

Urban Planning and Economy
Development Services

City of Edmonton
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Edmonton, AB T5J 0J4



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tyler.shukaliak@edmonton.ca

May 2, 2024

File No: 51-210-092-275

Hussien Al-Turk, E.I.T., M.Eng., CAPM.
Engineer In Training
Al-Terra Engineering Ltd.
5307 - 47 Street NW,
Edmonton, Alberta T6B 3T4

**RE: Drainage Servicing Report - Rossdale Center – Drainage Servicing Report –
7th Submission - dated April 29, 2024**

Further to your April 29, 2024 submission of the finalized report, Planning Coordination (Drainage) has reviewed the report and has no further requirements regarding the report setting out the storm and sanitary servicing requirements for the development proposed under LDA22-0542.

Therefore, this is to advise you that this report is accepted by Planning Coordination (Drainage) as the basis for storm and sanitary servicing of the proposed development.

Please note, the final report forms part of the City's file with respect to this neighbourhood and may be shared with the public, if requested.

If you have any questions or comments, please contact the undersigned at 780-423-5174.

A handwritten signature in black ink, appearing to read "Tyler Shukaliak".

Tyler Shukaliak, P.Eng.
Development Engineer
Planning Coordination
Development Services
Urban Planning and Economy

TS/ok

April 29, 2024

File: 713-001

City of Edmonton
Planning Coordination
Urban Form and Corporate Strategic Development
7th Floor, Edmonton Tower
10111 – 104 Avenue NW
Edmonton, AB T5J 0J4

Attention: **Donovan Pederson, P.Eng.**
 Senior Development Engineer

Re: **Rossdale Center – Drainage Servicing Report – 7th Submission**

1.0 Background Information and Proposed Development

1.1 Purpose of Report

Al-Terra Engineering Ltd. (Al-Terra) has been retained by Dub Architects to prepare a Drainage Servicing Report to investigate sanitary and storm servicing requirements for a redevelopment project in the Rossdale Neighborhood. The project is comprised of three separate sites which are situated just south of Rossdale Road and on both sides of 100 Street NW, and north of 98 Avenue NW (see **Figure 1.1**). They are legally described as the following: Lot 2-Block 2-Plan 0021114, Lot 12-15-Block 15-Plan Q. This report is intended to support the update of the DC1 zoning of three parcels of land within the project area. For the purposes of the report, each parcel will be addressed separately and referred to as Site A, Site B, and Site C.

1.2 Existing Site Information

The sites are located south of the downtown core within the Rossdale District. Presently the site is occupied by 18 vacant lots, plus one, that has the historic Rossdale Brewery on it. The area of redevelopment for Site A is 0.43 hectares, Site B is 0.46 hectares and Site C is 0.81 hectares. The current zoning is DC1 and allows for a maximum density of 155 dwellings per hectare.

1.3 Proposed Redevelopment

The proposed sites occupy approximately 1.7 ha on four hectares of land. The proposed redevelopment sites consist of three buildings ranging from two stories to a maximum of 15. These residential towers are planned to have provision for neighborhood convenience retail, work/live units, specialty food services and neighborhood amenities. The existing Rossdale Brewery is planned to be repurposed into a restaurant.

Site A is 0.43 hectares in size and consists of 119 residential units and 164 m² of retail commercial development. Site B is 0.46 hectares in size and consists of 117 residential units and 300 m² of retail commercial development. Site C is 0.81 hectares and consists of 245 residential units and 743 m² of

restaurants with the repurposing of the Rossdale Brewery. The entire development is anticipated to have a maximum of 481 residential units, 743 m² of floor area for restaurants, and 464 m² for office and retail. There is also discussion regarding the use of Green Roofs for these buildings which will assist with the stormwater management component of these sites. For the purposes of this report, any reduction in storage capacity as a result of green roofs, will be addressed at time of individual detailed site designs.

1.4 Review of Existing Documents

The following existing documents and information have been reviewed in the preparation of this report:

- ◆ Correspondence with City of Edmonton and EPCOR Drainage (included in Appendix B)
- ◆ Record drawings from EPCOR Drainage (included in Appendix C)
- ◆ City of Edmonton – Drainage Servicing Report – Terms of Reference
- ◆ City of Edmonton – Combined Sewer Overflow Control Strategy
- ◆ City of Edmonton – Capital City Downtown Plan
- ◆ City/EPCOR Drainage Capital Projects
- ◆ EPCOR Drainage – Stormwater Integrated Resource Planning
- ◆ Rossdale Area Redevelopment Plan (May 2020)
- ◆ National Research Council Canada – Guide for Design of Flood-Resistant Buildings

2.0 Sanitary and Storm Servicing

2.1 Existing Storm and Sanitary Servicing

Existing as-built information on the surrounding sewers was obtained from EPCOR Drainage Services. Along the north side of Site A, an existing 200mm clay tile storm sewer runs in an east/west direction. It ultimately ties back into a 500mm storm sewer outfall that discharges into the river about 100m from 100 Street NW. Along 100 Street NW, an existing 300mm HDPE combined sewer runs in a north/ south direction, roughly in the center of the road right of way. The 300mm HDPE combined sewer jogs east at 98th Ave and then flows into a 450mm trunk running parallel to the North Saskatchewan River. Existing servicing and overland drainage patterns are shown in **Figure 2.1**.

The existing overland drainage patterns are influenced mainly by the existing grading of the site. Site A and B drain south and southeast towards 100 Street NW. Site C drains directly east towards the North Saskatchewan River. The existing stormwater runoff generated from the existing sites in the 1:5-year storm event is 0.018 m³/s, 0.020 m³/s, and 0.035 m³/s for Sites A, B, and C respectively. Site A only generates sanitary from a wet weather inflow of 0.12 L/s, as the lots are currently undeveloped.

2.2 Proposed Storm and Sanitary Servicing

The proposed sanitary and storm servicing is shown on **Figure 2.2**. Since it is quite conceptual at this time, the final location of services will be confirmed at detailed design to coincide with the refined site layout.

2.2.1 Sanitary Servicing

The City of Edmonton Design and Construction Standards was used to estimate the sanitary flow generation from the proposed residential tower with retail areas on the lower levels. The following table summarizes the assumptions used:



Criteria	Design Assumption
Average Residential Wastewater Generation	1.89 pop/unit (RA9 pop density) @ 220 L/person/day
Average Commercial Wastewater Generation	743 m ² Restaurants (Ex Brewery Building) @ 20 L/day/m ² 464 m ² Office/Retail @ 8 L/day/m ²
Residential Peaking Factor	Greater of 1.5 or $2.6 \times P^{(-0.1)}$ P = design population in thousands
Commercial Peaking Factor	$10 \times Q^{(-0.45)}$ (min=2.5, max=25) Q = average dry weather flow
Inflow Allowance	0.4 L/s per sag manhole
Infiltration Allowance	0.28 L/s/gross ha
Manning's Roughness Coefficient	n = 0.015 (vitrified clay tile) n = 0.013 (PVC) n = 0.013 (HDPE)

It should be noted that the peaking factor used to estimate residential and commercial flows is conservative as it does not consider combined peaking effects upstream of the redevelopment.

The number of residential units and commercial retail area is based on preliminary project targets provided by the architect. It is expected that final project parameters will not significantly differ from the initial project targets. Assumptions in this report will be updated as required and re-submitted to the City if a large variation occurs.

The existing peak wet weather sanitary flow was estimated to be 0.476 L/s based on the existing vacant lots and adjacent park sites. The total peak wet weather sanitary flow generation from the three redevelopment sites is estimated to be **12.09 L/s**. As shown on **Figure 2.2**, the sanitary services for Sites B and C are proposed to tie-into the existing 300mm HDPE combined sewer under 100th Street at MH 244823. The sanitary service for Site A would tie-in further north into the existing combined sewer. The sanitary service will need to be extended west through the existing 6.0m wide EPCOR Drainage easement to service Site A.

The proposed connection point for Site A's sanitary service is approximately 25m south of manhole 245312 as shown in profile 3 of **Appendix E**. The depth of the invert at this manhole is 619.551m. The invert at the proposed connection point is 619.434m. A 45.78m service constructed at 2% would achieve an invert of 620.350m at the proposed sanitary manhole. This leaves the pipe with 3.15m of cover to invert of pipe which meets cover requirements by EPCOR Drainage Design and Construction Standards. Site B and Site C will connect to manhole 244823 at a depth of 619.115, provide 3.235m of cover as shown in profile 3 of **Appendix E**. **Figure 2.3** provides a profile view of the purposed sanitary extension towards Site A.



Detailed calculations for sanitary flows can be found in **Appendix A**.

2.2.2 Storm Servicing

The City of Edmonton requires the stormwater discharge rate to be controlled at 35 L/s/Ha. Upon examining the downstream capacity of the downstream sewer, it was determined that discharging at 35 L/s/Ha would exceed the capacity of the downstream pipe. To balance the onsite storage and downstream sewer capacity, 15 L/s/Ha was chosen as the design discharge across all sites. Therefore, the total allowable controlled stormwater discharge rate for the sites are as follows:

Site A – **6.45 L/s**

Site B – **6.9 L/s**

Site C – **12.15 L/s**

Additional stormwater above the allowable discharge rate will need to be stored onsite.

The required 1:100-year stormwater storage for the sites are as follows:

Site A - **236 m³**

Site B – **252 m³**

Site C – **444 m³**

These volumes are based on the 1:100 year 4-hour Chicago Design Storm per the City of Edmonton 2022 updated IDF curves using a runoff coefficient of 0.95. Storage requirements should be reviewed at detailed design once site layout is better defined, and a more accurate runoff coefficient can be used. It may be possible to utilize rooftop storage on these sites. Flow control roof drains will be implemented to control the release rate. Some additional storage will also be accommodated on the surface where outside parking is proposed. Storage tanks below the parkade slab could also be utilized as the groundwater level was found to be 7.55m below surface. These details would be finalized at detailed design.

Of the listed stormwater management storage methods, rooftop storage/green roofs, parking lot surface storage, and underground storage tanks could be considered for all three sites. However, due to Site C's proximity to the river and limited elevation change, high flow events may back up from the river through gravity pipes compromising storage tank capacity. Therefore, only rooftop and parking lot storage should be considered for Site C.

As recommended in the City's Combined Sewer Overflow Control Strategy, the site redevelopment provides a good opportunity to separate stormwater from combined sewers. With this consideration, the storm services for these sites are proposed to connect north into the 200mm storm sewer that runs parallel to Site A as shown on **Figure 2.2**. An alternate storm servicing location is also proposed for Site B if storm service depth becomes an issue. Detailed calculations for storm flows can be found in **Appendix A**. Further coordination with EPCOR WASS will be required at time of detailed design for a service off the 200mm storm sewer.

Site A will connect to manhole 245272 at 621.712m, Site B will connect to manhole 245273 at 621.302m, and Site C will connect to manhole 245275 at 620.887m. All three services will achieve the same cover as existing infrastructure at the lowest depths possible to tie into the closest manholes as shown on profile 1 in **Appendix E**.

Site B's alternative storm connection is to manhole 244786 also matching existing inverts. Existing invert elevation and downstream pipe slope is as shown on Profile 6 in **Appendix E**. The capacity of a 525mm storm pipe provides potential relief to the storm pipes north of the site that are only 300mm if used for Site B discharge. Using the alternative connection for Site B, we can reduce the utilization of the 300mm pipe downstream of manhole 245275 from 61.31% to 44.72%. This can be advantageous as larger existing storm conveyance infrastructure is being used and flow from the development is being split between two outlets. Lastly, the maximum allowable discharge from Site B may be increased from 15 L/s/ha to reduce the on-site storage requirements. This can be explored further with more information in the detailed design phase of the project.

Considering the EPCOR modeling results, Site A servicing is satisfactory, Site B should be serviced by connecting to storm manhole 245273 as the alternative servicing location exceeds downstream capacity, and Site C can be serviced in the location shown on **Figure 2.2** contingent on the upgrade of the existing pipe. In order to achieve the required capacity of 73.1 L/s, the existing 300mm pipe 29595 (MH245275 to 245291) will need to be upsized to a 375mm pipe. The slope of the 32m pipe will need to be adjusted to 0.20% to provide a capacity of 78.4 L/s as shown in the detailed calculations in **Appendix A**. The elevation of the new downstream invert will be 620.72m.

2.2.3 Floodplain Protection Overlay

Site C is located within the City of Edmonton's Floodplain Protection Overlay and is subject to the Floodplain Management Policies in the Rossdale Area Redevelopment Plan. The Floodplain Management Policies state that no development shall occur within the 1:25 year flood line of the North Saskatchewan River. As per the Floodplain Protection Area figure in **Appendix C**, Site C building is located outside of the 1:25 year flood line but within the 1:100-year flood line as shown in the floodplain images in **Appendix C**. Consequently, development of Site C can occur, however, proper flood-proofing measures need to be implemented. The details of the flood-proofing design would be required at the time of the Development Permit, and building changes that increase the building footprint area within the 1:25 year flood line would not be permitted.

3.0 Existing Drainage Network

3.1 Impacts to Existing Infrastructure

Figure 3.1 shows the proposed redevelopment within the overall drainage network for the area.

Per the City of Edmonton's Drainage Servicing Report Terms of Reference, the proposed storm and sanitary flow generation were compared as a percentage of downstream pipe to the full flow capacity and in terms of pre-development vs post-development flows.

With the storm flow restricted to 15 L/s/ha, the combined storm flow generation for all three sites utilizes less than 61.31% of the capacity of the immediate downstream sewer. The post development storm flow is 26 L/s, which is a 63.8% reduction from the pre-development storm flow of 72 L/s. The utilization can be reduced from 61.31% to 44.72% if the alternative service location is used to split the flow from the proposed development.

The combined sanitary flow generation for all three sites total 12.09 L/s and utilize 23.06% of the immediate downstream sewer. Although this is a significant increase from the pre-development sanitary flow of 0.476 L/s, it is a vast improvement from the current zoning and allowable discharge of the combined storm and

sanitary flow generation ($0.476 + 72 = 72.48$ L/s). Refer to **Appendix A** for existing stormwater and sanitary flow generation.

As the post-development flow increase exceeds 10% capacity of the immediate downstream sewer, Al-Terra recommends that EPCOR Drainage undertake hydraulic modelling and incorporate upstream catchment areas and downstream backwater effects to review the hydraulic grade line in the existing 300mm sanitary main within 100 Street NW. Additionally, evaluating the capacity of 300mm storm main along 100 street and the 525mm storm main along 98 avenue to determine the available capacity of both sewers. Based on that evaluation, Site B's discharge will be adjusted to the alternate service location as shown in **Figure 2.2** if capacity prohibits the proposed service location.

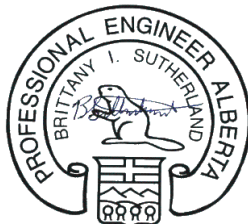
4.0 Closure

We trust that the above and enclosed meet with your satisfaction. Please do not hesitate to contact the undersigned if you have any questions.

Regards,



Prepared By:
Hussien Al-Turk, E.I.T, M.Eng., CAPM
Engineer in Training
Al-Terra Engineering Ltd.



107222
April 30, 2024

Reviewed By:
Brittany Sutherland P.Eng.
Manager, Site Development
Al-Terra Engineering Ltd.

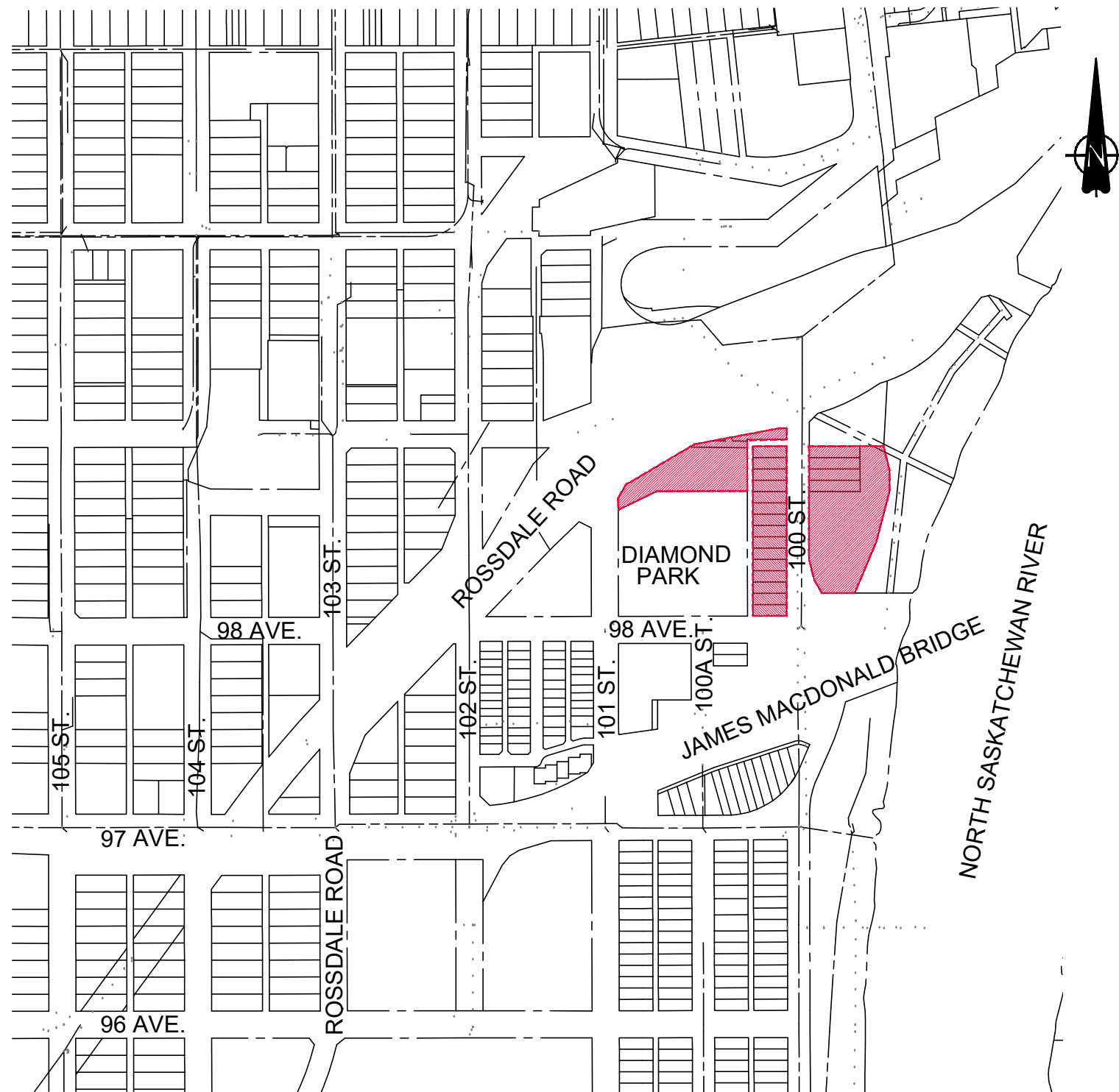
PERMIT TO PRACTICE	
AL-TERRA ENGINEERING LTD	
RM SIGNATURE: _____	
RM APEGA ID #: _____	M55541
DATE: _____	2024-Apr-30
PERMIT NUMBER: P002104	
The Association of Professional Engineers and Geoscientists of Alberta (APEGA)	

Reviewed By:
Glen W. Thoman, M.A.Sc. P.Eng.
Vice President
Al-Terra Engineering Ltd.

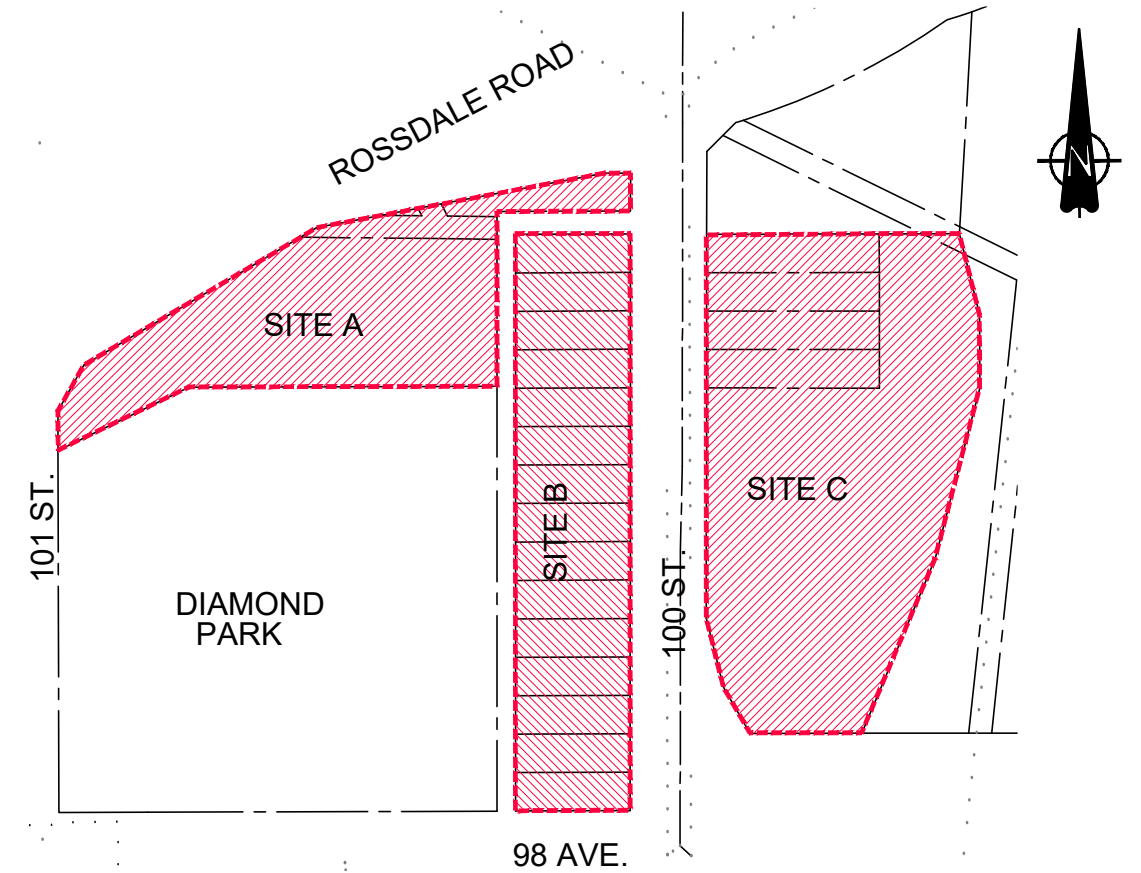
Enclosures

Cc Gene Dub, Dub Architects





KEY PLAN
SCALE: 1:5000



SITE LOCATION PLAN
SCALE: 1:2000

EXISTING

LEGEND

PROPOSED

PROPERTY LINE

SUBJECT PROPERTY



KEY PLAN AND
SITE LOCATION PLAN

DRAWN BY:	AGS	CHECKED:	AGS	JOB NO:	713-001
DESIGN:	AGS	DATE:	SEPTEMBER 2023	DRAWING NO:	
SCALE: 1:2000					Fig 1.1

ROSSDALE REDEVELOPMENT
DRAINAGE STUDY

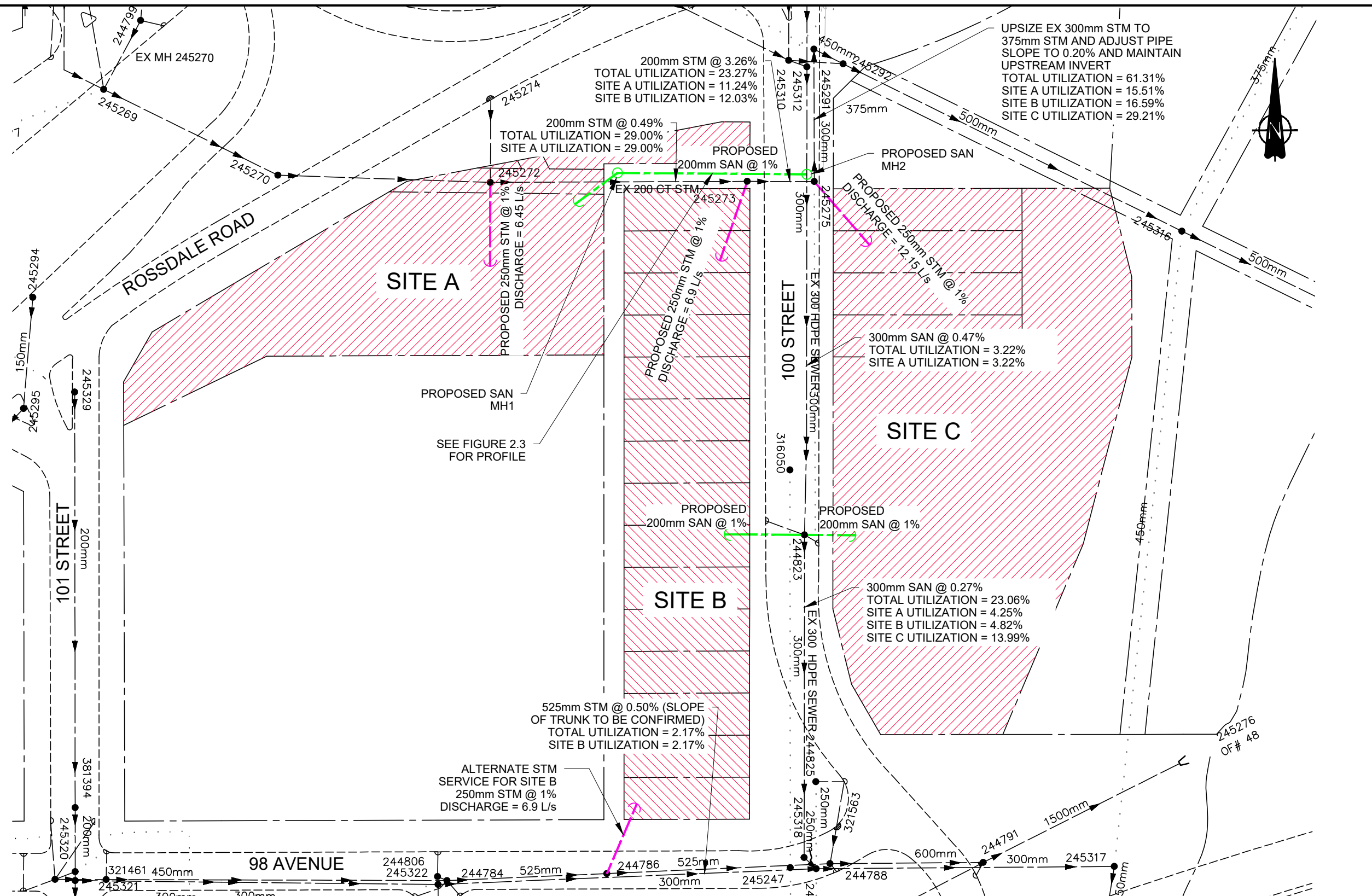
BY

DUB ARCHITECT

IN

THE CITY OF EDMONTON

98th Ave, ROSSDALE ROAD & 100 St.



UPSIZE EX 300mm STM TO
375mm STM AND ADJUST PIPE
SLOPE TO 0.20% AND MAINTAIN
UPSTREAM INVERT
TOTAL UTILIZATION = 61.31%
SITE A UTILIZATION = 15.51%
SITE B UTILIZATION = 16.59%
SITE C UTILIZATION = 29.21%

200mm STM @ 3.26%
TOTAL UTILIZATION = 23.27%
SITE A UTILIZATION = 11.24%
SITE B UTILIZATION = 12.03%

200mm STM @ 0.49%
TOTAL UTILIZATION = 29.00%
SITE A UTILIZATION = 29.00%

PROPOSED SAN
MH2

PROPOSED 250mm STM @ 1%
DISCHARGE = 12.15 L/s

300mm SAN @ 0.47%
TOTAL UTILIZATION = 3.22%
SITE A UTILIZATION = 3.22%

300mm SAN @ 0.27%
TOTAL UTILIZATION = 23.06%
SITE A UTILIZATION = 4.25%
SITE B UTILIZATION = 4.82%
SITE C UTILIZATION = 13.99%

525mm STM @ 0.50% (SLOPE
OF TRUNK TO BE CONFIRMED)
TOTAL UTILIZATION = 2.17%
SITE B UTILIZATION = 2.17%

ALTERNATE STM
SERVICE FOR SITE B
250mm STM @ 1%
DISCHARGE = 6.9 L/s

PROPOSED SAN
MH1
SEE FIGURE 2.3
FOR PROFILE

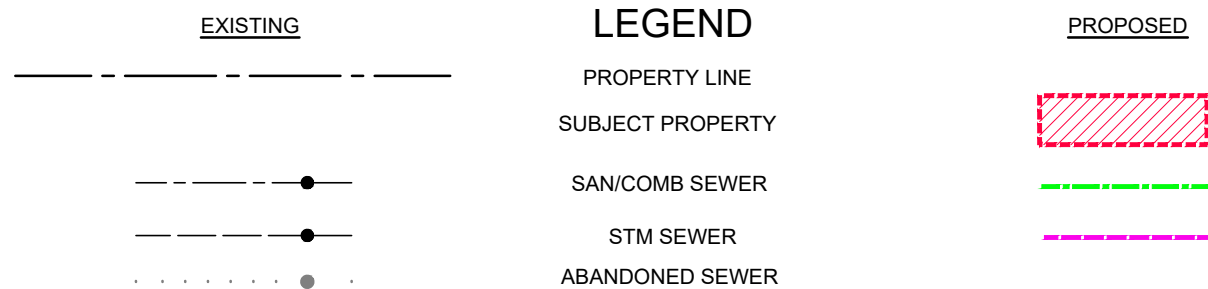
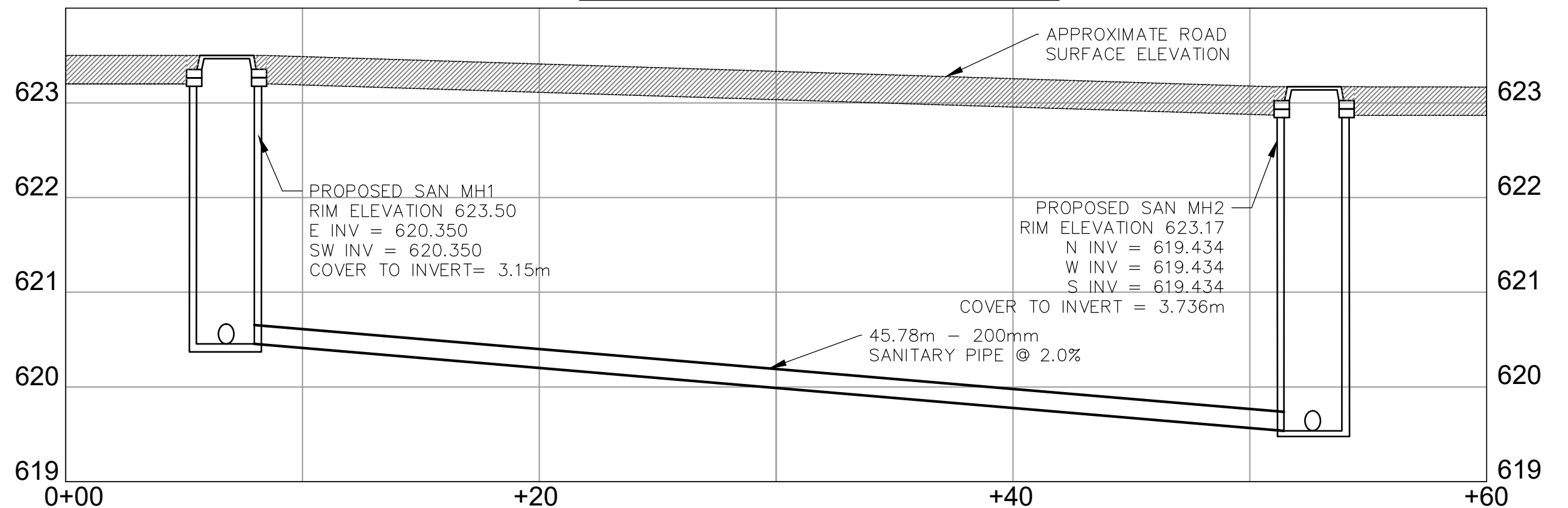
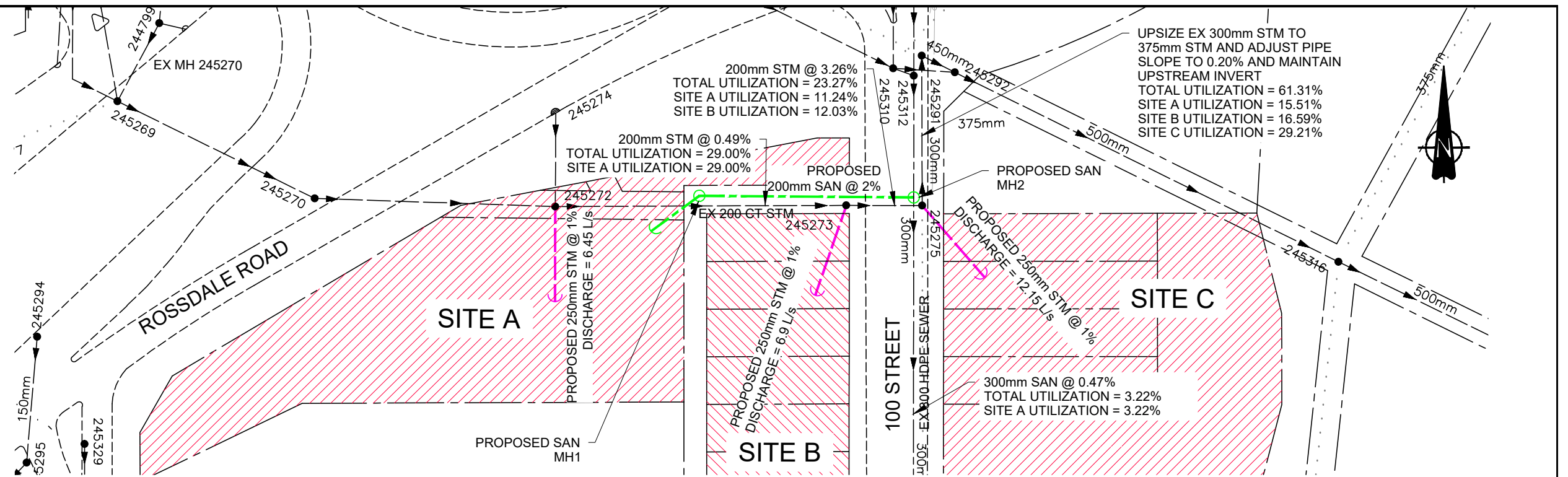
EXISTING		LEGEND		PROPOSED	
		PROPERTY LINE			
		SUBJECT PROPERTY			
		SAN/COMB SEWER			
		STM SEWER			
		ABANDONED SEWER			



PROPOSED STORM AND
SANITARY SERVICING

DRAWN BY:	AGS	CHECKED:	AGS	JOB NO:	713-001
DESIGN:	AGS	DATE:	SEPTEMBER 2023	DRAWING NO:	
SCALE: 1:1000				Fig. 2.2	

ROSSDALE TOWER
DRAINAGE STUDY
BY
DUB ARCHITECT
IN
THE CITY OF EDMONTON
98th Ave, ROSSDALE ROAD & 100 St.



PROPOSED SANITARY SERVICING - PROFILE

DRAWN BY:	HAA	CHECKED:	AGS	JOB NO:	713-001
DESIGN:	HAA	DATE:	OCTOBER 2023	DRAWING NO:	
SCALE: 1:1000				Fig. 2.3	

ROSSDALE TOWER
DRAINAGE STUDY
BY
DUB ARCHITECT
IN
THE CITY OF EDMONTON
98th Ave, ROSSDALE ROAD & 100 St.

ESTIMATED STORMWATER GENERATION
FROM REDEVELOPMENT AREAS:

SITE "A" AREA = 0.43 Ha
ALLOWABLE RELEASE RATE = 15 L/s/Ha
SITE RELEASE RATE = 6.45 L/s
STORAGE REQUIRED = 236m³

SITE "B" AREA = 0.46 Ha
ALLOWABLE RELEASE RATE = 15 L/s/Ha
SITE RELEASE RATE = 6.90 L/s
STORAGE REQUIRED = 252m³

SITE "C" AREA = 0.81 Ha
ALLOWABLE RELEASE RATE = 15 L/s/Ha
SITE RELEASE RATE = 12.15 L/s
STORAGE REQUIRED = 444m³

TOTAL STORM FLOW = 26 L/s
MH 245275 to MH 245291 SEWER = 300mmØ CONC @0.17%
CAPACITY UTILIZATION = 61.31%

USING ALTERNATIVE SITE B DISCHARGE:
TOTAL STORM FLOW = 19 L/s
MH 245275 to MH 245291 SEWER = 300mmØ CONC @0.17%
CAPACITY UTILIZATION = 44.72%

ESTIMATED PEAK SANITARY GENERATION
FROM REDEVELOPMENT AREA:

SANITARY GENERATION FOR RESTAURANTS IS
20 L/day/m2 AND OFFICE/RETAIL IS 8 L/day/m2

SITE A:

RESIDENTIAL:

119 UNITS @ 1.89 pop/unit & 220 L/day/pop
LOCAL PEAKING FACTOR = 3.02
RESIDENTIAL PEAK SAN GENERATION = 1.73 L/s

COMMERCIAL:

ASSUMING 164 m2 FOR FOR OFFICE/RETAIL
LOCAL PEAKING FACTOR = 25.00
COMMERCIAL PEAK SAN GENERATION = 0.38 L/s

INFLOW/INFILTRATION

ASSUME 0.28 L/s/Ha w/ NO SAGS
WET WEATHER FLOW = 0.12 L/s

SITE A PEAK SANITARY GENERATION = 2.229 L/s

SITE B:

RESIDENTIAL:

ASSUMING 117 UNITS @ 1.89 pop/unit & 220 L/day/pop
LOCAL PEAKING FACTOR = 3.02
RESIDENTIAL PEAK SAN GENERATION = 1.70 L/s

COMMERCIAL:

ASSUMING 300 m2 FOR OFFICE/RETAIL
LOCAL PEAKING FACTOR = 25.00
COMMERCIAL PEAK SAN GENERATION = 0.69 L/s

INFLOW/INFILTRATION

ASSUME 0.28 L/s/Ha w/ NO SAGS
WET WEATHER FLOW = 0.13 L/s

SITE B PEAK SANITARY GENERATION = 2.526 L/s

SITE C:

RESIDENTIAL:

ASSUMING 245 UNITS @ 1.89 pop/unit & 220 L/day/pop
LOCAL PEAKING FACTOR = 2.81
RESIDENTIAL PEAK SAN GENERATION = 3.31 L/s

COMMERCIAL:

ASSUMING 743 m2 FOR RESTAURANT
LOCAL PEAKING FACTOR = 22.08
COMMERCIAL PEAK SAN GENERATION = 3.8 L/s

INFLOW/INFILTRATION

ASSUME 0.28 L/s/Ha w/ NO SAGS
WET WEATHER FLOW = 0.23 L/s

SITE B PEAK SANITARY GENERATION = 7.335 L/s

TOTAL PEAK SANITARY FLOW = 12.09 L/s
MH 244825 to MH 245318 SEWER = 300mmØ HDPE @0.27%
CAPACITY UTILIZATION = 23.06%



EXISTING

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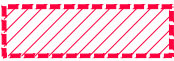
LEGEND

PROPERTY LINE
SUBJECT PROPERTY

SAN/COMB SEWER
STM SEWER

ABANDONED SEWER
OFFSITE SAN ROUTE
OFFSITE STM ROUTE

PROPOSED



Al-Terra
Engineering Ltd.

OVERALL DRAINAGE NETWORK PLAN

DRAWN BY:	AGS	CHECKED:	AGS	JOB NO:	713-001
DESIGN:	AGS	DATE:	SEPTEMBER 2023	DRAWING NO:	
SCALE: 1:3000					Fig 3.1

ROSSDALE TOWER
DRAINAGE STUDY
BY

DUB ARCHITECT
IN
THE CITY OF EDMONTON
98th Ave, ROSSDALE ROAD & 100 St.

Appendix A

Background Calculations

DRAINAGE SERVICING REPORT CALCULATIONS

PROJECT: Rossdale Centre - DSR
JOB NO.: 713-001
DATE UPDATED: October 12, 2023
DESIGNED BY: Hussien Al-Turk, E.I.T., M.Eng., CAPM
CHECKED BY: Andrew Stankieveh, RET

EXISTING STORM GENERATION

Area ID	Area (Ha)	Land Use/Zoning	Runoff Coefficient	T _c (min) =	I ₅ (mm/hr) =	I ₁₀₀ (mm/hr) =	Q ₅ (m³/s) =	Q ₁₀₀ (m³/s) =
Site A	0.43	SOFTSCAPE	0.20	8.000	76.68	155.74	0.018	0.047
Site B	0.46	SOFTSCAPE	0.20	8.000	76.68	155.74	0.020	0.050
Site C	0.81	SOFTSCAPE	0.20	8.000	76.68	155.74	0.035	0.088
Total Area:	1.70	Weighted Runoff C:	0.20				0.072	

T_c (min) = 8
I₅ (mm/hr) = 76.68
I₁₀₀ (mm/hr) = 155.74

CONTROLLED STORM GENERATION

Area ID	Area (Ha)	Land Use/Zoning	Runoff Coefficient	T _c (min) =	I ₅ (mm/hr) =	I ₁₀₀ (mm/hr) =	Q ₅ (m³/s) =	Q ₁₀₀ (m³/s) =
Site A	0.43	HARDSCAPE	0.95	5.000	91.37	180.57	0.006	0.221
Site B	0.46	HARDSCAPE	0.95	5.000	91.37	180.57	0.007	0.236
Site C	0.81	HARDSCAPE	0.95	5.000	91.37	180.57	0.012	0.416
Total Area:	1.70	Weighted Runoff C:	0.95				0.026	

Notes

1) Post development storm generation will be controlled to 15 L/s/ha

% CAP OF IMMEDIATE DOWNSTREAM PIPE

Site A	Site B	Site C	COMBINED	Alternative Site B Service
Pipe ID: MH 245272 to MH 245273 Pipe material = Clay tile Manning's n = 0.014 Pipe size (mm) = 200.00 Pipe slope (%) = 0.49% Q _{CAP} (L/s) = 22.241 % Q _{CAP} = 29.00%	Pipe ID: MH 245273 to MH 245275 Pipe material = Clay tile Manning's n = 0.014 Pipe size (mm) = 200.00 Pipe slope (%) = 3.26% Q _{CAP} (L/s) = 57.367 % Q _{CAP} = 12.03%	Pipe ID: MH 245275 to MH 245291 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 300.00 Pipe slope (%) = 0.17% Q _{CAP} (L/s) = 41.595 % Q _{CAP} = 29.21%	Pipe ID: MH 245275 to MH 245291 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 300.00 Pipe slope (%) = 0.17% Q _{CAP} (L/s) = 41.595 % Q _{CAP} = 61.31%	MH 245275 to MH 245291 Concrete 0.013 300.00 0.17% 41.595 44.72%
Pipe ID: MH 245273 to MH 245275 Pipe material = Clay tile Manning's n = 0.014 Pipe size (mm) = 200.00 Pipe slope (%) = 3.26% Q _{CAP} (L/s) = 57.367 % Q _{CAP} = 11.24%	Pipe ID: MH 245275 to MH 245291 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 300.00 Pipe slope (%) = 0.17% Q _{CAP} (L/s) = 41.595 % Q _{CAP} = 16.59%	Pipe ID: MH 245310 to MH 245292 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 375.00 Pipe slope (%) = 1.50% Q _{CAP} (L/s) = 214.735 % Q _{CAP} = 5.66%	Pipe ID: MH 245310 to MH 245292 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 375.00 Pipe slope (%) = 1.50% Q _{CAP} (L/s) = 214.735 % Q _{CAP} = 11.88%	MH 245310 to MH 245292 Concrete 0.013 375.00 1.50% 214.735 8.66%
	Alternate Service Pipe ID: MH 244786 to MH 244788 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 525.00 Pipe slope (%) = 0.66% Q _{CAP} (L/s) = 364.491 % Q _{CAP} = 1.89%		Upgrade Service Pipe ID: MH 245275 to MH 245291 Pipe material = Concrete Manning's n = 0.013 Pipe size (mm) = 375.00 Pipe slope (%) = 0.20% Q _{CAP} (L/s) = 78.410 % Q _{CAP} = 32.52%	

EXISTING SANITARY GENERATION

Existing lots are undeveloped. Only Inflow and Infiltration is to be considered for existing sanitary generation.

Land Use/ Zoning RF1	Area (Ha) 0.65	Units 0	Population 0.00
Total Area:		Total Population:	0.00
Q _{AVG} (L/s) =		0.00	
Peaking Factor =		0.00	
Q _{PEAK} (L/s) =		0.00	

Wet Weather Flow

Site Area (ha) =	1.70
Inflow/Infiltration (L/s) =	0.48
Sag MH Inflow (L/s) =	0.00
Q _{WET} (L/s) =	0.48
Q_{TOTAL} (L/s) =	0.476

NEW DESIGN SANITARY GENERATION - TOTAL

% CAP OF IMMEDIATE DOWNSTREAM PIPE

Summary Table

	Site A	Site B	Site C
Residential	1.73	1.70	3.31
Commercial	0.38	0.69	3.80
Inflow/Infiltration	0.12	0.13	0.23
Total	2.23	2.53	7.34

Q_{TOTAL} (L/s) = 12.090

Pipe ID:	MH 244823 to MH 245318
Pipe material =	HDPE
Manning's n =	0.013
Pipe size (mm) =	300.00
Pipe slope (%) =	0.27%
Q _{CAP} (L/s) =	52.420
% Q_{CAP} =	23.06%

NEW DESIGN SANITARY GENERATION Site A

% CAP OF IMMEDIATE DOWNSTREAM PIPE

Residential Site

Land Use/ Zoning RA9	Area (Ha) 0.43	Units 119	Population 224.91
Total Area:		Total Population:	224.91
Q _{AVG} (L/s) =		0.57	
Peaking Factor =		3.02	
Q _{PEAK} (L/s) =		1.73	

Pipe ID:	MH 244823 to MH 245318
Pipe material =	HDPE
Manning's n =	0.013
Pipe size (mm) =	300.00
Pipe slope (%) =	0.27%
Q _{CAP} (L/s) =	52.420
% Q_{CAP} =	4.25%

Building Use	Area (m ²)	Q (L/day/m ²)	Q _{AVG} (L/s)
Site A Restaurant	0	20	0.00
Site A NBHD Retail	164	8	0.02
		Total Q _{AVG} :	0.02
Q _{AVG} (L/s) =		0.02	
Peaking Factor =		25.00	
Q _{PEAK} (L/s) =		0.38	

Wet Weather Flow

Site Area (ha) =	0.43	Assume all onsite MH's Waterproofed
Inflow/Infiltration (L/s) =	0.12	
Sag MH Inflow (L/s) =	0.00	
Q _{WET} (L/s) =	0.12	
Q_{TOTAL} (L/s) =	2.229	

NEW DESIGN SANITARY GENERATION Site B

% CAP OF IMMEDIATE DOWNSTREAM PIPE

Residential Site

Land Use/ Zoning RA9	Area (Ha) 0.46	Units 117	Population 221.13
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Total Area:	0.46	Total Population:	221.13
Q _{AVG} (L/s) =	0.56		
Peaking Factor =	3.02		
Q _{PEAK} (L/s) =	1.70		

Building	Area (m ²)	Q (L/day/m ²)	Q _{AVG} (L/s)
Site B Restaurant	0	20	0.00
Site B NBHD Retail	300	8	0.03
		Total Q _{AVG} :	0.03

Q _{AVG} (L/s) =	0.03
Peaking Factor =	25.00
Q _{PEAK} (L/s) =	0.69

Wet Weather Flow

Site Area (ha) =	0.46	
Inflow/Infiltration (L/s) =	0.13	
Sag MH Inflow (L/s) =	0.00	Assume all onsite MH's Waterproofed
Q _{WET} (L/s) =	0.13	

Q_{TOTAL} (L/s) = 2.526

Pipe ID: MH 244823 to MH 245318

Pipe material = PVC
Manning's n = 0.013
Pipe size (mm) = 300.00
Pipe slope (%) = 0.27%

Q_{CAP} (L/s) = 52.420
% Q_{CAP} = 4.82%

NEW DESIGN SANITARY GENERATION Site C

% CAP OF IMMEDIATE DOWNSTREAM PIPE

Residential Site

Land Use/ Zoning RA9	Area (Ha) 0.81	Units 245	Population 463.05
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Total Area:	0.81	Total Population:	463.05
Q _{AVG} (L/s) =	1.18		
Peaking Factor =	2.81		
Q _{PEAK} (L/s) =	3.31		

Building	Area (m ²)	Q (L/day/m ²)	Q _{AVG} (L/s)
Site C Restaurant	743	20	0.17
Site C NBHD Retail	0	8	0.00
		Total Q _{AVG} :	0.17

Q _{AVG} (L/s) =	0.17
Peaking Factor =	22.08
Q _{PEAK} (L/s) =	3.80

Wet Weather Flow

Site Area (ha) =	0.81	
Inflow/Infiltration (L/s) =	0.23	
Sag MH Inflow (L/s) =	0.00	Assume all onsite MH's Waterproofed
Q _{WET} (L/s) =	0.23	

Q_{TOTAL} (L/s) = 7.335

Pipe ID: MH 244823 to MH 245318

Pipe material = PVC
Manning's n = 0.013
Pipe size (mm) = 300.00
Pipe slope (%) = 0.27%

Q_{CAP} (L/s) = 52.420
% Q_{CAP} = 13.99%

The City of Edmonton - Drainage Services Department

REQUIRED STORMWATER STORAGE

MODIFIED RATIONAL METHOD: 100 YEAR, 4 HOUR CHICAGO DISTRIBUTION (2022 IDF)



5307 - 47 Street NW, Edmonton, Alberta, T6B 3T4
Tel: 780-440-4411 Fax: 780-440-2585

PROJECT: Rossdale Centre - Site A

JOB NO.: 713-001

DATE: September 8, 2023

AREA: 0.43 ha
C: 0.95
RELEASE RATE: 15 L/s/ha
MAX. OUTFLOW: 6.45 L/s

Time (min)	Intensity (mm/hr)	Peak Flow (m ³ /s)	Max. Outflow (m ³ /s)	Timestep Storage (m ³)	Cumulative Storage (m ³)
0	0	0.000	0.00645	0.00	0.00
5	5.61	0.006	0.00645	0.00	0.00
10	5.93	0.007	0.00645	0.08	0.08
15	6.29	0.007	0.00645	0.21	0.29
20	6.71	0.008	0.00645	0.35	0.64
25	7.2	0.008	0.00645	0.52	1.16
30	7.77	0.009	0.00645	0.71	1.87
35	8.47	0.010	0.00645	0.95	2.81
40	9.31	0.011	0.00645	1.23	4.05
45	10.38	0.012	0.00645	1.60	5.65
50	11.77	0.013	0.00645	2.07	7.72
55	13.65	0.015	0.00645	2.71	10.43
60	16.35	0.019	0.00645	3.63	14.06
65	20.57	0.023	0.00645	5.07	19.13
70	28.09	0.032	0.00645	7.63	26.76
75	45.21	0.051	0.00645	13.46	40.21
80	137.78	0.156	0.00645	44.97	85.18
85	137.78	0.156	0.00645	44.97	130.15
90	79.03	0.090	0.00645	24.97	155.11
95	51.9	0.059	0.00645	15.73	170.85
100	38.53	0.044	0.00645	11.18	182.03
105	30.66	0.035	0.00645	8.50	190.53
110	25.52	0.029	0.00645	6.75	197.28
115	21.9	0.025	0.00645	5.52	202.80
120	19.23	0.022	0.00645	4.61	207.41
125	17.17	0.019	0.00645	3.91	211.32
130	15.53	0.018	0.00645	3.35	214.68
135	14.2	0.016	0.00645	2.90	217.57
140	13.1	0.015	0.00645	2.52	220.10
145	12.17	0.014	0.00645	2.21	222.31
150	11.37	0.013	0.00645	1.94	224.24
155	10.68	0.012	0.00645	1.70	225.94
160	10.08	0.011	0.00645	1.50	227.44
165	9.55	0.011	0.00645	1.32	228.75
170	9.08	0.010	0.00645	1.16	229.91
175	8.66	0.010	0.00645	1.01	230.92
180	8.28	0.009	0.00645	0.88	231.81
185	7.93	0.009	0.00645	0.76	232.57
190	7.62	0.009	0.00645	0.66	233.23
195	7.33	0.008	0.00645	0.56	233.79
200	7.07	0.008	0.00645	0.47	234.26
205	6.82	0.008	0.00645	0.39	234.65
210	6.6	0.007	0.00645	0.31	234.96
215	6.39	0.007	0.00645	0.24	235.20
220	6.2	0.007	0.00645	0.18	235.38
225	6.02	0.007	0.00645	0.11	235.49
230	5.85	0.007	0.00645	0.06	235.55
235	5.69	0.006	0.00645	0.00	235.55
240	5.54	0.006	0.00645	0.00	235.55

The City of Edmonton - Drainage Services Department

REQUIRED STORMWATER STORAGE

MODIFIED RATIONAL METHOD: 100 YEAR, 4 HOUR CHICAGO DISTRIBUTION (2022 IDF)



5307 - 47 Street NW, Edmonton, Alberta, T6B 3T4
Tel: 780-440-4411 Fax: 780-440-2585

PROJECT: Rossdale Centre - Site B

JOB NO.: 713-001

DATE: September 8, 2023

AREA: 0.46 ha
C: 0.95
RELEASE RATE: 15 L/s/ha
MAX. OUTFLOW: 6.9 L/s

Time (min)	Intensity (mm/hr)	Peak Flow (m ³ /s)	Max. Outflow (m ³ /s)	Timestep Storage (m ³)	Cumulative Storage (m ³)
0	0	0.000	0.0069	0.00	0.00
5	5.61	0.007	0.0069	0.00	0.00
10	5.93	0.007	0.0069	0.09	0.09
15	6.29	0.008	0.0069	0.22	0.31
20	6.71	0.008	0.0069	0.37	0.68
25	7.2	0.009	0.0069	0.55	1.24
30	7.77	0.009	0.0069	0.76	2.00
35	8.47	0.010	0.0069	1.01	3.01
40	9.31	0.011	0.0069	1.32	4.33
45	10.38	0.013	0.0069	1.71	6.04
50	11.77	0.014	0.0069	2.22	8.26
55	13.65	0.017	0.0069	2.90	11.16
60	16.35	0.020	0.0069	3.88	15.04
65	20.57	0.025	0.0069	5.42	20.46
70	28.09	0.034	0.0069	8.16	28.62
75	45.21	0.055	0.0069	14.39	43.02
80	137.78	0.167	0.0069	48.10	91.12
85	137.78	0.167	0.0069	48.10	139.23
90	79.03	0.096	0.0069	26.71	165.94
95	51.9	0.063	0.0069	16.83	182.77
100	38.53	0.047	0.0069	11.96	194.73
105	30.66	0.037	0.0069	9.10	203.82
110	25.52	0.031	0.0069	7.22	211.05
115	21.9	0.027	0.0069	5.91	216.95
120	19.23	0.023	0.0069	4.93	221.88
125	17.17	0.021	0.0069	4.18	226.07
130	15.53	0.019	0.0069	3.59	229.65
135	14.2	0.017	0.0069	3.10	232.75
140	13.1	0.016	0.0069	2.70	235.45
145	12.17	0.015	0.0069	2.36	237.82
150	11.37	0.014	0.0069	2.07	239.89
155	10.68	0.013	0.0069	1.82	241.71
160	10.08	0.012	0.0069	1.60	243.31
165	9.55	0.012	0.0069	1.41	244.71
170	9.08	0.011	0.0069	1.24	245.95
175	8.66	0.011	0.0069	1.08	247.03
180	8.28	0.010	0.0069	0.95	247.98
185	7.93	0.010	0.0069	0.82	248.80
190	7.62	0.009	0.0069	0.70	249.50
195	7.33	0.009	0.0069	0.60	250.10
200	7.07	0.009	0.0069	0.50	250.61
205	6.82	0.008	0.0069	0.41	251.02
210	6.6	0.008	0.0069	0.33	251.35
215	6.39	0.008	0.0069	0.26	251.61
220	6.2	0.008	0.0069	0.19	251.80
225	6.02	0.007	0.0069	0.12	251.92
230	5.85	0.007	0.0069	0.06	251.98
235	5.69	0.007	0.0069	0.00	251.98
240	5.54	0.007	0.0069	0.00	251.98

The City of Edmonton - Drainage Services Department

REQUIRED STORMWATER STORAGE

MODIFIED RATIONAL METHOD: 100 YEAR, 4 HOUR CHICAGO DISTRIBUTION (2022 IDF)



5307 - 47 Street NW, Edmonton, Alberta, T6B 3T4
Tel: 780-440-4411 Fax: 780-440-2585

PROJECT: Rossdale Centre - Site C

JOB NO.: 713-001

DATE: September 8, 2023

AREA: 0.81 ha
C: 0.95
RELEASE RATE: 15 L/s/ha
MAX. OUTFLOW: 12.15 L/s

Time (min)	Intensity (mm/hr)	Peak Flow (m ³ /s)	Max. Outflow (m ³ /s)	Timestep Storage (m ³)	Cumulative Storage (m ³)
0	0	0.000	0.01215	0.00	0.00
5	5.61	0.012	0.01215	0.00	0.00
10	5.93	0.013	0.01215	0.16	0.16
15	6.29	0.013	0.01215	0.39	0.55
20	6.71	0.014	0.01215	0.66	1.20
25	7.2	0.015	0.01215	0.97	2.18
30	7.77	0.017	0.01215	1.34	3.51
35	8.47	0.018	0.01215	1.79	5.30
40	9.31	0.020	0.01215	2.33	7.62
45	10.38	0.022	0.01215	3.01	10.64
50	11.77	0.025	0.01215	3.90	14.54
55	13.65	0.029	0.01215	5.11	19.65
60	16.35	0.035	0.01215	6.84	26.49
65	20.57	0.044	0.01215	9.55	36.03
70	28.09	0.060	0.01215	14.37	50.40
75	45.21	0.097	0.01215	25.35	75.75
80	137.78	0.295	0.01215	84.71	160.45
85	137.78	0.295	0.01215	84.71	245.16
90	79.03	0.169	0.01215	47.03	292.19
95	51.9	0.111	0.01215	29.64	321.83
100	38.53	0.082	0.01215	21.06	342.89
105	30.66	0.066	0.01215	16.02	358.90
110	25.52	0.055	0.01215	12.72	371.62
115	21.9	0.047	0.01215	10.40	382.02
120	19.23	0.041	0.01215	8.69	390.71
125	17.17	0.037	0.01215	7.37	398.07
130	15.53	0.033	0.01215	6.31	404.39
135	14.2	0.030	0.01215	5.46	409.85
140	13.1	0.028	0.01215	4.76	414.60
145	12.17	0.026	0.01215	4.16	418.76
150	11.37	0.024	0.01215	3.65	422.41
155	10.68	0.023	0.01215	3.20	425.61
160	10.08	0.022	0.01215	2.82	428.43
165	9.55	0.020	0.01215	2.48	430.91
170	9.08	0.019	0.01215	2.18	433.09
175	8.66	0.019	0.01215	1.91	435.00
180	8.28	0.018	0.01215	1.66	436.66
185	7.93	0.017	0.01215	1.44	438.10
190	7.62	0.016	0.01215	1.24	439.34
195	7.33	0.016	0.01215	1.06	440.40
200	7.07	0.015	0.01215	0.89	441.29
205	6.82	0.015	0.01215	0.73	442.01
210	6.6	0.014	0.01215	0.59	442.60
215	6.39	0.014	0.01215	0.45	443.05
220	6.2	0.013	0.01215	0.33	443.39
225	6.02	0.013	0.01215	0.22	443.60
230	5.85	0.013	0.01215	0.11	443.71
235	5.69	0.012	0.01215	0.00	443.71
240	5.54	0.012	0.01215	0.00	443.71

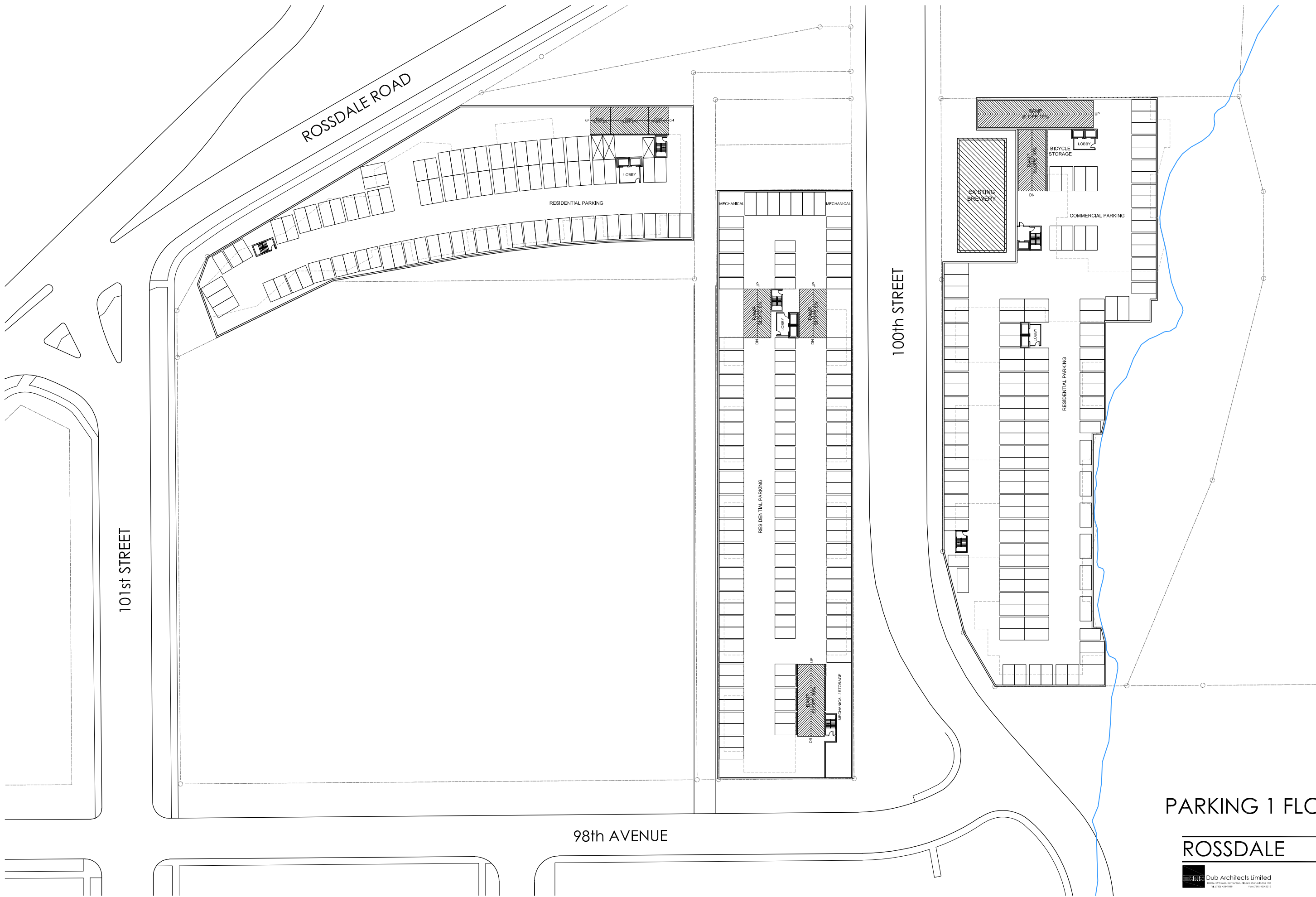
Appendix B

EPCOR Drainage Modelling Results

STORM SERVICES ANALYSIS

Appendix C

Rossdale Flood Plain Protection Area



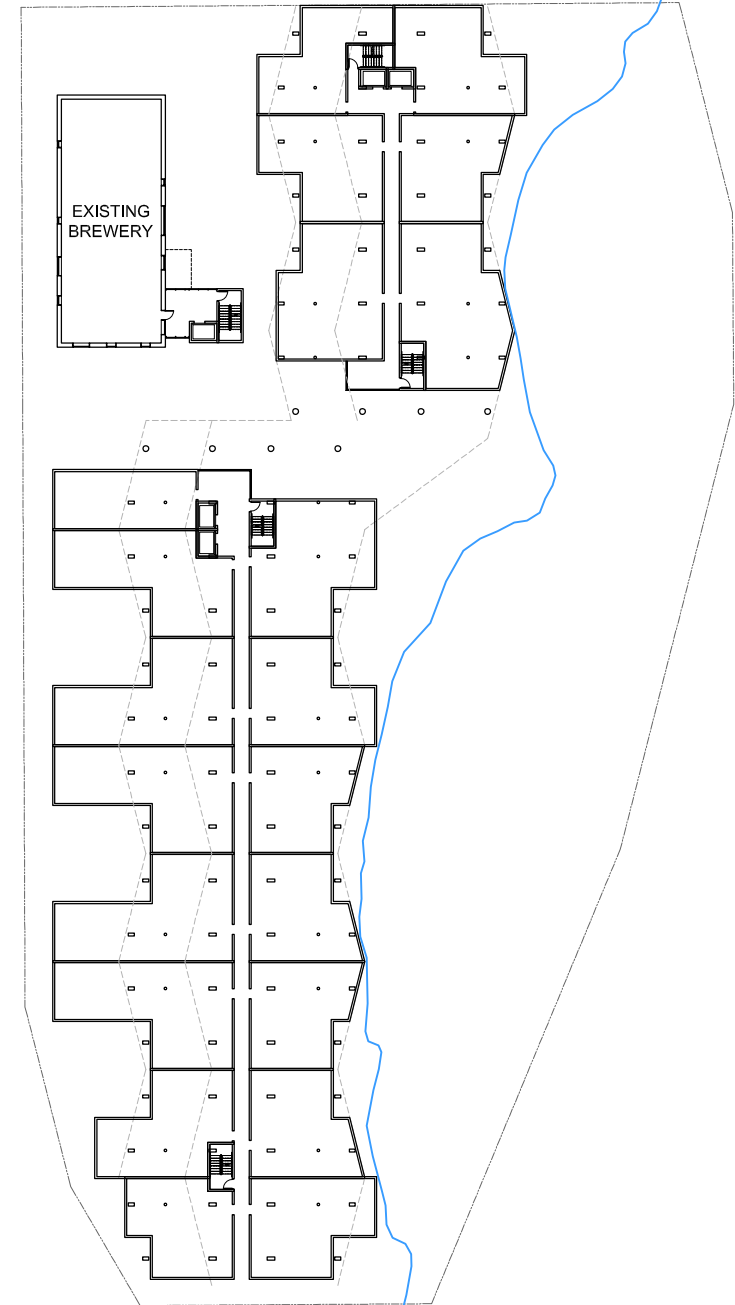
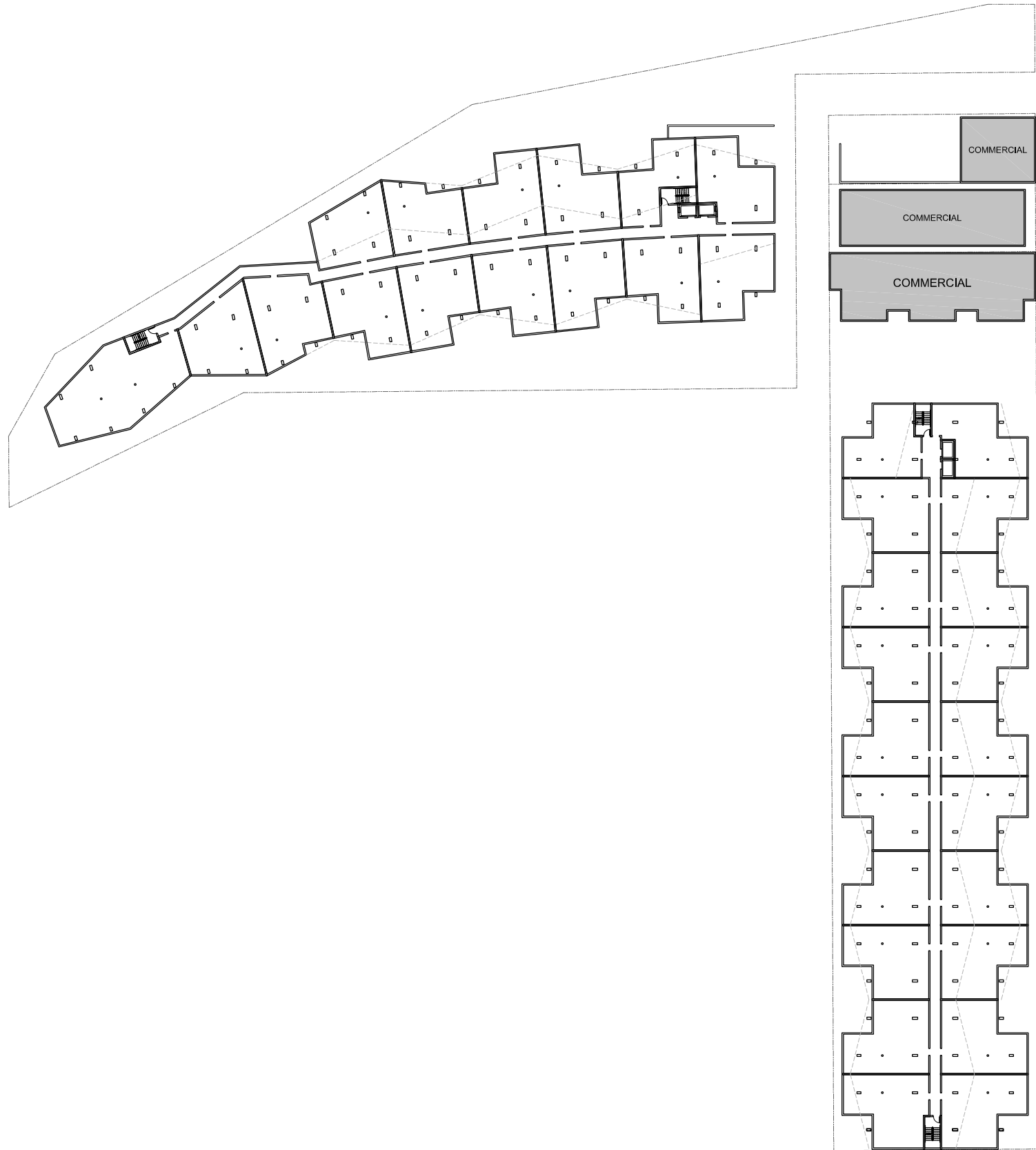




MAIN FLOOR PLAN

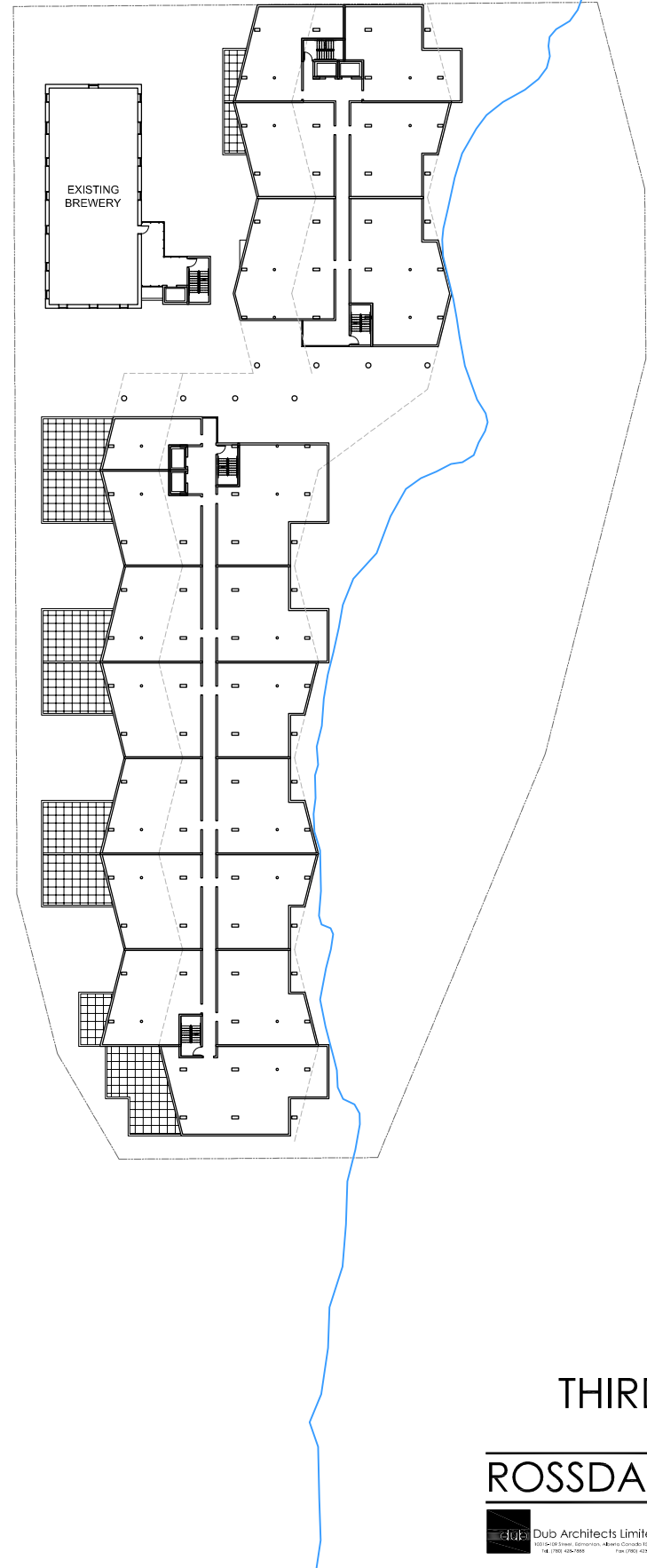
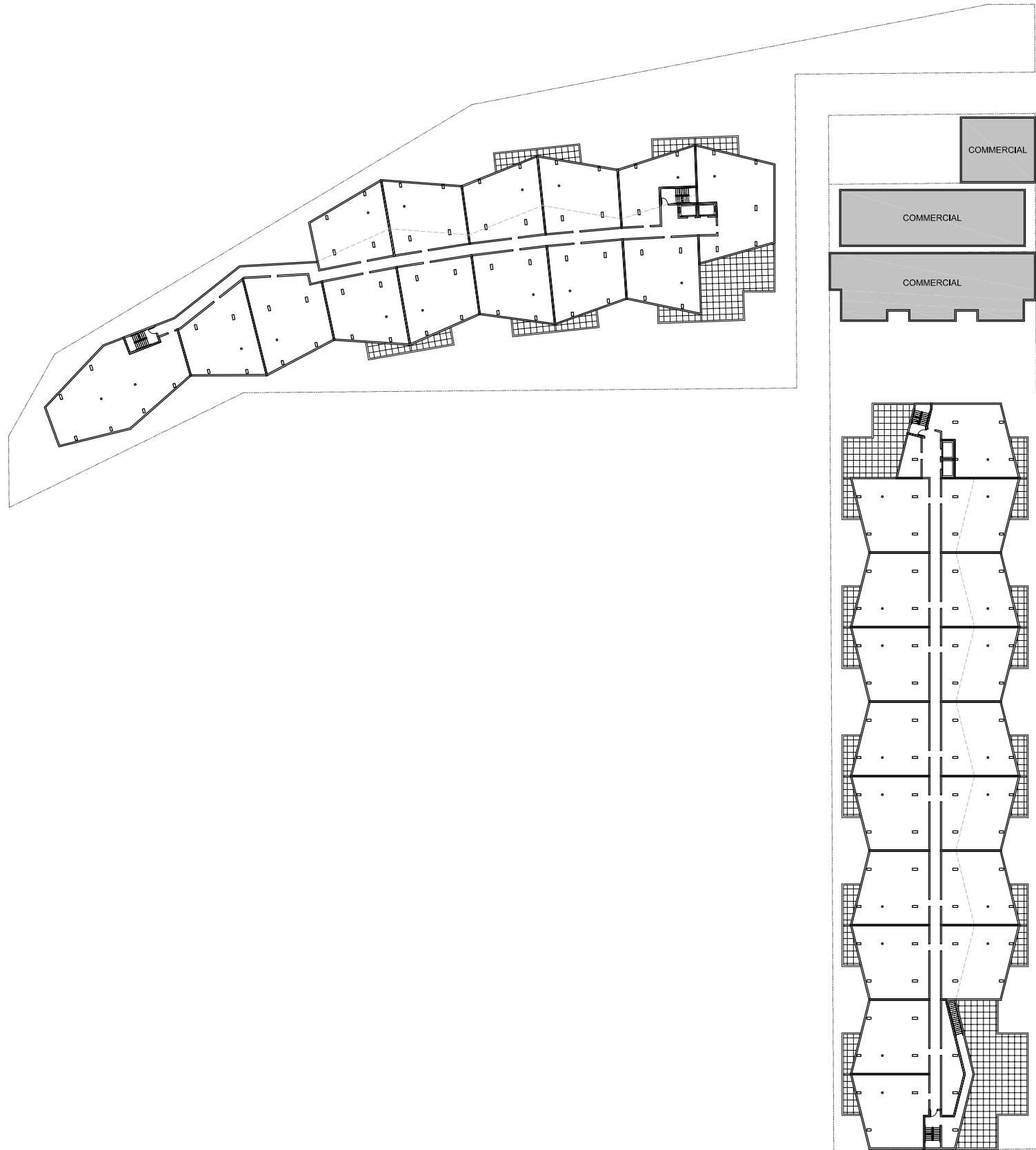
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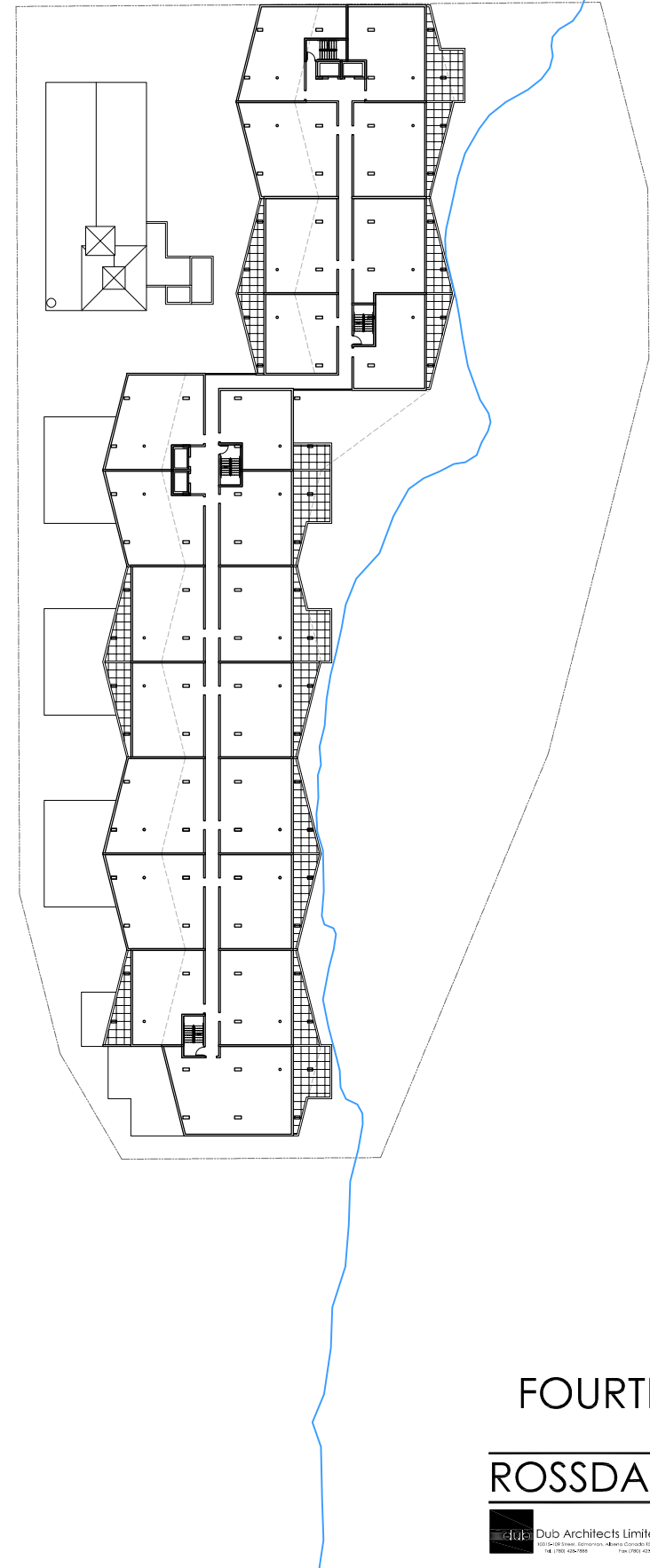
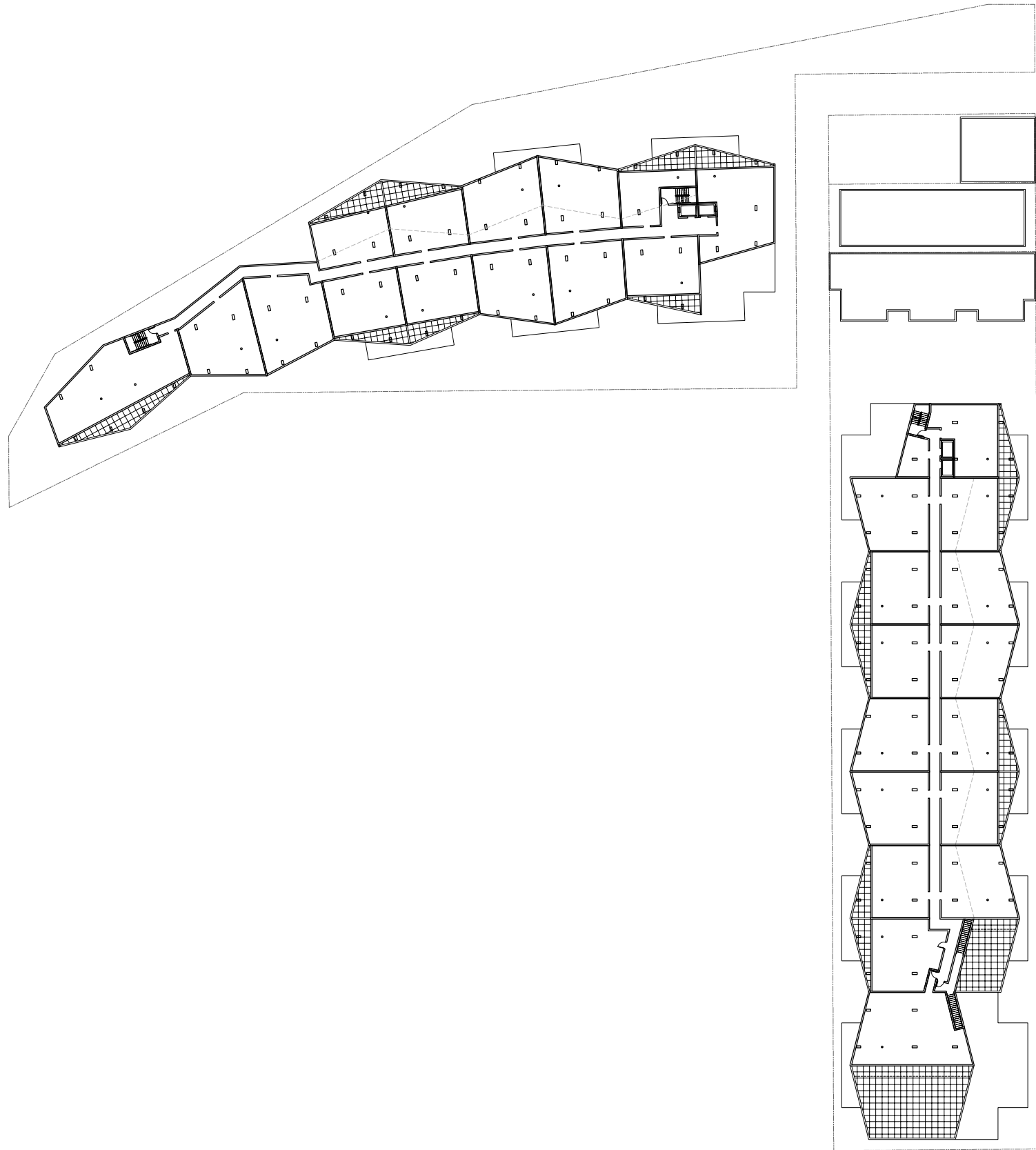
ROSSDALE CENTRE



SECOND FLOOR PLAN
SCALE 1/64"=1'-0"

ROSSDALE CENTRE





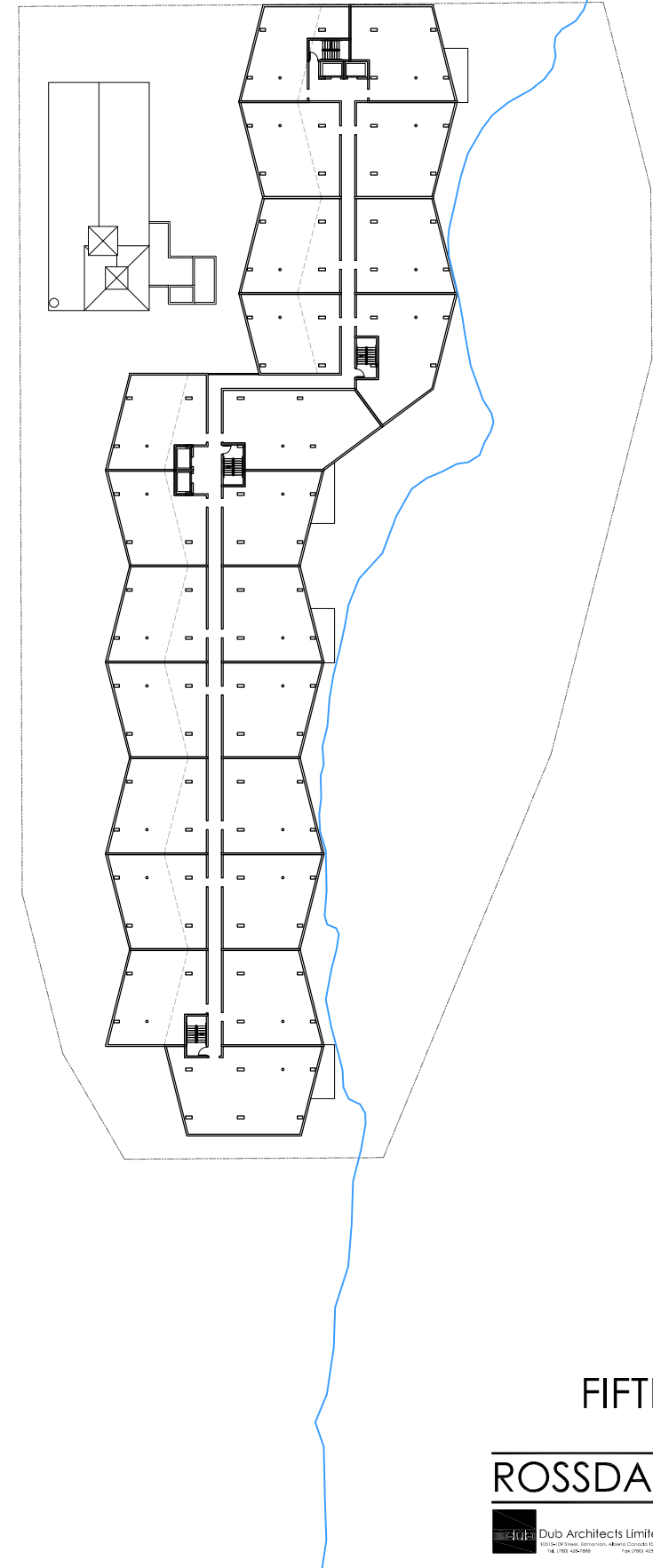
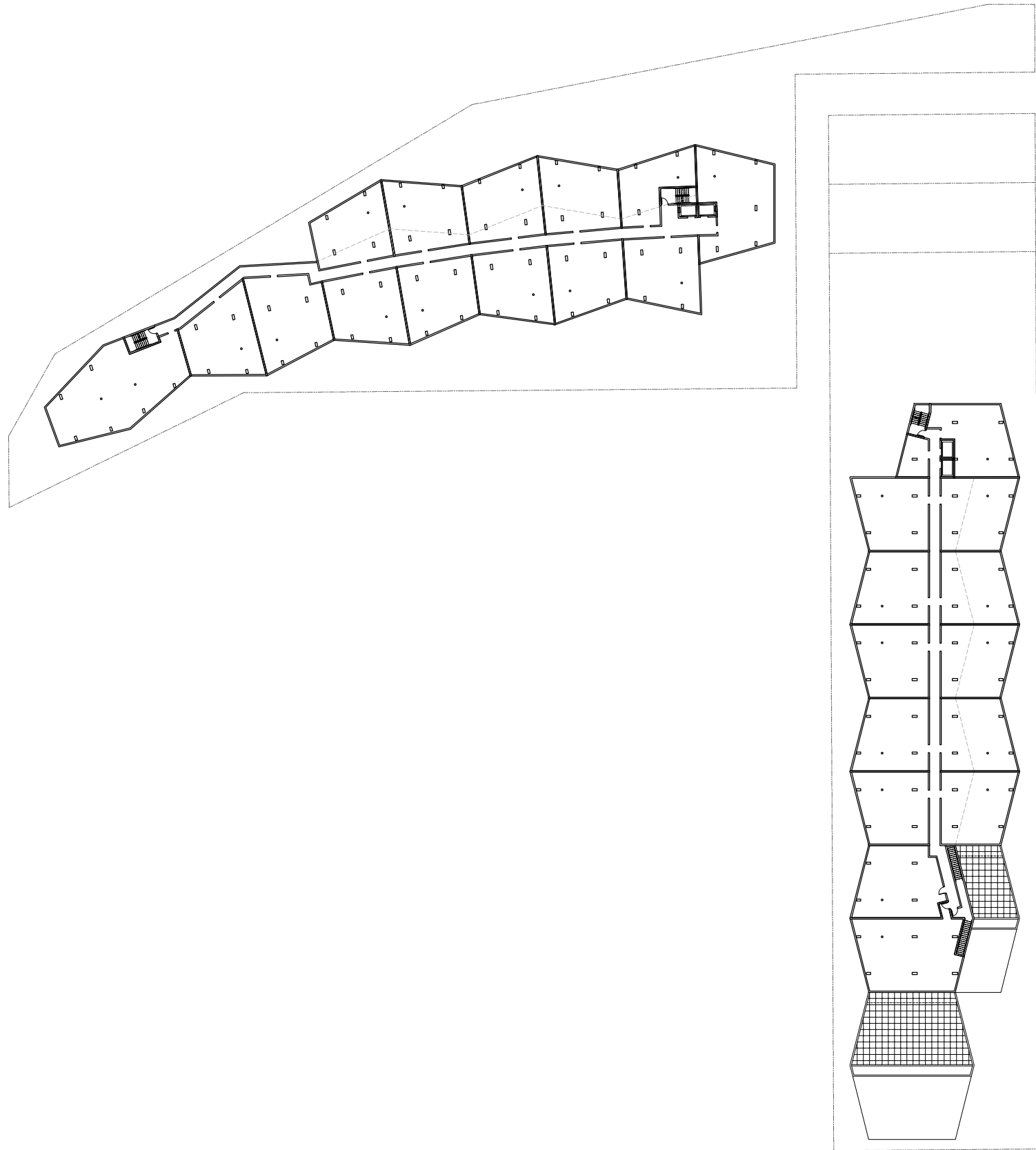
FOURTH FLOOR PLAN

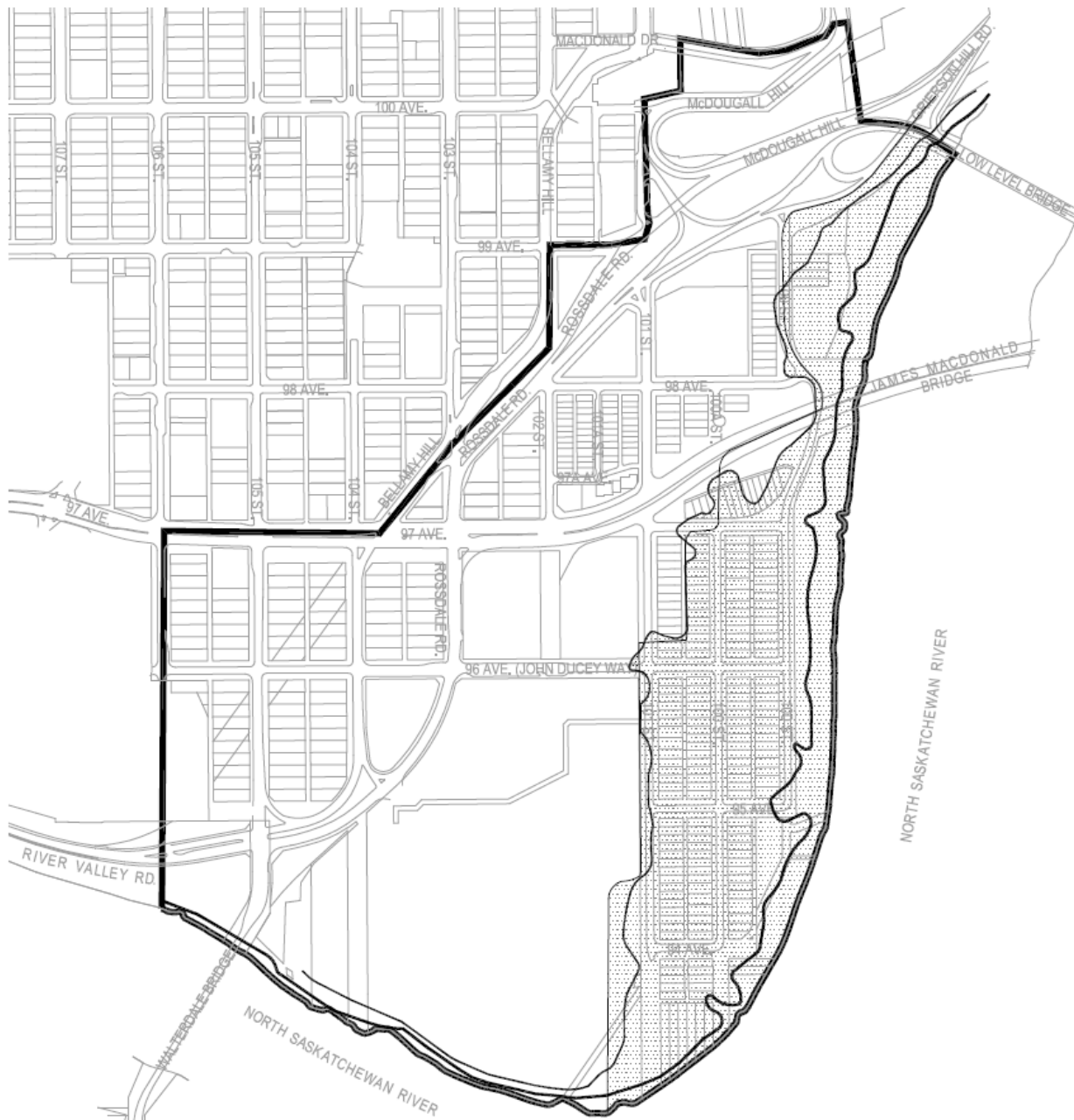
SCALE 1/64"=1'-0"

ROSSDALE CENTRE

Dub Architects Limited
100-10100 101st Avenue, Suite 101, Edmonton, Alberta T5A 1K1
Tel: (780) 424-1888 Fax: (780) 424-2012

date: 2023-12-06 sheet:





Legend

- Rosssdale ARP Boundary
- 1:25 Year Flood Line
- 1:100 Year Flood Line
- Floodplain Protection Overlay

Map 9
Floodplain Protection Area

Rosssdale
Area Redevelopment Plan
Edmonton, Alberta



Appendix D

Project Correspondence (Place Holder)

Appendi

Appendix E

Sewer Profiles

