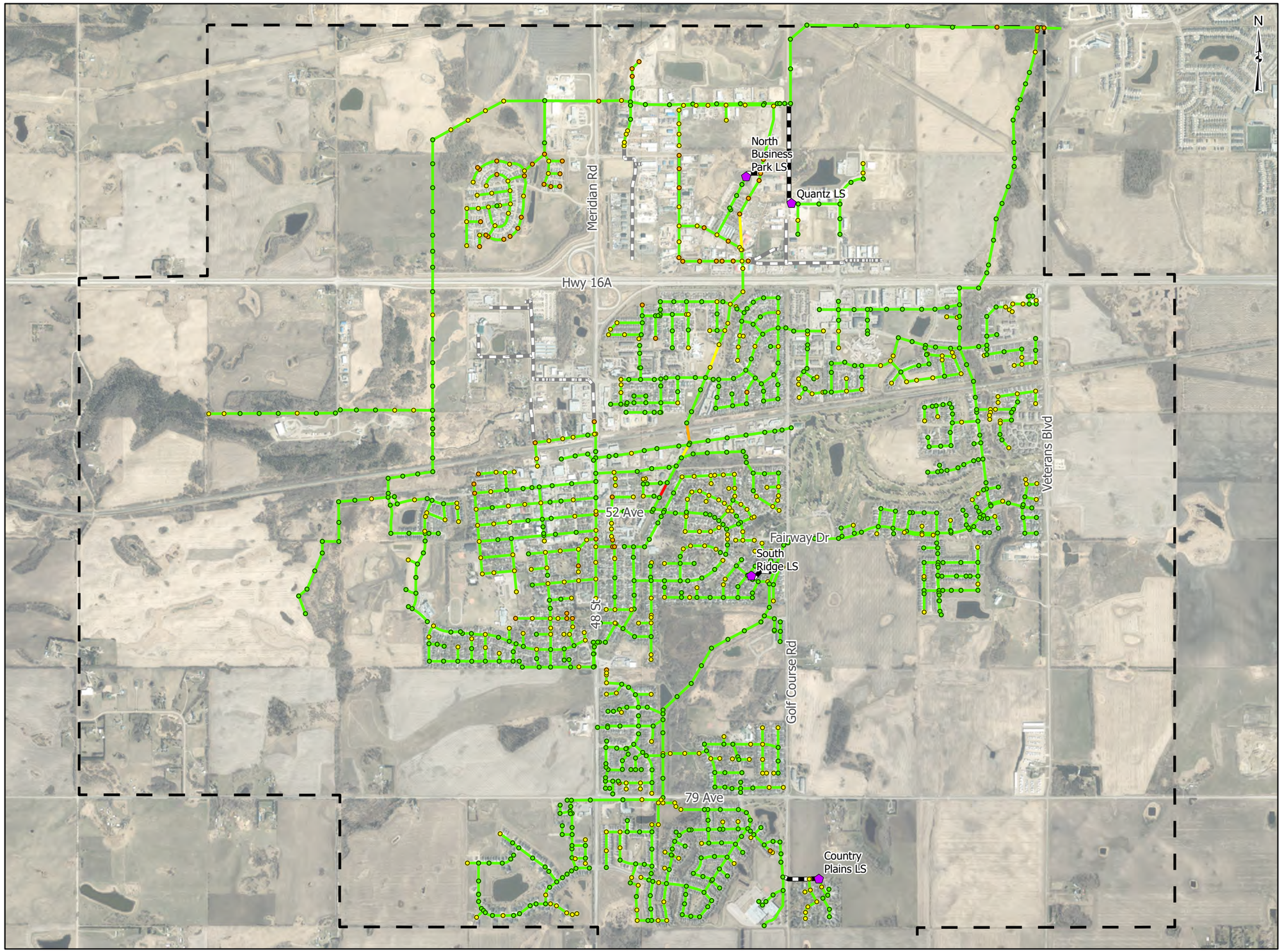
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.15
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 25-yr 24-hr Huff SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0m
- Between -2.4m and 0.0m
- Between -3.5m and -2.4m
- Less than -3.5m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
50-YR 24-HR HUFF

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

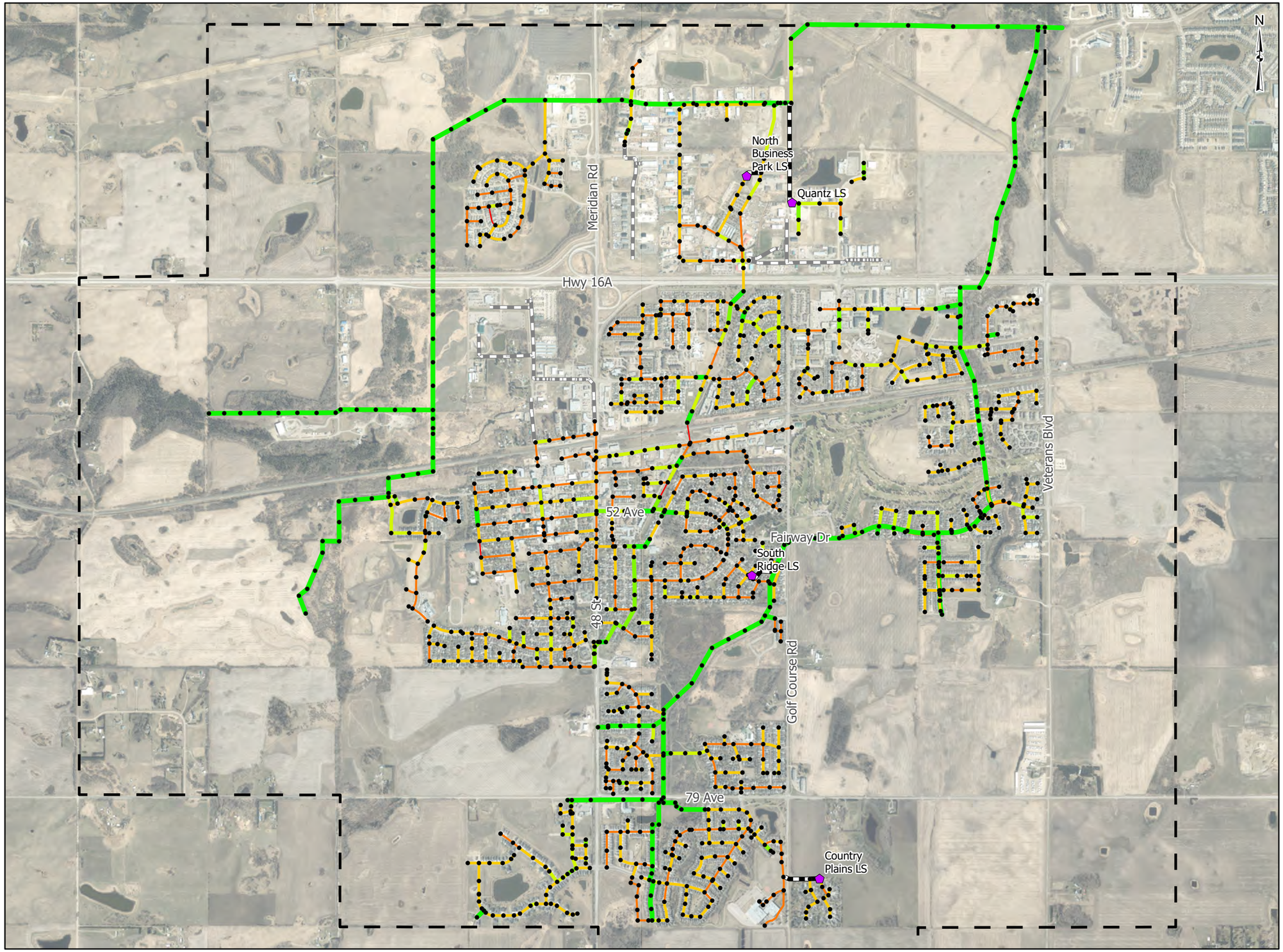
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

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1:24,000 Meters

FIGURE	7.16
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 50yr 24hr Huff Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
50-YR 24-HR HUFF

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

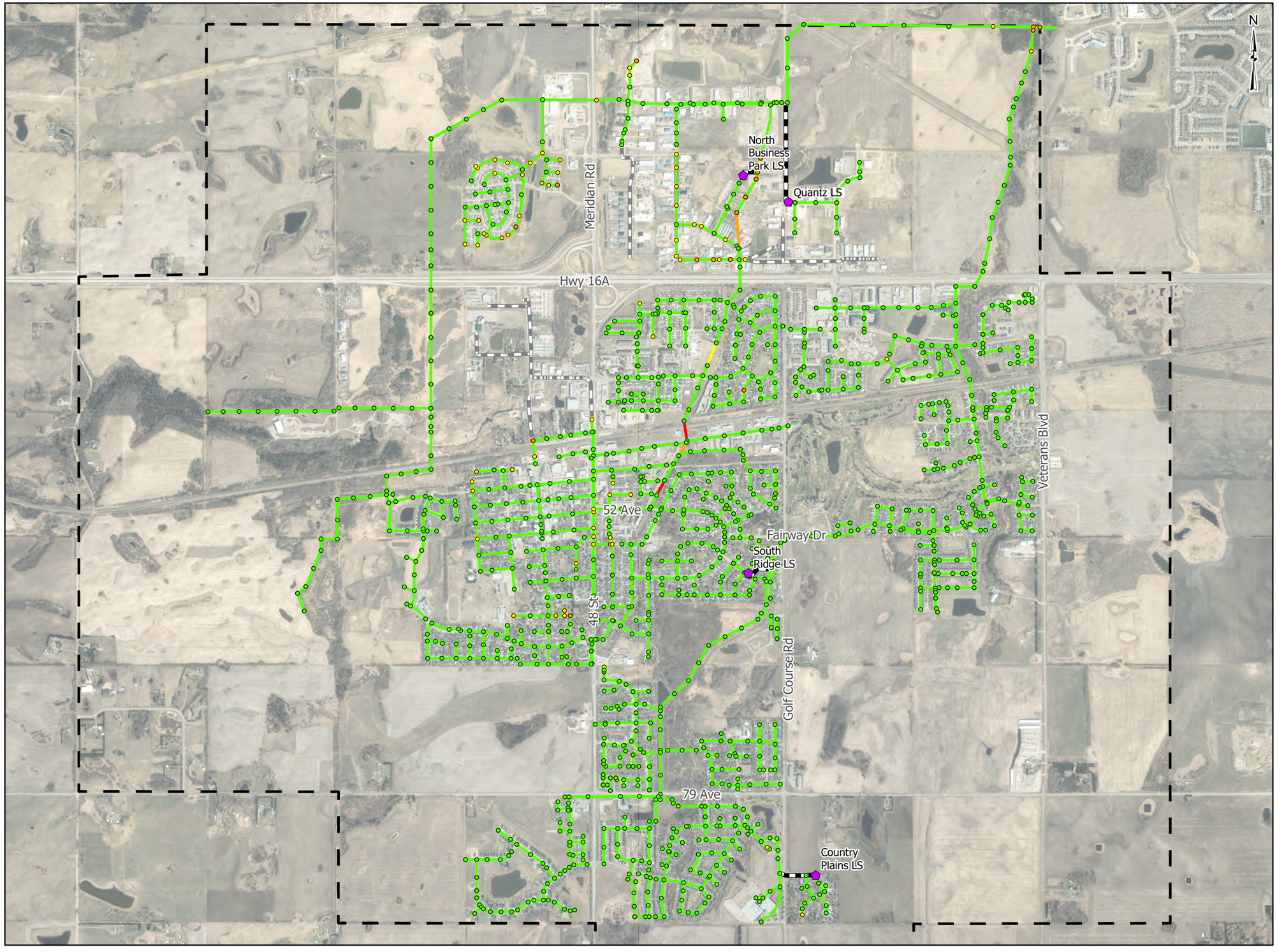
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

FIGURE	7.17
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 50-yr 24-hr Huff SpareQ



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
CAPACITY UTILIZATION AND PEAK HGL
100-YR 24-HR HUFF

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

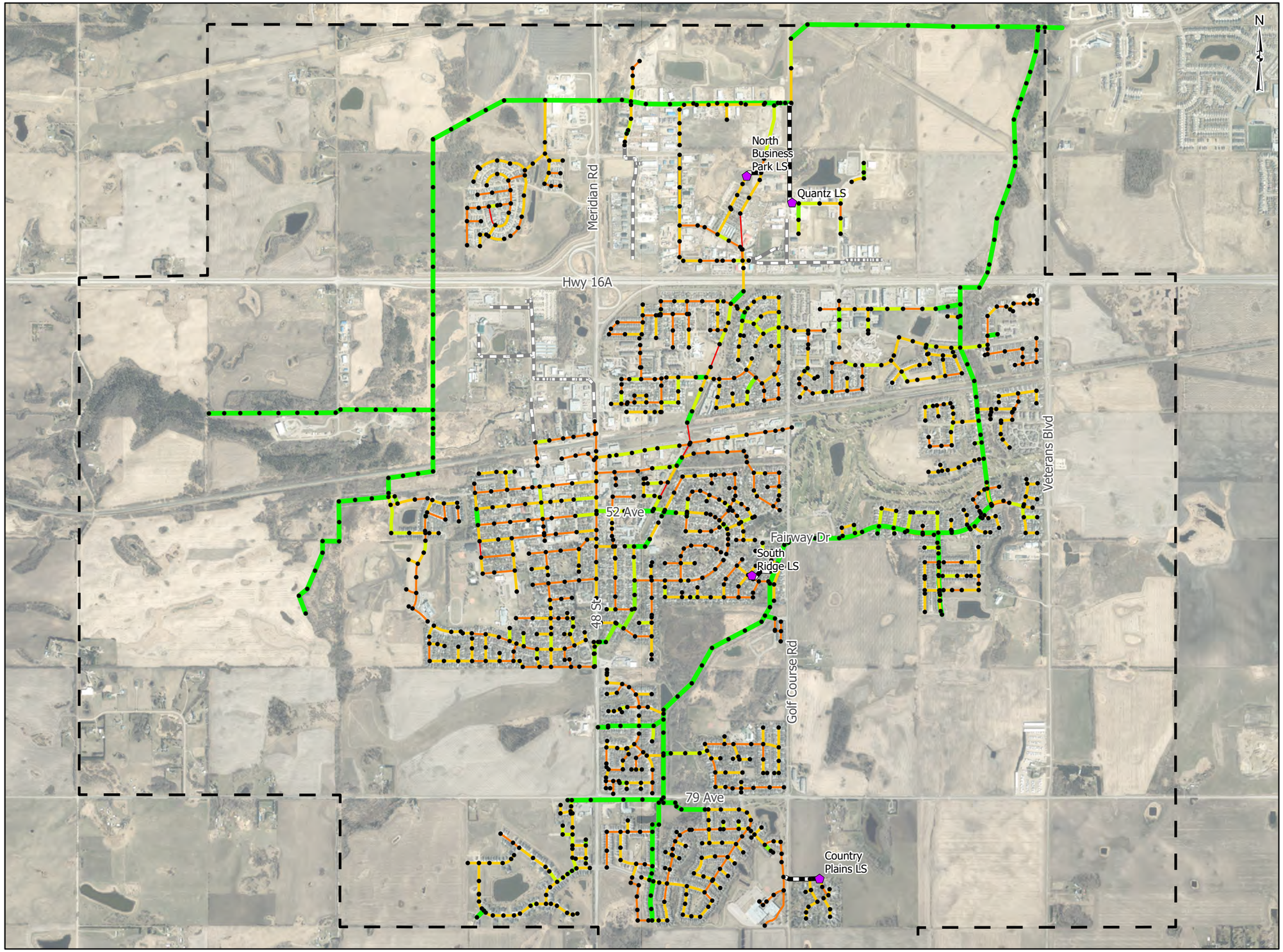
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.18
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 100-yr 24-hr Huff Results



LEGEND

- Manhole
- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

TITLE

EXISTING SYSTEM RESULTS
SPARE CAPACITY
100-YR 24-HR HUFF

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

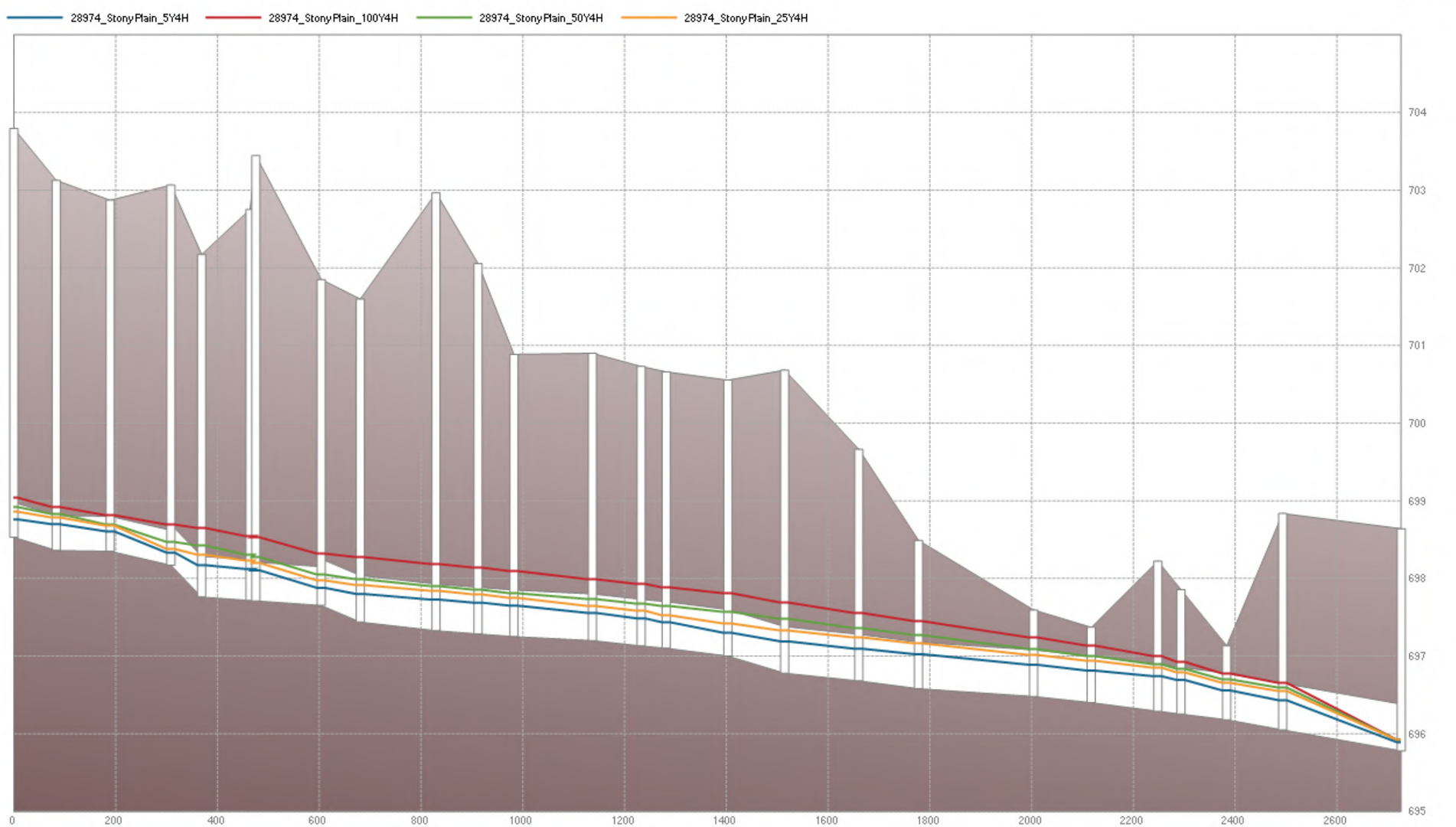
NAD 1983 CSRS 3TM 114

0 300 600

1:24,000 Meters

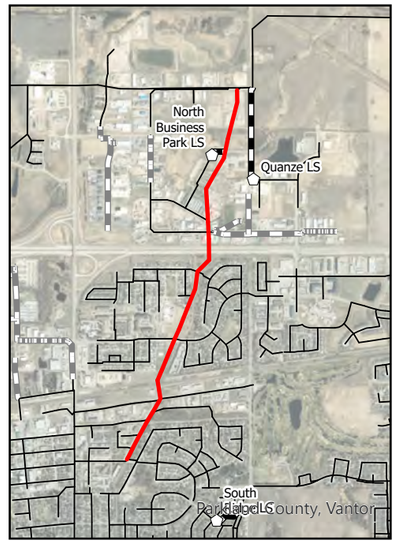
FIGURE	7.19
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX 100-yr 24-hr Huff SpareQ



LEGEND

- 5-yr 4-hr Peak HGL
- 25-yr 4-hr Peak HGL
- 50-yr 4-hr Peak HGL
- 100-yr 4-hr Peak HGL



TITLE

CENTRAL TRUNK HGL PROFILE
CHICAGO DESIGN STORMS

PROJECT

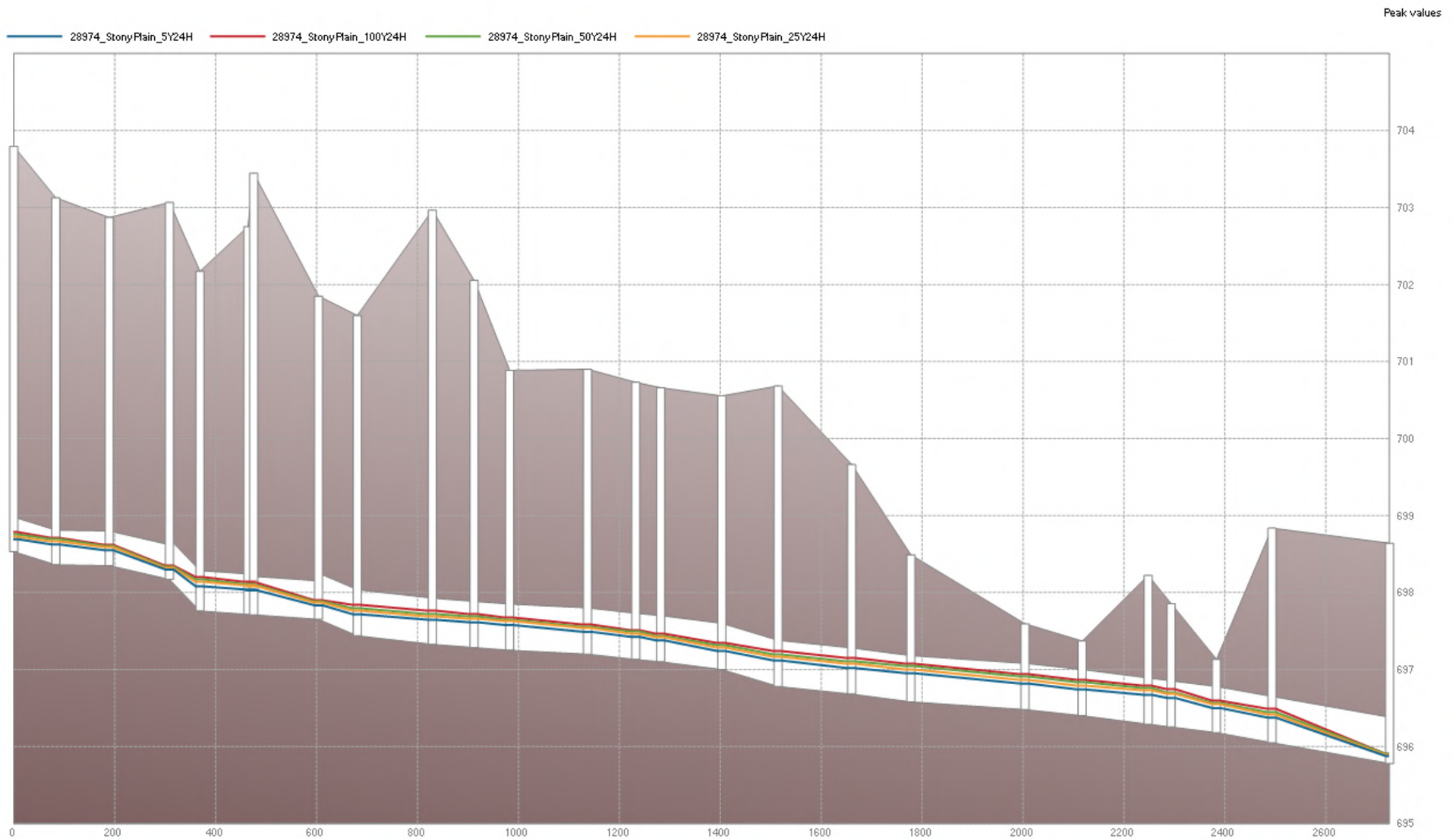
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

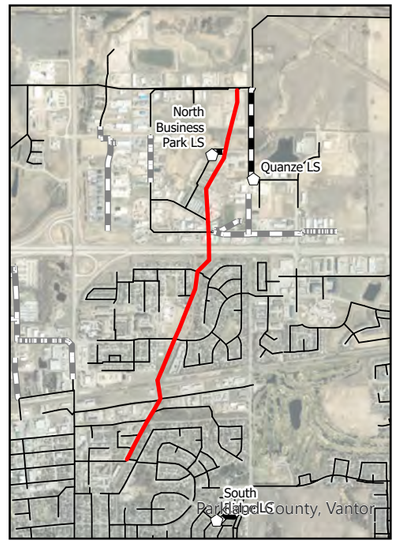
FIGURE	7.20
DATE	12/12/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_HGL Comparison_Chicago



LEGEND

- 5-yr 4-hr Peak HGL
- 25-yr 24-hr Peak HGL
- 50-yr 24-hr Peak HGL
- 100-yr 24-hr Peak HGL



TITLE

CENTRAL TRUNK HGL PROFILE
HUFF DESIGN STORMS

PROJECT

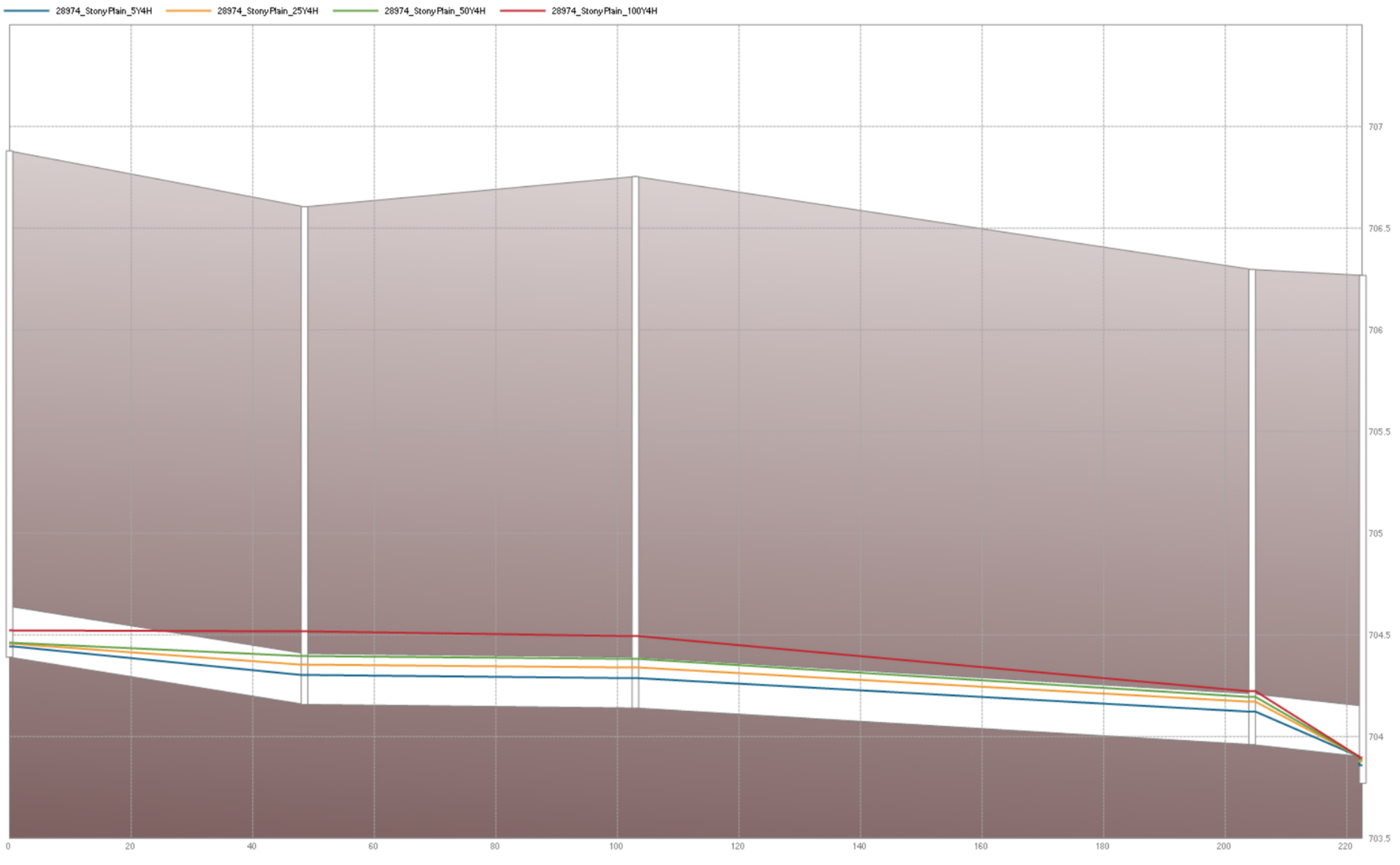
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

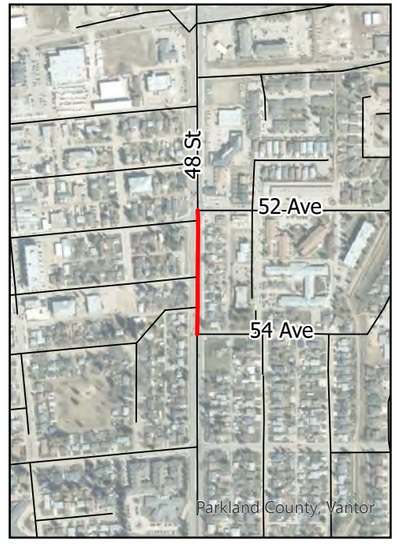
FIGURE	7.21
DATE	12/12/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_HGL Comparison_Huff



LEGEND

- 5-yr 4-hr Peak HGL
- 25-yr 4-hr Peak HGL
- 50-yr 4-hr Peak HGL
- 100-yr 4-hr Peak HGL



TITLE

48 ST HGL PROFILE
CHICAGO DESIGN STORMS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	7.22
DATE	12/16/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_48 St HGL Comparison_Chicago

7.3 Existing System Upgrade Recommendations

Based on the findings of the existing system assessment presented in **Section 7.2**, three upgrade options were developed for the Central Trunk. These options are illustrated in **Figure 7.23**. A longitudinal profile of the Central Trunk, including the resulting hydraulic grade line (HGL) for each option under the 100-year, 4-hour design event, is provided in **Figure 7.24**.

Under existing conditions, the peak HGL in the Central Trunk north of Highway 16A is within approximately 1.5 m of ground surface, even under dry weather conditions, since this part of the trunk is shallow and has less than 1.0 m of cover. As such, the primary objective of the proposed upgrades is to reduce the HGL to below the pipe obvert to mitigate basement flooding risk.

Option #1 – Diversion to East Trunk

This option involves diverting a portion of the flow from the Central Trunk to the East Trunk via installation of a 525 mm diameter sewer along Highway 16A. This diversion would alleviate surcharging in the Central Trunk downstream of Highway 16A. However, surcharging would remain in the upstream portion of the trunk. This is not considered a significant concern, as the peak HGL in the upstream section remains below 2.5 m from ground surface.

The proposed alignment would require deep sewer installation. A creek crossing is located near the west end of the alignment. Maintaining a minimum cover of 3 m beneath the creek and achieving a 0.1% slope to the East Trunk would result in sewer depths of approximately 10 m. This introduces constructability challenges, increased operation and maintenance considerations, and higher capital costs. Shallower installation beneath the creek may reduce these depths, subject to detailed design.

This option also has implications for future system capacity. Diverting additional flow to the East Trunk would reduce its available spare capacity, potentially advancing the timing of required upgrades under ultimate development conditions or increasing the extent of those upgrades.

Capacity assessment results for Option #1 under the 100-year, 4-hour Chicago design storm are provided in **Figure 7.25**. The nodes on the existing Central Trunk remain orange around the North Business Lift Station, which is expected since the sewer is shallow in this area and has less than 1.0 m of cover, but the HGL is reduced to below the obvert. Surcharging in the existing Central Trunk upstream of Highway 16A remains, however the HGL is more than 2.5 m below ground surface and is therefore less of a concern.

Option #2 – Twinning along Golf Course Road

This option involves twinning the Central Trunk along Golf Course Road with a 600 mm sewer. A larger sewer is required compared to Option #1, as the pipe would need to be installed at a shallower slope to match the downstream tie-in invert, reducing available capacity. The proposed alignment was selected to minimize impacts to private property, as the existing trunk currently crosses multiple private parcels. The new alignment would still require crossing one property north of Highway 16A (identified as a gravel parking lot associated with Competition RV), as well as a crossing of Highway 16A. The private property crossing may require the acquisition of a utility right-of-way (URW). In accordance with applicable legislation, no land acquisition costs are anticipated where the works are undertaken for municipal purposes. However, compensation may be required for any damage incurred during construction. Should the Town elect to secure the URW through purchase rather than statutory right-of-way, compensation would be subject to a formal land appraisal and would depend on the extent of land required. At this stage, no appraisal has been completed. However, given the limited area anticipated, any associated costs are expected to be relatively minor.

The proposed sewer would be relatively shallow downstream of Quantz Lift Station (approximately 2 m of cover), and therefore insulation would be required to meet design standards.

The Town has indicated that road improvements are planned for Golf Course Road, presenting an opportunity to coordinate construction and achieve potential cost efficiencies.

This option provides additional long-term benefits, including the potential to decommission the existing Central Trunk north of Highway 16A. The current alignment presents ongoing maintenance challenges due to its location beneath buildings and private property. A new trunk along Golf Course Road would provide a suitable alternative for redirecting existing connections. The proposed 600 mm sewer would have sufficient capacity to accommodate the additional flows, should the existing Central Trunk be fully decommissioned. In addition, if the Town proceeds with replacing the existing low-pressure systems in this area, the new trunk would provide a gravity servicing outlet.

Capacity assessment results for Option #2 under the 100-year, 4-hour Chicago design storm are provided in **Figure 7.26**. The nodes on the existing Central Trunk remain orange around the North Business Lift Station, which is expected since the sewer is shallow in this area and has less than 1.0 m of cover, but the HGL is reduced to below the obvert. Surcharging in the existing Central Trunk upstream of Highway 16A remains, however the HGL is more than 2.5 m below ground surface and is therefore less of a concern.

Option #3 – Super Pipe

This option, originally presented in the 2019 Water and Sanitary Master Plan (Associated Engineering, 2019), involves installation of approximately 500 m of 1,500 mm diameter “super” storage pipe between 52 Avenue/Oatway Drive and 49 Avenue. During wet weather events, flows would be temporarily stored within the pipe and controlled by an orifice at the downstream end.

The 2019 Master Plan proposed a 250 mm diameter orifice. However, based on updated modelling results, a 150 mm orifice would be required to eliminate downstream surcharging under the 100-year, 4-hour event.

While this option reduces downstream surcharge, it introduces significant operational and maintenance concerns, including sediment accumulation and odour generation (particularly within the residential area along Brown Street from 52 Avenue to 49 Avenue). Additionally, this option does not facilitate future decommissioning of the existing Central Trunk north of Highway 16A.

Capacity assessment results for Option #3 under the 100-year, 4-hour Chicago design storm are provided in **Figure 7.27**.

7.3.1 Central Trunk Upgrade Cost Estimates

A summary of the estimated costs associated with each upgrade option is shown below in **Table 7.6**. A full breakdown of the costs has been provided in **Appendix D**.

Table 7.6: Central Trunk Upgrade Cost Estimates (2026 $)

Upgrade Option	Description	Total Cost [1,2]
Option #1	Diversion to East Trunk	$3,620,000
Option #2	Twinning along Golf Course Road	$3,540,000
Option #3	Super Pipe	$3,800,000

[1] Costs are representative of 2026 dollars.

[2] The total cost has been rounded to the nearest $10,000 and includes a 30% contingency as well as 10% for engineering.

7.3.2 Central Trunk Upgrade Option Evaluation

An evaluation matrix was developed to support the selection of the preferred upgrade option. Evaluation criteria were developed based on discussions with the Town during Workshop #2 and are summarized in **Table 7.7**.

Table 7.7: Option Evaluation Criteria

Criteria			Scoring	
ID	Name	Definition	Scale	Description
C.1	Meets LOS under 100-Yr 4-Hr event	HGL is below pipe obvert under the campground / industrial area	5	Yes
			4	
			3	
			2	
			1	No
C.2	O&M Risks and Costs	Combined likelihood and consequence of operational issues, maintenance complexity, and long-term operational/maintenance costs over the asset lifecycle.	5	Minimal
			4	
			3	Moderate
			2	
			1	Significant
C.3	Capital Cost	Overall estimated project cost	5	Minimal
			4	
			3	Moderate
			2	
			1	Significant
C.4	Future Implications	Could affect timing/size of future upgrades to the East Trunk	5	No
			4	
			3	
			2	
			1	Yes
C.5	Central Trunk Decommissioning Potential	Possibility of decommissioning the existing Central Trunk north of Highway 16A	5	Yes
			1	No
C.6	Re-Routing Potential (Quantz Low-Pressure System)	Possibility of re-routing the Quantz low-pressure system into new trunk	5	Yes
			1	No
C.7	Coordination with Road Upgrades	Potential to coordinate trunk upgrades with future roadway improvements	5	Significant
			3	Moderate
			1	Minimal

A pairwise comparison was used to allocate a weighting to each criterion as shown in **Table 7.8**. The criteria ranking was informed by overall project objectives and engineering judgment, with greater weighting assigned to criteria related to level of service and operational risk, and lower weighting assigned to secondary or opportunistic considerations.

Table 7.8: Option Evaluation Criteria Ranking

Risk Criteria – Pairwise Comparison								Count	Weighting	Criteria Ranking		
	C.1	C.2	C.3	C.4	C.5	C.6	C.7			Rank	ID	Description
C.1	C.1	C.1	C.1	C.1	C.1	C.1	C.1	7	25.0%	1	C.1	Meets LOS under 100-Yr 4-Hr event
C.2		C.2	C.2	C.2	C.2	C.2	C.2	6	21.4%	2	C.2	O&M Risks and Costs
C.3			C.3	C.3	C.3	C.3	C.3	5	17.9%	3	C.3	Capital Cost
C.4				C.4	C.4	C.4	C.4	4	14.3%	4	C.4	Future Implications
C.5					C.5	C.5	C.5	3	10.7%	5	C.5	Central Trunk Decommissioning Potential
C.6						C.6	C.6	2	7.1%	6	C.6	Re-Routing Potential (Quantz Low-Pressure System)
C.7							C.7	1	3.6%	7	C.7	Coordination with Road Upgrades
							Total	28	100.0%			

The evaluation summary and associated scores are provided in **Tables 7.9** and **7.10**. Based on this assessment, **Option #2 – Twinning Along Golf Course Road** is identified as the preferred alternative.

Table 7.9: Option Evaluation Parameter Summary

Option	Description	Category Parameter						
		Meets LOS under 100-Yr 4-Hr event	O&M Risks and Costs	Capital Cost	Future Implications	Central Trunk Decommissioning Potential	Re-Routing Potential (Quantz Low-Pressure System)	Coordination with Road Upgrades
1	Diversion to East Trunk	Yes	Moderate	$3.6 M	Yes	No	No	Minimal
2	Twinned along Golf Course Road	Yes	Moderate	$3.5 M	No	Yes	Yes	Significant
3	Super Pipe	Yes	Significant	$3.8 M	No	No	No	Moderate

Table 7.10: Option Evaluation Scoring Summary

Option	Description	Category Weighted Score							Combined Weighted Score
		Meets LOS under 100-Yr 4-Hr event	O&M Risks and Costs	Capital Cost	Future Implications	Central Trunk Decommissioning Potential	Re-Routing Potential (Quantz Low-Pressure System)	Coordination with Road Upgrades	
1	Diversion to East Trunk	1.25	0.64	0.54	0.14	0.11	0.07	0.04	2.79
2	Twinned along Golf Course Road	1.25	0.64	0.71	0.71	0.54	0.36	0.18	4.39
3	Super Pipe	1.25	0.21	0.36	0.71	0.11	0.07	0.11	2.82

7.3.3 Low-Pressure System Replacement

The Town has identified ongoing operational challenges associated with the existing low-pressure systems in the industrial area. In response, alternative servicing concepts have been developed to replace all three low-pressure systems, as illustrated in **Figures 7.28** and **7.29**. These replacements can be implemented independently and do not need to be constructed concurrently.

The same design criteria applied in the future servicing concept were used in developing these alternatives, as described in **Section 3.3**.

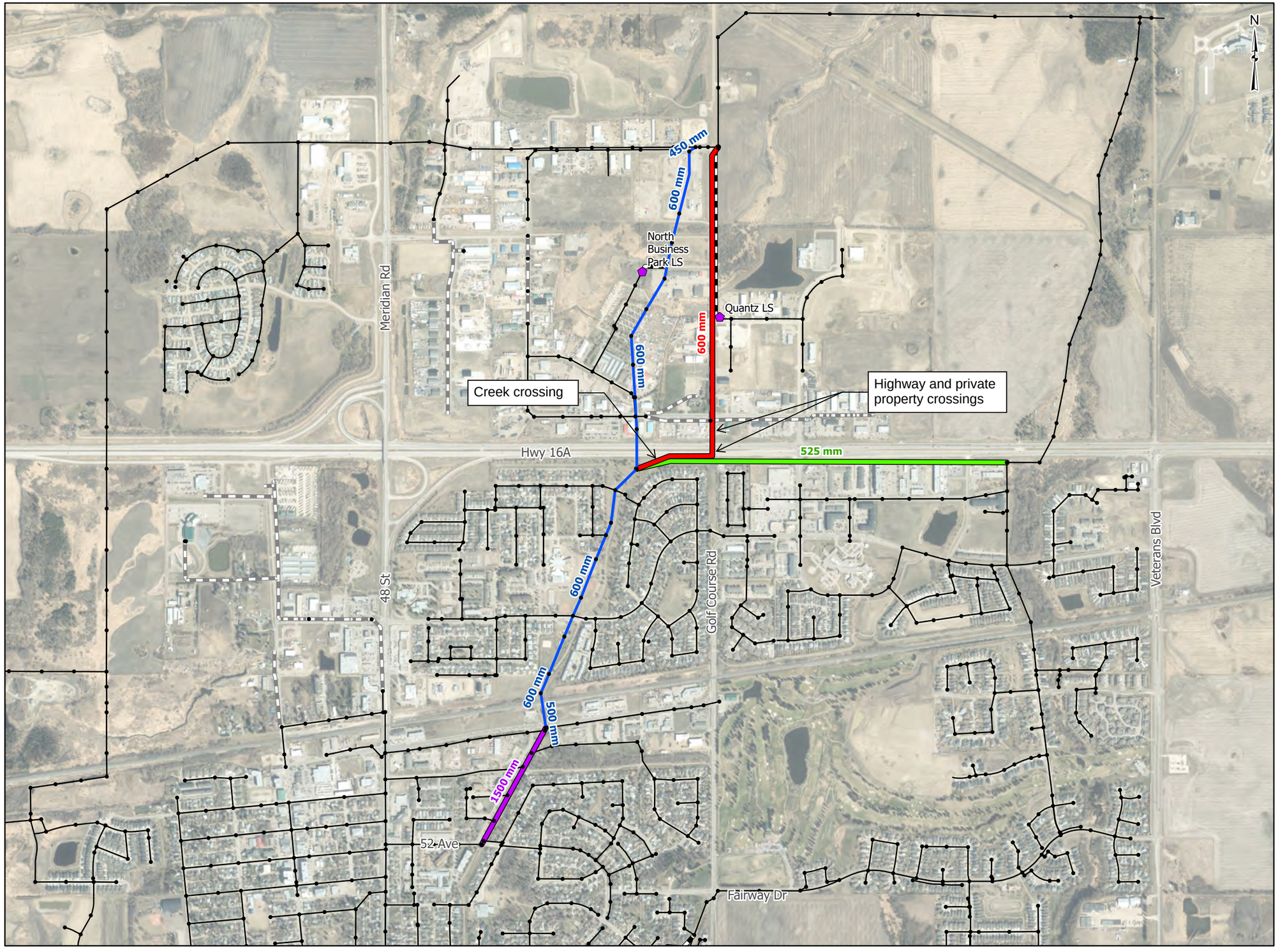
A summary of the costs associated with the recommended low-pressure system replacements are detailed below in **Table 7.11**. A full breakdown of the costs has been provided in **Appendix D**.

Table 7.11: Low-Pressure System Replacement Costs (2026 $)

Low-Pressure System	Total Cost [1,2]
Goertz	$2,120,000
Quantz	$2,000,000
South of Hwy 16	$4,850,000
Total	**$8,970,000**

[1] Costs are representative of 2026 dollars.

[2] The total cost has been rounded to the nearest $10,000 and includes a 30% contingency as well as 10% for engineering.



LEGEND

- Manhole
- Lift Station
- Gravity Main
- Low-Pressure System
- Forcemain
- Existing Central Trunk

Central Trunk Upgrade

- Option #1
- Option #2
- Option #3

TITLE

EXISTING SYSTEM UPGRADING OPTIONS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

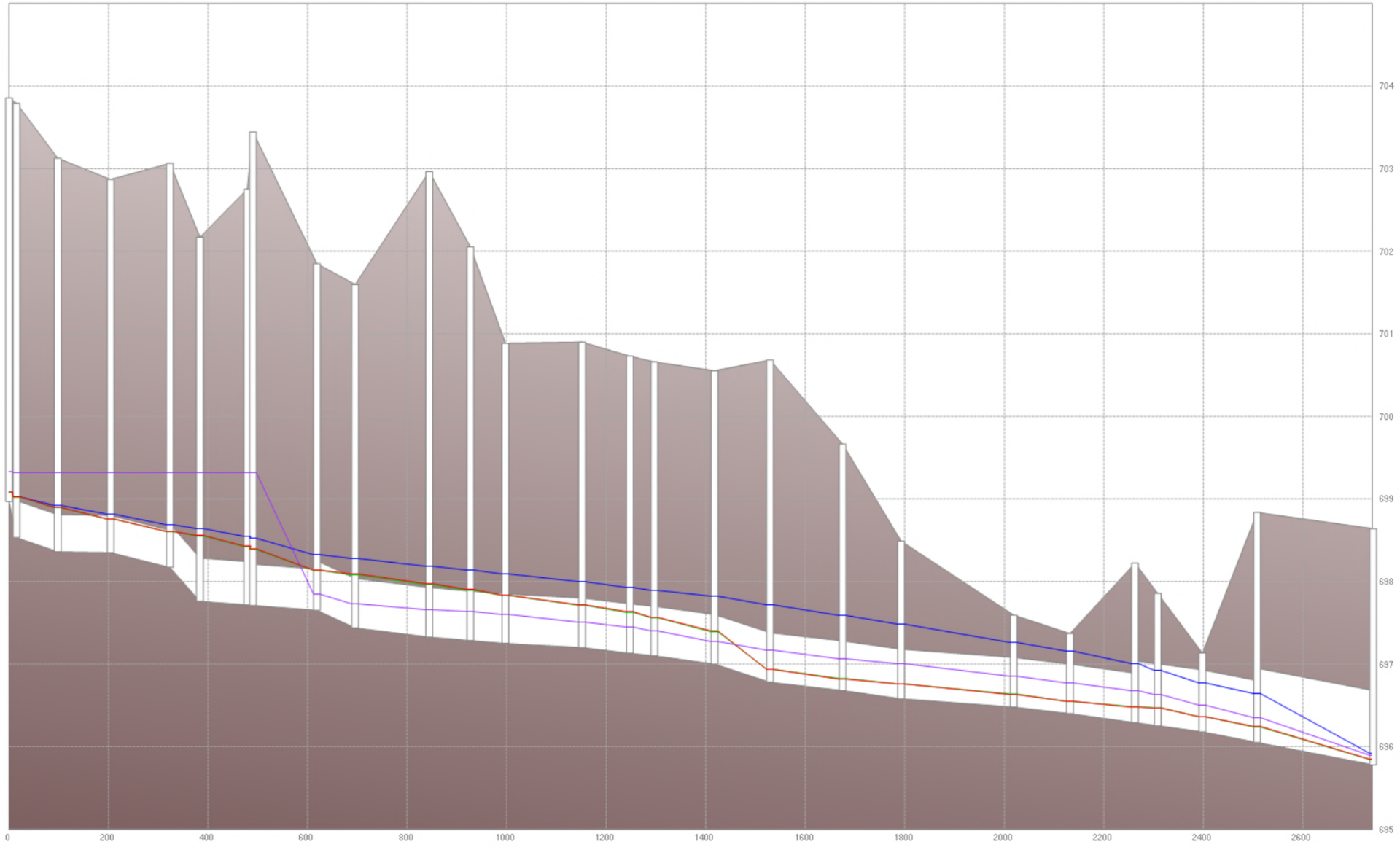
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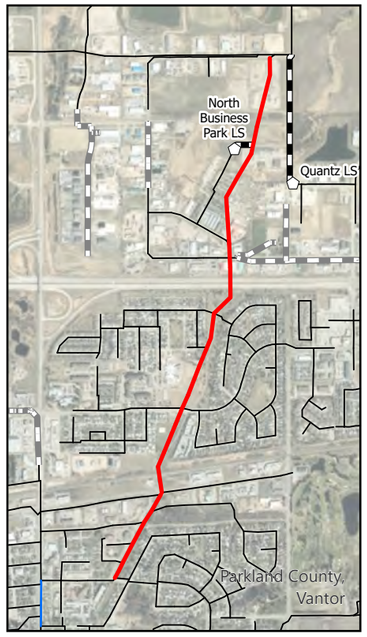
FIGURE	7.23
DATE	3/31/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 2.1_Existing System Upgrading Options



LEGEND

- Existing Peak HGL
- Upgrade Option #1 Peak HGL
- Upgrade Option #2 Peak HGL
- Upgrade Option #3 Peak HGL



TITLE

CENTRAL TRUNK HGL PROFILE
UPGRADE OPTION COMPARISON
100-YR 4-HR CHICAGO

PROJECT

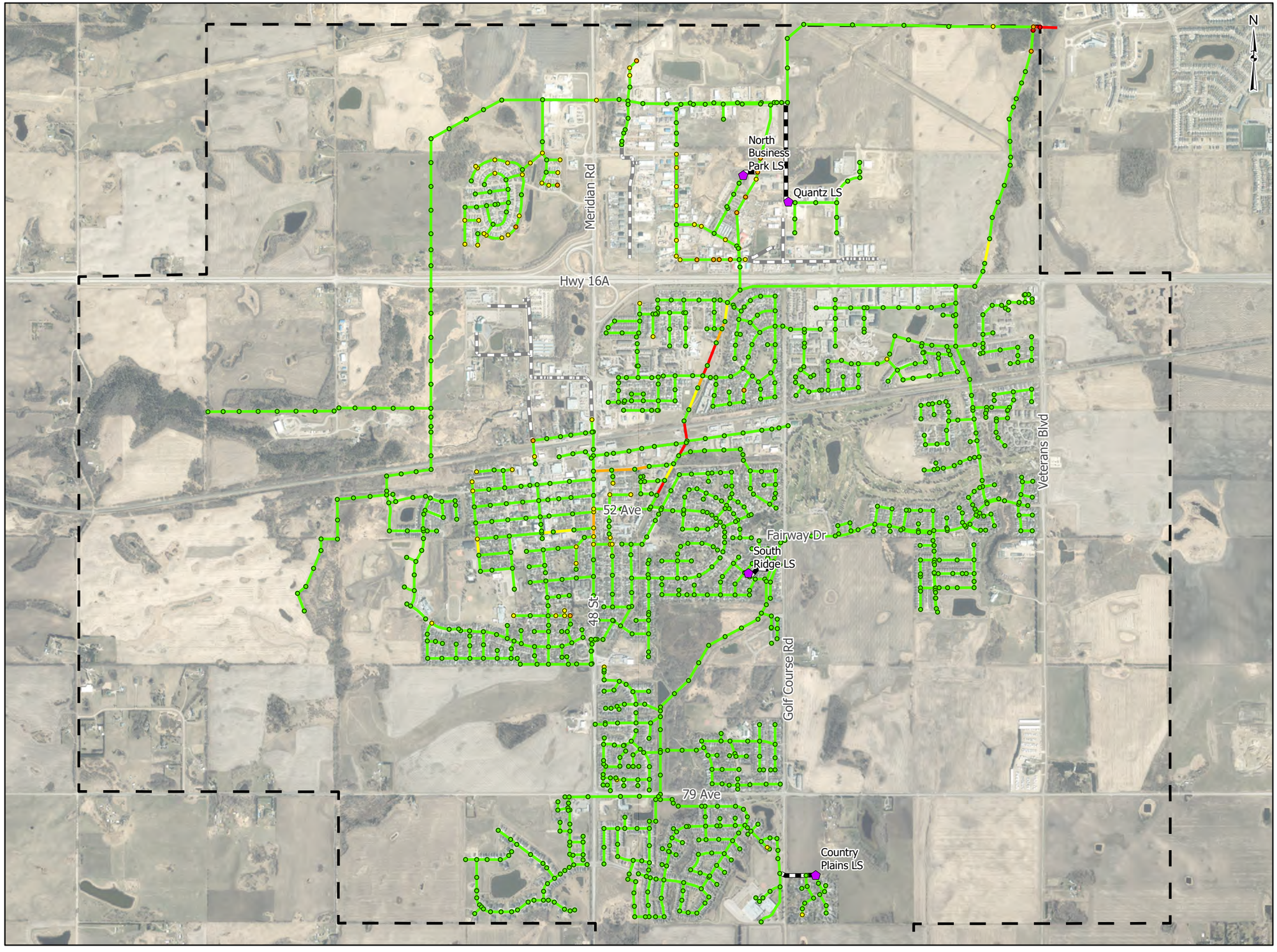
SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	7.24
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 2.2_EX Upgrade Option LPs



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
UPGRADE OPTION #1
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

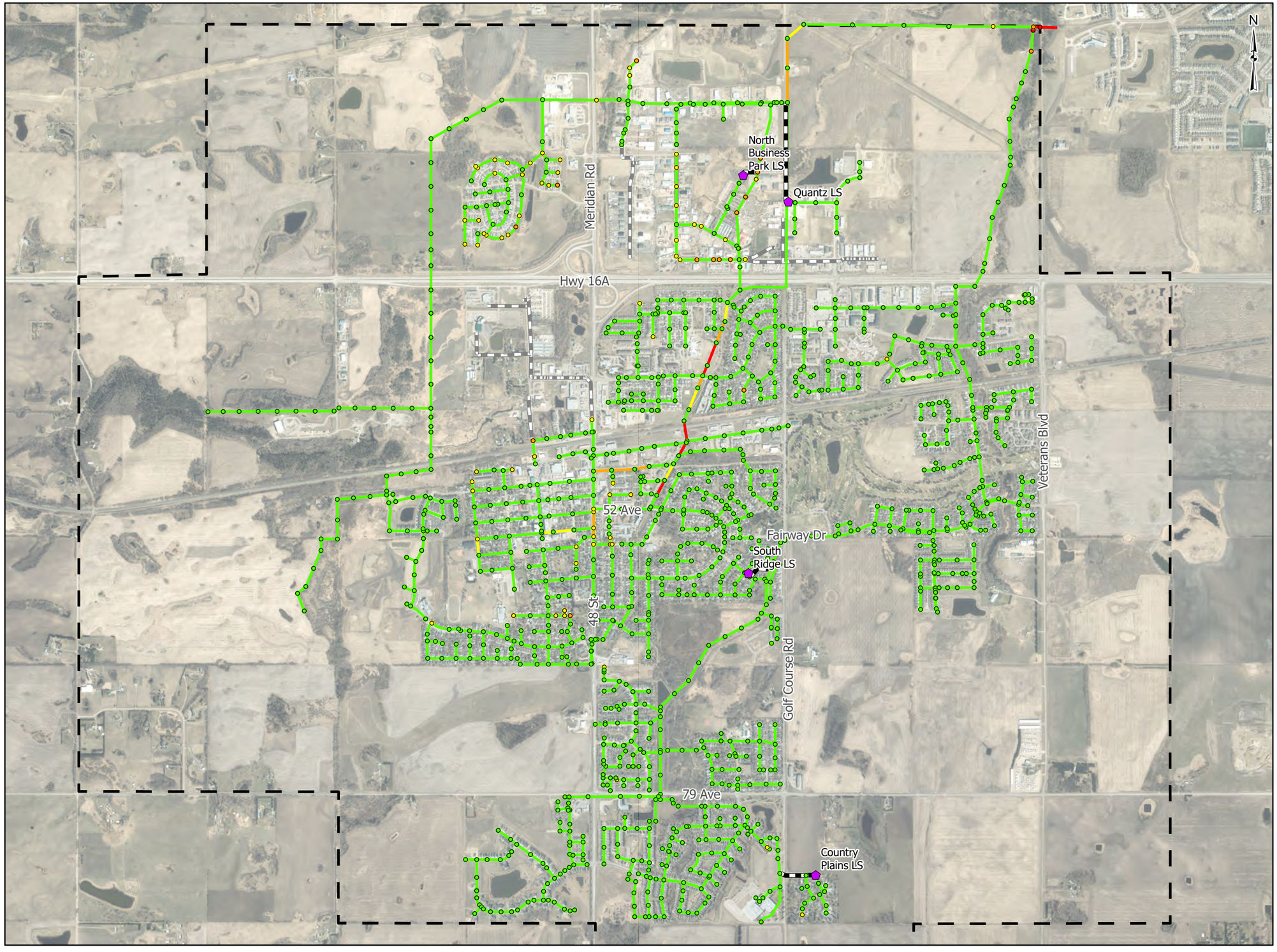
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.25
DATE	3/10/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX Upgrade Option 1 Results



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
UPGRADE OPTION #2 (TWINNED)
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

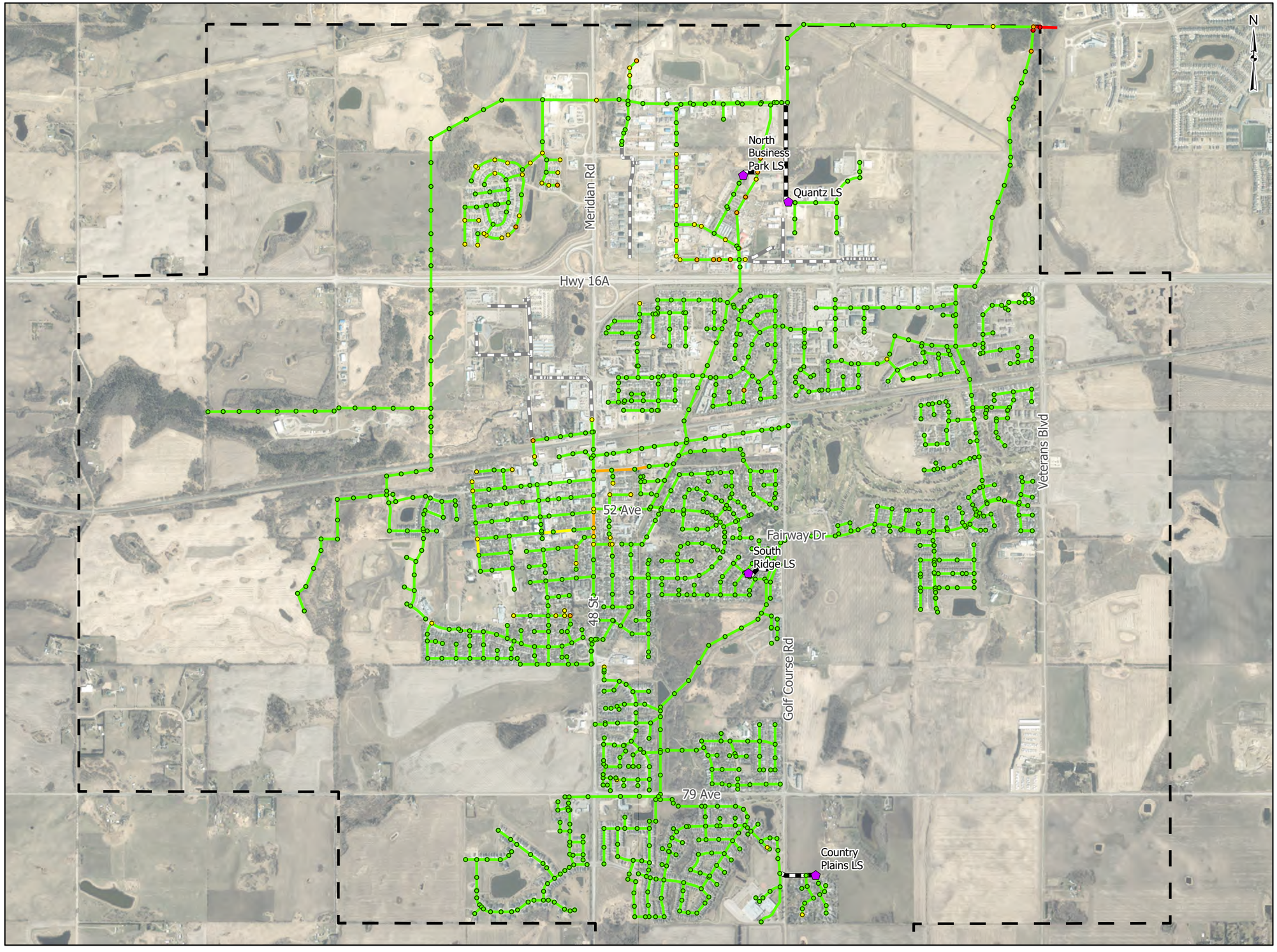
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.26
DATE	3/10/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX Upgrade Option 2 Results



LEGEND

- Lift Station
- Forcemain
- Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

TITLE

EXISTING SYSTEM RESULTS
UPGRADE OPTION #3 (SUPER PIPE)
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

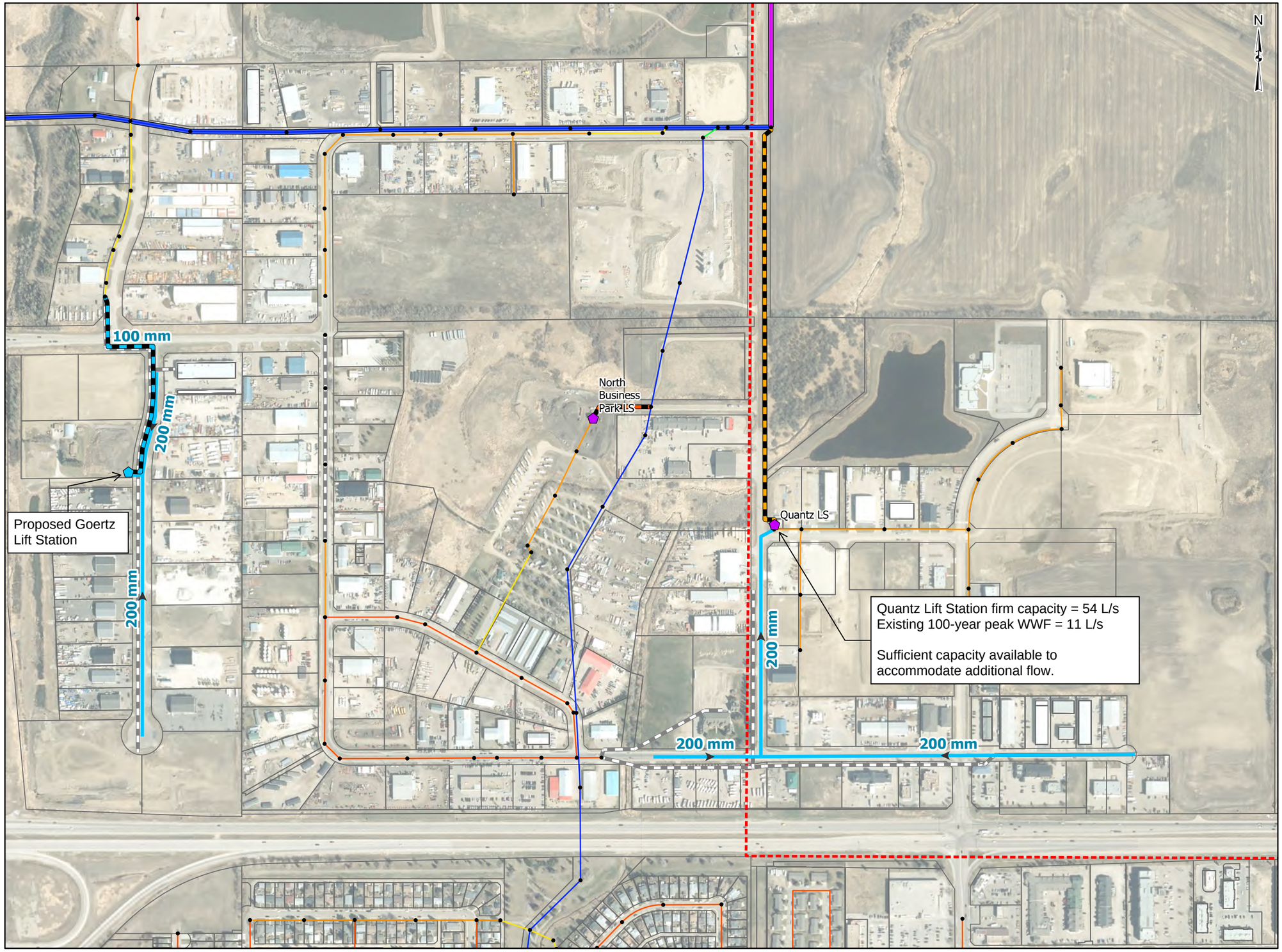
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

0 300 600
1:24,000 Meters

FIGURE	7.27
DATE	3/10/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_EX Upgrade Option 3 Results



LEGEND

- Manhole
- Lift Station
- Proposed Lift Station
- Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Water Commission Line
- Parcel

Forcemain Diameter

- 150 mm
- 200 mm

Gravity Main Diameter

- 100 mm
- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 600 mm
- 750 mm

ARROW Utilities Trunk Sewer

- 600 mm
- 750 mm

TITLE

LOW-PRESSURE SYSTEM REPLACEMENTS GOERTZ AND QUANTZ

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

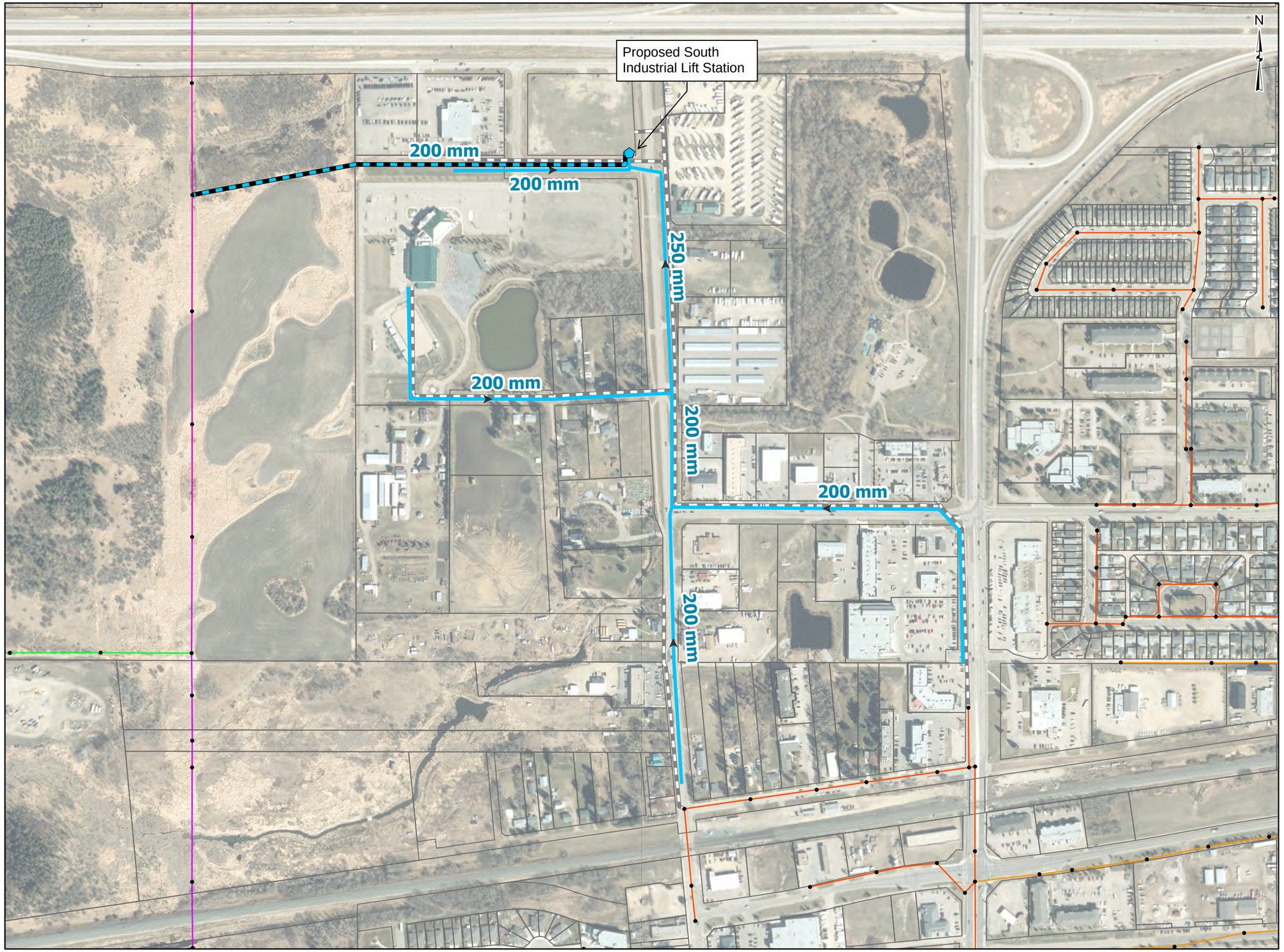
NAD 1983 CSRS 3TM 114

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FIGURE	7.28
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Low-Pressure Alternates



LEGEND

- Manhole
- Lift Station
- Proposed Lift Station
- Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Water Commission Line
- Parcel

Gravity Main Diameter

- 200 mm
- 250 mm
- 450 mm
- 600 mm
- 750 mm
- 900 mm

TITLE

LOW-PRESSURE SYSTEM REPLACEMENTS SOUTH OF HWY 16A

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 60 120

1:5,000 Meters

FIGURE	7.29
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Low-Pressure Alternates

8.0 Future System Assessment and Recommendations

8.1 Future Servicing Concept

A future sanitary servicing concept was developed to service the identified growth areas and is illustrated in **Figure 8.1**. The concept provides a high-level framework for how future development areas will connect to the existing sanitary system while maintaining system performance and minimizing downstream impacts.

The servicing concept was developed by delineating future subcatchments and identifying appropriate trunk sewer alignments and tie-in locations to the existing system. The future growth areas were grouped into subcatchments based on quarter section, growth horizon, and discharge location. Naming of subcatchments and future pipes is arbitrary and was completed for the purpose of this master plan only.

For each subcatchment, proposed servicing strategies were developed based on existing topography, proximity to existing infrastructure, and anticipated development staging. Where Area Structure Plans (ASPs) were available, proposed trunk alignments were generally aligned with planned infrastructure corridors, provided they were compatible with local grading and hydraulic constraints. In areas without defined plans, conceptual trunk sewer alignments were selected to optimize gravity servicing and minimize the need for deep sewer construction or lift stations. These alignments are intended for planning purposes only and will require refinement during future detailed design as grading plans, servicing strategies, and development layouts become available.

As shown in **Figure 8.1**, many future development areas can be serviced via gravity connections to the existing system. However, due to topographic constraints, two lift stations are required. These include one lift station in the South Creek area (FUT LS #1) and one near Willow Park (FUT LS #2).

A detailed mapbook of the future servicing concept is provided in **Appendix E**, including proposed trunk sizes, proposed manhole tie-in elevations to the existing system, and identified low points within each future catchment. Minimum elevation points were reviewed and adjusted where required to avoid waterbodies or wetlands. Longitudinal profiles for all proposed trunks are provided in **Appendix F**.

It should be noted that the longitudinal profiles are based on existing ground elevations derived from 2022 LiDAR data and assuming minimum slope requirements. As development proceeds, site grading will likely be refined, and final pipe profiles may differ from those presented.

The servicing schemes of the proposed sanitary system are conceptual. Ultimately, it will be up to the developer to fulfill the intent of the servicing concept presented herein. Therefore, a developer may choose to adjust the alignment of the specified trunks as needed, to accommodate the sanitary sewer collection system within future developments. A developer may also choose to connect services directly to the future sanitary trunks if found beneficial, provided the designed sanitary system does not result in any negative impacts on the directly connected developments. Specifically, surcharge conditions within the sanitary sewer collection system resulting in basement back-ups is of concern.

8.1.1 Future System Sizing

Infrastructure sizing was carried out using a spreadsheet-based approach. Pipe diameters were selected to be the smallest possible while still achieving self-cleansing full-pipe velocities greater than 0.60 m/s, based on the minimum design slopes and a roughness coefficient of 0.013. These velocities were verified under peak WWF conditions.

Pipes were designed to operate at a maximum of 86% capacity under peak conditions. Pipe sizes were rounded up to the nearest nominal diameter, resulting in most pipes operating below 86% capacity. This approach results in conservative pipe sizing.

At the detailed design stage, flatter slopes may be proposed depending on local grading or development constraints. In such cases, pipe diameters would need to be increased to maintain the required flow capacity. Conversely, if steeper slopes can be achieved due to topographic advantages, smaller pipe diameters may be appropriate. Either adjustment should be reviewed in detail during final design.

Forcemain sizing followed a similar approach, with design velocities targeted in the range of 0.76 m/s to 1.5 m/s. This range minimizes head losses and energy demands while maintaining sufficient flow velocity to prevent sediment buildup. All future forcemains were specified as single pipes; however, twinning may be considered for redundancy and flow staging, depending on the final build-out strategy.

8.1.2 Interim Servicing Recommendations

In addition to the overall servicing concept, several areas were reviewed for potential interim servicing approaches to support staged development.

- **Country Plains**: Staged development could potentially be serviced using the existing Country Plains Lift Station. However, the lift station and downstream sewers only have about 10 L/s of spare capacity, which restricts the feasibility of this approach. Upgrading the lift station and downstream gravity system could be considered but would likely be more costly than constructing new trunk infrastructure as part of greenfield development. If projected flows exceed the available 10 L/s capacity, on-site storage with controlled discharge to the lift station during off-peak periods could be considered to mitigate downstream capacity constraints. However, this approach introduces additional operation and maintenance considerations, including ongoing system monitoring, potential odour issues, and risks associated with storage system reliability and controlled release mechanisms.
- **Subcatchment 28-3 (East Boundary ASP):** Within the East Boundary ASP, a small area in the southwest corner is designated for development within the 10-year horizon, while the remainder is planned for the 25-year horizon. The proposed servicing concept conveys this area via FUT Pipe 35, requiring approximately 1.3 km of trunk construction to service a relatively small development area in the earlier stage. As an alternative, this area could be serviced westward by connecting to the existing sewer on Fairway Drive. This would cause surcharging in the existing sewers, however the peak HGL remains within the pipe obvert and is therefore not expected to present a significant risk. The option would also require crossing the water commission line along Veteran's Boulevard. It is recommended that additional modelling be undertaken at the development stage to confirm that interim servicing of the proposed development's peak flows does not result in downstream impacts to the existing system.

8.1.3 FUT FM 2 Alignment

Multiple alignment options were evaluated for FUT FM 2, including routes to the south, east, and north, as shown on **Figure 8.2**. The preferred alignment (Option #1) extends north before transitioning to a gravity sewer heading east, generally along the south side of the school. This option represents the lowest estimated cost.

An alternative alignment (Option #2) extending east through the Willow Park neighbourhood, generally following the existing road network, was also considered. This option would result in greater disruption to the existing community and would require upgrading approximately 60 m of 600 mm sewer on the East Trunk to 750 mm.

Another potential alignment (Option #3) travels south from the lift station, crosses 48 Street, and ties into the existing 450 mm sewer in Willow Park. There is uncertainty regarding whether this sewer extends west to 48 Street, as shown in the GIS, and Town operations staff have indicated that this segment may not exist. In addition, the existing 450 mm sewer would require upgrading to accommodate future flows under the Ultimate development horizon. The downstream segment of this sewer, prior to connecting to the East Trunk, passes between two houses with approximately 4 m separation, which could present significant constructability challenges. This section would likely not be feasible to upgrade, and the Town would need to accept potential surcharging and backups into the downstream 450 mm system during peak wet weather events. However, as this sewer is relatively deep (approximately 5–6 m), the risk of basement flooding is considered low.

Finally, an alignment extending south from the lift station to 79 Avenue was also considered (Option #4). This option would trigger upgrades to the East Trunk under the Ultimate development horizon, including approximately 550 m of 600 mm sewer to be upsized to 750 mm.

Cost estimates for the evaluated options are summarized in **Table 8.1**. For a detailed cost breakdown, please refer to **Appendix D**.

Table 8.1: FUT FM 2 Alternative Options Cost Estimates (2026 $)

Option	Total Cost [1,2]
Option #1	$1,270,000
Option #2	$1,450,000
Option #3	$1,350,000
Option #4	$2,210,000

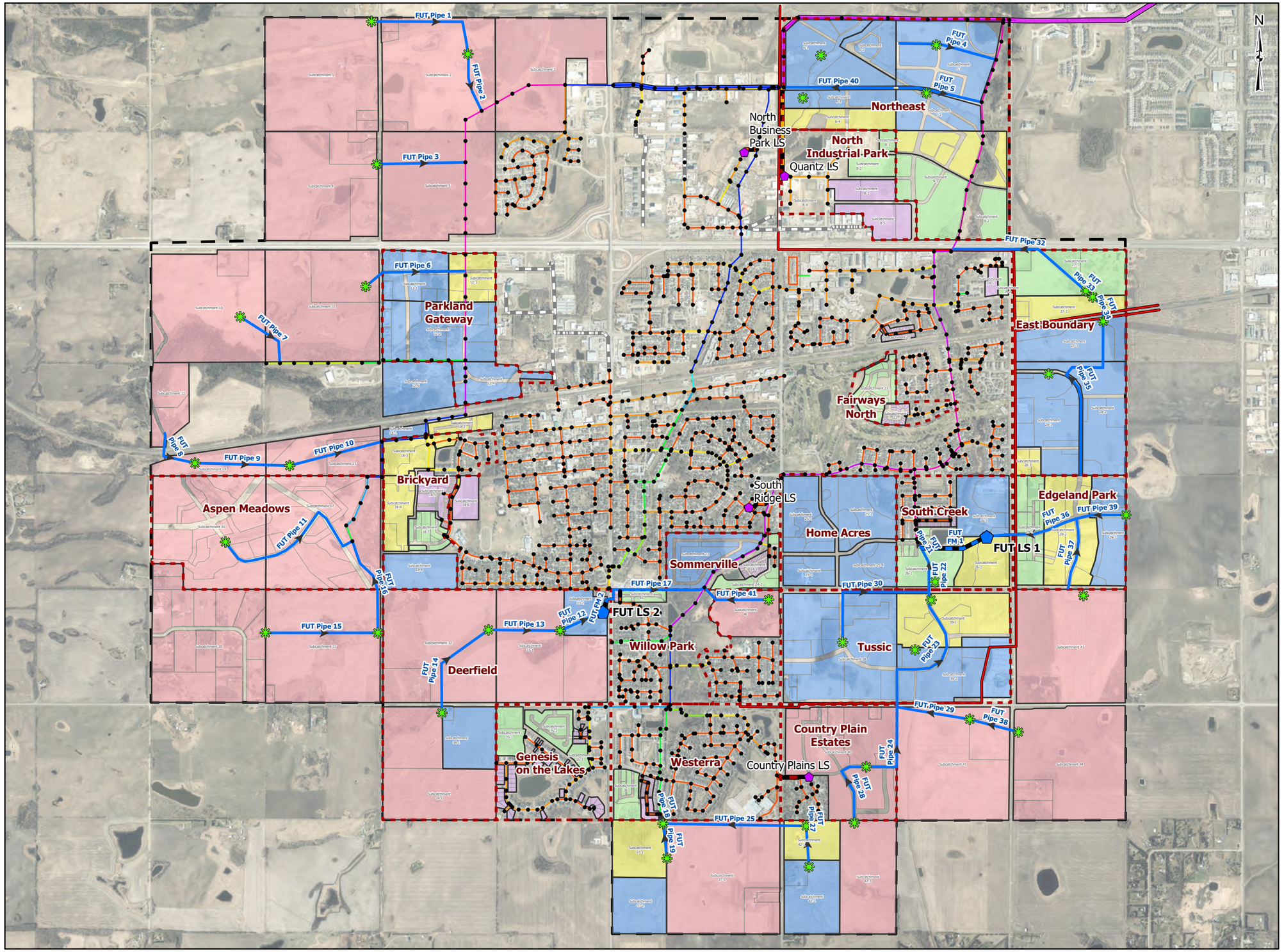
[1] Costs are representative of 2026 dollars.

[2] The total cost has been rounded to the nearest $10,000 and includes a 30% contingency as well as 10% for engineering.

8.1.4 Deep Sewers versus Lift Stations

A comparison between deep gravity sewers and lift stations presents a trade-off between capital costs, operability, and long-term maintenance. Deep gravity sewers eliminate the need for mechanical systems, reducing long-term operational and maintenance requirements and avoiding risks associated with pump failures or power outages. However, increased burial depth can significantly increase construction costs and introduce operational challenges, including limited accessibility for inspection and maintenance, as well as difficulties with conventional flushing equipment.

Conversely, lift stations can reduce initial capital costs by limiting sewer depth and excavation requirements, offering greater flexibility in staging and alignment. However, they introduce ongoing operation and maintenance requirements, including power consumption, routine servicing, and lifecycle replacement of mechanical and electrical components. Lift stations also have a higher risk of potential equipment failure and odour generation.



LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Proposed Lift Station
- Proposed Gravity Main
- Proposed Forcemain
- Water Commission Line
- Existing Low-Pressure System
- ASP
- Town Boundary

Existing Gravity Main Diameter

- 100 mm
- 150 mm
- 200 mm
- 250 mm
- 300 mm
- 375 mm
- 400 mm
- 450 mm
- 500 mm
- 525 mm
- 600 mm
- 750 mm
- 900 mm
- 1050 mm

Existing Forcemain Diameter

- 100 mm
- 150 mm
- 200 mm

ARROW Utilities Trunk Sewer

- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT OVERVIEW

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

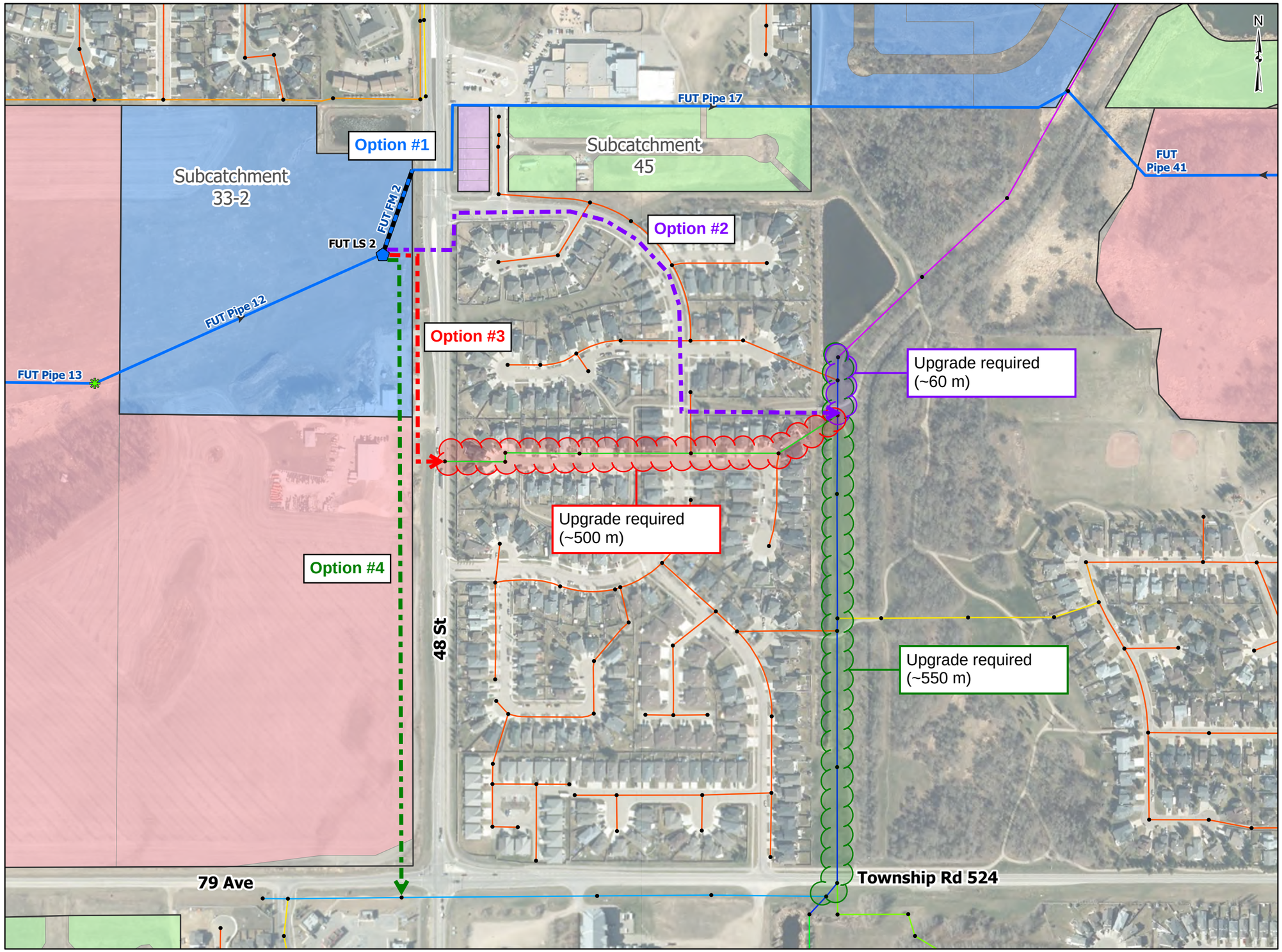
NAD 1983 CSRS 3TM 114

0 330 660

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FIGURE	8.1
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing Concept Overview



LEGEND

- Manhole
- Proposed Lift Station
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 450 mm
- 525 mm
- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUT FM 2 ALIGNMENT OPTIONS

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

NAD 1983 CSRS 3TM 114

0 40 80

1:4,000 Meters

FIGURE	8.2
DATE	3/31/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FUT FM 2 Alignment Options

8.2 Future System Concept Cost Estimates

The cost estimate summary for each growth horizon is summarized in **Table 8.2**. For a detailed cost breakdown, please refer to **Appendix D**. The items included in this table are only for new infrastructure required for the servicing concept and do not include any upgrades to the existing sanitary system. An assessment of the servicing concept and required upgrades follows. The total costs include contingency and engineering fees. A 35% contingency has been applied to non-ASP areas where alignments are undefined. For all other areas, a 30% contingency has been used. A 10% engineering fee was applied to all items. Costs are representative of 2026 dollars.

Table 8.2: Cost Estimates for Recommended Future Sanitary Servicing Concept (2026 $)

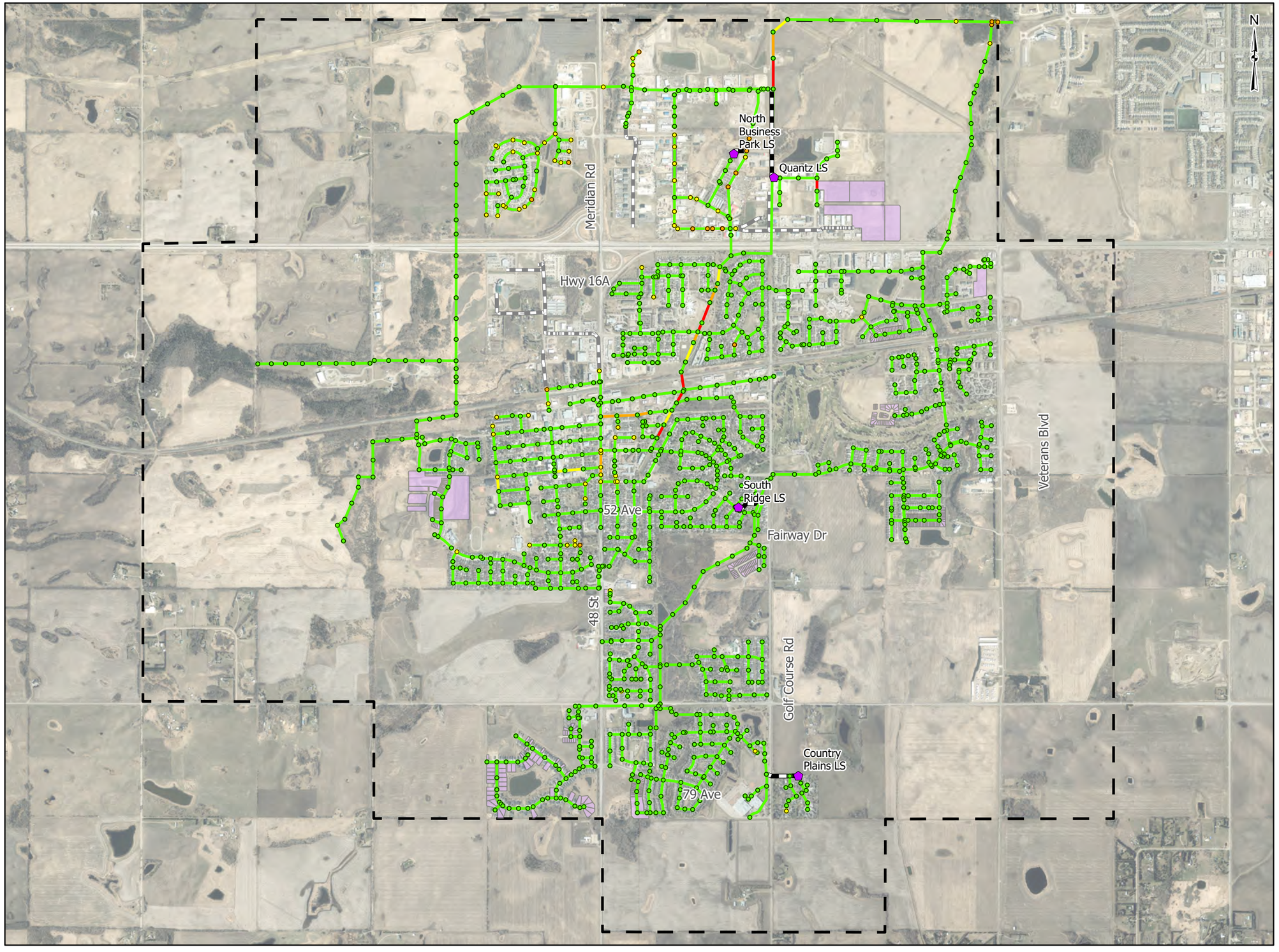
Growth Horizon	ID	Total Cost[1,2]
5-Year	FUT Pipe 21	$250,000
	FUT Pipe 22	$1,170,000
	FUT Pipe 32	$2,550,000
	FUT Pipe 36	$1,610,000
	FUT FM 1	$810,000
	FUT LS 1	$1,540,000
	5-Year Sub-Total	**$7,930,000**
10-Year	FUT Pipe 18	$180,000
	FUT Pipe 25	$1,860,000
	FUT Pipe 33	$130,000
	FUT Pipe 34	$330,000
	FUT Pipe 35	$2,550,000
	FUT Pipe 40	$1,090,000
	10-Year Sub-Total	**$6,140,000**
25-Year	FUT Pipe 4	$980,000
	FUT Pipe 5	$710,000
	FUT Pipe 6	$1,390,000
	FUT Pipe 12	$660,000
	FUT Pipe 13	$880,000
	FUT Pipe 14	$1,090,000
	FUT Pipe 17	$1,160,000
	FUT Pipe 19	$490,000
	FUT Pipe 23	$2,180,000
	FUT Pipe 27	$350,000
	FUT Pipe 30	$1,470,000
	FUT Pipe 39	$490,000
	FUT FM 2	$90,000
	FUT LS 2	$3,130,000
	25-Year Sub-Total	**$15,070,000**
Ultimate	FUT Pipe 1	$1,490,000
	FUT Pipe 2	$710,000

Growth Horizon	ID	Total Cost[1,2]
	FUT Pipe 3	$880,000
	FUT Pipe 7	$660,000
	FUT Pipe 8	$670,000
	FUT Pipe 9	$1,200,000
	FUT Pipe 10	$780,000
	FUT Pipe 11	$3,010,000
	FUT Pipe 15	$1,200,000
	FUT Pipe 16	$1,280,000
	FUT Pipe 24	$970,000
	FUT Pipe 28	$530,000
	FUT Pipe 29	$880,000
	FUT Pipe 37	$780,000
	FUT Pipe 38	$520,000
	FUT Pipe 41	$460,000
	Ultimate Sub-Total	**$16,110,000**
	Total	**$45,250,000**

[1] The total cost has been rounded to the nearest $10,000 and includes a 30-35% contingency as well as 10% for engineering.
[2] Costs are representative of 2026 dollars.

8.3 Future System Assessment

The future system was assessed under the 1:100-year 4-hour Chicago design storm given it governs over the Huff distribution and smaller return period events. The assessment assumes that the Central Trunk has been upgraded in alignment with Option #2, as described in **Section 7.3,** and assumes that none of the low-pressure system replacements have been implemented as these are opportunistic changes. The results of the assessment under each horizon are shown in **Figures 8.3** to **8.12**, illustrating the maximum HGL and peak discharge relative to pipe capacity, and spare capacity, respectively. The purpose of this assessment was to ensure the proposed servicing concept is effective and that the trunks tying into the existing sanitary system do not undermine downstream pipes.



LEGEND

- Existing Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon

TITLE

FUTURE SYSTEM RESULTS
SHORT-TERM HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

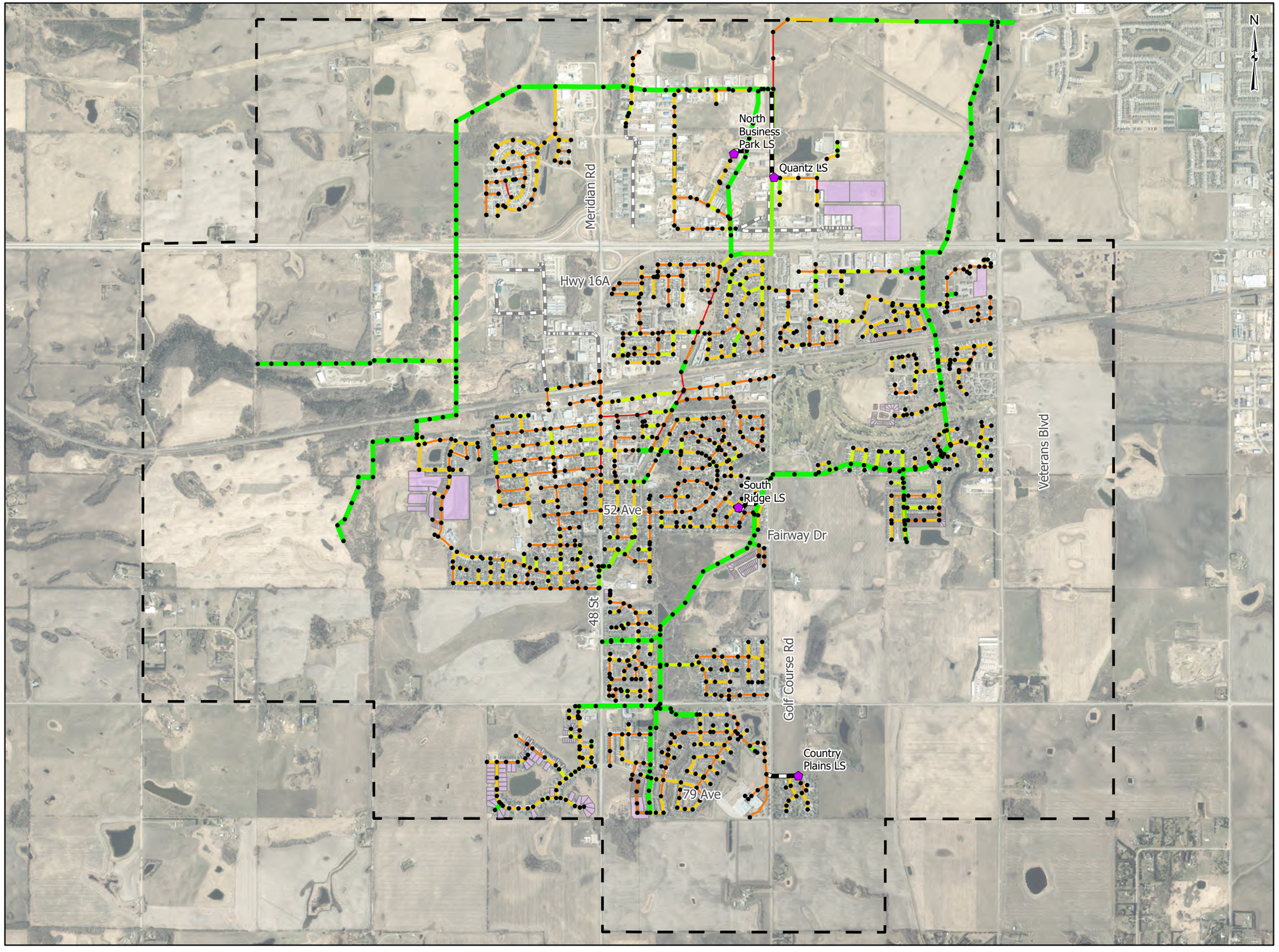
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

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FIGURE	8.3
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FUT Short-term_25-yr 24-hr Huff Results



LEGEND

- Existing Manhole
- Existing Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon

TITLE

FUTURE SYSTEM RESULTS
SHORT-TERM HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

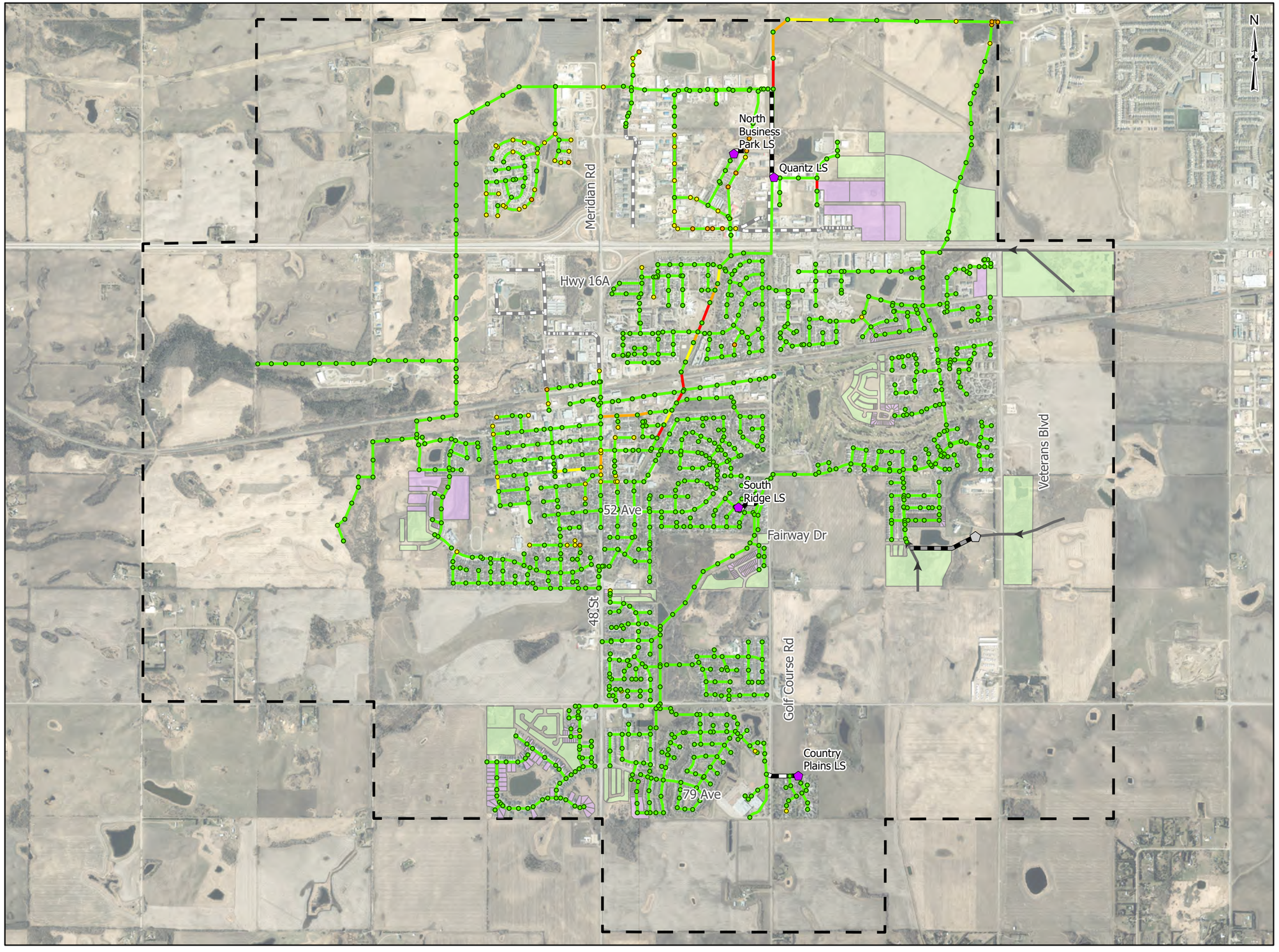
NAD 1983 CSRS 3TM 114

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FIGURE	8.4
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FUT Short-term_25-yr 24-hr Huff Results_SpareQ



LEGEND

- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon
- 5-year Horizon

TITLE

FUTURE SYSTEM RESULTS
5-YEAR HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

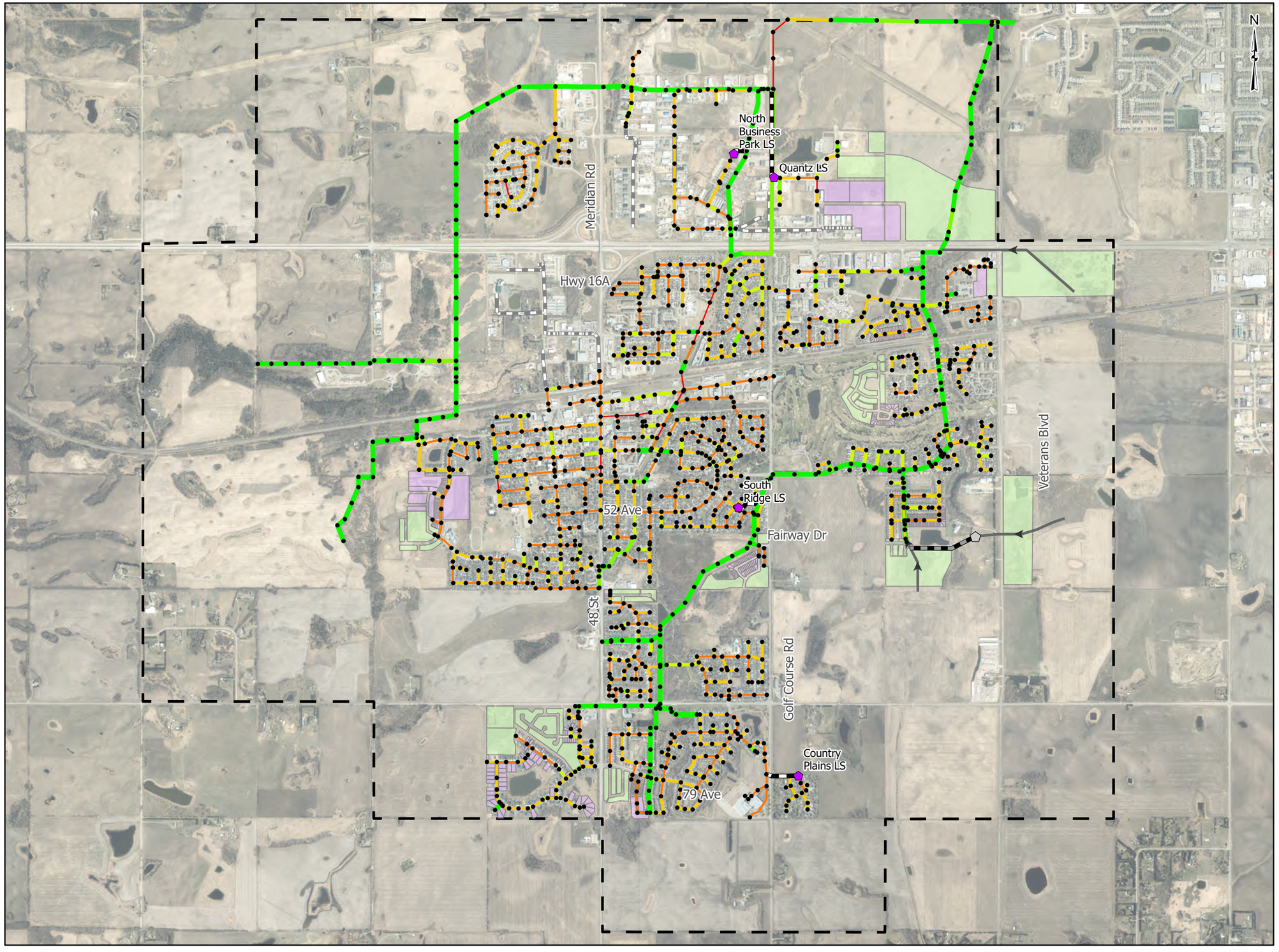
DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

0 330 660
1:27,000 Meters

FIGURE	8.5
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FUT 5year_Results



LEGEND

- Existing Manhole
- Lift Station
- Proposed Lift Station
- Forcemain
- Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon
- 5-year Horizon

TITLE

FUTURE SYSTEM RESULTS
5-YEAR HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

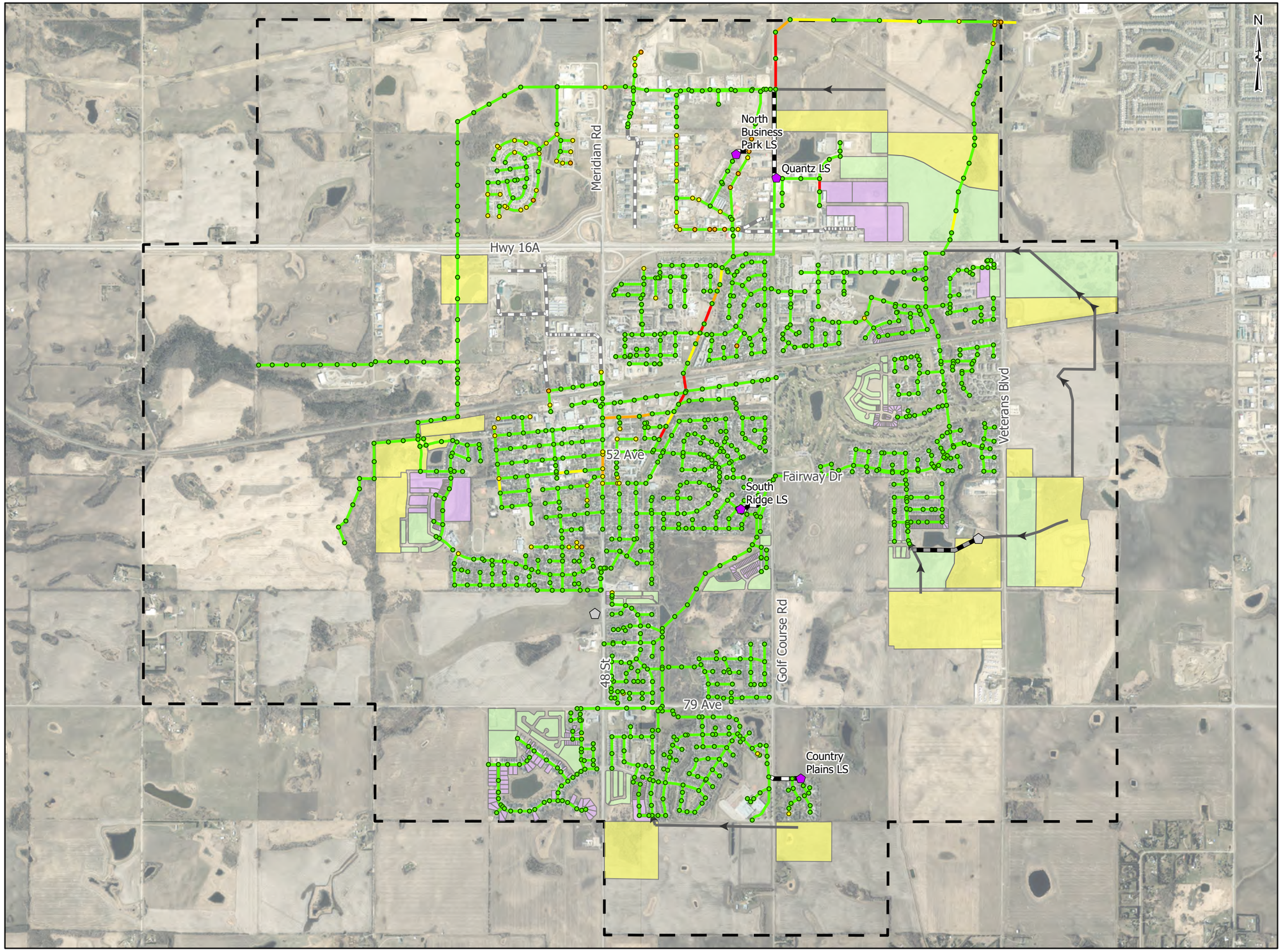
NAD 1983 CSRS 3TM 114

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1:27,000 Meters

FIGURE	8.6
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_FUT 5year_Results_SpareQ



LEGEND

- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon

TITLE

FUTURE SYSTEM RESULTS
10-YEAR HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

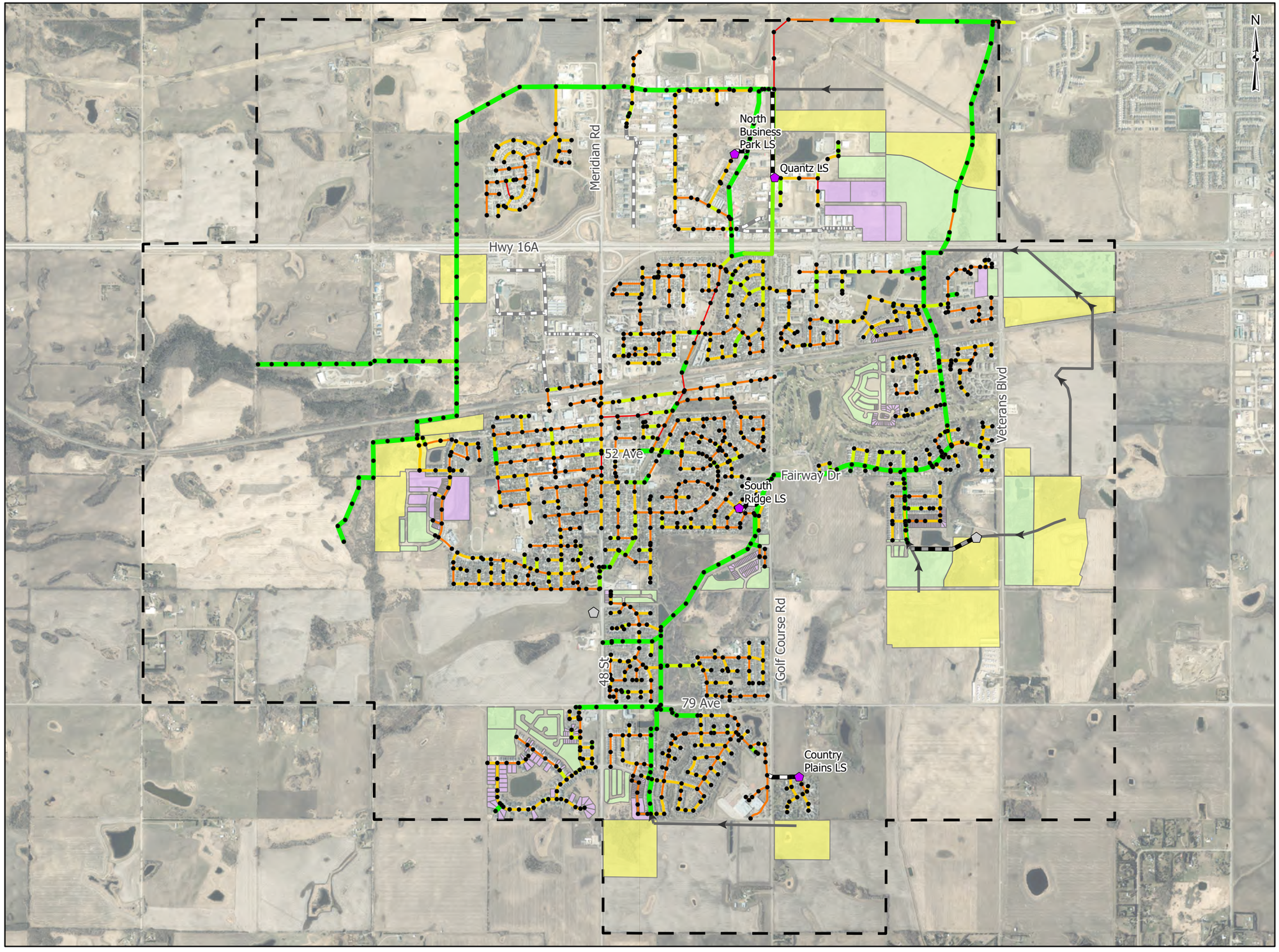
DATA SOURCES
- Topographic Map:Parkland County

PROJECTION
NAD 1983 CSRS 3TM 114

0 330 660
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FIGURE	8.7
DATE	7/23/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.5_FUT 10year_Results



LEGEND

- Existing Manhole
- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon

TITLE

FUTURE SYSTEM RESULTS
10-YEAR HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

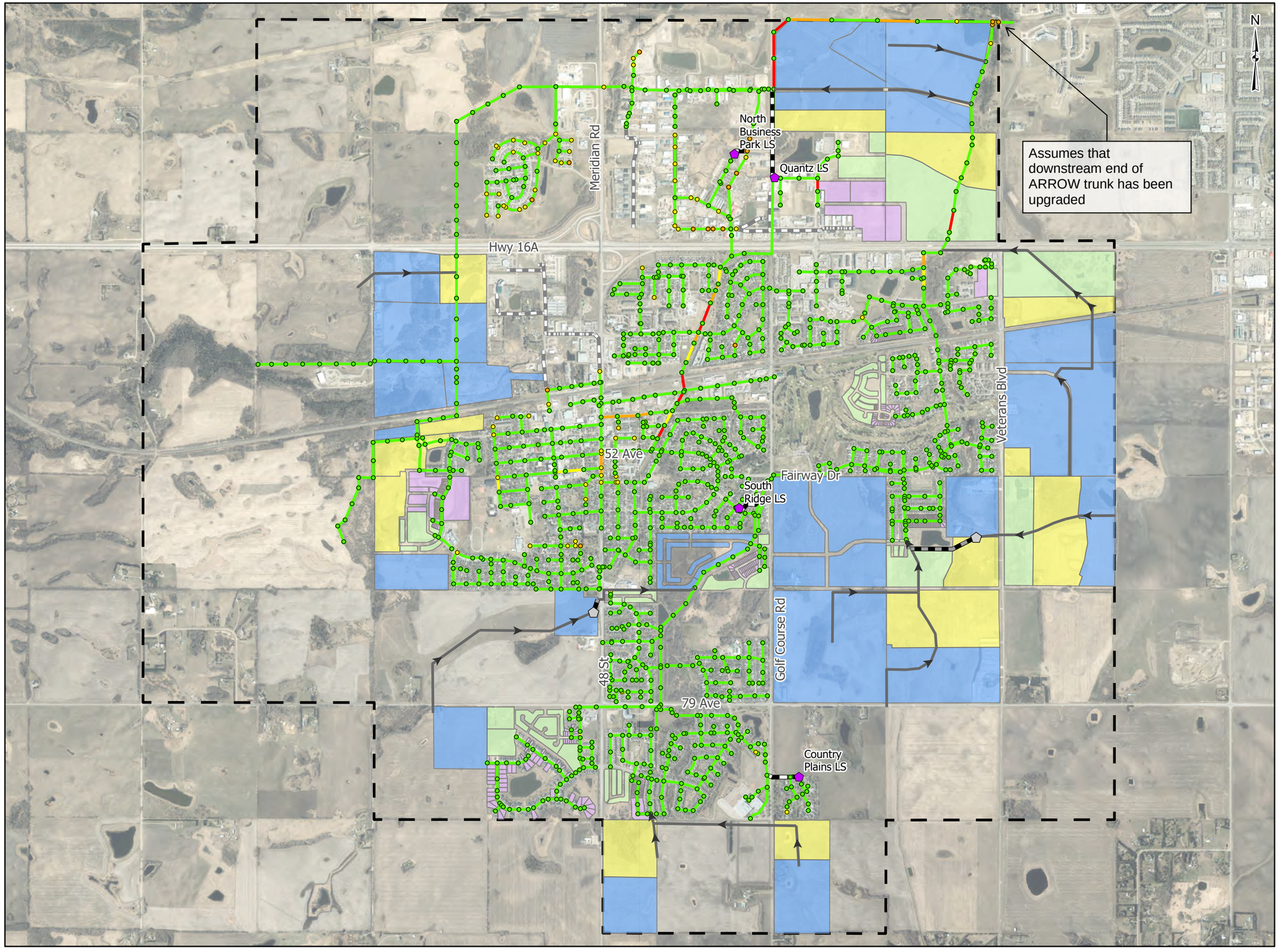
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FIGURE	8.8
DATE	7/23/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.6_FUT 10year_Results_SpareQ



LEGEND

- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon

TITLE

FUTURE SYSTEM RESULTS
25-YEAR HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

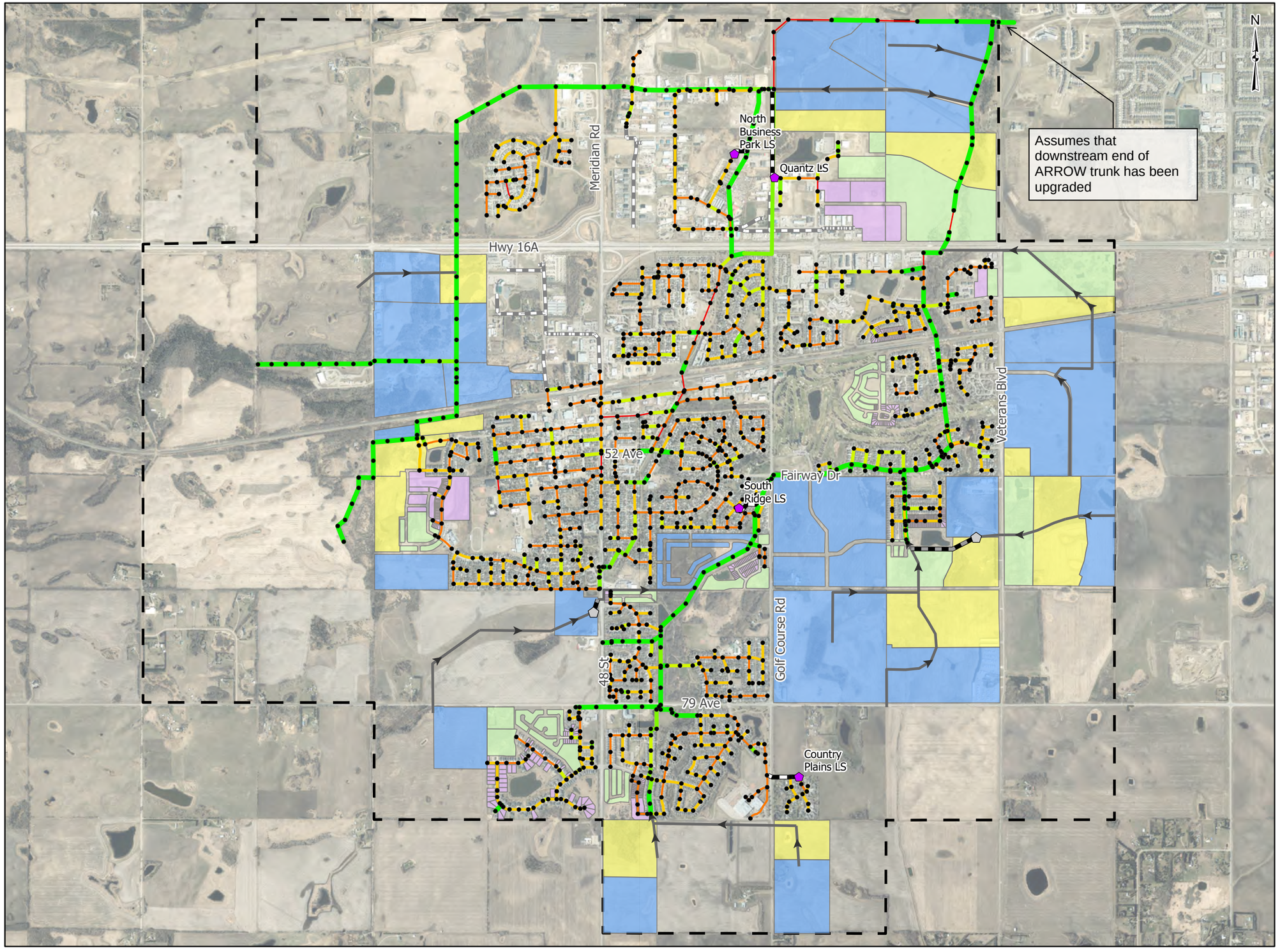
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

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FIGURE	8.9
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251 Figures\28974_Stony_Plain_SMP.aprx - Figure 5.7_FUT 25year_Results



LEGEND

- Existing Manhole
- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon

TITLE

FUTURE SYSTEM RESULTS
25-YEAR HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

NAD 1983 CSRS 3TM 114

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FIGURE	8.10
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251 Figures\28974_Stony_Plain_SMP.aprx - Figure 5.8_FUT 25year_Results_SpareQ

Assumes that entire ARROW trunk has been upgraded

Meridian Rd
Hwy 16A
52 Ave
48 St
79 Ave
Fairway Dr
Golf Course Rd
Veterans Blvd
North Business Park LS
Quantz LS
South Ridge LS
Country Plains LS

N

LEGEND

- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon
- Ultimate Horizon

TITLE

FUTURE SYSTEM RESULTS
ULTIMATE HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

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1:27,000 Meters

FIGURE	8.11
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.9_FUT_Ultimate_Results

Assumes that entire ARROW trunk has been upgraded

Meridian Rd
Hwy 16A
52 Ave
Fairway Dr
Veterans Blvd
48 St
Golf Course Rd
79 Ave

North Business Park LS
Quantz LS
South Ridge LS
Country Plains LS

N

LEGEND

- Existing Manhole
- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon
- Ultimate Horizon

TITLE

FUTURE SYSTEM RESULTS
ULTIMATE HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

DATA SOURCES
- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION
NAD 1983 CSRS 3TM 114

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FIGURE	8.12
DATE	4/1/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.10_FUT Ultimate_Results_SpareQ

8.4 Future System Upgrades

The only upgrades required to support future growth are on the East Trunk in the Ultimate development horizon, and on the ARROW Trunk. Recommended upgrades are shown on **Figure 8.13**.

8.4.1 Future East Trunk Upgrades

At the very downstream end of the East Trunk, the pipe is shallow with less than 1 m depth of cover. Upgrades were developed to lower the HGL to below the pipe obvert at this location. This would require upgrading approximately 500 m of sewer to 1,050 mm. Alternatively, this section could be twinned with a 750 mm sewer. Twinning is the preferred option due to its constructability and lower capital cost. A longitudinal profile of the East Trunk showing HGL before and after the proposed upgrade is on **Figure 8.14**.

The total estimated cost of twinning the downstream end of the East Trunk is **$1,180,000** (in 2026 dollars). A full breakdown of the cost has been provided in **Appendix D**.

Assessment results under the 1:100-year, 4-hour Chicago design storm for the twinned East Trunk under the ultimate growth horizon are shown in **Figures 8.15** and **8.16** for maximum HGL relative to surface and peak discharge relative to pipe capacity, and spare capacity, respectively. Results indicate that surcharging is alleviated in the sewers that were recommended for upgrades.

8.4.2 Future ARROW Trunk Upgrades

Upgrades to the portion of ARROW Trunk within Stony Plain will need to be investigated and implemented by the 25-year horizon. These upgrades are the responsibility of the Commission.

Future development scenarios were evaluated assuming that no downstream capacity constraints exist within the ARROW Trunk at the Stony Plain boundary. Accordingly, the downstream boundary condition was removed from the hydraulic model.

Results indicate that surcharging will occur at the 25-year development horizon at the downstream end of the trunk, where the East Trunk ties in. The HGL is within approximately 1.5 m of ground surface in this area, triggering upgrades. As this section of sewer is shallow (approximately 1 m of cover), upgrades should reduce the HGL below the obvert. To avoid upgrading this section twice, the pipe should be sized to accommodate the Ultimate development conditions.

At the Ultimate development horizon, it is estimated that the required capacity upgrades to the ARROW Trunk will include a 900 mm pipe up to Range Road 280, a 1200 mm/1050 mm pipe from Range Road 280 to the East Trunk tie-in, and a 1200 mm pipe from the East Trunk tie-in to the town boundary. The section of 1200 mm upstream of the 1050 mm is required due to a flatter slope. Alternatively, the entire length downstream of Range Road 280 could be upgraded to 1200 mm to avoid any risk of bottlenecks.

These requirements are based on the assumption that downstream capacity constraints do not exist in Spruce Grove and Parkland County, or that downstream improvements will be implemented as part of previously identified regional upgrades. The 2022 Spruce Grove Sanitary Master Plan Update identified staged twinning upgrades to the ACRWC (ARROW) Parkland Trunk system along Jennifer Heil Way, Highway 16, and Grove Drive to accommodate future regional growth (ISL, 2022). In addition, the Spruce Grove Wet Weather Storage Facility Design Report (Stantec, 2020) identified downstream diversion and conveyance upgrades intended to mitigate surcharge and backwater conditions within the regional trunk system.

The proposed diameters for the ARROW Trunk are based on the assumption that downstream capacity constraints do not exist in Spruce Grove and Parkland County, or that necessary downstream upgrades have been implemented.

Potentially 1200 mm to avoid risk of bottlenecks

North Business Park LS

Quantz LS

N

LEGEND

- Manhole
- Lift Station
- Gravity Main
- Low-Pressure System
- Forcemain
- Town Boundary

Proposed Diameter

- 750 mm

Proposed Diameter (ARROW Trunk)

- 900 mm
- 1050 mm
- 1200 mm

TITLE

FUTURE EAST TRUNK AND ARROW UTILITIES TRUNK UPGRADES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County

PROJECTION

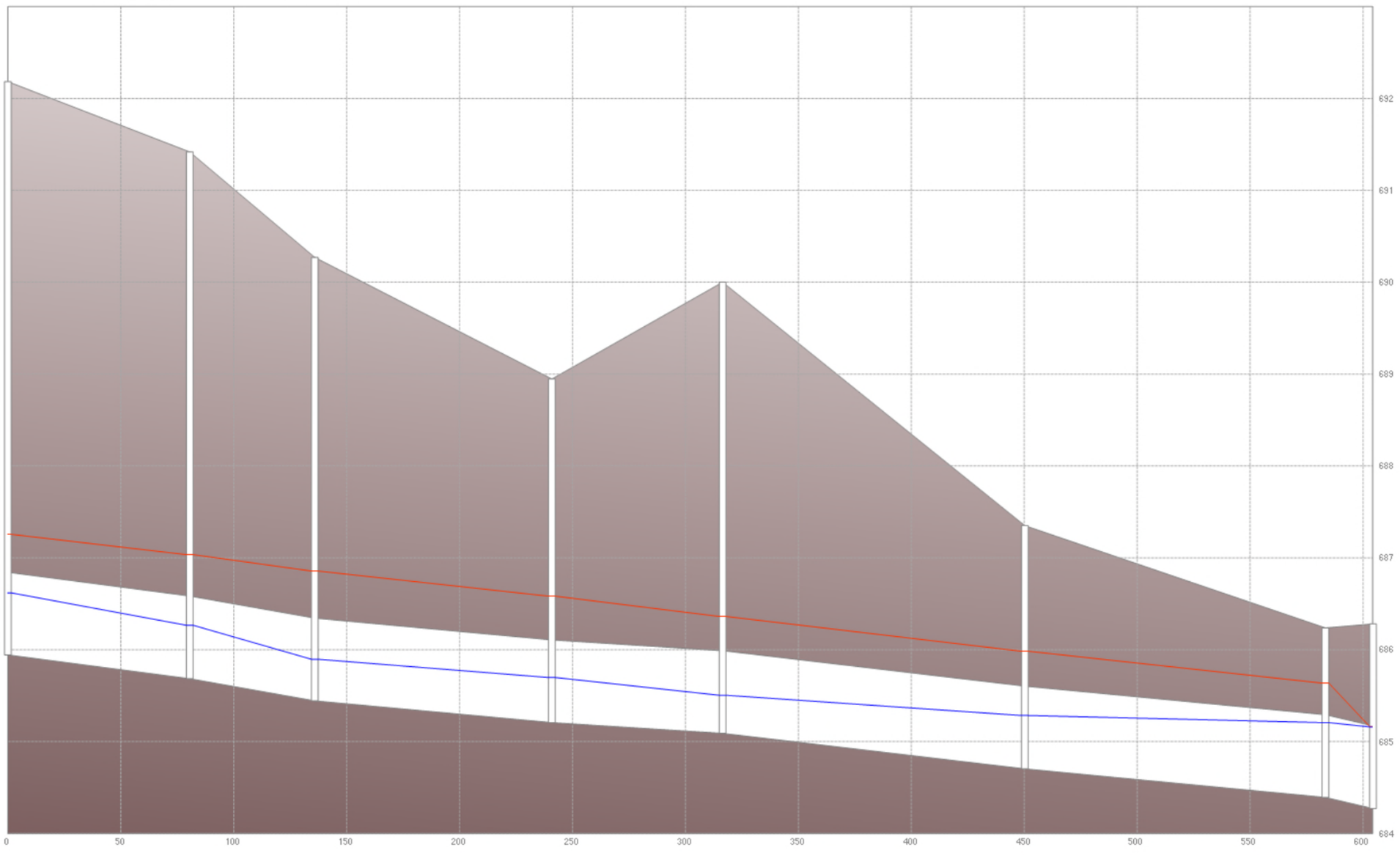
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0 130 260

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FIGURE	8.13
DATE	8/5/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

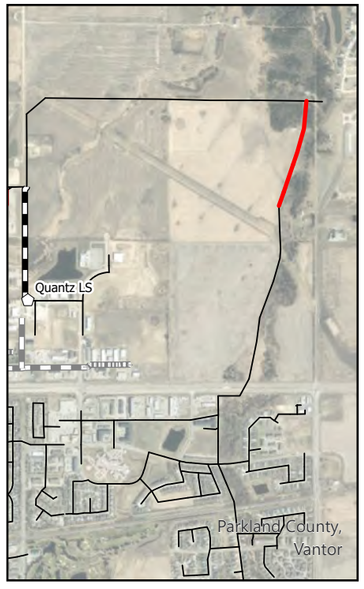
Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.11_Future System Upgrades



LEGEND

HGL under Ultimate Horizon

HGL with East Trunk Upgrades



TITLE

EAST TRUNK HGL PROFILE
ULTIMATE HORIZON
100-YR 4-HR CHICAGO

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

FIGURE	8.14
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.12_FUT Upgrade LP

Assumes that entire ARROW trunk has been upgraded

Meridian Rd
Hwy 16A
52 Ave
Fairway Dr
Veterans Blvd
48 St
79 Ave
Golf Course Rd
North Business Park LS
Quantz LS
South Ridge LS
Country Plains LS
N

LEGEND

- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Town Boundary

Maximum HGL Elevation Relative to Ground

- Greater than 0.0 m
- Between 0.0 m and -1.5 m
- Between -1.5 m and -2.5 m
- Less than -2.5 m

Peak Discharge Relative to Pipe Capacity

- Less than 86%
- Between 86% and 100%
- Between 100% and 120%
- Greater than 120%

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon
- Ultimate Horizon

TITLE

EAST TRUNK UPGRADE RESULTS
ULTIMATE HORIZON
CAPACITY UTILIZATION AND PEAK HGL
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

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FIGURE	8.15
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.13_FUT Upgrades_Results

Assumes that entire ARROW trunk has been upgraded

Meridian Rd
North Business Park LS
Quantz LS
Hwy 16A
52 Ave
Fairway Dr
South Ridge LS
Veterans Blvd
Golf Course Rd
48 St
79 Ave
Country Plains LS

N

LEGEND

- Existing Manhole
- Existing Lift Station
- Proposed Lift Station
- Existing Forcemain
- Existing Low-Pressure System
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Spare Capacity

- Less than 0L/s
- 0 - 25L/s
- 25 - 50L/s
- 50 - 75L/s
- 75 - 100L/s
- Greater than 100L/s

Future Subcatchment

- Short-term Horizon
- 5-year Horizon
- 10-year Horizon
- 25-year Horizon
- Ultimate Horizon

TITLE

EAST TRUNK UPGRADE RESULTS
ULTIMATE HORIZON
SPARE CAPACITY
100-YR 4-HR CHICAGO

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

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1:27,000 Meters

FIGURE	8.16
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure 5.14_FUT Upgrades_Results_SpareQ

9.0 Phasing Plan and Funding Strategies

A phasing plan staged to each growth horizon has been developed from the recommendations made by this servicing study. An overview of the phasing plan, including all upgrades required to the sanitary system by full build-out and the servicing scheme proposed, are illustrated in **Figure 9.1**.

To provide interim measures to ensure that areas of the Town are growth ready, the following staging plan is recommended to align with the capital plan:

- Complete the recommended Central Trunk upgrades (Option #2).
- Progress the future servicing concept as development proceeds, prioritizing infrastructure required to service development in the short-term.
- Monitor the section of the East Trunk flagged for upgrades due to future development, and target upgrades when the existing spare capacity is exceeded due to additional development.
- Coordinate with ARROW Utilities regarding downstream upgrades required to support future growth within the 10-year horizon, including trunk flow monitoring to confirm upgrade trigger points and coordination of downstream requirements associated with future upgrades.

The proposed servicing concept staging assumes ultimate pipe sizing to account for future development up to the ultimate development horizon based on an approximate sewer service life of 60 years. Oversizing sewer upgrades for future scenarios is seen as more cost-effective since the difference in pipe cost will be marginal compared to the costs of excavating and rehabilitating roadways multiple times. Oversizing existing sanitary system upgrades to account for ultimate development may introduce operational and maintenance concerns in the interim, such as odour and sedimentation within upgraded sewer sections due to low velocities. During detailed design, hydraulic performance under both dry weather and peak wet weather conditions should be evaluated to confirm that acceptable self-cleansing velocities are maintained. Where warranted, design measures such as dry weather flow channels, optimized manhole ventilation, or operational flushing programs may be incorporated to mitigate these risks. Costing for these mitigation measures will depend on site-specific conditions and should be evaluated during detailed design.

9.1 Cost Estimates

A summary of the costs per growth horizon is provided in **Table 9.1**. For detailed cost breakdowns per growth horizon, please refer to **Appendix D**. These recommended upgrades are being provided as a phasing plan with the intent that the servicing study will be integrated into an overall capital plan and budget. ISL recommends that the Town coordinate implementation of the recommended upgrades with roadway rehabilitation and other planned capital works wherever practical to minimize construction impacts, reduce restoration costs, and improve overall project efficiency.

The costs in **Table 9.1** are classified as either capacity-related or growth-related. Growth-related costs are generally eligible for recovery through off-site levies, while capacity-related costs are typically the responsibility of the Town and funded through general revenues or utility reserves.

The following should be considered when reviewing this information:

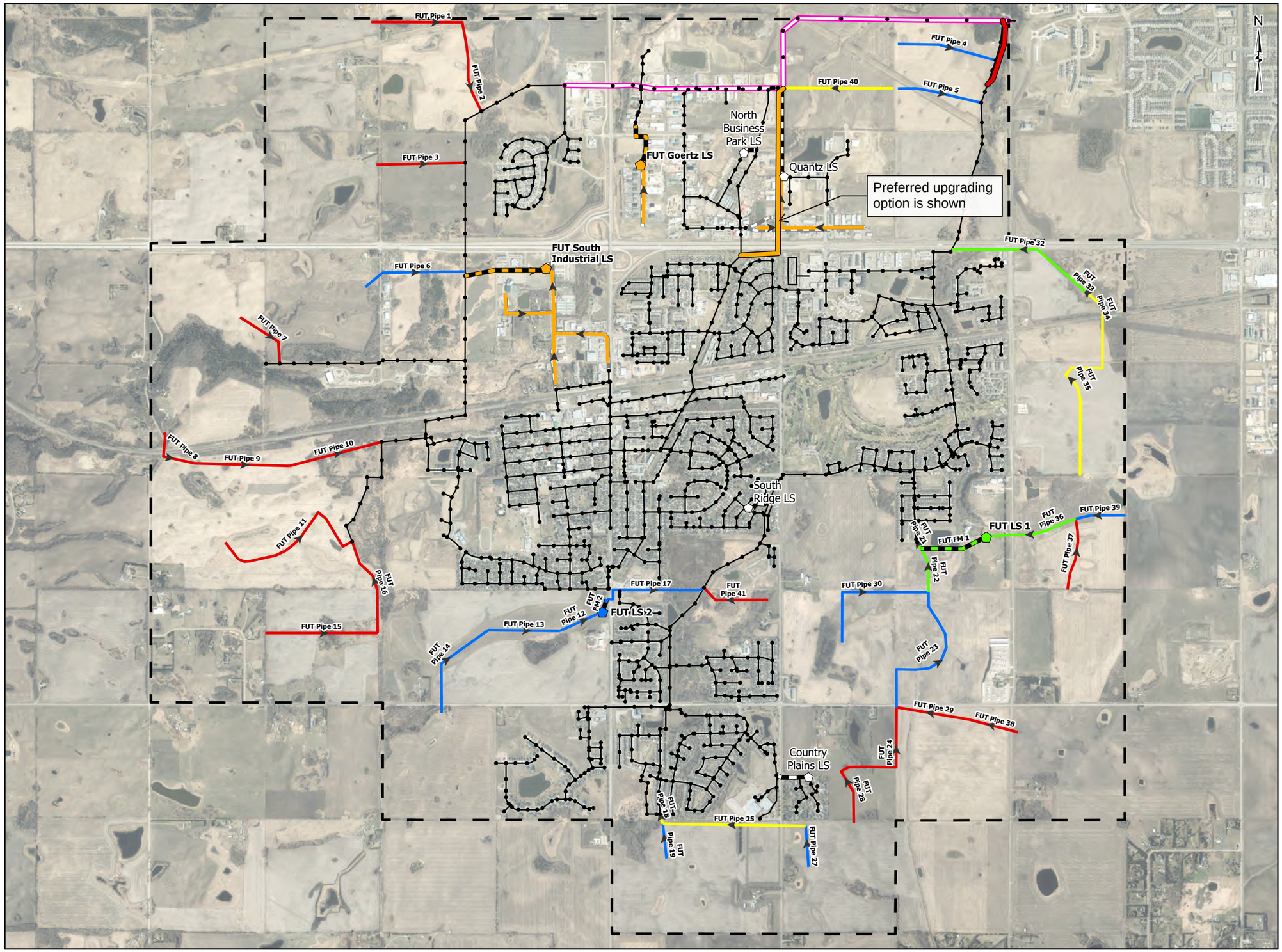
- A 2.1% inflation increase per year (Government of Alberta, 2026) should be considered to the base costs, which are represented in 2026 dollars. Actual inflation rates may vary over the implementation period and should be reviewed and updated as projects advance.
- The annual capital budget allowance is meant to hold funding each year for maintenance and “one off” instances where repairs are required.
- High level cost estimates provided are a Class 4 with an accuracy of +50% to -30%.
- Costs associated with the ARROW Trunk upgrades are not included.

Table 9.1: Capital Planning Horizons Summary (2026 $)

Growth Horizon	Description	Classification	Total Cost[1,2]
Existing System	Central Trunk Sewer Upgrades (Option #2)	Capacity-Related	$3,540,000
	Low-Pressure System Replacements	Operation/Maintenance Improvements (Opportunistic)	$8,970,000
		Existing System Total	**$ 12,510,000**
5-Year	New Gravity Infrastructure	Growth-Related	$5,580,000
	New Forcemain	Growth-Related	$810,000
	New Lift Station	Growth-Related	$1,540,000
		5-Year Total	**$7,930,000**
10-Year	New Gravity Infrastructure	Growth-Related	$6,140,000
		10-Year Total	**$6,140,000**
25-Year	New Gravity Infrastructure	Growth-Related	$11,850,000
	New Forcemain	Growth-Related	$90,000
	New Lift Station	Growth-Related	$3,130,000
		25-Year Total	**$15,070,000**
Ultimate	New Gravity Infrastructure	Growth-Related	$16,110,000
	East Trunk Sewer Upgrades	Growth-Related	$1,180,000
		Ultimate Total	**$17,290,000**

[1] Total cost represents both servicing and upgrading costs.

[2] Costs are representative of 2026 dollars.



LEGEND

- Manhole
- Lift Station
- Low-Pressure System
- Forcemain
- Gravity Main
- Central Trunk Upgrades
- East Trunk Upgrades
- ARROW Utilities Trunk Upgrades
- Town Boundary

Low-Pressure System Replacements

- Proposed Gravity Main
- Proposed Forcemain
- Proposed Lift Station

New Infrastructure - 5-Year

- Gravity Main
- Forcemain
- Lift Station

New Infrastructure - 10-Year

- New Infrastructure - 10-Year

New Infrastructure - 25-Year

- Gravity Main
- Forcemain
- Lift Station

New Infrastructure - Ultimate

- New Infrastructure - Ultimate

TITLE

PHASING PLAN

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Earthstar Geographics

PROJECTION

NAD 1983 CSRS 3TM 114

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FIGURE	9.1
DATE	3/26/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\25.1 Figures\28974_Stony_Plain_SMP.aprx - Figure 6.1_Phasing Plan

10.0 Regulatory Compliance

Implementation of the recommended sanitary infrastructure will be subject to applicable municipal, provincial, and federal regulatory requirements. Key approvals and legislation anticipated for the Town of Stony Plain include:

- Potential Provincial Approvals and regulatory with required mitigation for compliance
  - Water Act approvals or Code of Practice (COP) Notifications depending on the infrastructure type to be installed and the location of it in relation to a wetland or watercourse.
  - Environmental Protection and Enhancement Act (EPEA) approvals
  - Historical Resources Act
  - Public Lands Act
  - Wildlife Act
  - Weed Act
  - Soil Conservation Act
- Potential Provincial Approvals and required mitigation for compliance
  - Species at Risk Act
  - Migratory Birds Convention Act
  - Fisheries Act
  - Canada Navigable Waters Act
- Municipal Requirements:
  - Town of Stony Plain design standards, servicing agreements, and development approvals
  - Coordination with ARROW Utilities where upgrades or future development will contribute additional flows to the ARROW Trunk
  - Town of Stony Plain Plan Use Bylaw requires a 30-metre distance to manage flood risk and protect flood fringe areas
  - Town of Stony Plain Environmental Master Plan
- Other Potential Requirements:
  - Utility crossings and right-of-way approvals
    - Right-of-way approval required for Central Trunk Upgrade Option #2, as the trunk alignment crosses private property (see **Figure 7.23** for location)
    - Railway crossing required for FUT Pipe 8 and FUT Pipe 34
    - Water commission line crossings required for FUT Pipe 34, FUT Pipe 36, and FUT Pipe 23

The specific approvals required should be confirmed during detailed design based on project scope and location. Early engagement with regulatory agencies is recommended to confirm requirements and support timely approvals.

11.0 Conclusion and Recommendations

ISL was retained by the Town to complete an update to the Sanitary Master Plan. The purpose of this update was to review and refine the Town's existing hydraulic model, assess the performance and capacity of the sanitary sewer system under current and future conditions, and identify infrastructure upgrades required to support anticipated growth.

Since completion of the 2019 Water and Sanitary Master Plan, the Town has experienced continued growth and system changes, including updates to the GIS database, additional flow monitoring data, and revised population projections. These updates, combined with ongoing asset aging and I&I considerations, necessitated a comprehensive reassessment of the sanitary system.

This updated SMP provides a framework to support capital planning, guide future development, and maintain acceptable levels of service for residents and businesses.

11.1 Conclusion

Conclusions from the sanitary system assessment are summarized as follows:

- The hydraulic model was successfully updated and calibrated under both DWF and WWF conditions using recent flow monitoring and rainfall data. Calibration results were within accepted industry guidelines, providing confidence in the model's accuracy.
- Observed I&I rates across the Town were generally within acceptable AEPA guideline limits (0.28 L/s/ha), although localized areas of elevated I&I were identified (specifically FM #3 catchment) and should be monitored and investigated further.
- The existing sanitary system generally performs adequately under dry weather conditions.
- Under wet weather conditions, the Central Trunk was identified as the primary capacity constraint in the system. Surcharging occurs under multiple design storm scenarios, with some locations experiencing HGL levels approaching ground elevation due to shallow pipe depths.
- Additional localized surcharging was identified in some areas of the network during higher return period events. However, the risk of basement backups is low, as these locations are primarily within commercial and industrial areas where basements are not typically present, and hydraulic grade lines remain sufficiently below ground elevation.
- Condition assessment based on CCTV data, pipe material, and age identified several areas requiring rehabilitation or replacement. Notably, sections of the Central Trunk and older neighbourhoods show signs of deterioration and should be prioritized in conjunction with capacity upgrades.
- All existing lift stations were found to have sufficient capacity to convey peak wet weather flows under current conditions. Minor exceedances in recommended forcemain velocities were observed but are not expected to significantly impact performance.
- Three upgrade options were evaluated to address capacity limitations in the Central Trunk. Option #2 (twinning along Golf Course Road) was identified as the recommended solution based on level of service performance, operational considerations, and long-term flexibility.
- The future sanitary servicing concept was developed to accommodate projected growth to the Ultimate development horizon. The majority of future development areas can be serviced via gravity connections, with two new lift stations required due to topographic constraints.
- Under future growth conditions, the proposed servicing concept performs adequately, provided that recommended upgrades to the existing system are implemented.
- Capacity upgrades to the East Trunk are required under Ultimate development conditions, particularly at the downstream end where the system becomes shallow and HGL levels approach ground level.
- Potential downstream capacity constraints within the ARROW Utilities Parkland Sanitary Trunk Sewer were identified under existing conditions. The Town should coordinate with ARROW Utilities to confirm existing capacity constraints and long-term upgrade requirements, including upgrades anticipated to the section of the trunk within Town limits by the 25-year growth horizon.

11.2 Recommendations

Based on the findings of this study, the following recommendations are provided.

Table 11.1: Summary of Recommendations

Recommendation Area	Recommendations
Central Trunk Upgrades	• Proceed with the implementation of Option #2 (twinning along Golf Course Road) to address existing capacity limitations. • Coordinate construction with planned roadway improvements where feasible to optimize costs and minimize disruption. • Evaluate the potential to abandon the existing Central Trunk from Highway 16A to the ARROW Trunk.
Condition and Capacity Coordination	• Coordinate rehabilitation of the Central Trunk, which is nearing the end of its service life, with the recommended capacity upgrades to minimize future rework and optimize construction efficiency. • Higher-risk pipes identified through CCTV inspection, as documented in the separate CCTV and I&I System Assessment Technical Memorandum (ISL, 2026), should be considered for opportunistic rehabilitation or replacement in conjunction with future roadway rehabilitation projects.
Flow Monitoring Program	• Install permanent flow monitors on the Central and East Trunks near the Highway 16A crossings to capture areas that are currently unmonitored and improve system understanding. • Relocate FM #2 to a new location on the West Trunk to improve data quality, as the location used in the 2025 flow monitoring program had poor hydraulic conditions. • Retain Flow Monitor #3 as a permanent monitoring location to support ongoing assessment of inflow and infiltration trends within its catchment.
Inflow and Infiltration Management	• Undertake targeted field investigations (e.g., smoke testing, dye testing, CCTV inspections) in areas with elevated I&I (FM #3 catchment). • Implement mitigation measures where I&I sources are identified. • Where monitoring data confirms that I&I rates are within acceptable limits and sufficient capacity exists, consider permitting sump pump tie-ins in accordance with Town policy.
Future Servicing Implementation	• Implement the recommended future servicing concept in alignment with development staging, as described in **Section 8.1.** • Ensure that new infrastructure is designed to ultimate capacity where feasible to reduce long-term lifecycle costs.
East Trunk Upgrades	• Monitor system performance as development progresses and implement upgrades to the downstream East Trunk prior to reaching capacity under future conditions. • Twinning is recommended as the preferred upgrade approach due to constructability and cost considerations.
Low-Pressure System Replacement (Optional)	• Consider replacement of existing low-pressure systems with gravity systems where operational challenges exist, recognizing that these upgrades are opportunistic and not required for capacity.
Coordination with ARROW Utilities	• Engage with ARROW Utilities to confirm timing and requirements for upgrades to the regional trunk system. • Ensure that downstream capacity constraints are addressed in coordination with regional partners.

Recommendation Area	Recommendations
Development Servicing and Interim Solutions	• Allow flexibility for interim servicing solutions (e.g., controlled discharge, on-site storage) where required to support staged development, subject to detailed design and modelling verification. • Require developers to demonstrate that interim solutions do not negatively impact the existing system.
Ongoing Model Maintenance	• Update the hydraulic model periodically (recommended every 5 years or following significant development) to reflect updated infrastructure, monitoring data, and growth projections. • Use the model as a living tool to support capital planning, development review, and operational decision-making.

12.0 References

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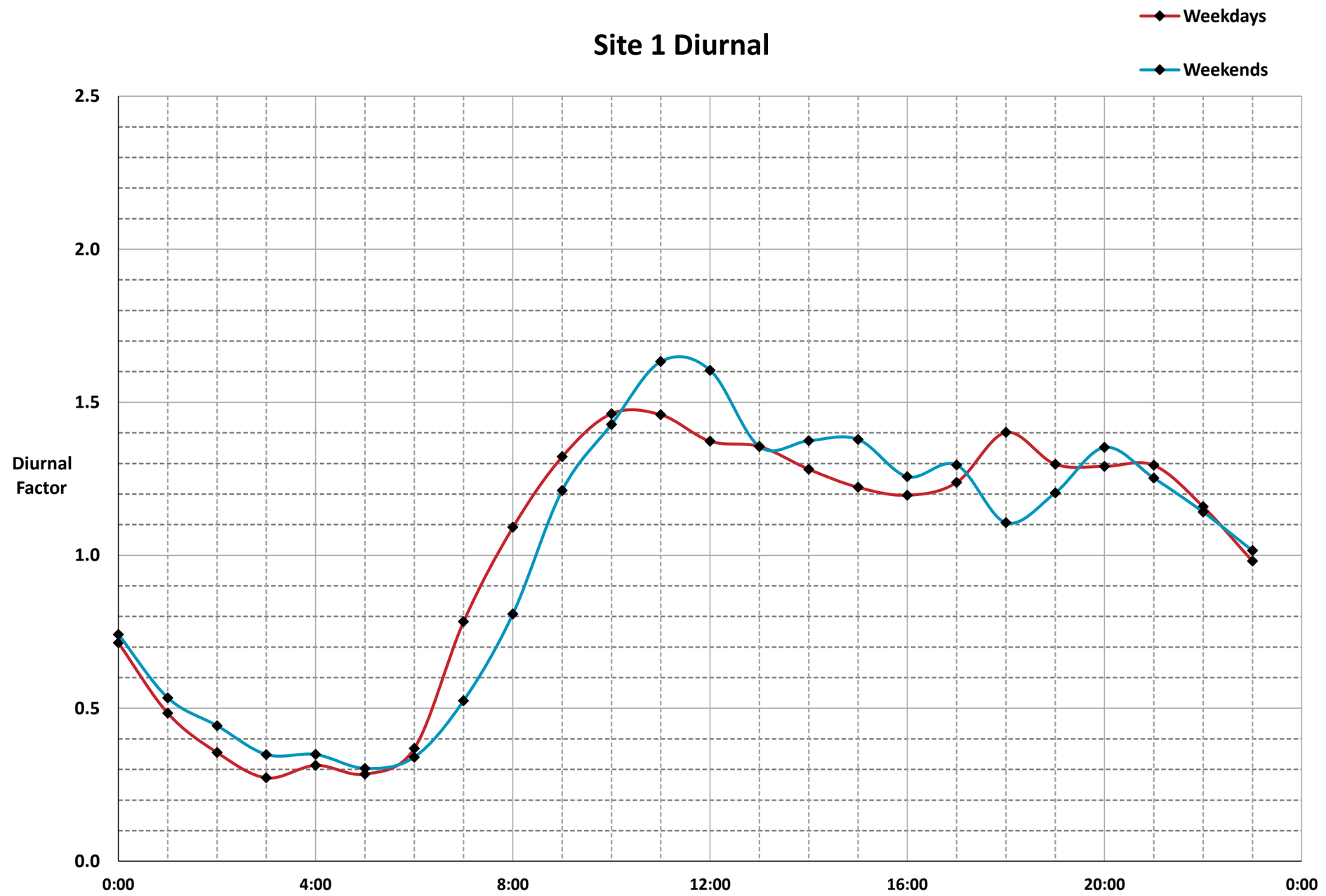
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APPENDIX A
Diurnal Curves



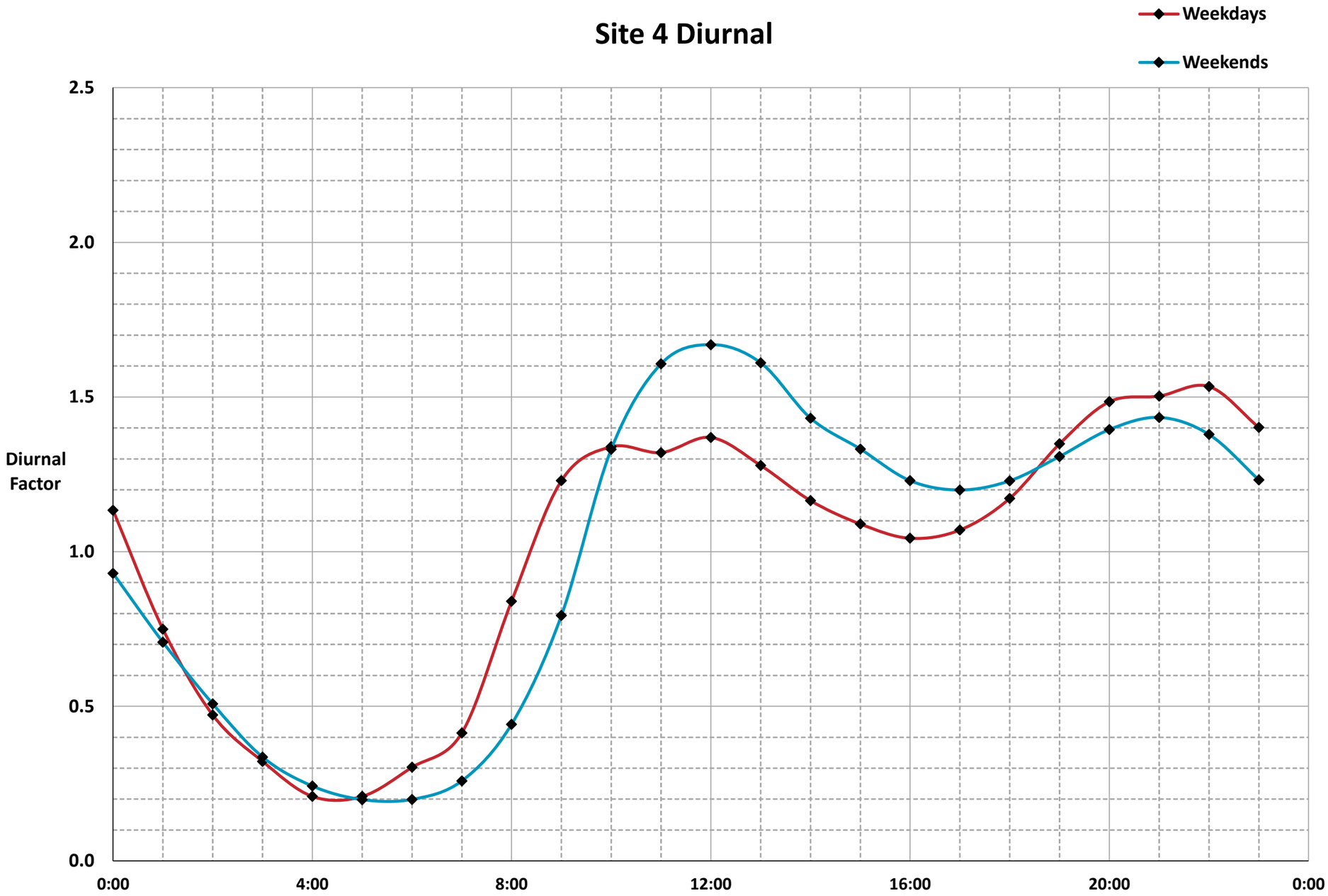
TITLE
DIURNAL PLOT
FLOW MONITOR #1

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	A.1
DATE	11/3/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Diurnal_FM #1



TITLE
DIURNAL PLOT
FLOW MONITOR #4

PROJECT
SANITARY MASTER PLAN UPDATE

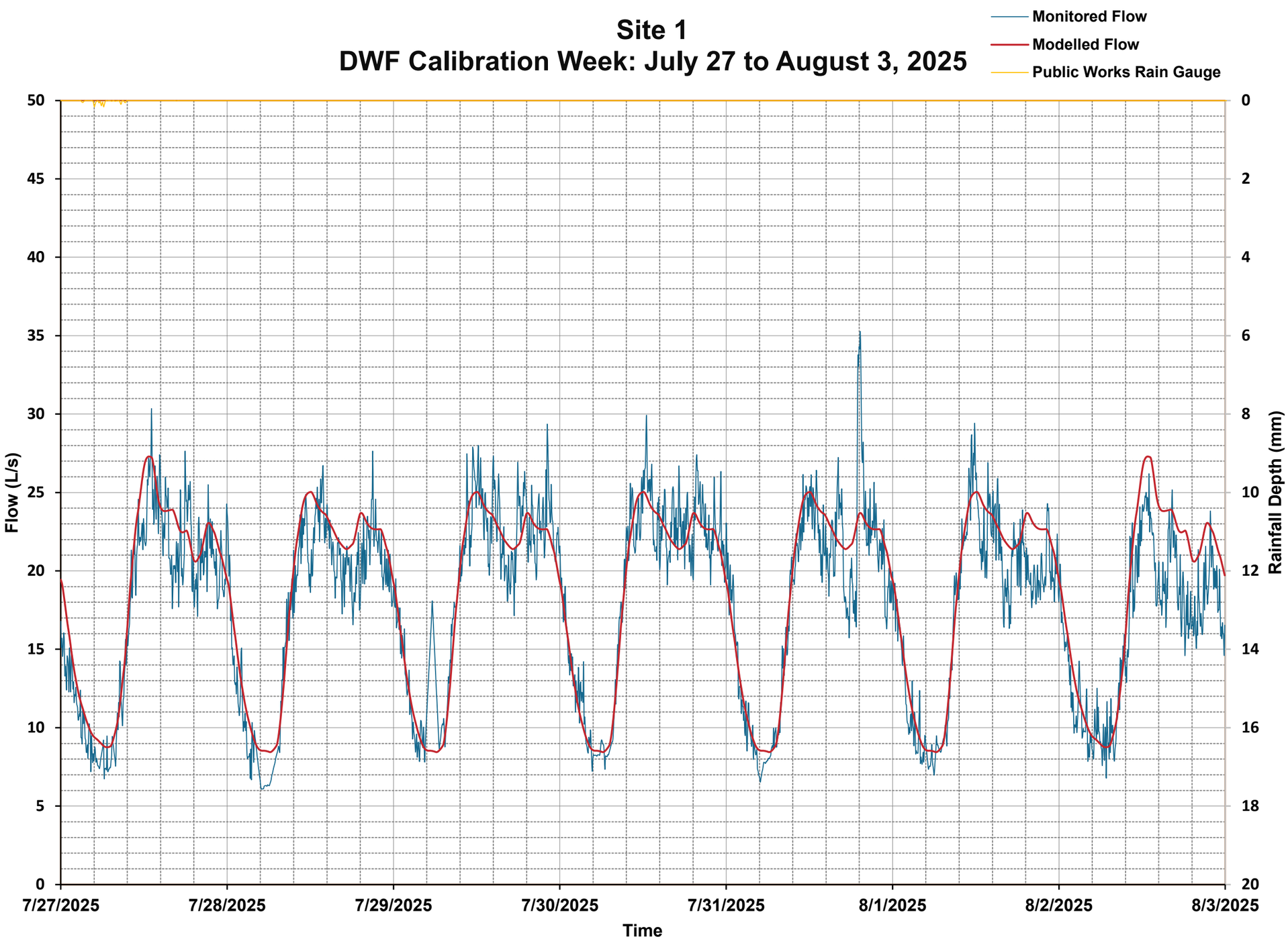
CLIENT
TOWN OF STONY PLAIN

FIGURE	A.2
DATE	11/3/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Diurnal_FM #4

APPENDIX B
DWF Calibration Graphs

Site 1
DWF Calibration Week: July 27 to August 3, 2025



TITLE
DWF CALIBRATION RESULTS
FLOW MONITOR #1

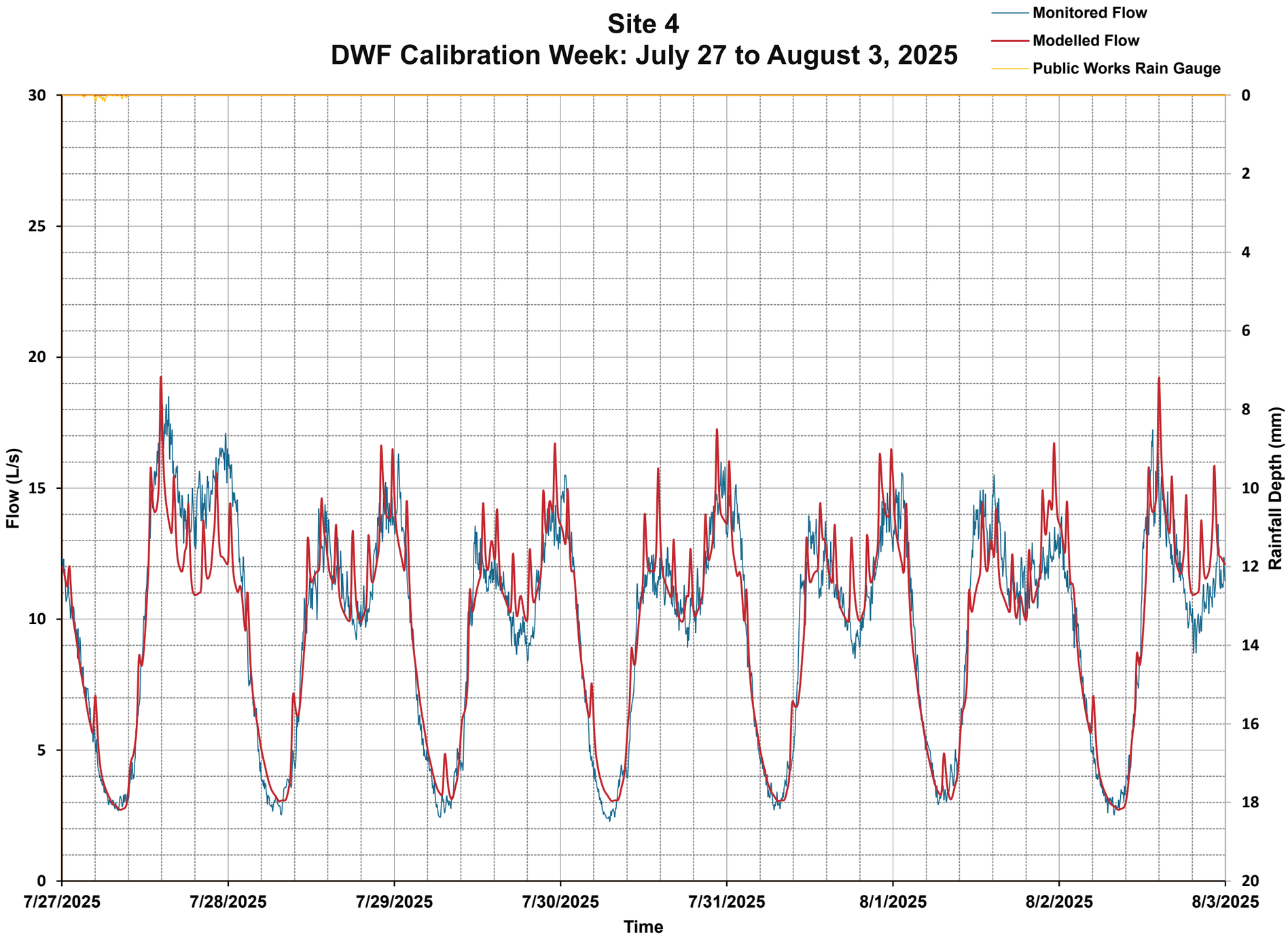
PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	B.1
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_DWF Graph_FM #1

Site 4
DWF Calibration Week: July 27 to August 3, 2025



TITLE
DWF CALIBRATION RESULTS
FLOW MONITOR #4

PROJECT
SANITARY MASTER PLAN UPDATE

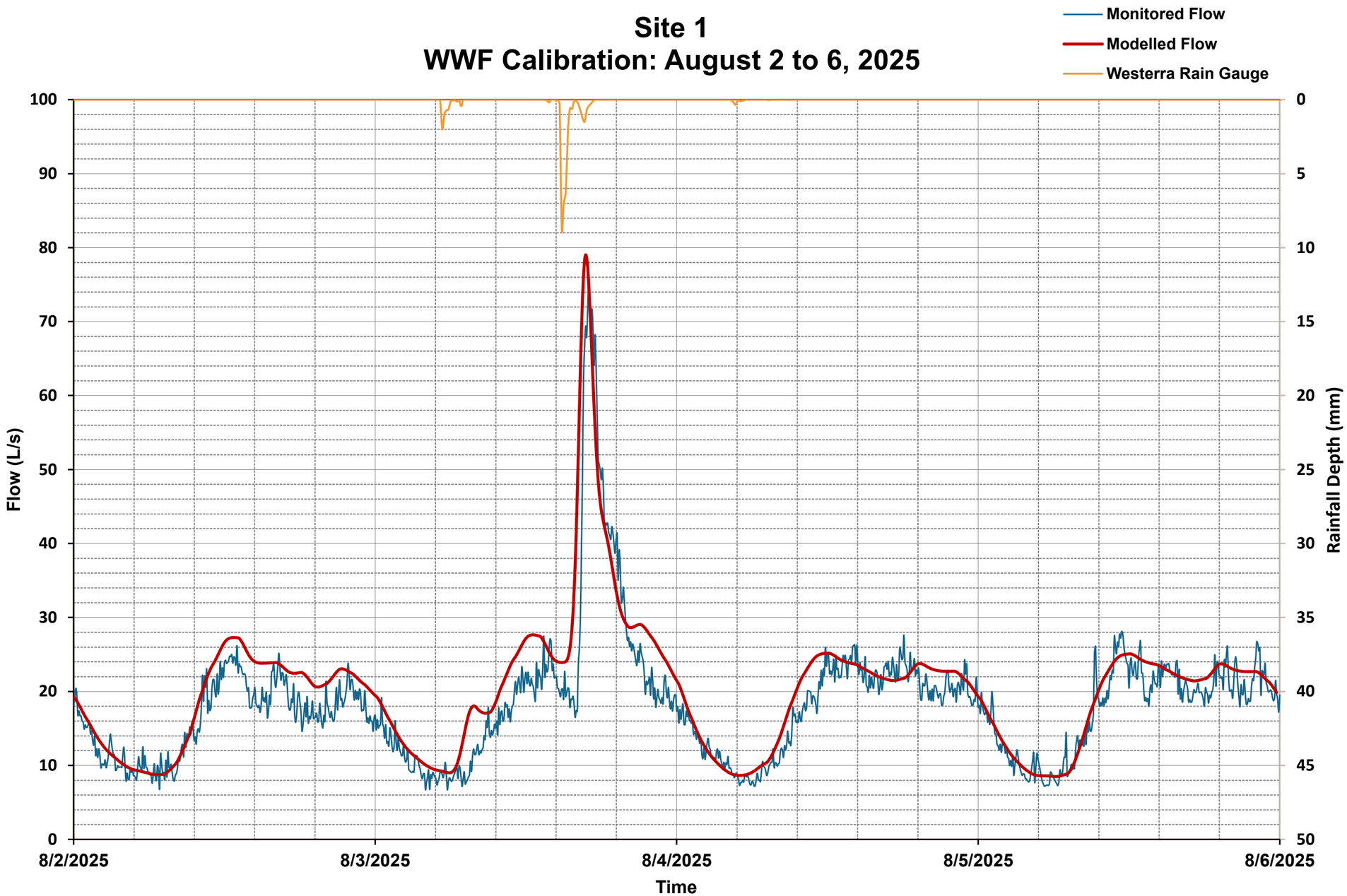
CLIENT
TOWN OF STONY PLAIN

FIGURE	B.2
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_DWF Graph_FM #4

APPENDIX C
WWF Calibration Graphs

Site 1
WWF Calibration: August 2 to 6, 2025



TITLE
WWF CALIBRATION RESULTS
FLOW MONITOR #1

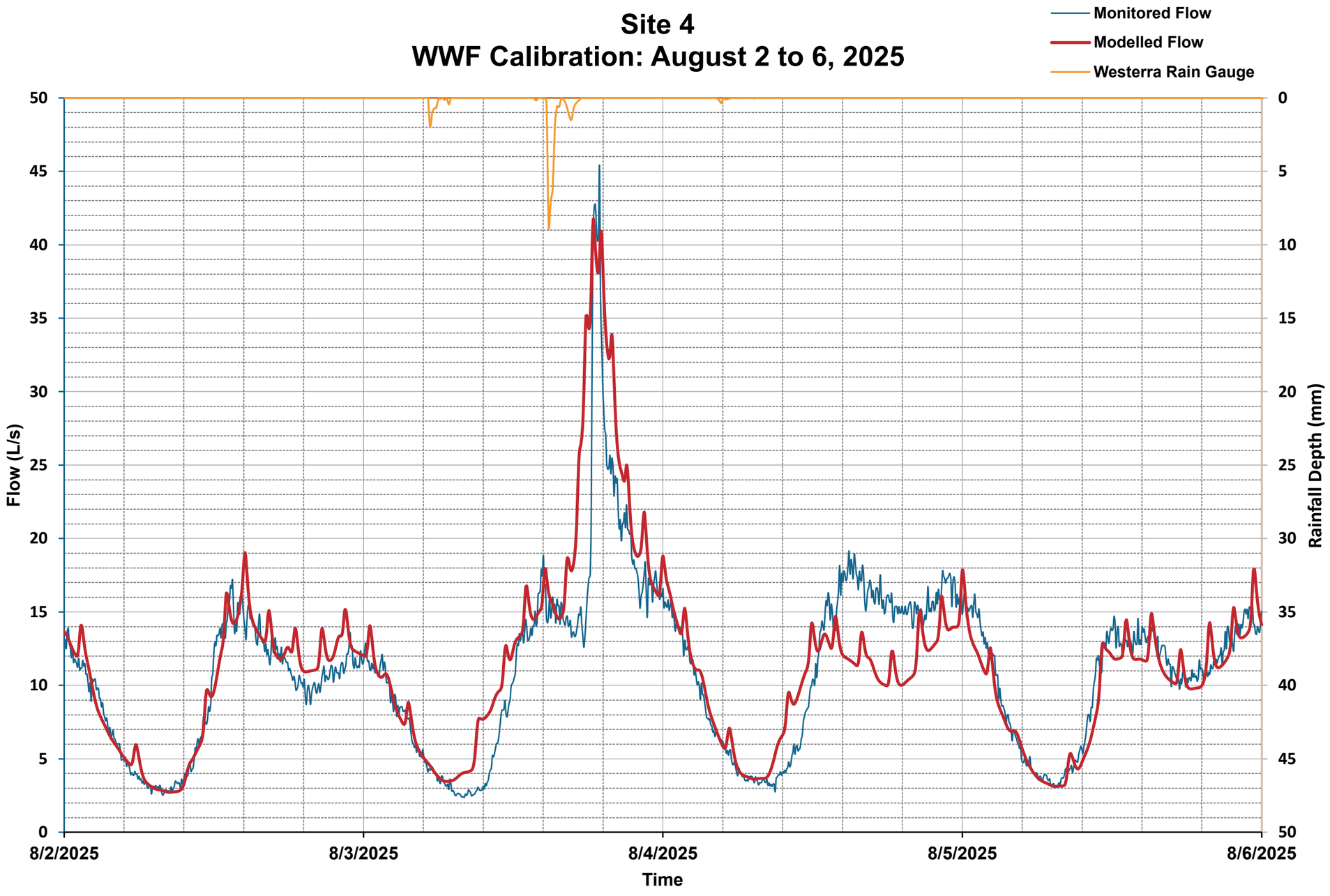
PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	C.1
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_WWF Calibration FM #1

Site 4
WWF Calibration: August 2 to 6, 2025



TITLE
WWF CALIBRATION RESULTS
FLOW MONITOR #4

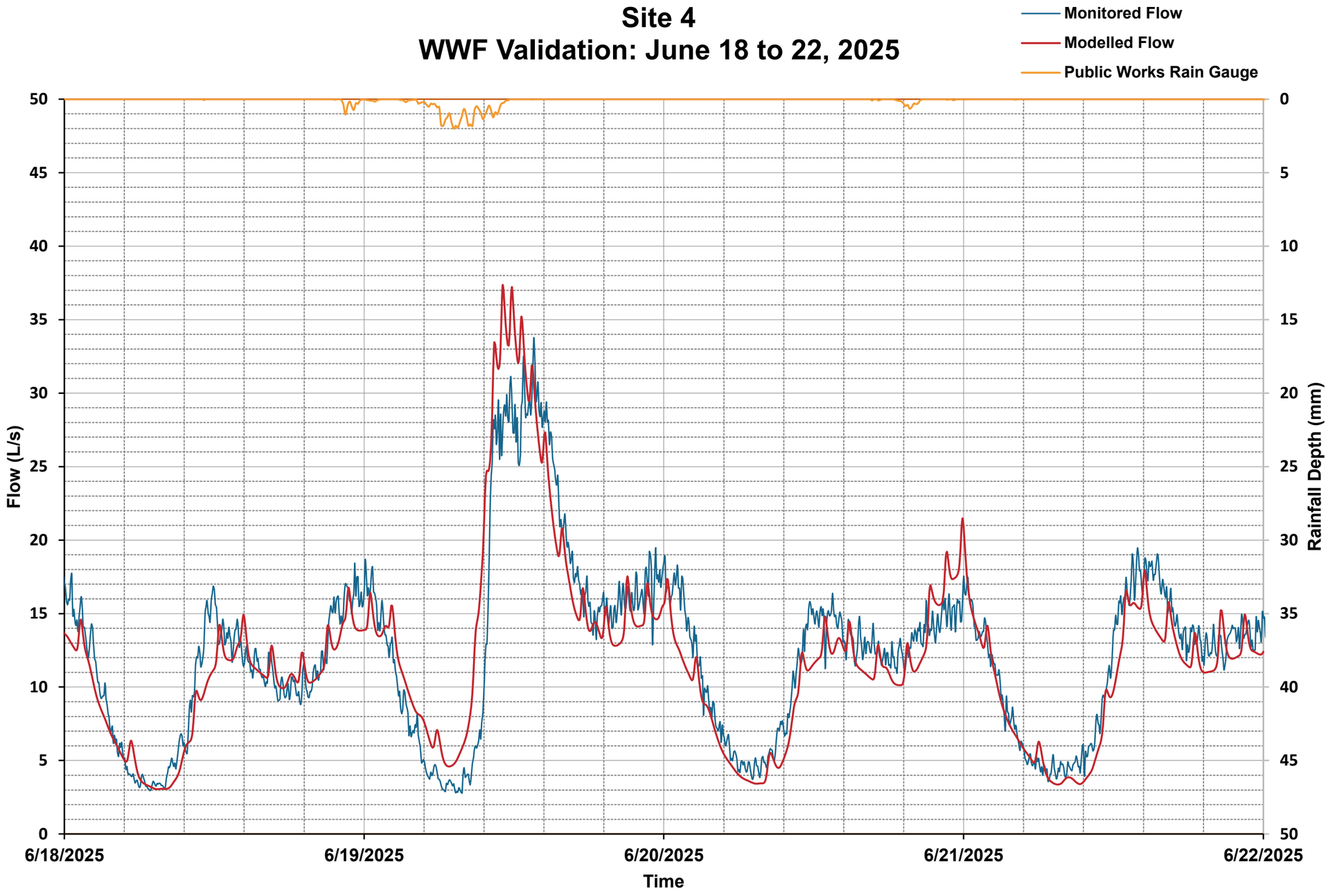
PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	C.2
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMPaprx - Figure X_WWF Calibration FM #4

Site 4
WWF Validation: June 18 to 22, 2025



TITLE
WWF VALIDATION RESULTS
FLOW MONITOR #4

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

FIGURE	C.3
DATE	12/17/2025
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_WWF Validation FM #4

APPENDIX D
Cost Estimates

Appendix D Cost Estimates

Table D.1: Central Trunk Upgrade Cost Estimates

ID	Item	Quantity	Unit	Unit Cost[1]	Sub-Total	Contingency (30%)	Engineering (10%)	Total Cost[2]
Option #1	525 mm Gravity Sewer (9 - 10 m Depth)	1,270	Metres	$1,810	$2,298,700	$689,610	$229,870	$3,220,000
	1200 mm Manhole (9 - 10 m Depth)	8	Item	$35,440	$283,520	$85,056	$28,352	$400,000
Option #1 Total					**$2,582,220**	**$774,666**	**$258,222**	**$3,620,000**
Option #2	600 mm Gravity Sewer (2 - 3 m Depth)	275	Metres	$1,700	$467,500	$140,250	$46,750	$660,000
	600 mm Gravity Sewer (4 - 5 m Depth)	600	Metres	$1,050	$630,000	$189,000	$63,000	$890,000
	600 mm Gravity Sewer (5 - 6 m Depth)	400	Metres	$1,390	$556,000	$166,800	$55,600	$780,000
	1200 mm Manhole (3 - 4 m Depth)	7	Item	$12,510	$87,570	$26,271	$8,757	$130,000
	1200 mm Manhole (6 - 7 m Depth)	2	Item	$23,970	$47,940	$14,382	$4,794	$70,000
	Highway Crossing (Trenchless Installation)	90	Metres	$5,000	$450,000	$135,000	$45,000	$630,000
	Pavement Rehabilitation	530	Metres	$500	$265,000	$79,500	$26,500	$380,000
Option #2 Total					**$2,504,010**	**$751,203**	**$250,401**	**$3,540,000**
Option #3	1500 mm Gravity Sewer (4 - 5 m Depth)	500	Metres	$3,630	$1,815,000	$544,500	$181,500	$2,550,000
	Removal of 450 mm Sewer	320	Metres	$115	$36,800	$11,040	$3,680	$60,000
	Removal of 525 mm Sewer	170	Metres	$125	$21,250	$6,375	$2,125	$30,000
	1500 mm Manhole (4 - 5 m Depth)	8	Item	$59,410	$475,280	$142,584	$47,528	$670,000
	Control Structure	1	Item	$100,000	$100,000	$30,000	$10,000	$140,000
	Pavement Rehabilitation	500	Metres	$500	$250,000	$75,000	$25,000	$350,000
Option #3 Total					**$2,698,330**	**$809,499**	**$269,833**	**$3,800,000**

[1] Costs are comparable to other municipalities in Alberta. Costs are representative of 2026 dollars. Unit costs have been rounded to the nearest $10.
[2] Total costs has been rounded up to the nearest $10,000.

Table D.2: Low-Pressure System Replacement Cost Estimates

LP System	Item	Quantity	Unit	Unit Cost[1]	Sub-Total	Contingency (30%)	Engineering (10%)	Total Cost[2]
Geortz	200 mm Gravity Sewer (3 - 4 m Depth)	164	Metres	$490	$80,291	$24,087	$8,029	$120,000
	200 mm Gravity Sewer (4 - 5 m Depth)	433	Metres	$620	$268,282	$80,485	$26,828	$380,000
	100 mm Sewer Removal	827	Metres	$95	$78,556	$23,567	$7,856	$110,000
	1200 mm Manhole (3 - 4 m Depth)	2	Item	$12,510	$25,020	$7,506	$2,502	$40,000
	1200 mm Manhole (4 - 5 m Depth)	4	Item	$16,680	$66,720	$20,016	$6,672	$100,000
	100 mm Forcemain (3 - 4 m Depth)	369	Metres	$405	$149,595	$44,879	$14,960	$210,000
	Pavement Rehabilitation	655	Metres	$500	$327,500	$98,250	$32,750	$460,000
	Geortz Lift Station (11 L/s)	1	Item	$500,000	$500,000	$150,000	$50,000	$700,000
Geortz Sub-Total					**$1,495,965**	**$448,789**	**$149,596**	**$2,120,000**
Quantz	200 mm Gravity Sewer (3 - 4 m Depth)	757	Metres	$490	$370,734	$111,220	$37,073	$520,000
	200 mm Gravity Sewer (4 - 5 m Depth)	370	Metres	$620	$229,203	$68,761	$22,920	$330,000
	100 mm Sewer Removal	1,323	Metres	$95	$125,724	$37,717	$12,572	$180,000
	1200 mm Manhole (3 - 4 m Depth)	6	Item	$12,510	$75,060	$22,518	$7,506	$110,000
	1200 mm Manhole (4 - 5 m Depth)	3	Item	$16,680	$50,040	$15,012	$5,004	$80,000
	Pavement Rehabilitation	1,110	Metres	$500	$555,000	$166,500	$55,500	$780,000
Quantz Sub-Total					**$1,405,761**	**$421,728**	**$140,576**	**$2,000,000**
South of Hwy 16A	200 mm Gravity Sewer (3 - 4 m Depth)	1,103	Metres	$490	$540,372	$162,112	$54,037	$760,000
	200 mm Gravity Sewer (4 - 5 m Depth)	711	Metres	$620	$440,765	$132,229	$44,076	$620,000
	250 mm Gravity Sewer (4 - 5 m Depth)	331	Metres	$700	$231,542	$69,463	$23,154	$330,000
	100 mm Sewer Removal	2,226	Metres	$95	$211,507	$63,452	$21,151	$300,000
	1200 mm Manhole (3 - 4 m Depth)	15	Item	$12,510	$187,650	$56,295	$18,765	$270,000
	1200 mm Manhole (4 - 5 m Depth)	4	Item	$16,680	$66,720	$20,016	$6,672	$100,000
	200 mm Forcemain (3 - 4 m Depth)	587	Metres	$490	$287,415	$86,224	$28,741	$410,000
	South Industrial Lift Station (27 L/s)	1	Item	$800,000	$800,000	$240,000	$80,000	$1,120,000
	Pavement Rehabilitation	1,330	Metres	$500	$665,000	$199,500	$66,500	$940,000
South of Hwy 16A Sub-Total					**$3,430,970**	**$1,029,291**	**$343,097**	**$4,850,000**
Total					**$6,332,696**	**$1,899,809**	**$633,270**	**$8,970,000**

[1] Costs are comparable to other municipalities in Alberta. Costs are representative of 2026 dollars. Unit costs have been rounded to the nearest $10.
[2] Total costs has been rounded up to the nearest $10,000.

Table D.3: FUT FM 2 Alignment Options Cost Estimates

ID	Item	Quantity	Unit	Unit Cost[1]	Sub-Total	Contingency (30%)	Engineering (10%)	Total Cost[2]
Option #1	300 mm Forcemain (3 - 4 m Depth)	93	Metres	$680	$63,240	$18,972	$6,324	$90,000
	525 mm Gravity Sewer (3 - 4 m Depth)	760	Metres	$980	$744,800	$223,440	$74,480	$1,050,000
	1200 mm Manhole (3 - 4 m Depth)	6	Item	$12,510	$75,060	$22,518	$7,506	$110,000
	Pavement Rehabilitation	25	Metres	$500	$12,500	$3,750	$1,250	$20,000
Option #1 Total					**$895,600**	**$268,680**	**$89,560**	**$1,270,000**
Option #2	300 mm Forcemain (5 - 6 m Depth)	675	Metres	$1,040	$702,000	$210,600	$70,200	$990,000
	750 mm Gravity Sewer (4 - 5 m Depth)	60	Metres	$1,780	$106,800	$32,040	$10,680	$150,000
	600 mm Sewer Removal	60	Metres	$135	$8,100	$2,430	$810	$20,000
	Pavement Rehabilitation	425	Metres	$500	$212,500	$63,750	$21,250	$300,000
Option #2 Total					**$1,029,400**	**$308,820**	**$102,940**	**$1,450,000**
Option #3	300 mm Forcemain (3 - 4 m Depth)	285	Metres	$680	$193,800	$58,140	$19,380	$280,000
	525 mm Gravity Sewer (5 - 6 m Depth)	295	Metres	$1,550	$457,250	$137,175	$45,725	$650,000
	750 mm Gravity Sewer (4 - 5 m Depth)	60	Metres	$1,780	$106,800	$32,040	$10,680	$150,000
	450 mm Sewer Removal	295	Metres	$115	$33,925	$10,178	$3,393	$50,000
	600 mm Sewer Removal	60	Metres	$135	$8,100	$2,430	$810	$20,000
	Pavement Rehabilitation	285	Metres	$500	$142,500	$42,750	$14,250	$200,000
Option #3 Total					**$942,375**	**$282,713**	**$94,238**	**$1,350,000**
Option #4	300 mm Forcemain (3 - 4 m Depth)	695	Metres	$680	$472,600	$141,780	$47,260	$670,000
	750 mm Gravity Sewer (4 - 5 m Depth)	570	Metres	$1,780	$1,014,600	$304,380	$101,460	$1,430,000
	600 mm Sewer Removal	570	Metres	$135	$76,950	$23,085	$7,695	$110,000
Option #4 Total					**$1,564,150**	**$469,245**	**$156,415**	**$2,210,000**

[1] Costs are comparable to other municipalities in Alberta. Costs are representative of 2026 dollars. Unit costs have been rounded to the nearest $10.
[2] Total costs has been rounded up to the nearest $10,000.

Table D.4: Future Servicing Cost Estimates

ID	Item	Quantity	Unit	Unit Cost[1]	Sub-Total	Contingency (30-35%)[2]	Engineering (10%)	Total Cost[3]
5-Year								
FUT Pipe 21	750 mm Gravity Sewer (8 - 9 m Depth)	51	Metres	$2,470	$125,114	$37,534	$12,511	$180,000
	1500 mm Manhole (8 - 9 m Depth)	1	Item	$47,950	$47,950	$14,385	$4,795	$70,000
FUT Pipe 22	675 mm Gravity Sewer (6 - 7 m Depth)	322	Metres	$2,340	$752,631	$225,789	$75,263	$1,060,000
	1500 mm Manhole (6 - 7 m Depth)	2	Item	$36,480	$72,960	$21,888	$7,296	$110,000
FUT Pipe 32	450 mm Gravity Sewer (6 - 7 m Depth)	1,055	Metres	$1,540	$1,624,964	$487,489	$162,496	$2,280,000
	1200 mm Manhole (6 - 7 m Depth)	8	Item	$23,970	$191,760	$57,528	$19,176	$270,000
FUT Pipe 36	450 mm Gravity Sewer (6 - 7 m Depth)	667	Metres	$1,540	$1,027,308	$308,192	$102,731	$1,440,000
	1200 mm Manhole (6 - 7 m Depth)	5	Item	$23,970	$119,850	$35,955	$11,985	$170,000
FUT FM 1	300 mm Forcemain (5 - 6 m Depth)	551	Metres	$1,040	$573,344	$172,003	$57,334	$810,000
FUT LS 1	Lift Station (77 L/s)	1	Item	$1,094,440	$1,094,440	$328,332	$109,444	$1,540,000
5-Year Horizon Sub-Total:					**$5,630,321**	**$1,689,096**	**$563,032**	**$7,930,000**
10-Year								
FUT Pipe 18	450 mm Gravity Sewer (5 - 6 m Depth)	71	Metres	$1,310	$93,388	$32,686	$9,339	$140,000
	1200 mm Manhole (5 - 6 Depth)	1	Item	$20,850	$20,850	$7,298	$2,085	$40,000
FUT Pipe 25	250 mm Gravity Sewer (7 - 8 m Depth)	1,012	Metres	$1,040	$1,052,480	$368,368	$105,248	$1,530,000
	1200 mm Manhole (7 - 8 m Depth)	8	Item	$28,140	$225,120	$78,792	$22,512	$330,000
FUT Pipe 33	450 mm Gravity Sewer (4 - 5 m Depth)	64	Metres	$1,060	$67,432	$20,230	$6,743	$100,000
	1200 mm Manhole (4 - 5 m Depth)	1	Item	$16,680	$16,680	$5,004	$1,668	$30,000
FUT Pipe 34	375 mm Gravity Sewer (4 - 5 m Depth)	206	Metres	$940	$193,706	$58,112	$19,371	$280,000
	1200 mm Manhole (4 - 5 m Depth)	2	Item	$16,680	$33,360	$10,008	$3,336	$50,000
FUT Pipe 35	375 mm Gravity Sewer (5 - 6 m Depth)	1,363	Metres	$1,160	$1,581,050	$474,315	$158,105	$2,220,000
	1200 mm Manhole (5 - 6 Depth)	11	Item	$20,850	$229,350	$68,805	$22,935	$330,000
FUT Pipe 40	300 mm Gravity Sewer (4 - 5 m Depth)	775	Metres	$860	$666,760	$200,028	$66,676	$940,000
	1200 mm Manhole (4 - 5 m Depth)	6	Item	$16,680	$100,080	$30,024	$10,008	$150,000
10-Year Horizon Sub-Total:					**$4,280,256**	**$1,353,669**	**$428,026**	**$6,140,000**
25-Year								
FUT Pipe 4	300 mm Gravity Sewer (4 - 5 m Depth)	707	Metres	$860	$607,977	$182,393	$60,798	$860,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$25,020	$8,340	$120,000
FUT Pipe 5	250 mm Gravity Sewer (4 - 5 m Depth)	600	Metres	$700	$420,081	$126,024	$42,008	$590,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$25,020	$8,340	$120,000
FUT Pipe 6	375 mm Gravity Sewer (5 - 6 m Depth)	742	Metres	$1,160	$860,820	$258,246	$86,082	$1,210,000
	1200 mm Manhole (5 - 6 Depth)	6	Item	$20,850	$125,100	$37,530	$12,510	$180,000
FUT Pipe 12	525 mm Gravity Sewer (4 - 5 m Depth)	331	Metres	$1,270	$420,014	$147,005	$42,001	$610,000
	1200 mm Manhole (4 - 5 m Depth)	2	Item	$16,680	$33,360	$11,676	$3,336	$50,000
FUT Pipe 13	450 mm Gravity Sewer (4 - 5 m Depth)	507	Metres	$1,060	$537,240	$188,034	$53,724	$780,000
	1200 mm Manhole (4 - 5 m Depth)	4	Item	$16,680	$66,720	$23,352	$6,672	$100,000
FUT Pipe 14	375 mm Gravity Sewer (4 - 5 m Depth)	703	Metres	$940	$661,190	$231,416	$66,119	$960,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$29,190	$8,340	$130,000
FUT Pipe 17	525 mm Gravity Sewer (3 - 4 m Depth)	760	Metres	$980	$744,800	$223,440	$74,480	$1,050,000
	1200 mm Manhole (3 - 4 m Depth)	6	Item	$12,510	$75,060	$22,518	$7,506	$110,000
FUT Pipe 19	375 mm Gravity Sewer (5 - 6 m Depth)	246	Metres	$1,160	$285,922	$100,073	$28,592	$420,000
	1200 mm Manhole (5 - 6 Depth)	2	Item	$20,850	$41,700	$14,595	$4,170	$70,000
FUT Pipe 23	525 mm Gravity Sewer (4 - 5 m Depth)	1,126	Metres	$1,270	$1,430,277	$429,083	$143,028	$2,010,000
	1200 mm Manhole (4 - 5 m Depth)	7	Item	$16,680	$116,760	$35,028	$11,676	$170,000
FUT Pipe 27	250 mm Gravity Sewer (4 - 5 m Depth)	290	Metres	$700	$202,659	$70,931	$20,266	$300,000
	1200 mm Manhole (4 - 5 m Depth)	2	Item	$16,680	$33,360	$11,676	$3,336	$50,000
FUT Pipe 30	375 mm Gravity Sewer (4 - 5 m Depth)	965	Metres	$940	$907,164	$272,149	$90,716	$1,280,000
	1200 mm Manhole (4 - 5 m Depth)	8	Item	$16,680	$133,440	$40,032	$13,344	$190,000

FUT Pipe 39	250 mm Gravity Sewer (5 - 6 m Depth)	354	Metres	$860	$304,450	$91,335	$30,445	$430,000
	1200 mm Manhole (5 - 6 Depth)	2	Item	$20,850	$41,700	$12,510	$4,170	$60,000
FUT FM 2[4]	300 mm Forcemain (3 - 4 m Depth)	93	Metres	$680	$63,240	$18,972	$6,324	$90,000
FUT LS 2	Lift Station (104 L/s)	1	Item	$2,234,950	$2,234,950	$670,485	$223,495	$3,130,000
25-Year Horizon Sub-Total:					**$10,598,185**	**$3,297,734**	**$1,059,818**	**$15,070,000**
Ultimate								
FUT Pipe 1	300 mm Gravity Sewer (5 - 6 m Depth)	874	Metres	$1,040	$908,911	$272,673	$90,891	$1,280,000
	1200 mm Manhole (5 - 6 Depth)	7	Item	$20,850	$145,950	$43,785	$14,595	$210,000
FUT Pipe 2	300 mm Gravity Sewer (5 - 6 m Depth)	421	Metres	$1,040	$437,365	$131,210	$43,737	$620,000
	1200 mm Manhole (5 - 6 Depth)	3	Item	$20,850	$62,550	$18,765	$6,255	$90,000
FUT Pipe 3	300 mm Gravity Sewer (4 - 5 m Depth)	627	Metres	$860	$539,595	$161,878	$53,959	$760,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$25,020	$8,340	$120,000
FUT Pipe 7	300 mm Gravity Sewer (4 - 5 m Depth)	477	Metres	$860	$410,072	$123,022	$41,007	$580,000
	1200 mm Manhole (4 - 5 m Depth)	3	Item	$16,680	$50,040	$15,012	$5,004	$80,000
FUT Pipe 8	250 mm Gravity Sewer (5 - 6 m Depth)	398	Metres	$860	$342,184	$102,655	$34,218	$480,000
	Rail Crossing (Directional Drilling)	70	Metres	$1,930	$135,100	$40,530	$13,510	$190,000
	1200 mm Manhole (5 - 6 Depth)	3	Item	$20,850	$62,550	$18,765	$6,255	$90,000
FUT Pipe 9	250 mm Gravity Sewer (8 - 9 m Depth)	670	Metres	$1,040	$696,867	$209,060	$69,687	$980,000
	1200 mm Manhole (8 - 9 m Depth)	5	Item	$31,270	$156,350	$46,905	$15,635	$220,000
FUT Pipe 10	250 mm Gravity Sewer (4 - 5 m Depth)	673	Metres	$700	$470,865	$141,260	$47,087	$660,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$25,020	$8,340	$120,000
FUT Pipe 11	450 mm Gravity Sewer (6 - 7 m Depth)	1,235	Metres	$1,540	$1,901,929	$570,579	$190,193	$2,670,000
	1200 mm Mnahole (6 - 7 m Depth)	10	Item	$23,970	$239,700	$71,910	$23,970	$340,000
FUT Pipe 15	375 mm Gravity Sewer (4 - 5 m Depth)	794	Metres	$940	$746,421	$223,926	$74,642	$1,050,000
	1200 mm Manhole (4 - 5 m Depth)	6	Item	$16,680	$100,080	$30,024	$10,008	$150,000
FUT Pipe 16	450 mm Gravity Sewer (4 - 5 m Depth)	757	Metres	$1,060	$802,508	$240,752	$80,251	$1,130,000
	1200 mm Manhole (4 - 5 m Depth)	6	Item	$16,680	$100,080	$30,024	$10,008	$150,000
FUT Pipe 24	375 mm Gravity Sewer (4 - 5 m Depth)	639	Metres	$940	$600,946	$180,284	$60,095	$850,000
	1200 mm Manhole (4 - 5 m Depth)	5	Item	$16,680	$83,400	$25,020	$8,340	$120,000
FUT Pipe 28	250 mm Gravity Sewer (3 - 4 m Depth)	572	Metres	$550	$314,600	$94,380	$31,460	$450,000
	1200 mm Manhole (3 - 4 m Depth)	4	Item	$12,510	$50,040	$15,012	$5,004	$80,000
FUT Pipe 29	450 mm Gravity Sewer (4 - 5 m Depth)	521	Metres	$1,060	$552,440	$165,732	$55,244	$780,000
	1200 mm Manhole (4 - 5 m Depth)	4	Item	$16,680	$66,720	$20,016	$6,672	$100,000
FUT Pipe 37	375 mm Gravity Sewer (4 - 5 m Depth)	512	Metres	$940	$481,151	$144,345	$48,115	$680,000
	1200 mm Manhole (4 - 5 m Depth)	4	Item	$16,680	$66,720	$20,016	$6,672	$100,000
FUT Pipe 38	375 mm Gravity Sewer (4 - 5 m Depth)	356	Metres	$940	$334,212	$100,264	$33,421	$470,000
	1200 mm Manhole (4 - 5 m Depth)	2	Item	$16,680	$33,360	$10,008	$3,336	$50,000
FUT Pipe 41	250 mm Gravity Sewer (3 - 4 m Depth)	492	Metres	$550	$270,800	$81,240	$27,080	$380,000
	1200 mm Manhole (3 - 4 m Depth)	4	Item	$12,510	$50,040	$15,012	$5,004	$80,000
Ultimate Horizon Sub-Total:					**$11,380,347**	**$3,414,104**	**$1,138,035**	**$16,110,000**
Total:					**$31,889,109**	**$9,754,603**	**$3,188,911**	**$45,250,000**

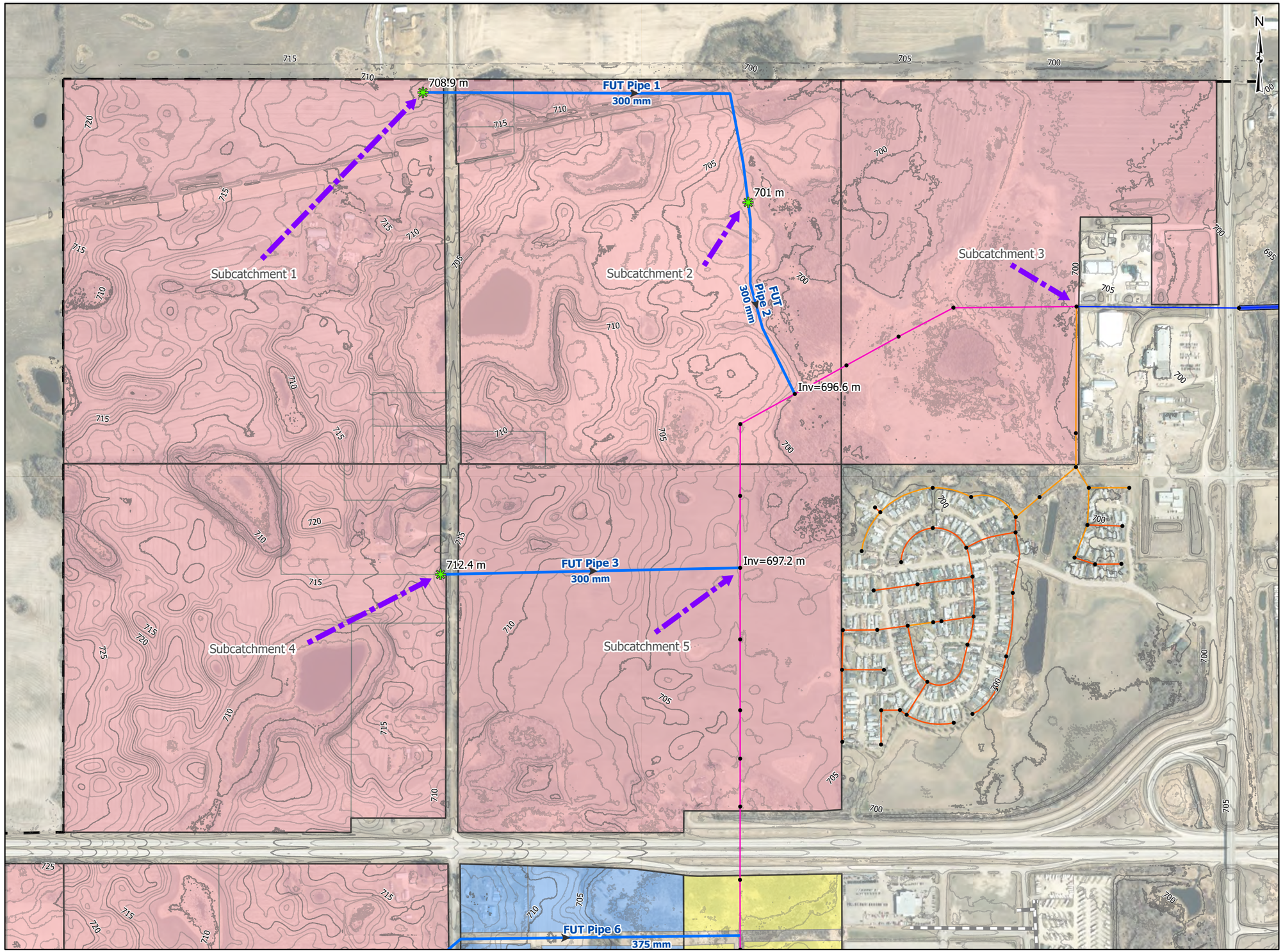
[1] Costs are comparable to other municipalities in Alberta. Costs are representative of 2026 dollars. Unit costs have been rounded to the nearest $10.
[2] Blue highlight indicates that a contingency of 35% was applied.
[3] Total costs have been rounded up to the nearest $10,000.
[4] Cost is based on Option #1.

Table D.5: East Trunk Upgrade Cost Estimates

ID	Item	Quantity	Unit	Unit Cost[1]	Sub-Total	Contingency (30%)	Engineering (10%)	Total Cost[2]
East Trunk Upgrade	1050 mm Gravity Sewer (3 - 4 m Depth)	470	Metres	$1,910	$897,700	$269,310	$89,770	$1,260,000
	1800 mm Manhole (3 - 4 m depth)	5	Item	$23,970	$119,850	$35,955	$11,985	$170,000
	900 mm Sewer Removal	470	Metres	$200	$94,000	$28,200	$9,400	$140,000
				Total:	**$1,111,550**	**$333,465**	**$111,155**	**$1,570,000**
East Trunk Upgrade (Twinned)	750 mm Gravity Sewer (3 - 4 m Depth)	470	Metres	$1,580	$742,600	$222,780	$74,260	$1,040,000
	1500 mm Manhole (3 - 4 m depth)	5	Item	$19,800	$99,000	$29,700	$9,900	$140,000
				Total:	**$940,300**	**$282,090**	**$94,030**	**$1,180,000**

[1] Costs herein are comparable to other municipalities. Costs are representative of 2026 dollars. Unit costs have been rounded to the nearest $10.
[2] Total cost has been rounded up to the nearest $10,000.

APPENDIX E
Detailed Future Servicing Concept



LEGEND

- Manhole
- Low Point
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Existing Low-Pressure System
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 600 mm
- 900 mm

ARROW Utilities Trunk Sewer

- 600 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

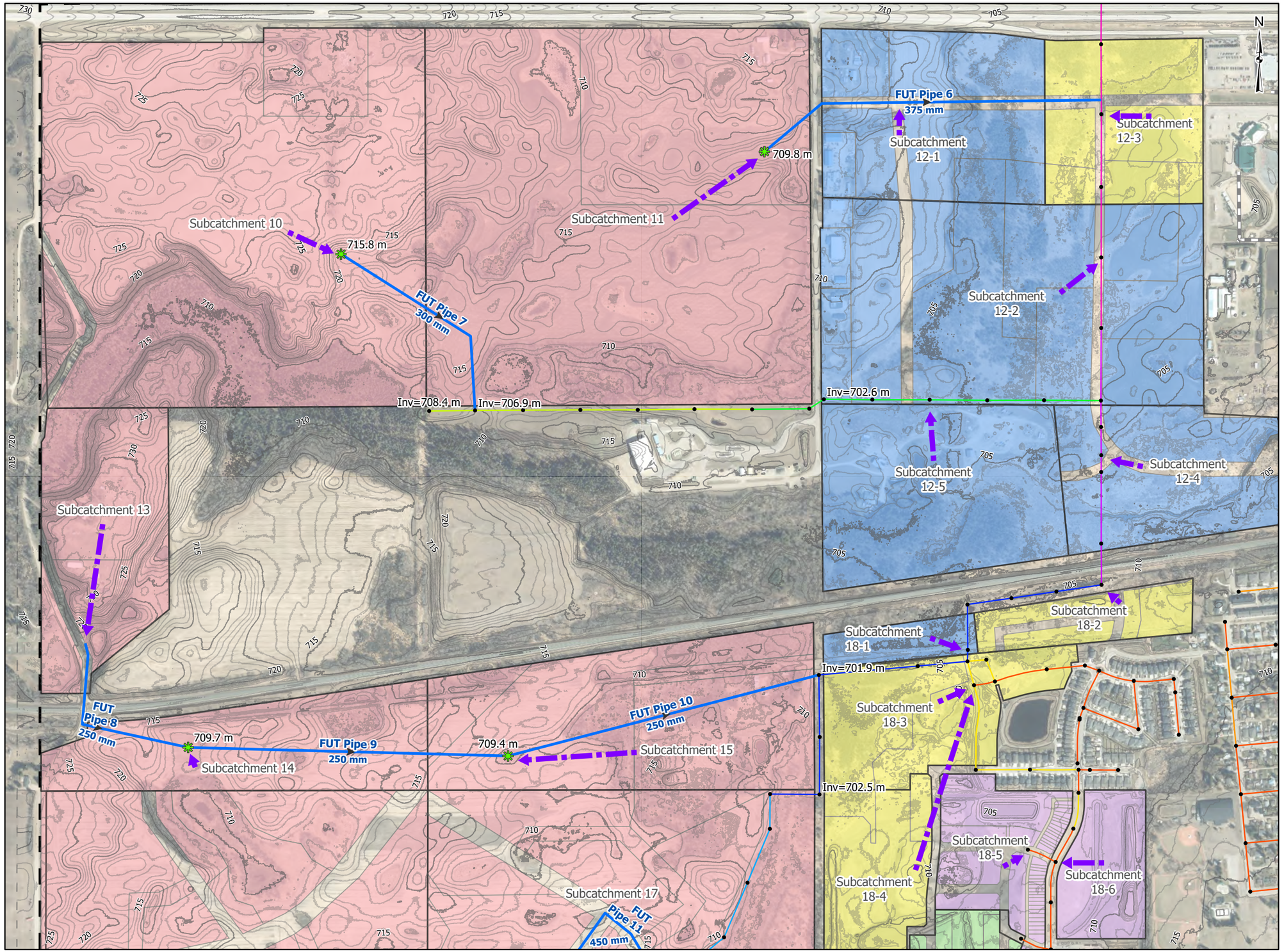
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	E.1
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB



LEGEND

- Manhole
- Low Point
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Existing Low-Pressure System
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 375 mm
- 450 mm
- 525 mm
- 600 mm
- 750 mm
- 900 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

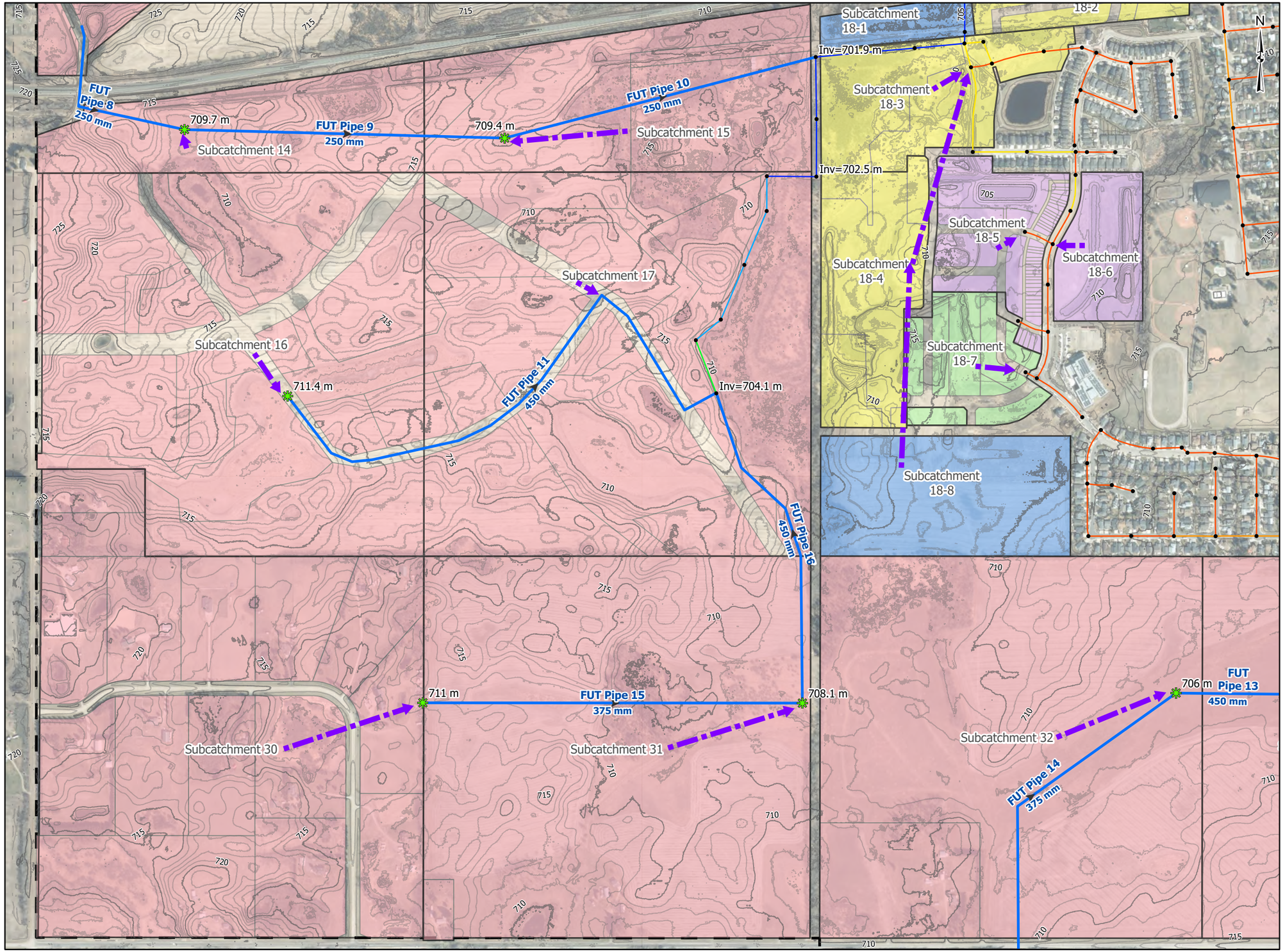
NAD 1983 CSRS 3TM 114

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1:8,000 Meters

FIGURE	E.2
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB



LEGEND

- Manhole
- Low Point
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 525 mm
- 600 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

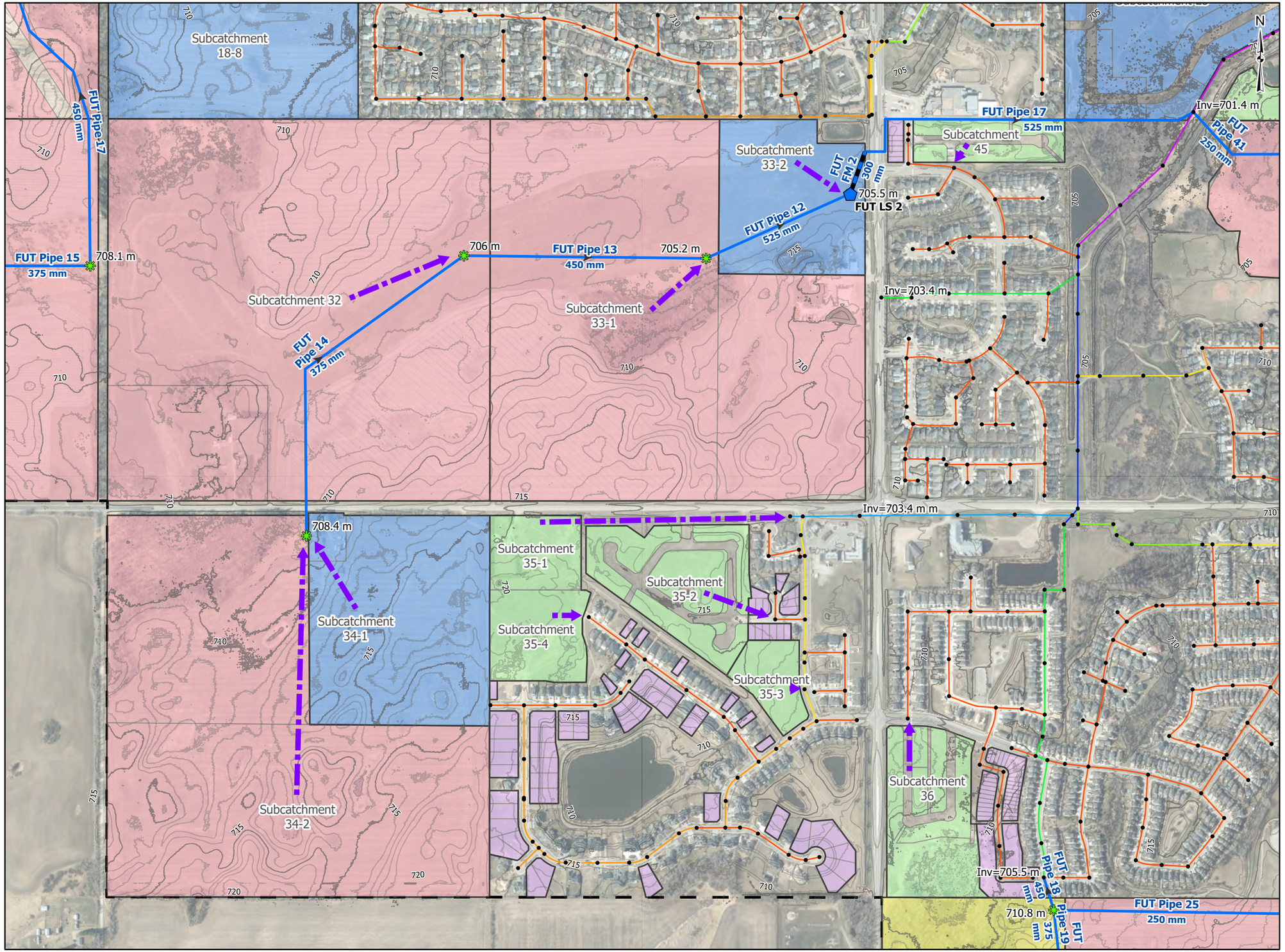
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	E.3
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing.MB



LEGEND

- Manhole
- Low Point
- Proposed Lift Station
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 450 mm
- 525 mm
- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

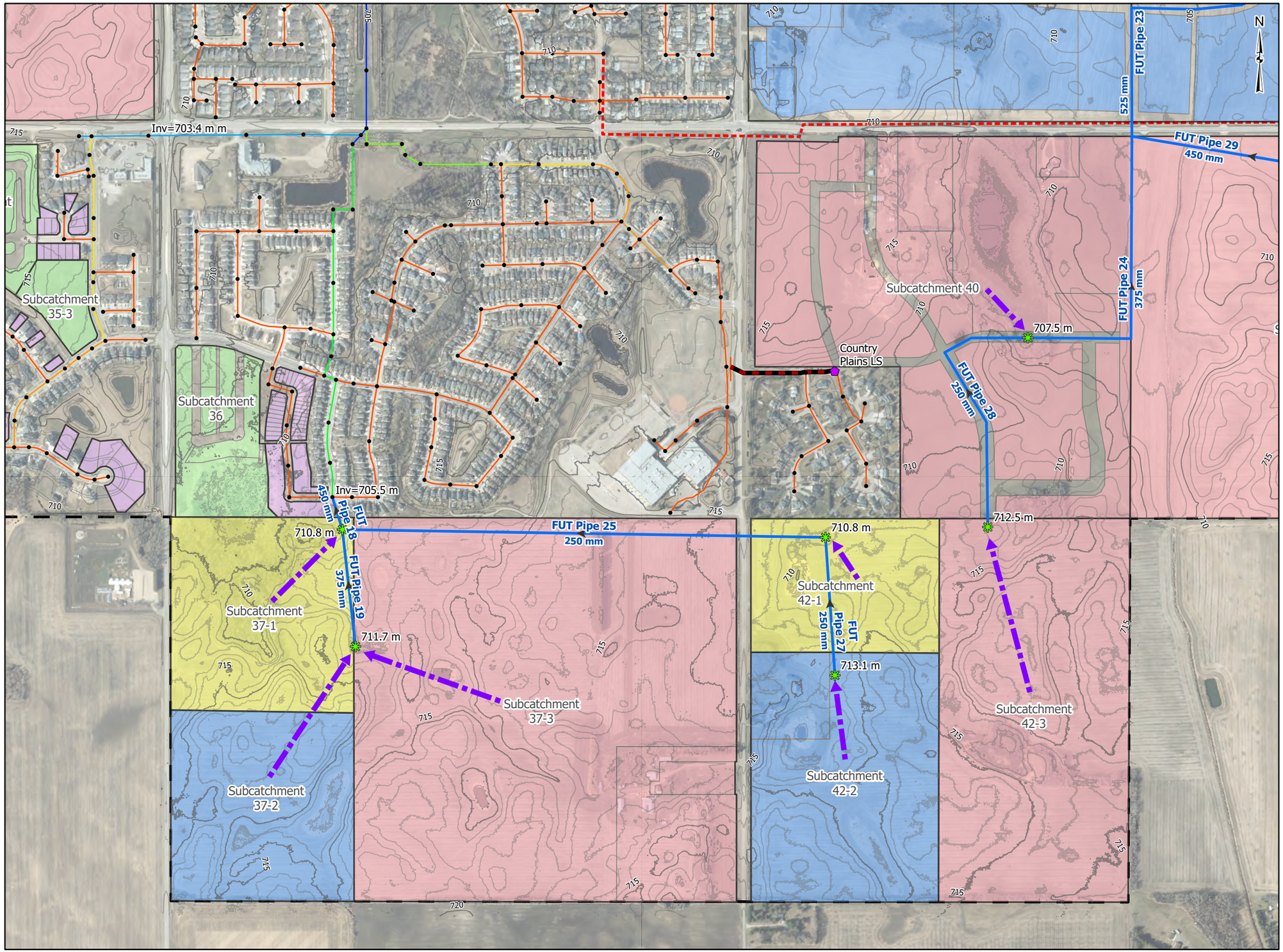
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	E.4
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMPaprx - Figure X_Future Servicing.MB



LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 450 mm
- 525 mm
- 600 mm

Existing Forcemain Diameter

- 100 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

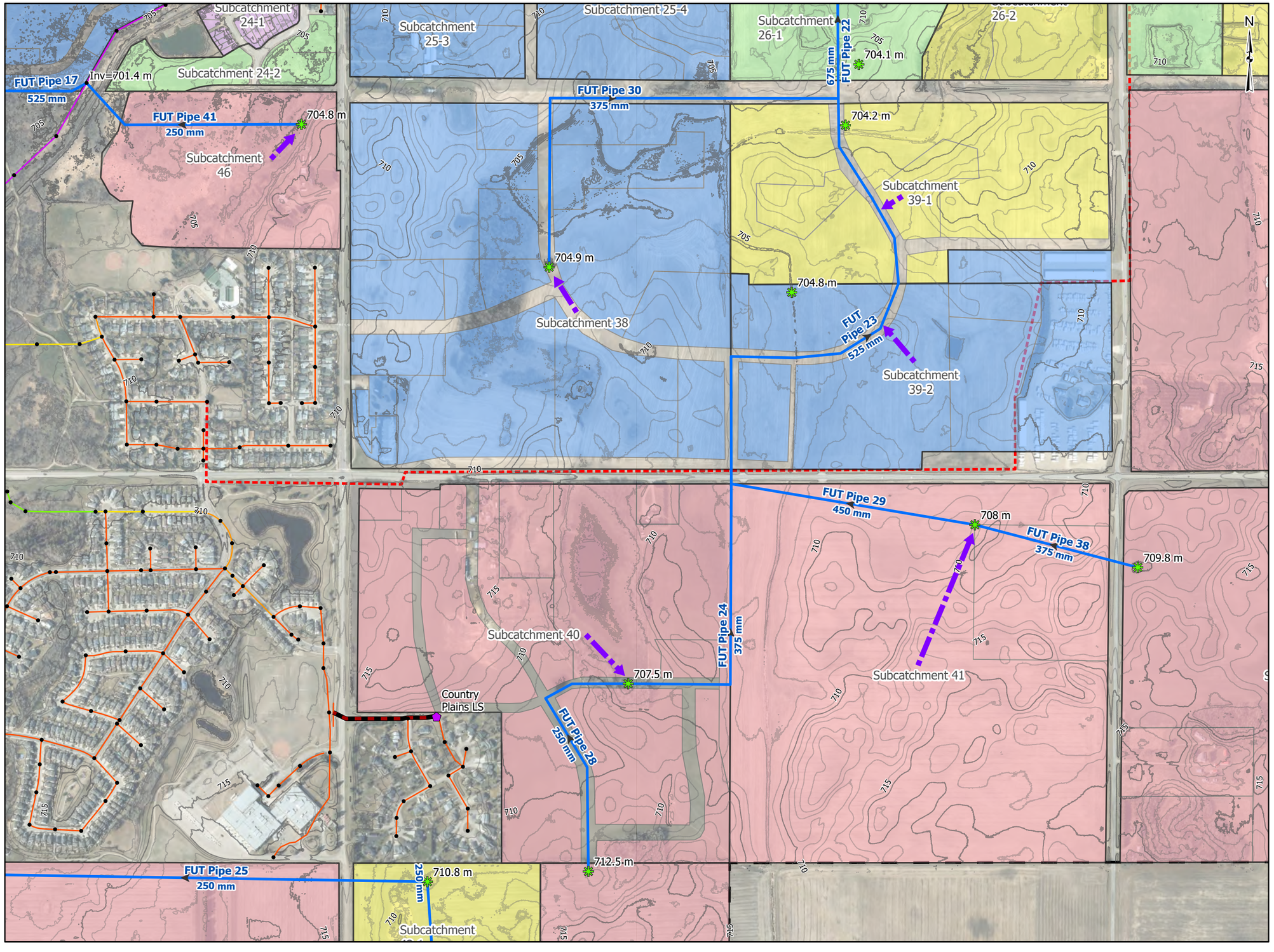
NAD 1983 CSRS 3TM 114

0 100 200

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FIGURE	E.5
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB



LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 750 mm

Existing Forcemain Diameter

- 100 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

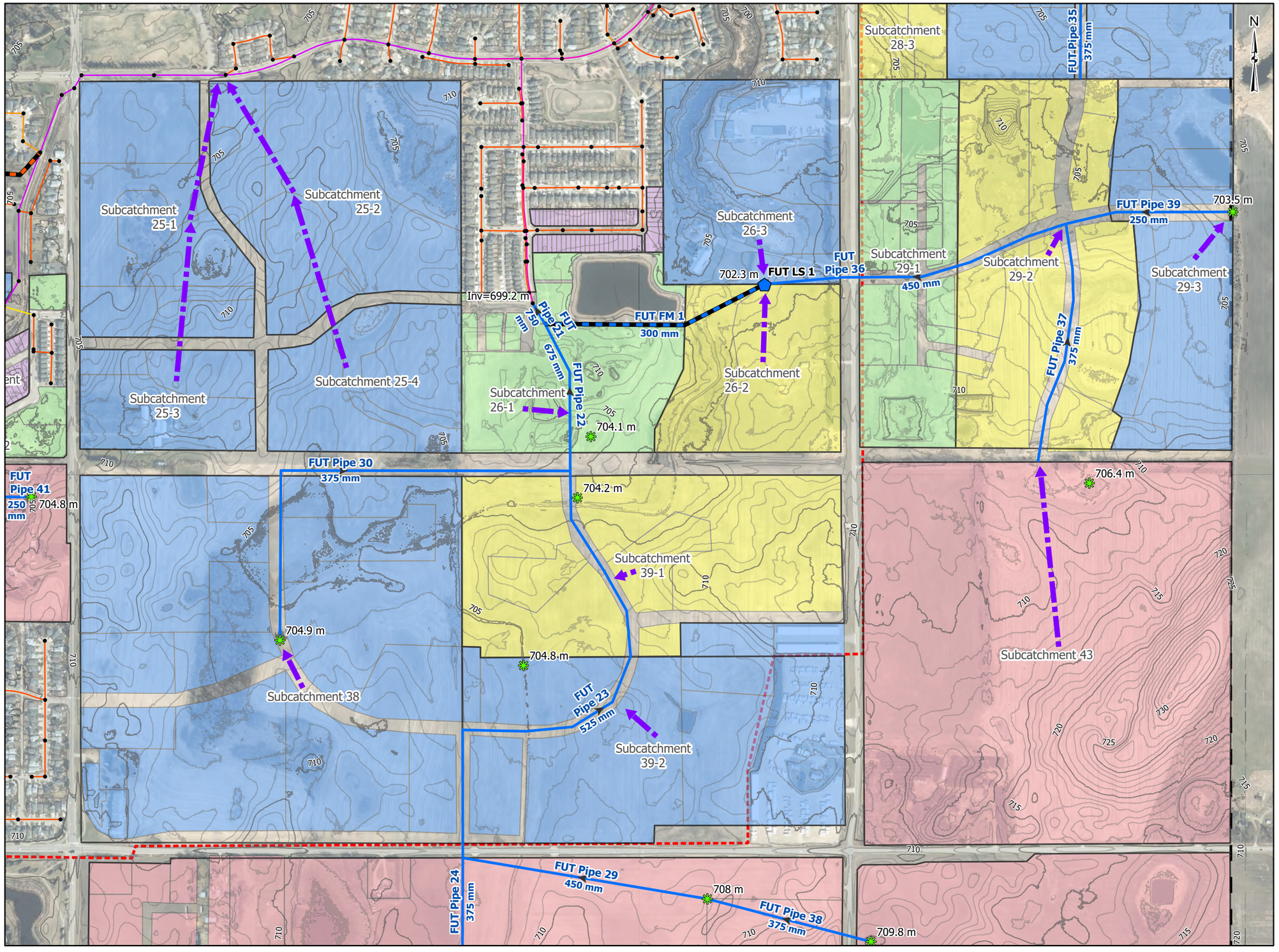
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FIGURE	E.6
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB



LEGEND

- Manhole
- Low Point
- Proposed Lift Station
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Proposed Forcemain
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 750 mm
- 900 mm

Existing Forcemain Diameter

- 150 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

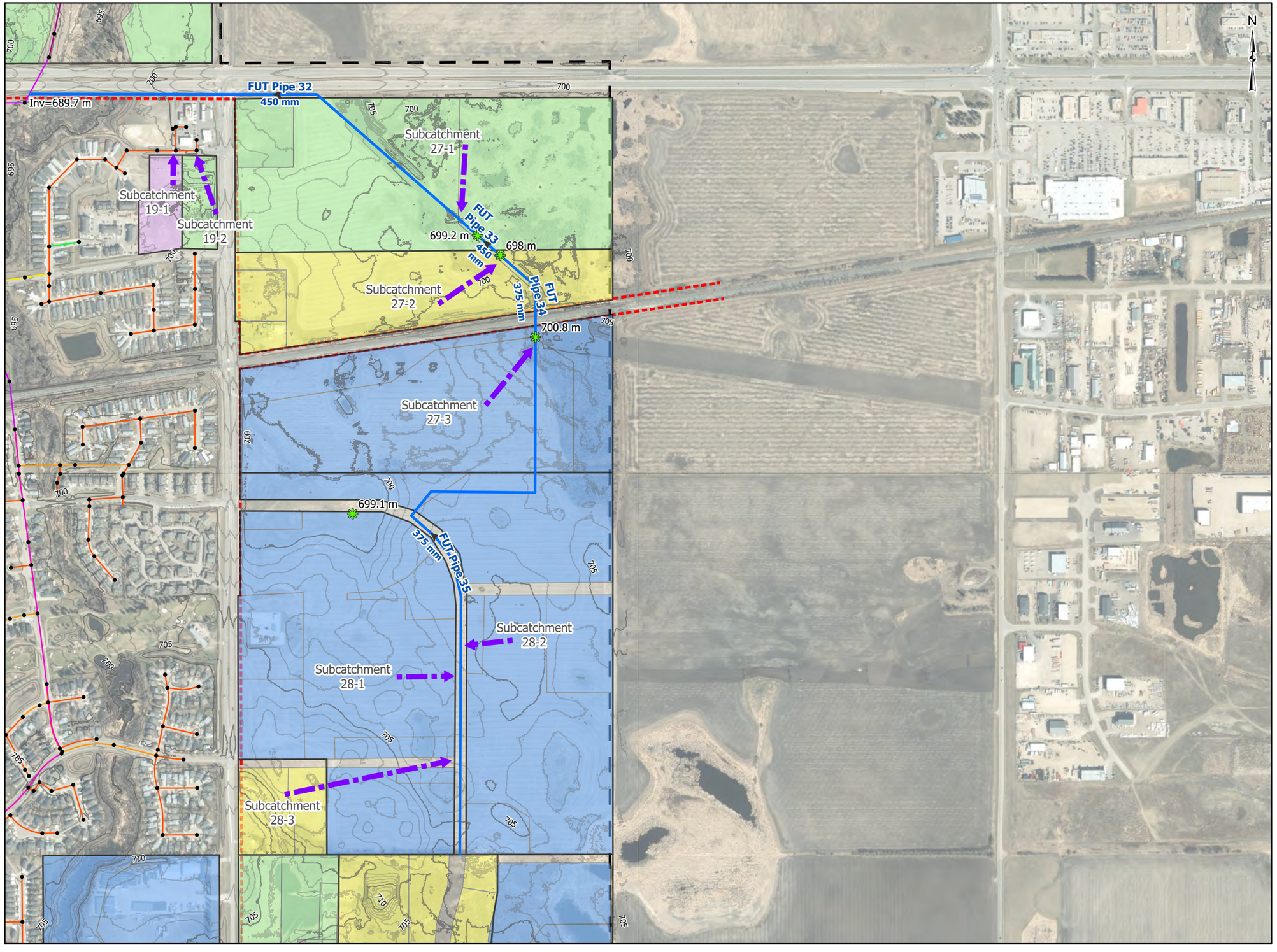
NAD 1983 CSRS 3TM 114

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1:8,000 Meters

FIGURE	E.7
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB



LEGEND

- Manhole
- Low Point
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 750 mm
- 900 mm
- 1050 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

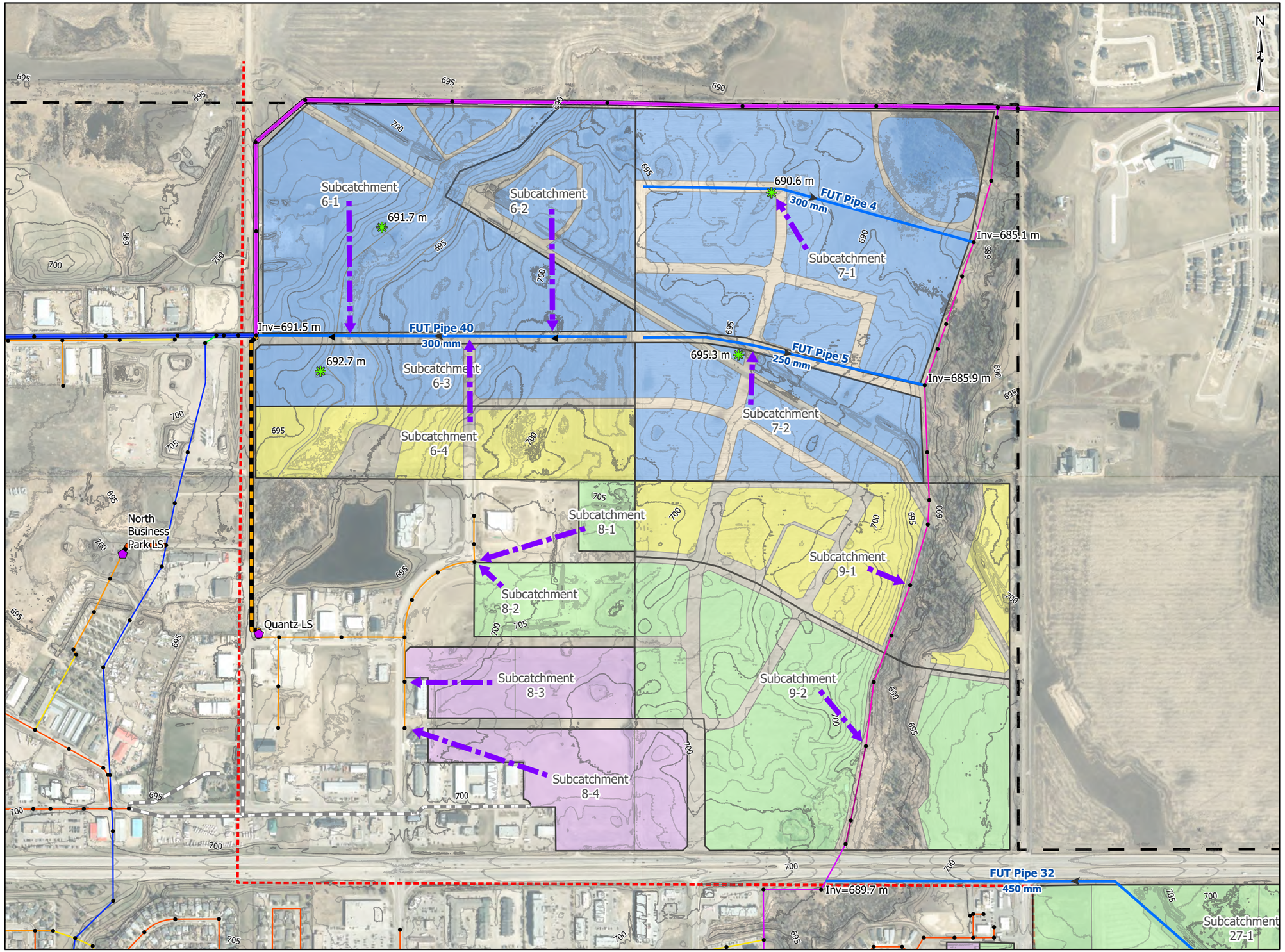
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1:8,000 Meters

FIGURE	E.8
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

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LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Minor Contour - 1 m
- Major Contour - 5 m
- Proposed Gravity Main
- Existing Low-Pressure System
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 600 mm
- 750 mm
- 900 mm
- 1050 mm

Existing Forcemain Diameter

- 150 mm
- 200 mm

ARROW Utilities Trunk Sewer

- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

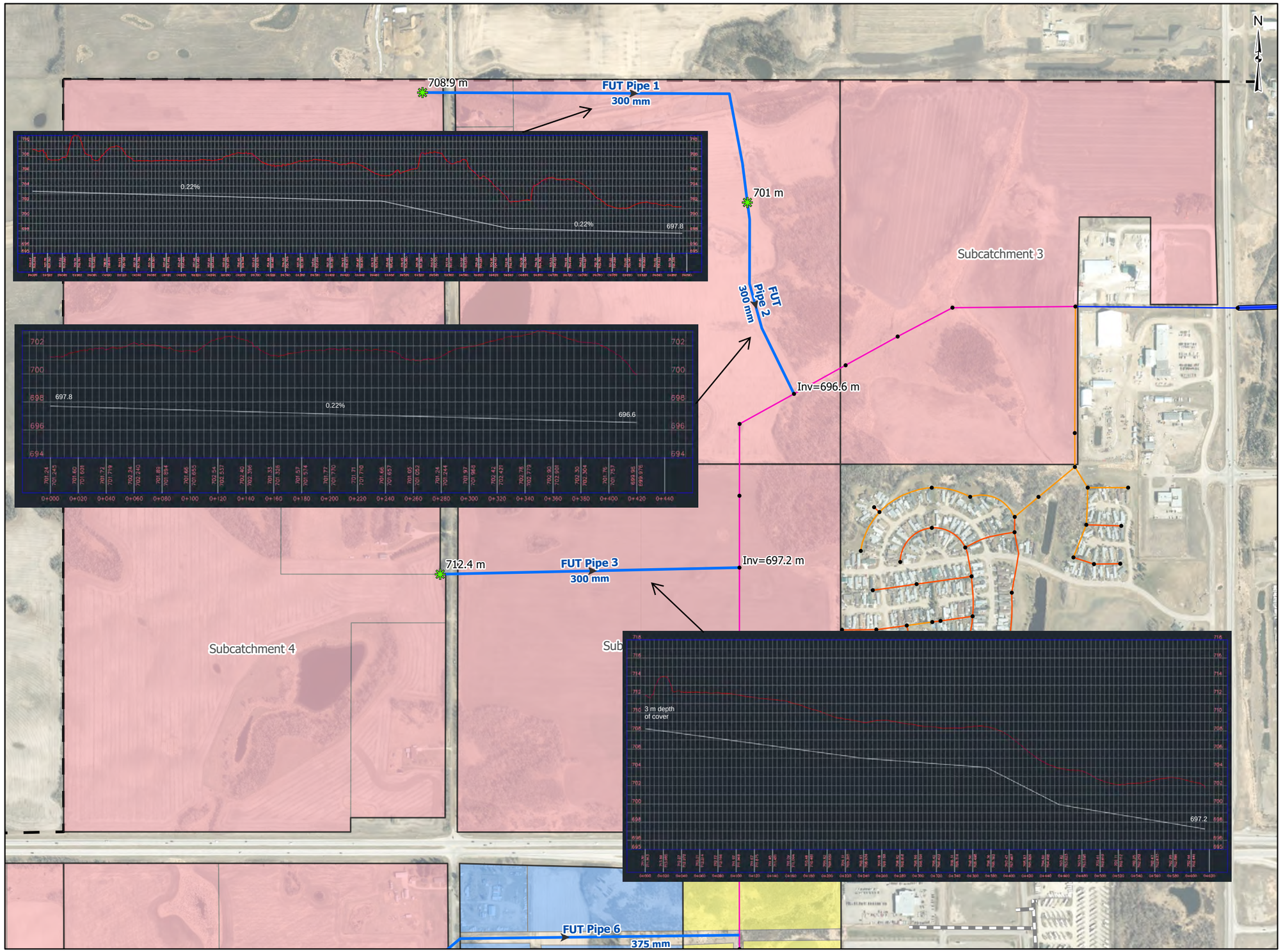
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FIGURE	E.9
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB

APPENDIX F
Future Servicing Profiles



LEGEND

- Manhole
- Low Point
- Proposed Gravity Main
- Existing Low-Pressure System
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 600 mm
- 900 mm

ARROW Utilities Trunk Sewer

- 600 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

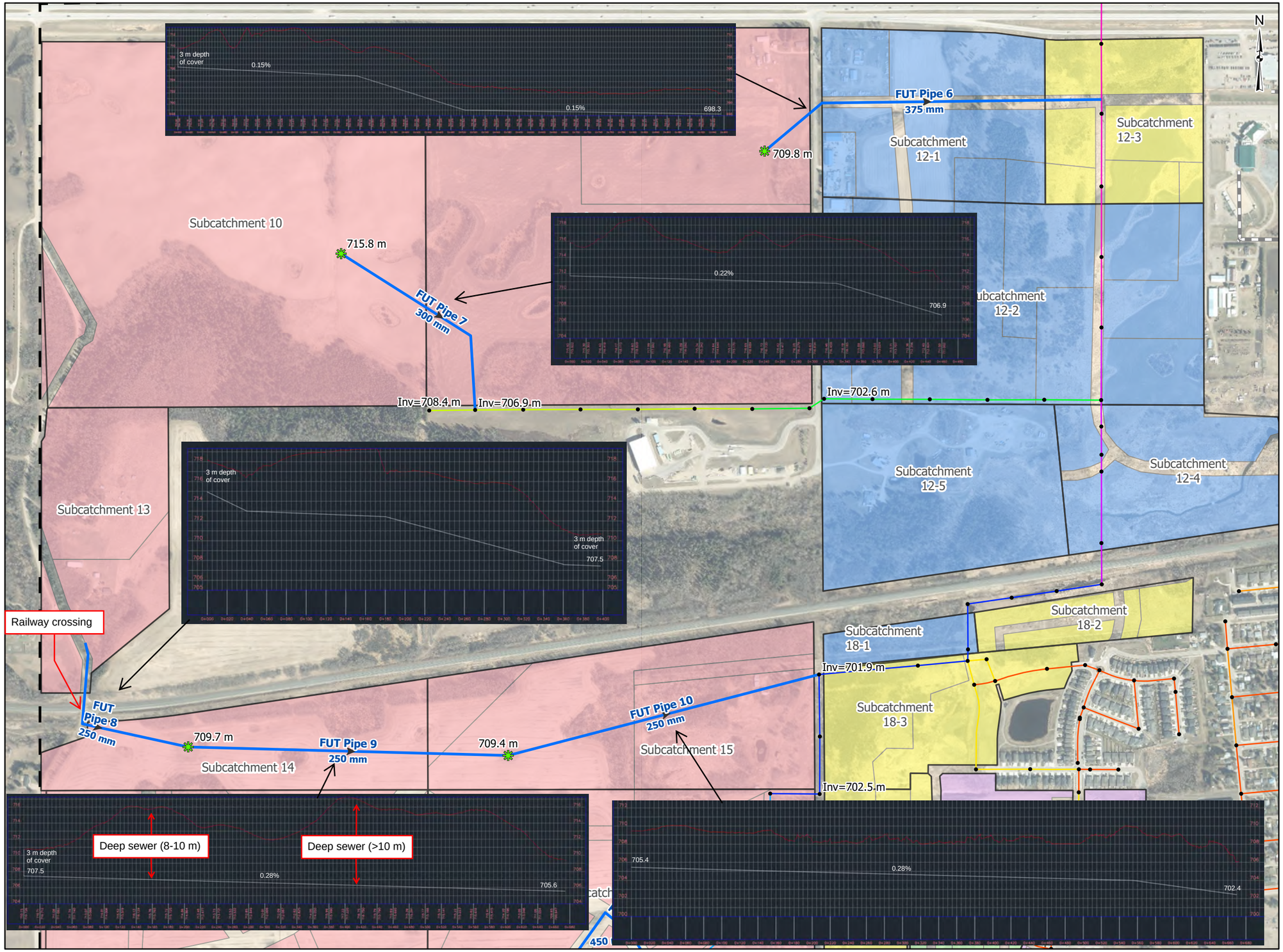
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	F.1
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles



LEGEND

- Manhole
- Low Point
- Proposed Gravity Main
- Existing Low-Pressure System
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 375 mm
- 450 mm
- 525 mm
- 600 mm
- 750 mm
- 900 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

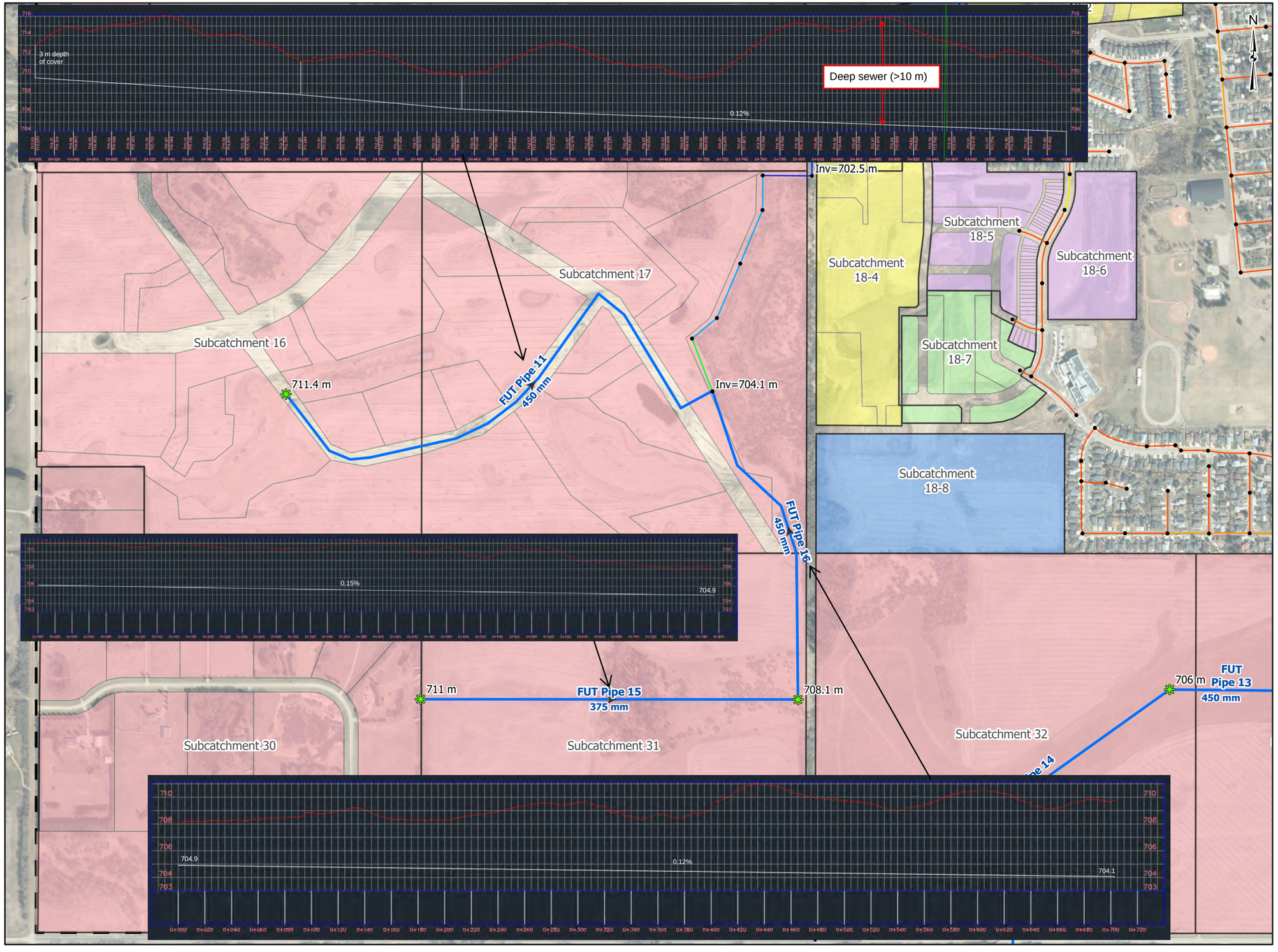
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0 100 200

1:8,000 Meters

FIGURE	F.2
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles



LEGEND

- Manhole
- Low Point
- Proposed Gravity Main
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 525 mm
- 600 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

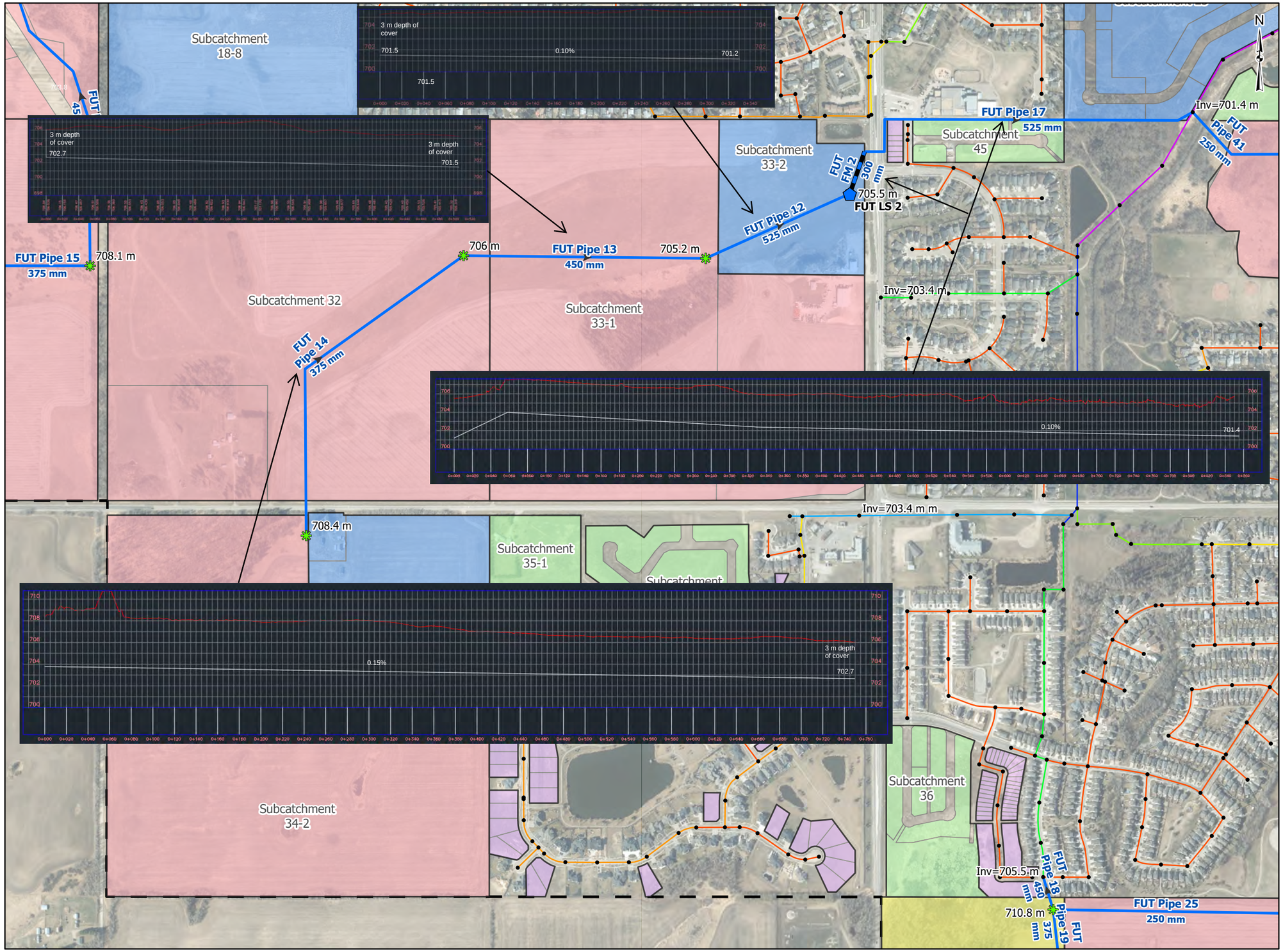
NAD 1983 CSRS 3TM 114

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1:8,000 Meters

FIGURE	F.3
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles



LEGEND

- Manhole
- Low Point
- Proposed Lift Station
- Proposed Gravity Main
- Proposed Forcemain
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 450 mm
- 525 mm
- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

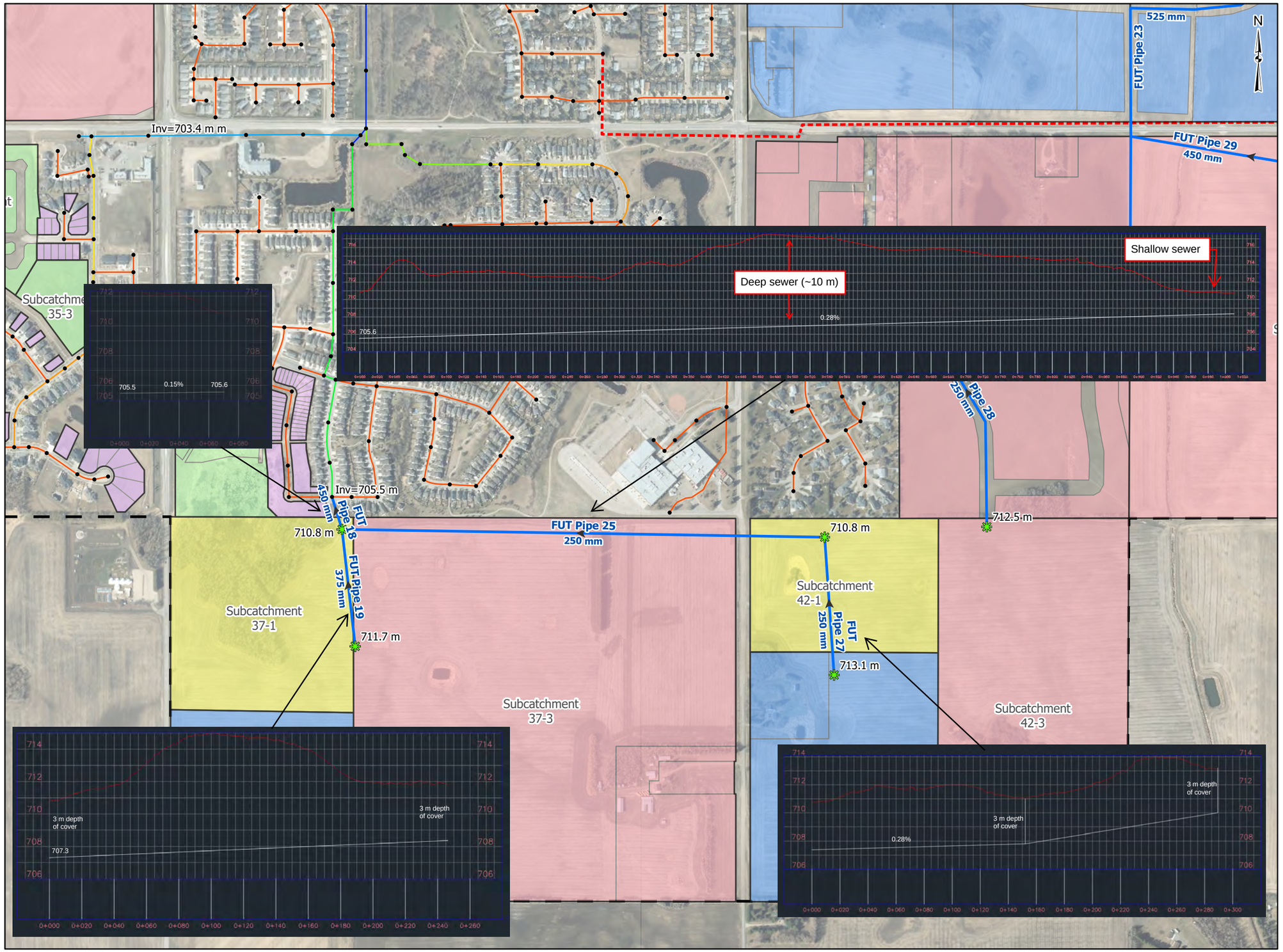
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	F.4
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles



LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 450 mm
- 525 mm
- 600 mm

Existing Forcemain Diameter

- 100 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

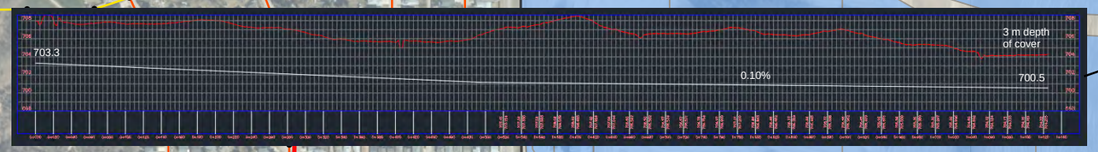
FIGURE	F.5
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

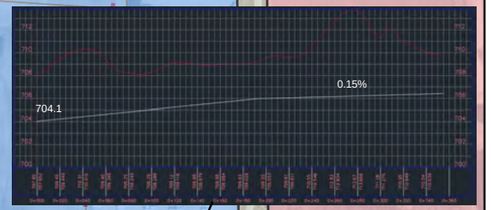
Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles

Subcatchment 24-1
Subcatchment 24-2
Subcatchment 25-3
Subcatchment 25-4
Subcatchment 26-1
Subcatchment 26-2
Subcatchment 46
Subcatchment 39-1
Subcatchment 38
Subcatchment 39-2
Subcatchment 40
Subcatchment 41
Subcatchment

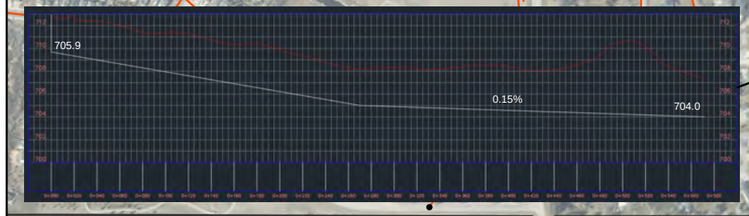
FUT Pipe 17
525 mm
Inv=701.4 m
FUT Pipe 41
250 mm
704.8 m
FUT Pipe 30
375 mm
675 mm
FUT Pipe 22
704.1 m
704.2 m
704.8 m
FUT Pipe 23
525 mm
FUT Pipe 29
450 mm
708 m
FUT Pipe 38
375 mm
709.8 m
FUT Pipe 24
375 mm
707.5 m
Country Plains LS
FUT Pipe 28
250 mm
712.5 m
FUT Pipe 25
250 mm
710.8 m
250 mm













N

LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 400 mm
- 750 mm

Existing Forcemain Diameter

- 100 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE
FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT
SANITARY MASTER PLAN UPDATE

CLIENT
TOWN OF STONY PLAIN

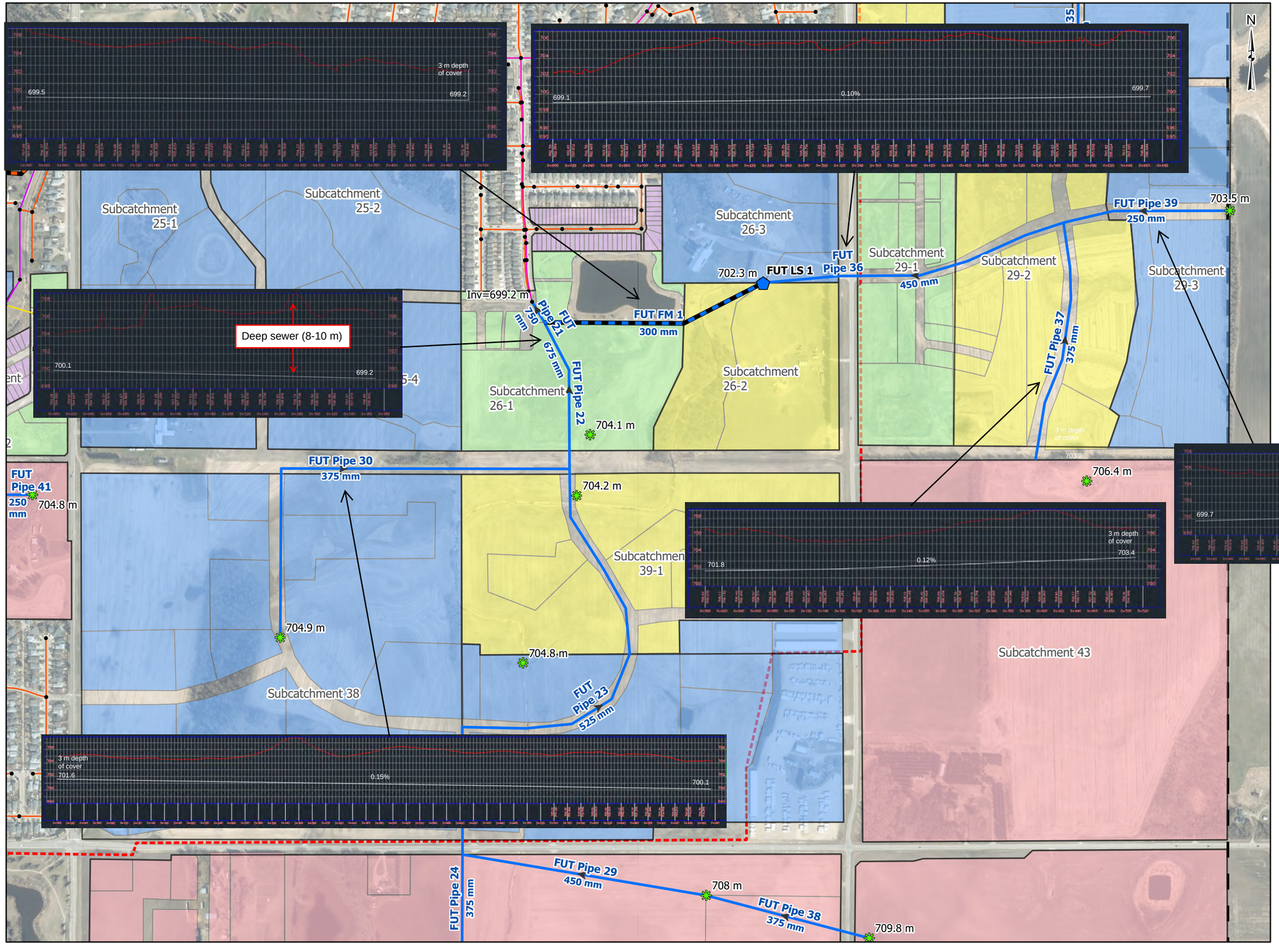
DATA SOURCES
- Topographic Map:Parkland County, Vantor

PROJECTION
NAD 1983 CSRS 3TM 114

0 100 200
1:8,000 Meters

FIGURE	F.6
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

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LEGEND

- Manhole
- Low Point
- Proposed Lift Station
- Proposed Gravity Main
- Proposed Forcemain
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 750 mm
- 900 mm

Existing Forcemain Diameter

- 150 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

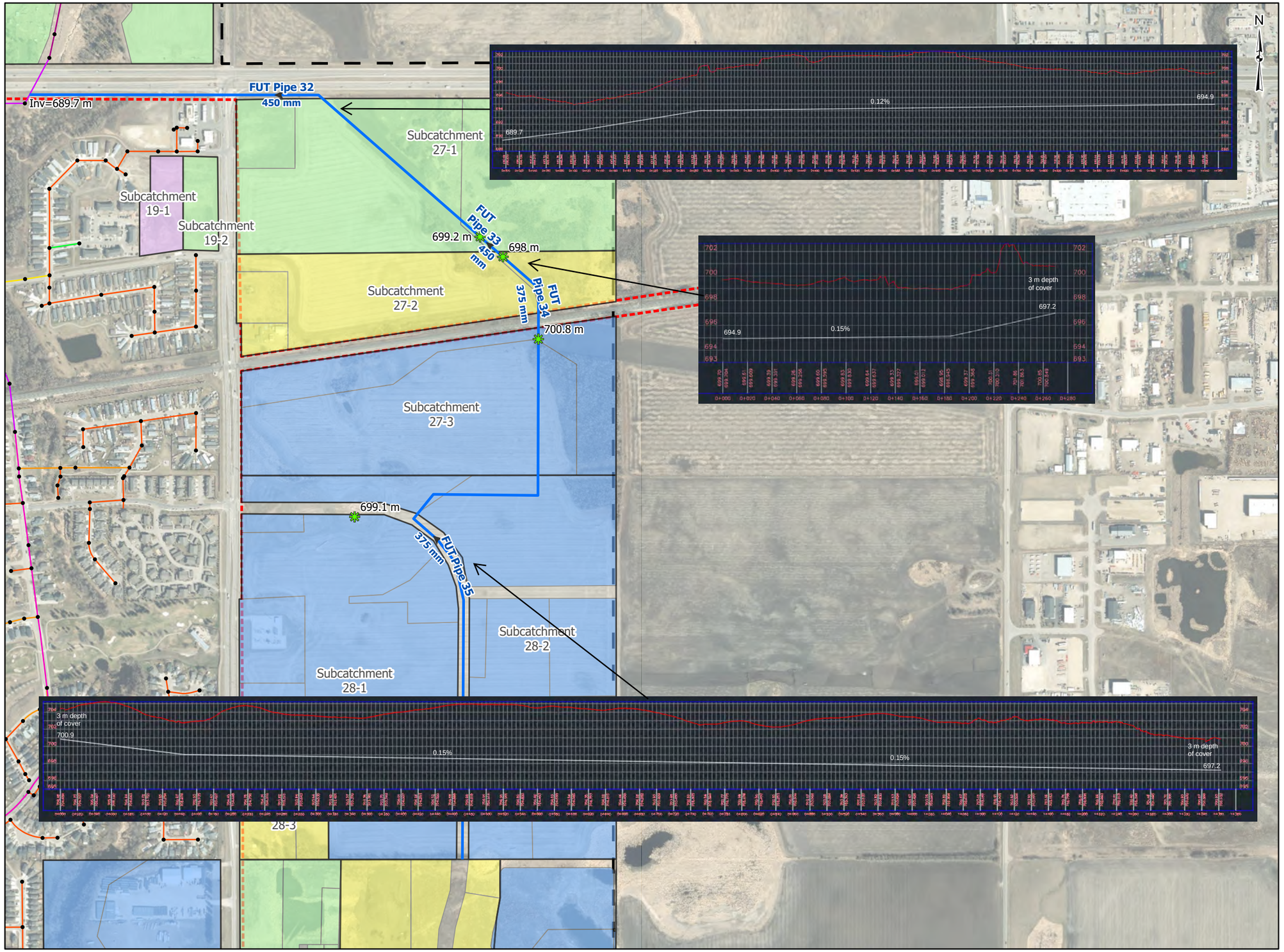
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	F.7
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

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LEGEND

- Manhole
- Low Point
- Proposed Gravity Main
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 750 mm
- 900 mm
- 1050 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

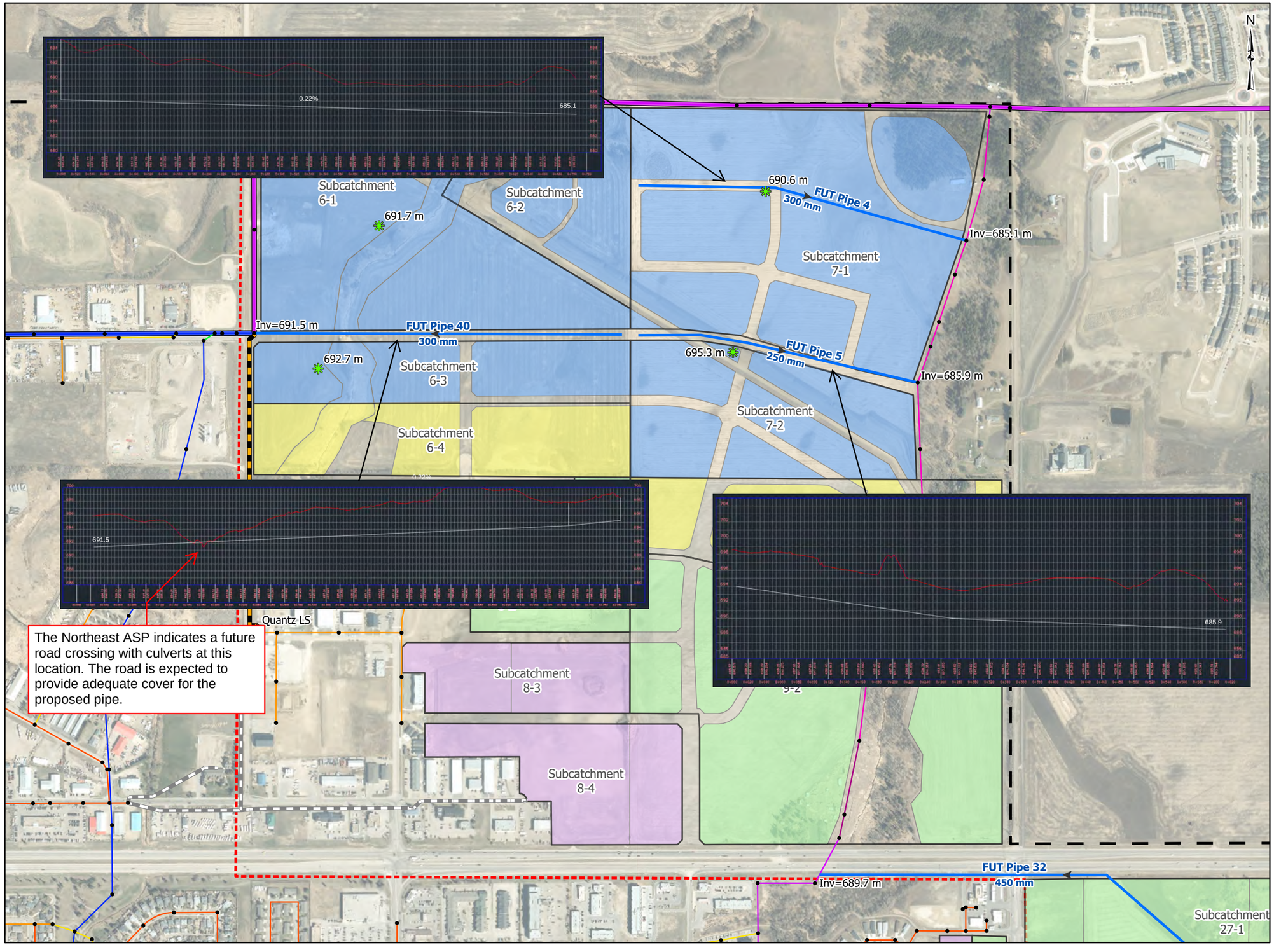
NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	F.8
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

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LEGEND

- Manhole
- Low Point
- Existing Lift Station
- Proposed Gravity Main
- Existing Low-Pressure System
- Water Commission Line
- Town Boundary

Existing Gravity Main Diameter

- 200 mm
- 250 mm
- 300 mm
- 450 mm
- 600 mm
- 750 mm
- 900 mm
- 1050 mm

Existing Forcemain Diameter

- 150 mm
- 200 mm

ARROW Utilities Trunk Sewer

- 600 mm
- 750 mm

Growth Horizon

- Short-term
- 5-year
- 10-year
- 25-year
- Ultimate

TITLE

FUTURE SERVICING CONCEPT PIPE PROFILES

PROJECT

SANITARY MASTER PLAN UPDATE

CLIENT

TOWN OF STONY PLAIN

DATA SOURCES

- Topographic Map:Parkland County, Vantor

PROJECTION

NAD 1983 CSRS 3TM 114

0 100 200

1:8,000 Meters

FIGURE	F.9
DATE	3/18/2026
PROJECT NO.	28974
AUTHOR	jlalonde-bester

Document: Z:\Shared\GIS\Projects\28974_Stony_Plain_Sanitary_Master_Plan\251_Figures\28974_Stony_Plain_SMP.aprx - Figure X_Future Servicing MB_Profiles