THE CITY OF EDMONTON

PROJECT AGREEMENT
VALLEY LINE LRT – STAGE 1

Schedule 5 – D&C Performance Requirements

Part 3: Civil

VALLEY LINE PROJECT

SCHEDULE 5

D&C PERFORMANCE REQUIREMENTS

PART 3: CIVIL

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SECTION 3-1 - TRACK

3-1.1 DESIGN BASIS AND CRITERIA

3-1.1.1 Reference Standards

A. Without limiting Section 1-1.7 *[Reference Documents]* of this Schedule, and except as otherwise specified herein, develop and implement design standards for the Track alignment, Track and all associated infrastructure (the ***"Track Design Standards"***) based upon with the following guidance, standards and regulations, as adjusted to accommodate all On-track Vehicles:

1. TCRP Report 155 – Track Design Handbook for Light Rail Transit, Second Edition; and

2. AREMA Manual for Railway Engineering, 2013.

B. The Track Design Standards shall provide all design criteria limits (i.e. minimum and maximums) and shall account for all factors affecting the safe and efficient operation of the System.

C. In the event of any conflict, ambiguity or inconsistency between or among the requirements of Section 3-1.1.1A *[Reference Standards]* of this Schedule 5 *[D&C Performance Requirements]*, the requirements of TCRP Report 155 shall prevail.

3-1.1.2 Track Alignment

A. Using the Track Design Standards as a basis, perform a Track alignment optimization study, as part of the design development process, to determine the optimal Track alignment necessary to ensure the safe and efficient operation of the System, (the "***Track Optimization Study***"), Demonstrate how the Track alignment is optimized for the System, including:

1. performance characteristics of the LRV, including acceleration, deceleration and braking capability;

2. all potential Train configurations, including LRV dimensions and bogie spacing;

3. Rail/wheel interface, including characteristics of the rail and wheel profiles;

4. the effect of different operating speeds, up to and including the Maximum Design Speed;

5. LRT Corridor constraints, including Station and Stop locations, available stopping distance; horizontal curvature, spiral transition, superelevation, grade and overlapping condition of horizontal curve with vertical curve and steep grade;

6. interfaces between the Track and adjacent structures, including the effect of Special Trackwork such as rail anchors or anti-creep devices, sliding rail joints and rail restraining devices in areas where differential structural movement is anticipated; and

7. the passenger ride comfort requirements identified in TCRP Report 155.

B. Optimize the Track alignment in accordance with the results of the Track Optimization Study, subject to the following requirements:

1. Passengers shall not be subjected to excessive accelerations, vibrations, or shocks, as defined in TCRP Report 155, *Section 2.4.6 Light Rail Vehicle Ride Quality* and *3.2.4 Curvature, Speed, and Superelevation—Theory and Basis of Criteria*, when the Train is travelling at the Maximum Design Speed; and

2. lateral acceleration and jerk rate due to curvature of Track shall not exceed the following acceleration of gravity values:

    a. Ballasted Track: 0.1 g maximum lateral acceleration;

    b. Direct Fixation Track and Embedded Track: 0.15 g maximum lateral acceleration; and

    c. the maximum jerk rate for any spiral length of Mainline Track shall not exceed 0.03 g/sec.

3-1.1.3 Design Speeds

A. Determine the Maximum Design Speed for each section of the alignment and include all relevant calculations with the applicable Final Design package.

B. Determine the Maximum Operating Speed, Maximum Design Speed, the Maximum Posted Speed, and the speed required to fulfill the requirements for Line-of-Sight operation, for each section of the alignment and include all relevant calculations with the applicable Final Design package.

3-1.1.4 Track General

3-1.1.4.1 Track Configuration

A. All Mainline Track shall consist of two sets of nominally parallel Track designed for revenue service, right hand running, operation.

3-1.1.4.2 Track Gauge

A. All Track shall be a standard gauge of 1435 mm, measured at a point 16 mm below top of the running rail.

3-1.1.4.3 Track Superelevation

A. Provide Track superelevation on curved sections of the alignment where required to ensure compliance with the passenger ride comfort and operational safety requirements of this Agreement.

B. Track superelevation shall not be permitted on any Track sections that include turnouts, crossovers or diamond crossings.

3-1.1.4.4 Horizontal Curves

A. The minimum radius of all curves on Mainline Track shall accommodate all On-track Vehicles.

B. The minimum radius curves on Yard Track shall be 25m.

C. The minimum length of tangent between reverse curves and curves in the same direction shall accommodate all On-track Vehicles.

D. Incorporate spiral transition curves in all horizontal curves on Mainline Track.

E. The minimum spiral length for all Mainline Track shall be no less than that required to accommodate the bogie spacing of any Train configuration.

3-1.1.4.5 Vertical Curves

A. All vertical curves shall be parabolic, with a minimum rate of change (K value), as required to accommodate all Trains.

B. Changes in grade shall not be permitted on any Track sections that include switches, crossovers or diamond crossings.

3-1.1.5 Trackway

3-1.1.5.1 General

A. Rail deflection and rail break gap shall not exceed the allowable rail deflection and rail break gap, each as specified in TCRP Report 155.

B. Design the Trackway to accommodate the operating system design temperature range specified in Section 1-2.1.1B *[Operational Design Parameters]* of this Schedule.

C. Design the Trackway based on the neutral temperature applicable to each section of the alignment.

3-1.1.5.2 Embedded Track

A. Provide Embedded Track at the following locations:

1. at each Grade Crossing except:

    a. at SUP and pedestrian only midblock crossings where no Embedded Track is provided at either end of the crossing, for which precast panels may be used;

2. in the zone delineated by all crosswalks at the intersections adjacent to all Stops;

3. from the western limit of the alignment (west of 102 Street Stop) to the western end of the 102 Avenue Tunnel Approach;

4. from the western limit of the Grade Crossing at 95 Avenue to the western end of the Davies Elevated Guideway; and

5. from the northern limit of the crosswalk, north of the Grey Nuns Stop, to the eastern limit of the alignment (west of Hewes Way/Youville Drive).

3-1.1.5.3 North River Bank Tunnel Approach Access Road

A. Any Trackway that forms part of the North River Bank Tunnel Approach Access Road, including all slab and Track components, shall be designed to permit a standard fire truck as defined in 2.4.10 of the *Valley Line LRT Roadways Design and Construction Standards* to turn around on the Trackway.

3-1.1.5.4 Davies Station

1. Provide either Embedded Track or Direct Fixation Track throughout the Davies Station, for at least the length of the Platforms.

3-1.2 GENERAL TRACK SYSTEM REQUIREMENTS

3-1.2.1 Passenger Ride Comfort Requirements

A. The alignment and Track shall be designed in accordance with the recommendations and best practices described in TCRP Report 155.

3-1.2.2 Railway Agreements

A. All Trackway that interfaces with, or passes under, across or over, a Heavy Rail right-of-way shall comply with the requirements of the applicable Railway Agreements.

3-1.3 FUNCTIONAL AND TECHNICAL REQUIREMENTS

3-1.3.1 Track Components

A. All Track materials shall follow the guidelines and standard practices based on the following reference documents:

1. AREMA Manual for Railway Engineering;

2. AREMA Portfolio of Trackwork Plans;

3. CEN EN Railway Application Standards; and

4. VDV Permanent Way Directives;

B. Ballast, sub-ballast and tee rail shall adhere to AREMA Standards.

C. All Trackway materials shall be service proven, with a minimum of 5 years of in-street light rail revenue service, in a climate designated as Koppen classification Dfa or Dfb, with at least three months per year of ice and snow cover.

3-1.3.2 Rail

3-1.3.2.1 Running Rail

A. All running rail on Mainline Track shall be a minimum of 115 lb. RE continuous welded rail, conforming to the standard carbon steel rail manufacturing standards of AREMA.

B. Notwithstanding the requirements of 3-1.3.2.1A *[Running Rail]* of this Schedule, girder rail, compatible with 115 lb. RE rail size, rail profile, metallurgy and the rail/wheel interface requirements, may be used for Embedded Track.

C. Jointed rail shall be permitted in the Yard Track.

3-1.3.2.2 Restraining Guard Rail

A. Determine the need for restraining guard rail in accordance with TCRP Report 155, Sections 2.5.5.4 *Inboard versus Outboard Bearing Trucks* and 4.3 *Guarded Curves and Restraining Rails,* and considering the risk of derailment caused by wheel climb.

B. Where deemed necessary, restraining guard rail shall be designed for the rail/wheel interface characteristics and curve radius.

3-1.3.2.3 Derailment Protection

A. Provide emergency guard rails or another form of derailment protection within the Trackway, where located on:

1. an Elevated Guideway having a vertical height difference between the edge of the Trackway and the immediately adjacent surface of 1m or greater;

2. an embankment fill section having a slope steeper than 3H:1V, with a total vertical height difference between the edge of the Trackway and the bottom of the slope of between 1m and 3m; and

3. an embankment fill section having a slope equal to, or shallower than, 3H:1V, with a total vertical height difference between the edge of the Trackway and the bottom of the slope greater than 3m.

B. All emergency guard rails and other derailment protection structures shall be designed to contain the Train within the Trackway in the event of derailment.

3-1.3.3 Rail Fastening Systems

A. Provide mechanical rail fasteners for the entire length of any curve, where that curve is fully or partially within a Grade Crossing.

B. Rail fastening systems shall:

1. hold gauge and absorb the rail forces caused by temperature fluctuation; and

2. dampen vibrations and prevent rail creep caused by rail/wheel interaction.

C. All fasteners within Direct Fixation Track and Ballasted Track shall permit lateral gauge adjustment. Direct Fixation Track shall allow for vertical adjustment by use of shims.

3-1.3.4 Wood Ties

A. Wood ties shall not be permitted on Mainline Track.

B. Where wood ties are used, they shall comply with the requirements of Schedule 10 *[Environmental Performance Requirements]* of this Agreement.

C. Wood tie preservation treatment shall not contain any creosote or other Hazardous Substances having potential to leach in any way to the surrounding environment.

3-1.3.5 Turnout Standards and Geometry

A. All turnouts and crossovers shall (except as specified in Section 3-1.3.5B *[Turnout Standards and Geometry]* of this Schedule):

1. comply with standard AREMA frog number designations;

2. be designed with tangential turnout geometry;

3. be fully welded or connected with zero-gap joints; and

4. employ solid rigid frogs on Mainline Track.

B. All turnouts within Embedded Track sections shall:

1. be constructed using cast-in-place concrete or pre-cast panels as infill material designed to:

   a. maintain the functionality of the switch;

   b. not interfere with operation of the Closure Rail; and

   c. sustain loading from emergency vehicles; and

2. accommodate the weight and turning radius of a standard ladder truck used by Edmonton Fire Rescue Services.

C. Manual switch operating devices are permitted on turnouts.

D. Switches within Embedded Track sections must be concealed below top of rail, where they are operated with removable levers.

3-1.3.6 Track Drainage System

A. All Track, including Mainline Track, Secondary Track, Shop Track and Yard Track shall comply with the applicable requirements of Section 3-4.6.1*[Track Drainage]* of this Schedule.

3-1.3.7 Vehicle Overrun Protection

A. Provide vehicle overrun protection at both ends of the Mainline Track, and at all stub-ended Secondary Track, to prevent On-track Vehicles from overrunning the end of the Track.

B. Determine the requirements for vehicle overrun protection based upon a hazard analysis which shall consider, as a minimum, the following items:

1. the distance from the normal stopping point to the end of Track;
2. the Maximum Operating Speed at the approach to the end of the Track;
3. the likelihood of an overrun incident, considering all plausible events leading up to the incident;
4. the likelihood of Passengers being onboard the Train at the time of an overrun incident; and
5. other consequences of an overrun incident, including consideration of pedestrians, vehicles and property beyond the end of Track.

C. The hazard analysis may also consider mitigations to lessen the probability or consequences of an overrun incident, including:

1. application of automatic train stops;
2. Driver cab crashworthiness;
3. operation and responsiveness of Driver's Safety Device; and
4. application of a Driver awareness monitoring system.

D. Where the probability and consequences of an overrun incident can be demonstrated to be low, non-energy absorbing devices may be considered, otherwise energy absorbing devices shall be provided which, in the event of an overrun incident, shall:

1. bring a single LRV at AW0 loading to a gradual stop at a deceleration rate no greater than 0.3g; and
2. prevent an On-track Vehicle from passing beyond the end of the Track, considering a Train of maximum length and fully loaded to AW4, or other rail-borne auxiliary equipment if heavier.

3-1.3.8 Switch Blower and Heat Tracing Requirements

A. Provide a system to keep all switches and associated Closure Rails clear of snow and ice at all times.

B. Where switch blowers are used, they shall be housed within noise reduction enclosures as required to comply with the requirements of Section 1-2.1.3 *[Noise Control]* of this Schedule.

SECTION 3-2 - ROADWAYS, SIDEWALKS AND SHARED USE PATHS

3-2.1 SCOPE

A. This section sets out the requirements for all Roadways, sidewalks and Shared Use Paths, including all elements of design and construction pertaining to streets, alleys, private and commercial accesses, bus stops, signage, delineation, and pavement markings.

3-2.2 GENERAL DESIGN BASIS AND CRITERIA

3-2.2.1 Design Standards

A. Without limiting Section 1-1.7 *[Reference Documents]* of this Schedule and except as otherwise specified herein, the Roadways, sidewalks, SUPs and all associated infrastructure shall comply with the following codes, standards and regulations, except as otherwise specified in this Section 3-2 *[Roadways, Sidewalks and Shared Use Paths]*:

1. Valley Line LRT Project Roadways Design and Construction Standards, as included in the Disclosed Data;
2. TAC “Geometric Design Guide for Canadian Roads”;
3. TAC “Manual of Uniform Traffic Control Devices for Canada”;
4. TAC “Bikeway Traffic Control Guidelines for Canada”;
5. TAC “Pedestrian Crossing Control Guide”; and
6. AASHTO “A Policy on Geometric Design of Highways and Streets”.

3-2.2.2 Design Speed

A. Design all Roadways in accordance with the following maximum vehicular design speeds and Roadway types:

	Roadway	Design Speed	Roadway Type
1.	102 Avenue	40 km/h	Collector
2.	98 Avenue	70 km/h	Arterial
3.	Muttart Service Road	60 km/h	Collector
4.	Connors Road/90 Avenue	70 km/h	Arterial
5.	95 Avenue	50 km/h	Collector
6.	85 Street	60 km/h	Arterial
7.	83 Street (90 Ave to 82Ave)	60 km/h	Arterial
8.	83 Street (82 Ave to Argyll)	60 km/h	Arterial
9.	82 (Whyte) Avenue	60 km/h	Arterial
10.	Argyll Road	70 km/h	Arterial
11.	Wagner Road/Davies Road	60 km/h	Collector
12.	75 Street	70 km/h	Arterial
13.	66 Street	70 km/h	Arterial
14.	28 Avenue	60 km/h	Collector

3-2.3 ROAD SAFETY AUDITS

A. “Preliminary Design”, “Detailed Design” and “Pre-Opening” road safety audits, completed in accordance with the procedures specified in *The Canadian Road Safety Audit Guide*, shall be required for each Roadway Work Package to be Constructed, (each, a “***Road Safety Audit***”).

B. Within 60 days after the Effective Date, Project Co shall engage an independent road safety auditor, acceptable to Project Co and the City acting reasonably (the "***Independent Road Safety Auditor***"). The Independent Road Safety Auditor shall have the following minimum qualifications:

1. recognized expert in the field of road safety engineering;

2. at least 15 years of road safety engineering experience on projects with similar scope and complexity as the Project;

3. having completed at least 5 road safety audits on projects with similar scope and complexity as the Project using the procedures set out in *The Canadian Road Safety Audit Guide*.

C. Where, for any reason during the Construction Period, the Independent Road Safety Auditor is, or becomes, unable or unwilling to continue to perform the Independent Road Safety Auditor's services Project Co shall promptly engage a replacement Independent Road Safety Auditor, acceptable to Project Co and the City, acting reasonably.

D. Project Co shall cause the Independent Road Safety Auditor to complete each Road Safety Audit report in accordance with "the audit report" procedures specified in *The Canadian Road Safety Audit Guide*, (the "***Road Safety Audit Report***").

E. Promptly following completion of each Road Safety Audit, Project Co shall cause the Independent Road Safety Auditor to provide a copy of the Road Safety Audit Report concurrently to Project Co and the City.

F. As soon as practicable following receipt of each Road Safety Audit Report, Project Co shall prepare a Road Safety Response Report in accordance with the requirements of The Canadian Road Safety Audit Guide, (the "***Road Safety Response Report***") and submit it to the City.

G. After Project Co has implemented all measures contained in the accepted Detailed Design Road Safety Audit Road Safety Response Report, Project Co shall cause the Independent Road Safety Auditor to issue a Road Safety Audit Certificate, which Project Co shall include with the associated Final Design of the applicable Roadway Work Package, in accordance with Section 6.10 *[Final Designs]* of Schedule 4 *[Design and Construction Protocols]*.

H. Each applicable Roadway shall not be opened until Project Co has implemented all measures contained in the accepted Pre-Opening Road Safety Audit Road Safety Response Report.

I. Not more than 60 Business Days prior to the Target Service Commencement Date, Project Co shall cause the Independent Road Safety Auditor to complete a comprehensive Project wide "In-Service" road safety audit, completed in accordance with the procedures specified in The Canadian Road Safety Audit Guide, (the "***In-Service Road Safety Audit***").

1. Promptly following completion of the In-Service Road Safety Audit, Project Co shall cause the Independent Road Safety Auditor to provide a copy of the In-Service Road Safety Audit Report concurrently to Project Co and the City.

2. As soon as practicable following receipt of the In-Service Road Safety Audit Report, Project Co shall prepare an In-Service Road Safety Response Report in accordance with the requirements of The Canadian Road Safety Audit Guide, (the "***In-Service Road Safety Response Report***") and submit it to the City.

3. Project Co shall implement all measures contained in the accepted In-Service Road Safety Response Report prior to Service Commencement.

3-2.4 GEOMETRIC DESIGN

3-2.4.1 Cross Fall

A. The cross fall of all Roadways shall be a minimum 0.020 m/m.

B. All Roadways, including existing Roadways that are modified or reconstructed, shall comply with the standard cross section requirements as specified in *Valley Line LRT Project Roadways Design and Construction Standards*, with an asphalt overlay appropriate to the applicable roadway classification.

3-2.4.2 Lane Width

A. Roadway lane widths shall be the actual finished pavement dimensions measured between pavement markings or between pavement marking and lip of gutter, as applicable.

B. Minimum lane widths, including bike lanes, vehicular travel lanes, on-street parking, loading zones, turn bays, tapers, bus lay-bys, and any other on-street facility shall be as specified in the *Valley Line LRT Project Roadways Design and Construction Standards*, except as specified in Section 3-2.11 *[Area Specific Requirements]* of this Schedule.

3-2.4.3 Shy-way Width

A. Shy-ways shall meet or exceed the following separations:

1. Shy-way between any bike lane and any vertical obstruction, raised curb, Dynamic Envelope or vehicular traffic lane – 600mm;

2. Shy-way between any vehicular travel lane and any vertical obstruction on 102 Avenue or slab-on median – 500mm;

3. Shy-way between the Dynamic Envelope and any vehicular travel lane – 600mm; and

4. Shy-way between the edge of any SUP and any vertical obstruction 150mm or higher – 600mm.

3-2.4.4 Median Width

A. The minimum width of any raised median shall be 1.20m from face-of-curb to face-of-curb.

B. With the exception of painted medians on 102 Avenue, painted medians shall not be greater than 1.20m in width.

3-2.4.5 Curb and Gutter

A. Curbs and gutters throughout the Lands shall comply with drawing #5000 in the *Valley Line LRT Project Roadways Design and Construction Standards*, subject to the following exceptions:

1. curbs and gutters in the following locations shall comply with drawing #5023 in the *Valley Line LRT Project Roadways Design and Construction Standards*:

   a. where the Trackway is centre running, to separate Embedded Track from the adjacent Roadway;

   b. along 102 Avenue, to separate Embedded Track or a planted median from the adjacent Roadway;

      i. where the curbs and gutters shall be white concrete;

c. along the west side of the median on 85 Street between 93 Avenue and 95 Avenue. In these areas the the curbs and gutters shall be poured monolithically with a concrete verge as specified in Table 2-14.3.2 *[Spatial Requirements for Planting]* of this Schedule;

d. along the east side of 83 Street north of 73 Avenue between the bus stop and the mid-block crosswalk at the north end of the northbound Platform of the Avonmore Stop;

e. along the west side of 83 Street south of 73 Avenue between the bus stop and the mid-block crosswalk at the south end of the southbound Platform of the Avonmore Stop; and

f. along both sides of the median on 83 Street from 69A Avenue to 76 Avenue. In these areas the curbs and gutters shall be poured monolithically with a concrete verge as specified in Section 2-14.7.2.3G *[Area Specific Requirements]* of this Schedule;

2. curbs and gutters separating the north curbline sidewalk from the adjacent Roadway on 102 Avenue between 95 Street and 97 Street shall comply with drawing #5024 in the *Valley Line LRT Project Roadways Design and Construction Standards;* and

3. curbs and gutters separating the cycle track from the adjacent Roadway on 102 Avenue shall comply with *Section 2-4.7.A.1.h [102 Avenue Special Requirements]* of this Schedule.

3-2.4.6 Slopes

A. Slopes located adjacent to Roadways, sidewalks and SUPs shall not be steeper than 3.5H:1V, except as follows:

1. on 83 Street, between 69A Avenue and Argyll Road, the slopes west of the sidewalk shall not be steeper than 3H:1V; and

2. on 66 Street, between Whitemud Drive and 38 Avenue, the slopes on the east side of the Trackway, adjacent to the SUP, 3m wide gravel path to the Plains Midstream valve site, and gravel pad at the Plains Midstream valve site, shall not be steeper than 3H:1V.

3-2.4.7 Width of Ditch

A. The minimum width of any ditch bottom shall be 1.0m.

3-2.4.8 Horizontal Clearances

A. All horizontal clearances shall comply with the requirements specified in Section 3-2.2.1 *[Design Standards]* of this Schedule.

3-2.4.8.1 Stopping Sight Distance

A. For each section of Roadway, the “Stopping Sight Distance”, as defined in TAC, shall meet or exceed the upper limit for the design speed of the applicable Roadway section.

3-2.4.8.2 Intersections

A. Intersection design shall comply with roadway design guidelines in the *Valley Line LRT Project Roadways Design and Construction Standards*. Intersections shall be designed to the classification of each incoming Roadway, as defined in the City Transportation System Bylaw #15101.

3-2.4.8.3 Shared-Use Paths

A. The width of all asphalt SUPs shall be 3.0m with the following exceptions:

1. all curbline SUPs (no boulevard) shall be concrete and a minimum 3.5m in width;

2. SUP sections on the west side of 75 Street, south of McIntyre Road and north of Whitemud Drive, may be narrowed where there is insufficient space for a 3.0m width, but under no circumstances shall an SUP be less than 2.5m in width; and

3. SUP sections on the south side of 28 Avenue, between 66 Street to Hewes Way, may be narrowed where there is insufficient space for a 3.0m width, but under no circumstances shall an SUP be less than 2.5m in width.

B. All SUPs shall allow a clear path of travel, free of obstructions. Connecting curb ramps shall also be free of obstructions.

3-2.4.8.4 Monolithic (curbline) Sidewalks

A. The minimum width of all monolithic (curbline) sidewalks shall be 2.0m measured from the back of curb with the following exceptions:

1. on 95 Avenue and 83 Street between 76 Avenue and 82 Avenue, the concrete monolithic (curbline) sidewalks may be narrowed where there is insufficient space for a 2.0m width, but under no circumstances shall the sidewalk be less than 1.85m in width (2.0m adjacent to bus stops);

2. along arterial Roadways, within 100m of a Stop or Station, sidewalk widths shall be at least 2.5m in width; and

3. along 102 Avenue and on adjacent cross roads, the width of the sidewalks shall be equal to the distance between the Roadway curb and gutter to the adjacent buildings or property line.

B. Adjacent to On-Street Parking

1. In areas where on-street parking is permitted, as shown in Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule, monolithic (curbline) sidewalks shall be provided.

C. All monolithic (curbline) sidewalks shall allow a clear path of travel, free of obstructions. Connecting curb ramps shall also be free of obstructions.

3-2.4.8.5 Separate (boulevard) Sidewalks

A. All separate (boulevard) sidewalks shall be a minimum of 2.0m in width with the following exceptions:

1. on 95 Avenue and 83 Street between 76 Avenue and 82 Avenue, the separate (boulevard) sidewalks may be narrowed where there is insufficient space for a 2.0m width, but under no circumstances shall the sidewalk be less than 1.5m in width.

B. All separate (boulevard) sidewalks shall allow a clear path of travel, free of obstructions. Connecting curb ramps shall also be free of obstructions.

3-2.5 PAVEMENT DESIGN REQUIREMENTS

3-2.5.1 New Construction

A. The minimum pavement structures for the following Roadways shall be as follows:

Table 3-2.5.1 Minimum Pavement Structures

Roadway	Segment	10mm-HT Asphalt (mm)	20mm-B Asphalt (mm)	3-20mm Granular Base (mm)	Cement Stabilized Subgrade (mm)
102 Avenue	95 Street to 103 Street	pavers as per Section 2-4.7.A.1 *[102 Avenue Special Requirements]* of this Schedule 25mm bedding sand 150mm class B concrete base		300	150
102 Avenue – Bicycle Safe Zones	99 Street to 103 Street	275mm Class A Concrete c/w load transfer joints		300	150
Jasper Avenue	West of 95 Street	40	200	300	150
Armature Alley	North of Jasper Avenue	50	75	As shown in Valley Line LRT Project Roadways Design and Construction Standards Drawing # 2041	
95 Street	Jasper Avenue to 101A Avenue	40	200	300	150
Muttart Service Road	South of 98 Avenue	40	125	300	150
Connors Road	West of 95 Street to 94 Street	40	200	300	150
Connors Road One Way Connection	95 Avenue to Cloverdale Road	40	200	300	150
95 Avenue	Connors Road to 85 Street	40	100	300	150
85 Street	North of 95 Avenue	40	150	300	150
90 Avenue	85 Street to 90 Avenue Reconstruction Project Limits	40	100	300	150
85 Street	95 Avenue to 90 Avenue / Connors Road	40	150	300	150
Connors Road / 90 Avenue Intersection	West of 85 Street to East of 83 Street	40	200	300	150
83 Street	90 Avenue / Connors Roadd to 82 Avenue	40	200	300	150
82 (Whyte) Avenue	85 Street to 83 Street	40	200	300	150
83 Street	82 Avenue to Argyll Road	40	200	300	150

Roadway	Segment	10mm-HT Asphalt (mm)	20mm-B Asphalt (mm)	3-20mm Granular Base (mm)	Cement Stabilized Subgrade (mm)
Wagner Road	Davies Road to 75 Street	40	170	300	150
Davies Road	South of Wagner Road	40	150	300	150
75 Street	Wagner Road to Whitemud Drive	40	225	300	150
51 Avenue	75 Street to 51 Avenue Upgrade Project Limits	40	225	300	150
66 Street	Whitemud Drive to 28 Avenue	40	200	300	150
28 Avenue	66 Street to East of Hewes Way	40	200	300	150

All Roadways, alleys, parking lots, and service roads not listed in Table 3-2.5.1 *[Minimum Pavement Structures]*, shall be constructed of asphalt, in accordance with *Valley Line LRT Project Roadways Design and Construction Standards*.

B. Except for Jasper Avenue, 95 Street, Connors Road, 82 Avenue, Davies Road, 66 Street and 75 Street, all sections of Roadway listed in Table 3-2.5.1 *[Minimum Pavement Structures]* shall be fully reconstructed.

C. For Jasper Avenue, 95 Street, Connors Road, 82 Avenue, Davies Road, 66 Street and 75 Street, any section of existing pavement 3.25m or narrower shall be removed. Removal of existing pavement structure shall be such that the edge of any pavement structure that is to be retained shall be in the centre or along the lane lines of the future traffic lanes.

D. If the distance from the final surface elevation to the top of an existing vault structure on 102 Avenue is less than the required 102 Avenue pavement structure depth in Table 3-2.5.1 of this Schedule, but more than the paver thickness as per Section 2-4.7.A *[102 Avenue Special Requirements]* of this Schedule plus 25mm, and the structural integrity of the vault is confirmed by the vault owner, then the pavement structure may be reduced to the paver thickness plus 25mm bedding sand and 150mm minimum Class B concrete base over the existing vault structure.

E. If the distance from the final surface elevation to the top of an existing vault structure on 102 Avenue is nominally the thickness of the paver as per Section 2-4.7.A *[102 Avenue Special Requirements]* of this Schedule plus 25mm bedding sand and the structural integrity of the vault is confirmed by the vault owner, then the pavement structure may be reduced to the paver plus the nominal 25mm bedding sand.

F. Final stage paving for Roadways parallel to the LRT Trackway shall be completed lip of gutter to lip of gutter for the length of each Roadway segment from cross street to cross street as a minimum including any existing pavement structure that remains. Mill existing pavement as required to accommodate the final lift of asphalt.

G. For final stage paving for Roadways that cross the LRT Trackway mill and overlay to the full width of any lane or lanes impacted or adjacent to work on that Roadway.

H. Roadways that are not impacted, including the curb and gutter on either side, do not require an overlay.

I. 102 Avenue pavement through the 99 Street intersection shall be concrete.

J. Pavement structures for SUPs and sidewalks shall comply with the following:

1. *Valley Line LRT Project Roadways Design and Construction Standards*;

2. where SUPs or sidewalks will be utilized as an access for maintenance or emergency vehicles, the pavement structure shall be designed to accommodate such use;

3. where SUPs or sidewalks will be subject to vehicular traffic, the pavement structure shall be designed to accommodate such use; and

4. all SUPs of width 2.5m or greater shall be constructed of asphalt, in accordance with *Valley Line LRT Project Roadways Design and Construction Standard*s, except when the SUP is a monolithic (curbline) SUP, in which case it shall be constructed of concrete, in accordance with *Valley Line LRT Project Roadways Design and Construction Standard*s.

K. All bus stop amenity pads shall be constructed of concrete in accordance with *Valley Line LRT Project Roadways Design and Construction Standards*.

L. All in-street bus stops and lay-bys shall be constructed of concrete, in accordance with *Valley Line LRT Project Roadways Design and Construction Standards*.

M. All alley, residential, commercial and industrial crossings shall be concrete, in accordance with *Valley Line LRT Project Roadways Design and Construction Standards*, except that:

1. all commercial and industrial crossings on arterial roads shall be “major commercial accesses” (curb return accesses) in accordance with drawing #4052 in the *Valley Line LRT Project Roadways Design and Construction Standards*.

N. For any Roadway where there is a mix of partial depth pavement removal, full depth pavement removal and mill and overlay, ensure the transition between existing and new pavement structure provides consistency between the performance of the existing and new pavement through the full section.

3-2.5.2 Rehabilitation

A. Provide a minimum curb height of 150mm on all Roadways. Where existing curbs meet the applicable Project Requirements they may be retained.

B. Where new curb and gutter ties in to existing curb and gutter, any transition in the curb height shall occur over a distance of 10 horizontal to 1 vertical. Lip of gutter tie-ins shall be designed to match.

C. Except as specified in Table 3-2.5.1 *[Minimum Pavement Structures]*, where new Roadway ties in to existing Roadway, the new pavement structure shall match the existing pavement structure and shall not impede sub-surface drainage.

3-2.6 BUS STOPS

3-2.6.1 General

A. Provide bus stops, bus lay-bys and amenity pads at the locations specified in Table 3-2.6.1 *[Bus Stop Requirements]*.

B. Bus stops shall comply with the *Valley Line LRT Project Roadways Design and Construction Standards*.

C. Bus lay-bys shall be designed to accommodate a 12m Transit Bus (B-12), as defined in TAC, entering, exiting, and stopping parallel to the curb face, except as otherwise specified in Table 3-2.6.1 *[Bus Stop Requirements]*.

D. Locate and configure all bus stops so as to permit buses to stop safely.

Table 3-2.6.1 Bus Stop Requirements

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
98 Avenue	Eastbound	East of 96A St	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
98 Avenue	Westbound	West of 96A St	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
Connors Road	Eastbound	All	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
Connors Road	Westbound	East of 95 Ave/94 St	N/A	N/A	N/A	N/A	Existing bus stop – to be eliminated.
Connors Road	Westbound	West of 85 St	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
Connors Road	All	Between 94 St and 83 St	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
95 Avenue	Westbound	West of Donnell Road	5-1A-10	No	21m	9m long	New bus stop – bus stop location shall be coordinated with the final geometry of the intersection of 95 Ave with Connors Rd.
95 Avenue	Eastbound	East of Connors Road	5-1A-10	Yes	Full length of bus stop and lay-by.	None	New bus stop
92 Street	Southbound	South of 95 Ave	5-1A-11	No	None	Sized to accommodate bus shelter	Existing bus stop – to be relocated 10m south of existing location Provide 2m sidewalk from existing boulevard side walk to curb
95 Avenue	Westbound	East of 90 St	5-1A-11	Yes	Full length of bus stop and lay-by.	None	New bus stop
95 Avenue	Eastbound	West of 87 St	5-1A-12	Yes	Full length of bus stop and lay-by.	None	New bus stop

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
95 Avenue	Westbound	East of 85 St	5-1A-12	No	21m	Located behind sidewalk and sized to accommodate bus shelter.	New bus stop.
95 Avenue	Eastbound	East of 85 St	5-1A-12	No	21m	Sized to accommodate bus shelter off sidewalk within road right of way	Adjacent walk minimum of 2.0m. Locate and configure bus stop in space available so that buses can be stopped safely without impeding traffic.
85 Street	Southbound	South of 95 Ave	5-1A-13	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
85 Street	Southbound	South of 92 Ave	5-1A-14	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
90 Avenue	Westbound	East of 85 St	5-1A-15	No	21m	12m long by 3m wide	Head of bus stop to be 30m west of western edge of relocated crosswalk
83 Street	Southbound	South of 90 Ave	5-1A-16	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Northbound	North of 86 Ave	5-1A-16	No	21m	None	Adjacent walk minimum of 2.0m
83 Street	Northbound	South of 84 Ave	5-1A-17	Yes	21m	None	Lay-by integrated with on-street parking. Adjacent walk minimum of 2.0m

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
83 Street	Southbound	South of 84 Ave	5-1A-17	Yes	90m	None	Integrated with southbound right turn lane to 82 (Whyte) Ave. Length of bus stop to be determined by final geometry of 83 St and available space between the Stop Platform and road.
82 (Whyte) Avenue	Eastbound	East of 85 St	5-1A-17	N/A	N/A	N/A	Existing bus stop to remain in median between the eastbound lanes of 82 Ave and the service road
82 (Whyte) Avenue	Eastbound	West of 83 St	5-1A-17	No	21m	Length to fit by 4m wide	Within the new traffic channelization (pork chop) island on the southwest corner of 82 (Whyte) Ave and 83 St
82 (Whyte) Avenue	Westbound	West of 83 St	5-1A-17	N/A	N/A	N/A	Existing bus stop – to remain unchanged.
83 Street	Northbound	North of 81 Ave	5-1A-18	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Northbound	North of 78 Ave	5-1A-18	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Southbound	South of 78 Ave	5-1A-19	Yes (36m Tangent)	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Northbound	South of 77 Ave	5-1A-19	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Southbound	South of 76 Ave	5-1A-19	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
83 Street	Northbound	North of 73 Ave	5-1A-20	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Southbound	South of 73 Ave	5-1A-20	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Southbound	South of 71 Ave	5-1A-21	Yes	21m	None	Lay-by integrated with on-street parking. Adjacent walk minimum of 2.0m
83 Street	Northbound	South of 71 Ave and service road tie in	5-1A-21	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Northbound	South of 69 Ave	5-1A-21 & 5-1A-22	Yes	Full length of bus stop and lay-by	None	Adjacent walk minimum of 2.0m
83 Street	Southbound	North of Argyll Road	5-1A-22	Yes	21m	2m wide by 3m long	Lay-by integrated with southbound right turn lane. Adjacent walk minimum of 2.0m
Wagner Road	Westbound	West of Davies Road	5-1A-24	No	21m	9m long by boulevard width	Locate so bus operation will not conflict with Elevated Guideway.
Wagner Road	Eastbound	East of Davies Road	5-1A-24	No	21m	9m long by boulevard width	Head of bus stop to be 35 m east of east curbline of Davies Road
Wagner Road	Westbound	West of 75 St	5-1A-25	N/A	N/A	N/A	Existing bus stop – to remain unchanged.

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
75 Street	Northbound	North of McIntyre Road	5-1A-27	No	21m	9m long	Head of bus stop to be 40 m north of north curbline of McIntyre Road. Maximize the width of the amenity pad within the space available between the road and the Elevated Guideway.
75 Street	Southbound	South of McIntyre Road	5-1A-27	No	21m	9m long by boulevard width	Head of bus stop to be 25 m south of south curbline of McIntyre Road.
Roper Road	Westbound	West of 75 St	5-1A-28	No	21m	9m long by boulevard width	Head of bus stop to be 25 m west of west curbline of 75 Street.
Roper Road	Eastbound	East of 75 St	5-1A-28	No	21m	9m long by boulevard width	Locate 50m east of the centreline of the northbound Track.
75 Street	Southbound	South of Roper Road	5-1A-28	No	21m	9m long by available road right of way width	Head of bus stop to be 50 m south of south nose of the traffic channelization (pork chop) island on the SW corner of Roper Road and 75 Street.
75 Street	Southbound	North of 51 Ave	5-1A-29	No	21m	9m long by boulevard width	Integrate bus stop at the northern most end of the southbound right turn lane to 51 Ave.

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
75 Street	Northbound	North of 51 Ave	5-1A-30	No	21m	9m long	Head of bus stop to be 40 m north of north curbline of 51 Avenue. Maximize the width of the amenity pad between the Roadway and Trackway.
66 Street	Southbound	In front of 4202 - 66 St	5-1A-33	No	N/A	N/A	Existing bus stop – to remain unchanged. Provide new 2.0m wide concrete sidewalk connection to the new SUP.
66 Street	Northbound	North of 41 Ave	5-1A-33	No	21m	9m long	Head of bus stop to be 35m north of north curbline of 41 Ave. Maximize the width of the amenity pad between the road and Trackway.
66 Street	Southbound	South of 41 Ave	5-1A-34	No	21m	9m long by boulevard width	Head of bus stop to be 40m south of south curbline of 41 Ave.
66 Street	Northbound	North of 38 Ave	5-1A-35	Yes (50m Tangent)	Full length of bus stop and lay-by	9m long by 4.0m wide	Bus stop to be located as close to the north end of the LRT Platform as conditions and available space permit. Provide 2.0m wide concrete connector sidewalk.
38 Avenue	Westbound	East of 66 St	5-1A-35	Yes (60m Tangent)	Full length of bus stop and lay-by	21m long by 4.0m wide	Bus stop to be located as close to the east side of the LRT Platform as conditions and available space permit. Provide 2.0m wide concrete connector sidewalk.
38 Avenue	Eastbound	East of 66 St	5-1A-35	No	21m	9m long by 4.0m wide	Locate 35m east of the centreline of the northbound LRT Track.

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
66 Street	Southbound	South of 38 Ave	5-1A-36	No	21m	9m long by boulevard width	The bus stop shall be located approximately 50m south of the south nose of the traffic channelization (pork chop) island on the southwest corner of 38 Avenue and 66 Street.
66 Street	Northbound	North of 36A Ave	5-1A-37	No	21m	9m long by 4.0m wide	Head of bus stop to be 25m north of north curbline of 36A Ave. If the distance between the concrete pad and the Trackway is less than 1.5m extend the concrete pad to the Trackway.
66 Street	Southbound	South of 36A Ave	5-1A-37	No	21m	9m long by boulevard width	Head of bus stop to be 25m south of south curbline of 36A Ave.
66 Street	Northbound	North of 34 Ave	5-1A-38	No	21m	9m long by 4.0m wide	Head of bus stop to be 35m north of north curbline of 34 Ave. If the distance between the concrete pad and the Trackway is less than 1.5m extend the concrete pad to the Trackway.
66 Street	Southbound	South of 34 Ave	5-1A-39	No	21m	9m long by boulevard width	The bus stop shall be located approximately 60m south of the south nose of the traffic channelization (pork chop) island on the southwest corner of 34 Avenue and 66 Street.

Bus Stop Street	Direction	Location	Shown on Schedule 5 Part 1, Appendix 5-1A, Figure #	Lay-by Required	Bus Stop Pad (In Street) Length	Amenity Pad Required	Notes
66 Street	Northbound	North of 31 Ave	5-1A-39	No	21m	9m long by 4.0m wide	The amenity pad shall be as close to the north end of the LRT Platform as conditions and available space permit.
66 Street	Southbound	South of 31 Ave	5-1A-40	No	26m	14m long by 4.0m wide	Head of bus stop to be 40m south of south curbline of 31 Ave.
66 Street	Northbound	North of 28 Ave	5-1A-40	No	21m	9m long by 4.0m wide	Head of bus stop to be 40m north of the centreline of the first commercial access north of 28 Ave.
28 Avenue	All	West of 66 St	N/A	N/A	N/A	N/A	Existing bus stop – to remain unchanged.

3-2.7 BICYCLE PARKING

A. At a minimum, provide the number of bicycle racks specified below. Bicycle racks shall be located within 50m of a Platform Access Point:

1. Muttart Stop: 8;
2. Strathearn Stop: 16;
3. Holyrood Stop: 16;
4. Bonnie Doon Stop: 32;
5. Avonmore Stop: 8;
6. Millbourne/Woodvale: 9;
7. Grey Nuns Stop: 10; and
8. Davies Station: in accordance with Section 3-3.3.4A *[Davies Station Bicycle Parking]* of this Schedule.

B. All existing bicycle racks removed to accommodate the Construction shall be replaced or reinstalled within the same street block, so as to accommodate the same number of bicycles.

3-2.8 SIGNING, DELINEATION AND PAVEMENT MARKINGS

3-2.8.1 Signing

A. Provide all Roadway, pedestrian, and bicycle signage required to guide, regulate and control traffic and reinstate all existing information signage within the Lands in accordance with the requirements of MUTCD (Canada), except as follows:

1. the City will supply all “regulatory”, “traffic control” and “information” signs as defined in MUTCD (Canada) in accordance with the accepted Final Designs provided by Project Co; and
2. the City will install all “regulatory”, “traffic control” and “information” signs as defined in MUTCD (Canada) in accordance with the accepted Final Designs provided by Project Co, except “regulatory” and “traffic control” signs to be mounted on traffic signal poles or arms,

and provide the City with sufficient notice that the Roadway or SUP will be complete and ready for opening, in accordance with Section 1-1.3 *[City Works]* of this Schedule.

B. Provide all other signage required for Operation of the System as noted in Section 5-2.5.4 *[Information]* of this Schedule.

C. Maintain all temporary “regulatory” and “traffic control” signage until permanent signage is installed.

3-2.8.2 Delineation Markers

A. Where delineation markers are required, they shall comply with the requirements of MUTCD (Canada).

3-2.8.3 Pavement Markings

A. Provide all Roadway, pedestrian, and bicycle pavement markings required to guide, regulate and control traffic within the Lands in accordance with the requirements of *City of Edmonton Design and*

Construction Standards, Volume 8 – Pavement Markings, 2012 and the TAC manuals referred to in Section 3-2.2.1A *[Design Standards]* of this Schedule, except as follows:

1. the City will supply and install all pavement markings to be installed on Early Handover Items except for the lane lines on 102 Avenue that are integrated into the pavers described in Section 2-4.7.A.1.c *[102 Avenue Special Requirements]* of this Schedule, in accordance with the accepted Final Designs provided by Project Co. Provide the City with sufficient notice that the Early Handover Items will be complete and ready for opening, in accordance with Section 1-1.3 *[City Works]* of this Schedule.

B. Maintain all temporary pavement markings until permanent pavement markings are installed.

3-2.9 ROAD APPURTENANCES

A. Provide all road appurtenances required by the Road Safety Audits, including traffic barriers, pedestrian barriers, and protective netting.

B. Where median or roadside barriers are required, such barriers, including end treatments, shall comply with *Alberta Transportation Standard Specifications for Highway Construction – Edition 14, 2010*.

C. Box beam guardrails are not permitted.

3-2.10 RESTORING EXISTING ROADS AND DRIVEWAYS

A. Where existing infrastructure is impacted by Construction, restore or reconstruct all impacted infrastructure, including all Roadways, sidewalks, driveways, SUPs, curbs and gutters, medians, traffic islands, storm drain systems, Utilities, signs, markings, street lighting and landscaping.

B. Where elevation or grading of existing infrastructure, including sidewalks and driveways, is impacted by Construction, restore existing conditions. Where final grading does not permit the restoration of existing conditions without introduction of a step(s), transitions shall be provided using a ramp meeting the ABC requirements. Where access to property outside the Lands is required in order to complete such tie-ins, obtain access in accordance with Section 4.15 *[Community Improvement Program]* of the Agreement.

3-2.11 AREA SPECIFIC REQUIREMENTS

3-2.11.1 General Requirements

A. Provide crosswalks on all sides of intersections except as otherwise specified in this Section 3-2.11 *[Area Specific Requirements]*.

B. Provide curb extensions at all crosswalks across Roadways with on-street parking to minimize pedestrian crossing distances.

C. Provide curb ramps at all crosswalks. The width of the ramp must equal the width of the adjacent walk or SUP.

D. All sidewalks, SUPs and Roadways constructed as part of the Project shall provide a seamless transition into the applicable existing infrastructure.

1. Except as noted in 3-2.11.1D.2 Where a sidewalk, SUP or Roadway is provided parallel to an existing parking lot and impacts the existing parking lot, provide a curb at the edge of the City Lands. Where the distance between the edge of sidewalk or SUP is less than 0.5m, a hard surface shall be provided in accordance with the applicable Character Zone. Where the distance between the edge of sidewalk or SUP is greater than 0.5m a, grassed surface shall be

provided.*[General Requirements]* the area between the edge of the sidewalk shall match the adjacent Lands.

2. Where a sidewalk, SUP or Roadway is provided parallel to an existing parking lot and impacts the existing parking lot, provide a curb at the edge of the City Lands. Where the distance between the edge of sidewalk or SUP is less than 0.5m, a hard surface shall be provided in accordance with the applicable Character Zone. Where the distance between the edge of sidewalk or SUP is greater than 0.5m a, grassed surface shall be provided.

E. Except as otherwise specified in this Section 3-2.11 *[Area Specific Requirements]*, re-establish all SUPs, sidewalks and Trails that are impacted by the Construction, to the same standard as the applicable existing SUPs, sidewalks and Trails.

F. Set design elevations and grading such that there is no step between the back of Platform and the integrated sidewalk at the following locations:

1. north Platform at the 102 Street Stop;

2. north Platform at the Churchill Stop;

3. south Platform at the Quarters Stop;

4. west Platform at the Bonnie Doon Stop;

5. east Platform at the Bonnie Doon Stop;

6. east Platform at the Millbourne/Woodvale Stop; and

7. east Platform at the Grey Nuns Stop.

G. Set design elevations and grading on 102 Avenue between 97 Street and 103 Street such that the requirements of Section 2-4.7.C *[102 Avenue Special Requirements]* of this Schedule are met.

H. Provide co-ordinated intersection geometric design along the LRT Corridor in compliance with the requirements of 1-2.7 *[Measures of Effectiveness]*.

I. Maintain all vehicular accesses between a Roadway and land adjacent to that Roadway, including accesses to existing parkades, alleys, private driveways, and commercial properties except as otherwise specified in this Section 3-2.11 *[Area Specific Requirements]* or as shown in Appendix 5-3A *[Access and Road Closure Drawings]* of this Schedule:

1. Subject to Section 3-2.11.9C and 3-2.11.13I of this Schedule, for accesses and Roadways noted as either “Alley Access Closure”, “Access Closure Prior to January 1, 2016” or “Road Closure prior to January 1, 2016”, Project Co shall block vehicular access to the Roadway, with physical means prior to August 20, 2016. Provide notice to the City at least three months in advance of blocking these accesses.

2. For accesses noted as either “Access Closure to be coordinated by Project Co…” or “Potential Access Closure to be coordinated by Project Co…”, Project Co shall maintain each vehicular access until the City has obtained the necessary approval for the closure of that access pursuant to Section 4.4 *[Access and Road Closures]* of Schedule 28A *[Project Approvals]*. Project Co shall block the vehicular access to the Roadway with physical means within one year of the City obtaining approval for the closure of that access. Provide notice to the City at least three months in advance of blocking these accesses.

J. Coordinate Roadway and access closures in accordance with Appendix 5-3A *[Access and Road Closure Drawings]* of this Schedule.

1. Provide the City 6 months advance notice prior to the closure of a Roadway or access.

2. Roadways or accesses that are to be closed shall be physically closed within 15 months but no less than 6 months after notice is given.

3. For potential road or access closures, as identified in Appendix 5-3A *[Access and Road Closure Drawings]* of this Schedule, Project Co shall, through detailed design determine if the existing access will continue to be used. Should the access not be incorporated into the Final Design, Project Co shall close this access. Where an existing Roadway or alley is to be permanently closed provide the required turn-a-rounds, signage, barricades and restore the closed Roadway or alley to a natural landscaped area and comply with the requirements of the applicable road closure Permits.

3-2.11.2 102 Avenue / Downtown

A. The geometric configuration, lane direction and vehicle turning movement requirements for 102 Avenue between 103 Street and Jasper Avenue shall be as shown on Figures 5-1A-1 to 5-1A-4 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The lane geometry and widths, segregated two way cycle track, and sidewalks for 102 Avenue between 103 Street and 99 Street shall be as shown on Figures 5-3B-1 to 5-3B-2 of Appendix 5-3B *[102 Avenue Drawings]* of this Schedule except:

   1. if a secondary track is be provided between 103 Street and 102 Street the geometry and lane configuration between 103 Street and 102 Street is to be modified to accommodate the secondary track as well as the segregated two way cycle track, an eastbound travel lane, and a westbound travel lane of the same dimensions shown on Figure 5-3B-1 of Appendix 5-3B *[102 Avenue Drawings]*; or

   2. if 102 Street Stop has a centre loading platform then the track alignment is to be modified to accommodate the eastbound travel lane and the segregated two way cycle track as shown on Figure 5-3B-1 of Appendix 5-3B *[102 Avenue Drawings]*.

C. The minimum lane widths for 102 Avenue from 99 Street to 97 Street shall be:

   1. 4.20m for the eastbound travel lane;

   2. 2.25m for the parking/loading zone;

   3. 3.50m for the right turn lane at 97 Street; and

   4. 3.30m for the left turn lane at 97 Street.

D. The minimum lane width for the westbound travel lane on 102 Avenue from 97 Street to 96 Street shall be 3.45m.

E. The minimum lane widths on 102 Avenue from 96 Street to Jasper Avenue shall be:

   1. 3.70m for the westbound travel lane; and

   2. 2.75m for the loading zone lay-by.

F. Areas between the property line and the buildings faces on both sides of 102 Avenue between 103 Street and 99 Street and the north side of 102 Avenue between 99 Street and 97 Street are included in the sidewalk reconstruction.

G. Provide a minimum width of 6.0m of space, clear from vertical obstructions and parking, along the full length of 102 Avenue for emergency vehicle access.

H. Left turn vehicular movements on 102 Avenue, at 101 Street, 100 Street, and 99 Street are not permitted.

I. Eastbound through vehicular movements on 102 Avenue, at 97 Street are not permitted.

J. Westbound through and left turn movements on 102 Avenue, at 97 Street are not permitted.

K. Westbound left turn vehicular movements on 102 Avenue, at 96 Street are not permitted.

L. At the intersection of 102 Avenue and 96 Street:

1. utilize the existing custom traffic signal poles at their existing locations and integrate them with the Traffic Signal Equipment;

2. recognize that:

   a. the road portion of the existing intersection is constructed on a temporary structure (200mm of soil cement over 150mm of gravel over 150mm stabilized subgrade) with 30mm sand and 100mm paving stones placed on the surface; and

   b. the sidewalk portion was constructed on a temporary structure (150mm gravel) with 30mm sand and 100mm paving stones placed on the surface;

3. salvage all existing paving stones and reinstate the paving stones outside of the Trackway such that:

   a. reinstated paving stones are undamaged;

   b. paving stones are installed to match the existing paving stone pattern; and

   c. all surplus paving stones are returned to the City for stockpiling;

4. so as to support the 30mm of sand and 100mm paving stones, the permanent road structure shall be 150mm concrete base over 200mm granular base over 150mm stabilized subgrade and the permanent sidewalk structure shall be 150mm concrete on 150mm gravel;

5. provide curb ramps along the adjusted curblines that tie into the existing crosswalk locations;

6. replace headers in their existing locations;

7. protect any existing junction boxes within the affected area and tie into new concrete base;

8. salvage and reinstate any affected bollards/signposts and site furnishings in their original locations; and

9. protect existing secondary power, fibre optic, and communications conduits and irrigation lines that run north/south across this intersection.

M. Provide an off-street loading zone lay-by on the north side of the Roadway east of 96 Street for each of the properties at 9550 102 Avenue and 9530 102 Avenue as shown on “Figure 102 Ave Lay-by” as included in the Disclosed Data.

N. Provide as many parking stalls as possible, but not less than 5, and maintain the alley connection west of 95 Street, north of Jasper Avenue as shown on Figure 5-1A-4 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

O. Provide a mid-block crosswalk immediately east of the 102 Avenue Tunnel Approach, as close to the existing crosswalk location as possible.

P. The connection of 102 Avenue to Jasper Avenue shall be west of 95 Street and shall be a single one-way westbound lane only.

Q. Retain the intersection at 95 Street and Jasper Avenue in its existing configuration, except for the removal of the 102 Avenue approach into the intersection.

R. Provide an alley (the ***"Armature Alley"***) on the north side of Jasper Avenue from Jasper Avenue east of 95A Street to Jasper Avenue west of 95A Street as shown on Figure 5-1A-4 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

3-2.11.3 North River Bank Tunnel Approach Access Road

A. Provide an access road between the North River Bank Tunnel Approach and the junction of Cameron Avenue and 94 Street to the east. The access road shall be a minimum of 6.0m width and accommodate all maintenance and emergency response requirements for the Quarters Tunnel and the Elevated Guideway in the vicinity of the North River Bank Tunnel Approach.

3-2.11.4 Muttart Area

A. The geometric configuration, lane direction and vehicle turning movement requirements around the Muttart Conservatory from 98 Avenue to Connors Road shall be as shown on Figures 5-1A-7 and 5-1A-8 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. On the Muttart Service Road, south of 98 Avenue, provide:

1. a one-way traffic lane southbound, as shown on Figure 5-1A-7 and 5-1A-8 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule, minimum 4.50m wide; and

2. two-way traffic lanes north/southbound, as shown on Figure 5-1A-7 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule, each minimum 4.25m wide.

C. Provide a two way access road from the Muttart Service Road, across the Trackway, connecting to the 7.5m wide Muttart Conservatory South Access Road at the limit of the Lands that will be constructed by the City in 2016 and to the existing Muttart Conservatory North Access Road, south of the Muttart Stop:

1. the access road shall provide access for a WB-20 design vehicle, as defined in TAC, to Muttart Conservatory South Access Road; and

2. the access road shall provide access for an HSU design vehicle, as defined in TAC and a standard fire truck as defined in 2.4.10 of the *Valley Line LRT Roadways Design and Construction Standards* to the existing Muttart Conservatory North Access Road.

D. On 98 Avenue west of 96A Street the Roadway alignment on 98 Avenue shall remain unchanged from existing.

E. Provide separate (boulevard) sidewalks on the south side of 98 Avenue between 96A Street and the western limit of the intersection between the Muttart Service Road and 98 Avenue. For clarity, the sidewalk on the north side of 98 Avenue, outside of the Lands, shall be completed by the City.

F. Remove the northbound lane connecting Connors Road and the Muttart Conservatory South Access Road. Provide a sidewalk from the Muttart Service Road to Connors Road along the alignment of the removed northbound lane.

G. Provide a monolithic (curbline) sidewalk along the east side of the Muttart Service Road, from 98 Avenue to the Muttart Conservatory South Access Road.

H. Make provision for the addition of a future 3.0m wide SUP with a 2.0m boulevard to be provided by the City along the south side of the Muttart Conservatory South Access Road.

I. Provide a SUP connection along the east side of the one-way Muttart Service Road from the Muttart Conservatory South Access Road to Connors Road including a Grade Crossing.

3-2.11.5 Connors Road

A. The geometric configuration, lane direction and vehicle turning movement requirements along Connors Road shall be as shown on Figures 5-1A-9 and 5-1A-10 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths on Connors Road, west of 95 Street, shall be:

1. 3.50m for the outside travel lanes (one in each direction); and

2. 3.70m for the centre reversible travel lane.

C. The minimum lane widths on Connors Road, between 95 Street and 94 Street, shall be:

1. 4.20m for the outside travel lanes (one in each direction);

2. 3.50m for the inside travel lanes (one in each direction); and

3. 3.30m for the eastbound left turn lane.

D. The minimum lane width for the Connors Road/Cloverdale Road one-way westbound connection from 95 Avenue to Cloverdale Road shall be 4.5m.

E. Retain the existing alignment of Connors Road at its intersections with 95 Street and with the Kâhasinîskâk Bridge. Between these two points, Connors Road may be realigned by up to 9.0 metres south of the existing road curb line.

F. Provide an SUP on the north side of the Trackway from Kâhasinîskâk Bridge to Cloverdale Road.

G. The north edge of the SUP on the north side of Connors Road shall be south of the location at Northing 5,934,623.210 and Easting 34,691.370.

3-2.11.6 95 Avenue

A. The geometric configuration, lane direction and vehicle turning movement requirements along 95 Avenue, between Connors Road and 85 Street, shall be as shown on Figures 5-1A-10 to 5-1A-13 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 3.50m for through travel lanes (one in each direction);

2. 3.30m for left turn lanes;

3. 3.25m for bus lay-bys; and

4. 3.50m for right turn lanes.

C. On 92 Street, between 94 Avenue and 96 Avenue, provide:

1. one lane in each direction; and

2. northbound and southbound left turn bays at 95 Avenue.

D. On 91 Street, between 94 Avenue and 96 Avenue, provide:

1. one lane in each direction.

E. On 87 Street, between 94 Avenue and 96 Avenue, provide:

1. one lane in each direction; and

2. northbound and southbound left turn bays at 95 Avenue.

F. Westbound left turn vehicular movements from 95 Avenue onto Connors Road are not permitted.

G. Provide for right in/right out only vehicular turning movements from 95 Avenue to Donnell Road and Strathearn Drive.

H. Provide for right in/right out only vehicular turning movements from 95 Avenue to 89 Street, 90 Street, and 91 Street.

I. Provide a new right in/right out intersection north of the Strathearn Stop to access the proposed residential development from the existing road right-of-way.

J. Westbound left turn vehicular movements from 95 Avenue onto 87 Street are not permitted.

K. Provide for right in/right out only vehicular movements from 95 Avenue to 86 Street.

L. Provide on-street parking equal to the lesser of; i) the number of existing on-street parking removed from 95 Avenue; or ii) the maximum parking that can be accommodated in the following areas:

1. angle parking on the east side of 91 Street between 95 Avenue and the alley north of 95 Avenue;

2. angle parking on the east side of 91 Street between 95 Avenue and 94 Avenue;

3. angle parking on the east side of 90 Street between 95 Avenue and 96 Avenue; and

4. angle parking on the east side of 89 Street between 95 Avenue and 94 Avenue.

M. Provide a monolithic (curbline) sidewalk along both sides of 95 Avenue except provide an SUP separated by a minimum 2.0m wide boulevard along the north side of 95 Avenue between Cloverdale Road and 92 Street.

N. The alley on the north side of 95 Avenue between Strathearn Drive and Donnell Road shall be closed.

O. Crosswalks across the Trackway between 92 Street and 89 Street are not permitted.

3-2.11.7 85 Street

A. The geometric configuration, lane direction and vehicle turning movement requirements along 85 Street from 96 Avenue to the intersection of 90 Avenue/Connors Road shall be as shown on Figures 5-1A-13 to 5-1A-15 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 4.20m for the outside travel lanes (one in each direction);

2. 3.50m for the inside travel lanes;

3. 3.50m for the right turn lanes;

4. 3.30m for the left turn lanes;

5. 4.50m for the one way service road;

6. 2.25m for on-street parking lanes; and

7. 3.25m for bus lay-bys.

C. Maintain existing lane widths and dimension of any two-way service road to be retained.

D. Subject to 3-2.11.7G *[85 Street]* of this Schedule, retain the existing service road on the east side of 85 Street north of 93 Avenue and provide a hammerhead turn around at the south end of the service road at the location shown on Figure 5-1A-14 of Appendix 5-1A *[Project Description Drawings]* of this Schedule prior to closing off access from the service road onto 93 Avenue in accordance with Section 3-2.11.1J *[General Requirements]* of this Schedule.

E. Remove the existing service road on the west side of 85 Street.

F. On 85 Street, between 95 Avenue and 96 Avenue:

1. provide a new one way northbound service road access on the east side of 85 Street, immediately north of 95 Avenue, minimum 4.50m wide;

2. maintain access for the existing parking for the property at 9510C 85 Street, as shown on Figure 5-1A-13; and

3. maintain the existing two-way service road on either side of 85 Street north of the first east-west alley north of 95 Avenue.

G. Provide a one way northbound service lane from north of the underground parkade access for 9383 85 Street on the east side of 85 Street to 95 Avenue with a northbound right turn only connection at 95 Avenue.

H. Provide a new sidewalk along the east side of the Trackway from 90 Avenue to 93 Avenue.

I. Prior to October 31, 2017:

1. remove the existing service road while retaining the existing sidewalk on the east side of 85 Street south of 93 Avenue to the limits shown on Figures 5-1A-14 and 5-1A-15 of Appendix 5-1A *[Project Description Drawings]* of this Schedule;

2. fully block the service road west of the alley connection as shown on Figure 5-1A-15 of Appendix 5-1A *[Project Description Drawings]* of this Schedule using concrete mini-barriers; and

3. provide 100mm topsoil with sod to disturbed areas matching the top of the retained sidewalk within the restricted use area shown in Figure 8.0 of Appendix 14B *[City Lands Site Plans]* in Schedule 14 *[City Lands]*.

J. Remove the east-west alley pavement structure west of 85 Street at 93 Avenue (east) from the west side of 85 Street to 3m east of the first driveway access. Provide a sidewalk at this location in place of the removed alley pavement structure.

K. Provide a mid-block crosswalk at the north end of the north Holyrood Stop Platform crossing the Roadway only.

L. Provide a monolithic (curbline) sidewalk on the west side of 85 Street, between 95 Avenue and the intersection of 90 Avenue/Connors Road.

M. Provide a minimum 2.5m wide sidewalk, where sufficient space is available within the City Lands on the west side of 85 Street between 92 Avenue and 93 Avenue, and as wide as space permits otherwise.

N. Provide a southbound right in access from 85 Street to the parking lot of the property at 9010 85 Street.

O. An alternative access to the underground parkade access for 9383 85 Street will be provided through the property east of the service road, Lot 31 Block 15 Plan 0325528, by the property owner prior to August 1, 2017. Until this alternate access is provided, or until January 1, 2017, whichever is later, access to and from the parkade shall be provided via the existing service road connection to 93 Avenue, the existing service road connection to 85 Street, or a connection to 85 Street provided by Project Co.

P. Subject to Section 3-2.11.7O *[85 Street]* of this Schedule, close the existing connections from the east 85 Street service road between 93 Avenue and 95 Avenue. Provide notice to the City at least three months in advance of closing these connections.

3-2.11.8 Connors Road/90 Avenue/85 Street/83 Street Intersection

A. The geometric configuration, lane direction and vehicle turning movement requirements for the Connors Road/90 Avenue/85 Street/83 Street intersection shall be a signalized intersection as shown on Figure 5-1A-15 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 4.20m for the outside travel lanes;
2. 3.50m for the inside travel lanes;
3. 3.50m for the outside left turn lanes;
4. 3.30m for the inside and single left turn lanes;
5. 3.50m for the right turn lanes; and
6. 4.50m for the one-way “channelized” lanes.

C. Provide a two-way emergency access road between 83 Street and 85 Street for the property at 8309 90 Avenue. The emergency access road shall be located on the south side of the intersection as shown on Figure 5-1A-15 and shall be of sufficient width to allow all directional movements for all Emergency Services vehicles that utilize the facility at that location to access both 83 Street and 85 Street. The emergency access road shall be fully reconstructed, using a pavement structure consistent with that of 83 Street, as outlined in Table 3-2.5.1.

D. Provide monolithic (curbline) sidewalks:

1. on the south side of Connors Road along the right turn bay onto 85 Street;

2. on both sides of the emergency access road;

3. along the inside curbline from 85 Street north of Connors road to Connors road westbound;

4. on the west side of 83 Street between Connors Road and the emergency access road; and

5. along the northeast curbline of the service road on the north side of 90 Avenue.

E. Provide a concrete sidewalk, minimum 2.0m wide:

1. from the northeast corner of the emergency access road and 85 Street intersection to the southwest corner of the 83 Street and Connors Road intersection; and

2. on the east side of the Trackway south of 90 Avenue.

F. Realign the service road that runs north of 90 Avenue and ties into the service road east of 85 Street.

G. Provide a SUP on the north side of 90 Avenue from the alley east of 85 Street to the existing SUP at the crosswalk at approximately 83 Street.

H. Provide as many parking stalls as possible, but not less than 60 in the parking lot south of the property at 9010 85 Street.

I. Recognize that 90 Avenue, from 85 Street to the 90 Avenue Reconstruction Project Limits, has had a temporary mill and overlay. Reconstruction of 90 Avenue to the minimum pavement structure in Table 3-2.5.1 *[Minimum Pavement Structures]* of this Schedule is required.

3-2.11.9 83 Street North of 82 (Whyte) Avenue

A. Geometric configuration, lane direction and vehicle turning movement requirements for 83 Street between 90 Avenue and 82 (Whyte) Avenue shall be as shown on Figures 5-1A-15 to 5-1A-17 of Appendix 5-1A *[Project Description Drawings]* of this Schedule.

B. The minimum lane widths shall be:

1. 3.50m for the outside travel lanes (one in each direction) except that, when adjacent to a curb the minimum shall be 3.70m;

2. 3.50m for the inside travel lanes (one in each direction);

3. 3.50m for the outside left turn lanes;

4. 3.30m for the inside and single left turn lanes;

5. 3.50m for right turn lanes;

6. 2.25m for on-street parking; and

7. 3.25m for bus Lay-bys.

C. Provide a new intersection into the Bonnie Doon Mall parking lot and to the proposed Dermott District Park Renewal as shown on Figure 5-1A-16 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule, (the "***Future Bonnie Doon Intersection***"). The Future Bonnie Doon Intersection shall allow all directional pedestrian and vehicular access.

1. The closure of the existing access into the Bonnie Doon Mall, as shown on Figure 5-3A-8 of Appendix 5-3A *[Access and Road Closures]* of this Schedule*,* cannot occur until the Future Bonnie Doon Intersection is completed and open for use.

D. Provide a monolithic (curbline) sidewalk along the east and west side of the right-of-way, north of the Future Bonnie Doon Intersection.

E. Provide a monolithic (curbline) sidewalk along the east side of the right-of-way from the Future Bonnie Doon Intersection, south to 82 (Whyte) Avenue.

F. Provide a SUP along the west side of the Trackway from the Future Bonnie Doon Intersection, south to 82 (Whyte) Avenue.

G. Provide an on-street parking lane in the available space along the east side of 83 Street, from 86 Avenue to 84 Avenue, minimum 2.25m wide.

H. On 83 Street, from 84 Avenue to 82 (Whyte) Avenue:

1. provide a combined northbound bus lay-by and on-street parking; and

2. provide a southbound, integrated multi-bus stop as identified in Table 3-2.6.1 [*Bus Stop Requirements*] of this Schedule, and right turn lane, along the west side of 83 Street between 84 Avenue and 82 (Whyte).

I. Provide a curb crossing access from 83 Street at the midpoint of the parking lot north of the alley north of 82 Avenue in addition to reinstating the existing curb crossing access at the north end of the parking lot.

3-2.11.10 82 (Whyte) Avenue and Intersection with 83 Street

A. 82 (Whyte) Avenue will remain in its existing alignment, subject to the following exceptions:

1. provide an additional eastbound lane on 82 (Whyte) Avenue between 83 Street and 85 Street;

2. retain the service road, maximize on-street parking and maintain access to the front of the residential properties between 83 Street and 85 Street; and

3. maintain the existing monolithic (curbline) sidewalk along the south side of 82 (Whyte) Avenue between 83 Street and 85 Street.

B. The minimum lane widths between 83 Street and 85 Street shall be:

1. 3.30m for the service road; and

2. 2.30m for on-street parking.

3-2.11.11 83 Street South of 82 (Whyte) Avenue to Argyll Road

A. Geometric configuration, lane direction and vehicle turning movement requirements for 83 Street from 82 (Whyte) Avenue to Argyll Road shall be as shown on Figures 5-1A-17 to 5-1A-22 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 3.50m for the travel lanes (one in each direction);

2. 3.30m for the left turn lanes;

3. 3.50m for the right turn lanes;

4. 2.25m for the on-street parking; and

5. 3.25m for the bus lay-bys.

C. Provide monolithic (curbline) sidewalks along both sides of the Roadway, except for the west side of 83 Street from 81 Avenue to 82 (Whyte) Avenue, which shall be a SUP, and the following locations where separate (boulevard) sidewalks are to be provided:

1. on the west side of 83 Street between 76 Avenue and 77 Avenue;

2. on the east side of 83 Street between 76 Avenue and the first alley south of 76 Avenue;

3. on the west side of 83 Street between 73 Avenue and the first alley north of 73 Avenue;

4. on the east side of 83 Street between 73 Avenue and approximately 50m south of 73 Avenue; and

5. on either side of 83 Street where curb bulbs are provided at intersections and the ends of bus stops.

D. Provide for right in/right out only vehicle turning movements at 81 Avenue, 80 Avenue, 79 Avenue, 78 Avenue, 77 Avenue, 71 Avenue, and 69 Avenue.

E. No crosswalks are permitted across 83 Street at 81 Avenue, 80 Avenue, 79 Avenue, or 77 Avenue.

F. Provide a crosswalk across 83 Street at 78 Avenue.

G. On 83 Street, from 76 Avenue to Argyll Road:

1. provide a tee intersection at 69A Avenue that accommodates future northbound to southbound U-turns.; and

2. provide for right out only vehicle turning movements at the east service road south of 71 Avenue.

H. Provide on-street parking in the available space:

1. on the west side of 83 Street from the first alley south of 76 Avenue to the first alley north of 73 Avenue;

2. on the east side of 83 Street from the first alley south of 76 Avenue to the mid-block crosswalk at the north end of the northbound Platform of the Avonmore Stop;

3. on the west side of 83 Street from the mid-block crosswalk at the south end of the southbound Platform of the Avonmore Stop to 71 Avenue;

4. on the east side of 83 Street from approximately 50m south of 73 Avenue to 71 Avenue; and

5. on the west side of 83 Street from 71 Avenue to the first alley north of 69A Avenue.

I. Provide a mid-block crosswalk across:

1. the northbound lane of 83 Street at the north end of the northbound Platform of the Avonmore Stop. Provide a curb bulb on the east side of 83 Street at this location; and

2. the southbound lane of 83 Street at the south end of the southbound Platform of the Avonmore Stop. Provide a curb bulb on the west side of 83 Street at this location.

J. Close the commercial access to the south side of Argyll Road at 83 Street.

3-2.11.12 Wagner Road / Davies Road

A. Geometric configuration, lane direction and vehicle turning movement requirements for Wagner Road and Davies Road shall be as shown on Figures 5-1A-23 to 5-1A-25 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. Provide an additional eastbound lane on Wagner Road from 75 Street to Davies Road, for a total of two eastbound and two westbound lanes with the following minimum lane widths:

1. 4.20m for the outside through/right turn lanes (one in each direction); and

2. 3.50m for the inside through/left turn lanes (one in each direction).

C. Wagner Road, west of Davies Road shall match existing dimensions and lane configurations.

D. Davies Road, south of Wagner road shall match existing dimensions.

E. Provide accesses to the Davies Site as specified in Section 3-3.3.6 *[Access]*.

F. Provide a separate (boulevard) sidewalk along the south side of Wagner Road between Davies Road and 75 Street.

G. Provide a monolithic (curbline) sidewalk on the east side of Davies Road from Wagner Road south to the south limit of the Davies Site.

3-2.11.13 75 Street – Wagner Road to Whitemud Drive

A. Geometric configuration, lane direction and vehicle turning movement requirements for 75 Street between Wagner Road and Whitemud Drive shall be as shown on Figures 5-1A-25 to 5-1A-30 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. Provide an additional northbound and southbound lane on 75 Street from Wagner Road to Whitemud Drive. The final configuration of 75 Street from Wagner Road to Whitemud Drive will be an arterial road with a total of three northbound and three southbound lanes having the following minimum lane widths:

1. 4.20m for the outside travel lanes (one in each direction);

2. 3.50m for the inside travel lanes (two in each direction);

3. 3.50m for the outside left turn lanes;

4. 3.30m for the inside left turn lanes; and

5. 3.50m for the right turn lanes.

C. Provide a transition from the six lane arterial road south of Wagner Road to the 4 lane arterial road north of Wagner Road on the north side of Wagner Road.

D. Provide an SUP on the west side of 75 Street from Wagner Road to Whitemud Drive with a minimum 2.0m wide boulevard between the Roadway and the SUP.

E. Provide accesses to the Davies Site as specified in Section 3-3.3.6 *[Access]* of this Schedule.

F. The grade crossing between 75 Street and the CN Railway right-of-way shall comply with the requirements of the applicable Railway Agreement.

G. At the grade crossing between 75 Street and the CN Railway right-of-way design and construct the Roadway such that the URP Company clearance requirements for the existing 750mm EPCOR waterline and the new CN Railway crossing warning system signal mast foundations are met. Clearances shall not be less than:

1. 2.0m clearance between the EPCOR waterline and any signal foundation; and

2. 1.4m separation between the face of curb and the center of any railway crossing warning signal mast.

H. Provide a minimum 1.50m wide concrete sidewalk on the east side of the Trackway from McIntyre Road to Roper Road.

I. The closure of the existing access located approximately 100m north of McIntyre Road, as shown on Figure 5-3A-14 of Appendix 5-3A *[Access and Road Closures]* of this Schedule, cannot occur until April 15, 2016

J. Close all existing commercial accesses between Roper Road and 51 Avenue on the east side of 75 Street.

1. Maintain the existing access for Over-Dimensional Vehicles to access the High Load Corridor from the site at 5203 75 Street NW as shown on Figure 5-3A-15 of Appendix 5-3A *[Access and Road Closures]* of this Schedule until August 15, 2016.

K. Between Roper Road and 51 Avenue the design of the Roadway and the Trackway shall permit the installation of two side loading 90m by 4m Platforms for a future Stop, including room for 2.0m wide concrete sidewalk behind the northbound Platform.

3-2.11.14 Whitemud Drive Road Bridge

A. Geometric configuration, lane direction and vehicle turning movement requirements for the Roadway over Whitemud Drive shall be as shown on Figures 5-1A-30 and 5-1A-32 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 4.20m for the outside travel lanes (one in each direction);

2. 3.50m for the two northbound inside travel lanes;

3. 3.50m for the one southbound inside travel lane;

4. 3.50m for the outside left turn lanes (one in each direction); and

5. 3.30m for the inside left turn lanes (one in each direction).

C. Maintain the existing dimensions and lane configurations for both the eastbound and westbound off-ramps to Whitemud Drive from 66 Street/75 Street.

D. Provide SUP connections as required to tie into the Whitemud Drive Pedestrian Bridge. Pedestrians shall be accommodated on the Whitemud Drive Pedestrian Bridge.

3-2.11.15 66 Street – Whitemud Drive to 28 Ave

A. Geometric configuration, lane direction and vehicle turning movement requirements for 66 Street from Whitemud Drive to 28 Ave shall be as shown on Figures 5-1A-33 and 5-1A-41 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The final configuration of 66 Street from Whitemud Drive to 28 Ave will be a four lane divided arterial road with the following minimum lane width:

   1. 4.20m for the outside travel lanes (one in each direction);

   2. 3.50m for the inside travel lanes (one in each direction);

   3. 3.50m for the outside left turn lanes;

   4. 3.30m for the inside left turn lanes; and

   5. 3.50m for the right turn lanes.

C. Provide an SUP on the west side of 66 Street from Whitemud Drive to 28 Avenue with a minimum 4.0m wide boulevard between the Roadway and the SUP where sufficient space is available and a minimum 3.0m wide boulevard otherwise.

D. Provide a pedestrian crossing across 66 Street on the north side of the intersection of 66 Street and 41 Avenue (Figure 5-1A-34). A crosswalk on the south side of the intersection is not permitted.

E. Provide a monolithic (curbline) sidewalk on the east side of 66 Street between the crosswalk at 41 Avenue and the bus stop north of 41 Avenue (Figure 5-1A-34).

F. Provide an SUP on the east side of the Trackway from 41 Avenue to Grand Meadow Crescent that ties into the crosswalk across the Trackway north of 41 Avenue (Figures 5-1A-34 and 5-1A-35).

G. Provide a monolithic (curbline) sidewalk on the east side of 66 Street between the north end of the southbound Platform of the Millbourne/Woodvale Stop and the north end of the bus lay-by (Figure 5-1A-35).

H. Provide a mid-block crosswalk across 66 Street and the Trackway between 36A Avenue and 38 Avenue that ties into adjacent neighbourhood walkways (Figure 5-1A-36).

I. Provide a minimum 1.50m wide concrete sidewalk on the east side of the Trackway between 36A Avenue and the nearest alley (Figure 5-1A-37).

J. Provide a minimum 1.50m concrete sidewalk on the east side of the Trackway from 34 Avenue to 28 Avenue.

K. Close all commercial accesses on the east side of 66 Street between 28 Avenue and 34 Avenue (Figure 5-1A-40), except for the first commercial access north of 28 Avenue on the east side of 66 Street which shall be converted to a signalized all directional intersection serving properties east and west of 66 Street and the existing fire hall at 2904 66 Street.

L. Provide a crosswalk across 66 Street on the north side of the intersection of the first commercial access north of 28 Avenue (Figure 5-1A-40). A crosswalk on the south side of the intersection is not permitted.

M. Provide Kiss 'N Ride drop offs as shown on Figures 5-1A-35 and 5-1A-39 of Appendix 5-1A [*Project Description Drawings*] of this Schedule. These include:

   1. a 3.5m wide Kiss 'N Ride drop off lane approximately 30m in length (excluding tapers) along the north side of 38 Avenue, west of 66 Street;

   2. a 3.5m wide Kiss 'N Ride drop off lane approximately 30m in length (excluding tapers), along the south side of 38 Avenue, west of the right lane taper, west of 66 Street; and

3. a minimum of 3 Kiss 'N Ride drop off spots along the north side of 31 Avenue between the Church access and the existing bus stop.

N. Provide a 3m wide gravel path on the east side of the Trackway from the crosswalk across the Trackway north of 41 Avenue to the Plains Midstream valve site. Provide a gravel pad at the valve site sized to accommodate two (2) parking stalls and turning around a 13m long single unit truck with the parking stalls occupied. Provide two (2) wooden bollards at the south end of the gravel path with lockable chain between them to prevent unauthorized access.

3-2.11.16 28 Avenue

A. Geometric configuration, lane direction and vehicle turning movement requirements for 28 Avenue from 66 Street to 55 Street shall be as shown on Figures 5-1A-41 and 5-1A-42 of Appendix 5-1A *[Project Description Drawings]* in Part 1 *[General]* of this Schedule.

B. The minimum lane widths shall be:

1. 3.30m for the travel lanes;

2. 3.30m for the turn lanes; and

3. 2.25m for on-street parking.

C. For 28 Avenue from 66 Street to 55 Street:

1. provide a minimum 2.0m concrete sidewalk on the north side of 28 Avenue from 66 Street to Hewes Way; and

2. provide an SUP on the south side of the Trackway from 66 Street to Hewes Way.

D. On the north side of 28 Avenue, the design of the Roadway shall permit the future installation of an on-street parking lane, 2.25m wide in the following locations:

1. between Hewes Way/Youville Drive and the first commercial access west of Hewes Way/Youville Drive; and

2. between the first commercial access west of Hewes Way/Youville Drive and the first commercial access east of 66 Street.

E. Provide an on-street parking lane along the south side of 28 Avenue, adjacent to the Mill Woods Stop, between the commercial access west of Hewes Way and the right turn lane onto Hewes Way.

F. The existing right in/right out accesses on the south side of 28 Avenue shall be closed.

G. On the east side of Hewes Way/Youville Drive, provide a transition from the four lane Roadway west of Hewes Way/Youville Drive to the existing Roadway geometry on the east side of Hewes Way/Youville Drive. The reconfiguration of sidewalks and angled on-street parking shall be optimized to maximize ease of use.

3-2.12 OPENING ROADS TO THE PUBLIC

A. For each road segment that requires either reconstruction or geometric changes, Project Co shall apply to the Independent Certifier for a Completion Certificate in accordance with Section 13.3 *[Early Handover Item Completion]* of Schedule 4 *[Design and Construction Protocols]* prior to opening or re-opening the road segment(s) to the public.

3-2.13 HIGH LOAD CORRIDOR

A. Design and construct 75 Street, from Whitemud Drive to Roper Road, including the intersection of Roper Road and 75 Street to accommodate Over-Dimensional Vehicles.

B. All Infrastructure, including, Traffic Signal arms, if applicable, and cantilever sign structures, along the High Load Corridor shall be designed to provide passage for Over-Dimensional Vehicles.

SECTION 3-3 DAVIES TRANSIT CENTRE AND DAVIES PARK 'N' RIDE

A. This section sets out the civil site development requirements for the Davies Site, including the requirements for the horizontal and vertical alignments of the Davies Transit Centre busways and Passenger loading platforms, parking lots, sidewalks, and Shared Use Paths. This section does not include requirements for the Davies Station, drainage of the Davies Site, landscape features, lighting or security.

3-3.1 REFERENCE STANDARDS

A. Without limiting Section 1-1.7 *[Reference Documents]* of this Schedule and except as otherwise specified herein, the civil site development requirements for the Davies Site and all associated infrastructure shall comply with the following codes, standards and regulations:

1. Valley Line LRT Project Roadways Design and Construction Standards, as included in the Disclosed Data;

2. ETS Transit Centre Design Guidelines;

3. TAC "*Geometric Design Guide for Canadian Roads*";

4. Alberta Safety Codes Council, "*Barrier-Free Design Guide*"; and

5. Alberta Building Code.

B. In the event of any conflict, ambiguity or inconsistency between or among the requirements of this Section 3-3.1 *[Reference Standards],* the requirements shall apply in the order listed in Section 3-3.1A [*Reference Standards*].

3-3.2 GENERAL REQUIREMENTS

3-3.2.1 Davies Transit Centre Requirements

A. The Davies Transit Centre shall include:

1. a central passenger loading platform;

2. additional passenger loading platforms; and

3. a minimum of 20 sawtooth-style bus bays, of which 4 shall be configured for articulated buses.

B. The central passenger loading platform shall be integrated with the Davies Station and shall be located beneath the portion of the Davies Elevated Guideway within the Davies Site.

3-3.2.2 Design Vehicles

A. Design vehicles for the Davies Transit Centre shall be:

1. 12m Transit Bus (B-12) as defined in TAC;

2. Articulated Bus (A-Bus) as defined in TAC;

3. DATS Buses;

4. Standard fire truck as defined in 2.4.10 of the *Valley Line LRT Roadways Design and Construction Standards*; and

5. ambulance emergency vehicles.

B. Design vehicles for the Davies Park 'n' Ride, including the Kiss 'n' Ride, shall be a passenger car, as defined in TAC.

3-3.3 DESIGN SPECIFIC REQUIREMENTS

3-3.3.1 Davies Transit Centre Busway

A. The Davies Transit Centre busway layout shall be such that any combination of design vehicles can maintain two-way circulation around the Davies Transit Centre, with all bus bays occupied by the design vehicle buses.

B. All bus bays shall operate independently and shall be accessible to buses (in and out) regardless of the occupancy of any adjacent bays. All buses parked in a bus bay shall be accessible for safe loading and unloading of passengers.

C. The busway design shall accommodate the turning paths, sight distance, and clearance envelope requirements for all Davies Transit Centre design vehicles.

D. Curb return radii shall accommodate all design vehicle minimum inside turning radii and allow simultaneous two-way design vehicle bus movements, without lane encroachment.

3-3.3.2 Passenger Loading Platforms

A. Passenger loading platforms refer to the areas adjacent to the bus sawtooth bays for passenger loading and unloading.

B. Passenger loading platforms on the outside perimeter of the Davies Transit Centre busway shall be a minimum of 3.0m wide and at least the length of the applicable design vehicle bus, constructed of concrete. Any permanent obstructions or structures (including light standards, benches, shelters, landscape features) that could interfere with the loading or unloading of bus passengers, including those with wheelchairs, scooters and other mobility aids using buses or DATS vehicles with ramps deployed, shall be located more than 3.0m from the platform curb.

C. Sidewalks associated with a passenger loading platform area shall have a minimum longitudinal grade of 0.5% and a maximum of 5% and a minimum 2.0% and a maximum of 2.5% cross fall.

D. Passenger loading platforms shall comply with the Barrier-Free Design Guide.

3-3.3.3 Service, Maintenance and Security Vehicle Parking

A. Provide a minimum of 4 parking spaces, for exclusive City use, within 50m of the central passenger loading platform of the Davies Transit Centre.

B. The 4 parking spaces referred to in Section 3-3.3.3A *[Service, Maintenance and Security Vehicle Parking]* shall:

1. be designed for a passenger car, as defined in TAC;

2. be fully accessible when all bus bays are occupied by the design vehicle buses; and

3. not impede ETS bus operations within the Davies Transit Centre.

3-3.3.4 Davies Station Bicycle Parking

A. Provide a minimum 95 bicycle racks within 50m of an entrance to the Davies Station.

3-3.3.5 Davies Park 'n' Ride

A. Provide as many passenger vehicle parking stalls as possible, but not less than 1,300 in a park and ride facility on the Davies Site (the "***Davies Park 'n' Ride***"). At least 26 parking stalls shall be Barrier-Free stalls, located within a maximum walking distance of 50m from an entrance to the Davies Station, and meeting the requirements of the ABC and the Barrier-Free Design Guide.

B. The Davies Park 'n' Ride shall be separated into a minimum 400 stall parking lot located north of the Davies Transit Centre and a minimum 900 stall parking lot located south of the Davies Transit Center.

C. No infrastructure required to support the Operation of the System is to be installed within the Davies Park 'n' Ride, with the exception of infrastructure required solely for the purpose of operating the Davies Park n' Ride.

D. The horizontal geometry layout of the Davies Park 'n' Ride shall comply with Good Industry Practice and accommodate the turning movements of the applicable design vehicle, and the following design parameters:

1. standard parking stall – minimum 2.6 x 5.5m;

2. Barrier-Free stalls – minimum 3.7 x 5.5m;

3. perimeter drive aisle width – minimum 7.3m;

4. internal drive aisle width – minimum 7.0m;

5. maximum parking bay length – 122m;

6. dead-end drive aisles are not permitted;

7. parking bays shall be defined by cast-in-place concrete curbed landscape islands on the ends. Minimum dimensions of the islands shall be 2.0 x 10m, measured from face of curb to face of curb; and

8. each parking lot perimeter shall be defined by cast-in-place concrete curbing.

E. The Davies Park 'n' Ride shall comply with the following vertical layout design parameters:

1. minimum grade in a parking stall shall be 0.5% and a maximum grade shall be 3.0%;

2. minimum grade along a curb shall be 0.5%; and

3. minimum longitudinal grade in the drive aisle shall be 0.5% with a maximum of 5.0%.

3-3.3.6 Access

A. The number of passenger vehicle accesses and the size of each access to the Davies Park 'n' Ride shall be determined using a traffic impact assessment, provided that:

1. access to 75 Street shall be right-in/right-out only;

2. access to Wagner Road shall be all directional;

3. access to Davies Road shall be all directional; and

4. accesses to the Davies Park 'n' Ride shall not interfere with ETS bus movements to and from the Davies Transit Centre.

B. Provide the following dedicated bus access to Davies Transit Centre, sizing and configuration to be validated through a traffic impact assessment:

1. 75 Street, right-in/right-out and bus only left turn from 75 Street northbound into Davies Transit Centre. A bus priority signal shall be provided for bus access to Davies Transit Centre; and

2. an all directional access from the Davies Transit Centre to Davies Road.

3-3.3.7 Kiss 'N' Ride

A. Provide a Kiss 'n' Ride facility within 50m walking distance of the central passenger loading platform of the Davies Transit Centre.

B. The Kiss 'n' Ride shall have a minimum capacity of 20 parked, passenger cars, as defined in TAC.

C. The Kiss 'n' Ride is intended to be short term parking for drop off and pick up only. Provide signage to designate the Kiss 'n' Ride for temporary parking only, with a maximum duration of 5 minutes.

D. The design of the Kiss 'n' Ride shall permit vehicles to safely pass parked vehicles.

E. The Kiss 'n' Ride shall be designed for passenger drop-off on the right hand side of the vehicle. Provide a minimum 3.0m wide concrete surface for passenger drop-off.

3-3.3.8 Taxicab Parking

A. Provide a taxicab parking area within 50m walking distance of the central passenger loading platform of the Davies Transit Centre. The taxicab parking area shall include a minimum of six (6) dedicated standard parking stalls of minimum dimensions 2.6m (width) x 5.5m (length).

3-3.3.9 Pedestrians

A. Provide direct, dedicated, Barrier-Free, safe and functional pedestrian paths of travel:

1. to and from all areas of the Davies Park 'n' Ride, Kiss 'n' Ride, taxi cab parking, the Davies Transit Centre and the Davies Station; and

2. from the Davies Site to existing, adjacent, offsite pedestrian facilities, including SUPs on 75 Street.

B. Pedestrian corridors within the Davies Site shall be a minimum 3.0m wide and shall comply with the requirements set out in Section 2-4.2D *[Streetscape]* of this Schedule.

3-3.3.10 Crosswalks

A. Provide marked crosswalks within Davies Transit Centre in accordance with Section 2-4.3C *[Crossing Treatments]* of this Schedule. At a minimum provide crosswalks from the four corners of the central passenger loading platform to the sidewalk located on the opposite side of the busway.

3-3.3.11 Pavement Structure

A. Design and construct all pavement structures within the Davies Site.

B. Within the Davies Park ‘n’ Ride, all parking areas and drive lane surfaces shall be of the same material, either asphalt concrete pavement or Portland cement concrete pavement.

C. Within the Davies Transit Centre, the busway, including travel lanes and sawtooth bus bays, shall be Class A Portland cement concrete pavement.

3-3.3.12 Curbs, Gutters, Medians and Sidewalks

A. All curbs, gutters, medians and sidewalks within the Davies Site shall comply with the applicable requirements of the *Valley Line LRT Project Roadways Design and Construction Standards*.

3-3.3.13 Pavement Marking and Signage

A. Design and install all permanent pavement marking in accordance with the *City of Edmonton Design and Construction Standards, Volume 8 – Pavement Markings*.

B. All parking stalls within Davies Park ‘n’ Ride shall be delineated with 10cm wide yellow lines.

C. Provide all way-finding and regulatory signs within the Davis Transit Centre and Davies Park ‘n’ Ride including the following:

1. signs specified in the *ETS Transit Centre Design Guidelines,* including 2 Park ‘n’ Ride signs as shown in Appendix H of the *ETS Transit Centre Design Guidelines* (one on 75 Street and one on Davies Road).

D. All ETS bus route signs will be designed, supplied, and installed by the City.

SECTION 3-4 STORMWATER MANAGEMENT

3-4.1 SCOPE

A. This section sets out the requirements for the Stormwater Management System, including the installation of new and modification or removal of existing Stormwater Management infrastructure required to manage stormwater and other flows within and from the Lands.

3-4.2 REFERENCE STANDARDS

A. Without limiting Section 1-1.7 *[Reference Documents]* of this Schedule and except as otherwise specified herein, the Stormwater Management System and all associated infrastructure shall comply with the following codes, standards and regulations:

1. Valley Line LRT Project Drainage Design and Construction Standards;

2. City of Edmonton Drainage Bylaw (No. 16200);

3. City of Edmonton Erosion and Sediment Control Field Manual;

4. the following clause in Section 6.0 of the Municipal Policies and Procedures Manual, Alberta Environment: “Stormwater management techniques to improve water quality shall be included to effect a minimum of 85% removal of sediments of particle size 75 microns or greater”; and

5. City of Edmonton Stormwater Low Impact Development Best Management Practices Design Guide.

3-4.3 DESIGN CRITERIA

A. Design the Stormwater Management System to accommodate the following design storm events: the 1:5 year, 1:25 year and 1:100 year design events, each as defined in the *Valley Line LRT Project Drainage Design and Construction Standards*.

B. The Stormwater Management System shall be designed in accordance with the goals and principles set out in the following City of Edmonton documents, copies of which are included in the Disclosed Data:

1. *Approval-to-Operate*;
2. *Stormwater Quality Control Strategy and Action Plan*;
3. *Total Loading Plan*;
4. *Combined Sewer Overflow Control Strategy*; and
5. *Downtown Intensification Plan*.

C. Provide Positive Drainage away from all foundations, including the Trackway.

D. Provide Minor Drainage systems to carry stormwater runoff for events up to and including the 1:5 year design event.

E. Provide Major Drainage systems to carry stormwater runoff in excess of the capacity of the Minor Drainage systems, for events up to and including the 1:100 year design event.

F. The Stormwater Management System shall mitigate all adverse impacts of stormwater runoff on Operations and Infrastructure for events up to and including the 1:100 year design event, while not increasing existing flows into the existing City Stormwater Management systems by more than 10%.

G. The Stormwater Management System shall:

1. be sustainable;
2. maximize use of existing infrastructure; and
3. protect downstream Stormwater Management systems and the environment.

H. The Stormwater Management System, and each component thereof, shall be designed to address:

1. runoff quantity control (for all events up to and including the 1:100 year design event);
2. runoff quality treatment, in accordance with Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule; and
3. spill containment, in accordance with Section 3-4.3.2. *[Water Quality Treatment]* of this Schedule.

I. Drainage from the Infrastructure shall not adversely impact adjacent properties or the surrounding environment, including properties, Roadways, sidewalks and SUPs.

J. The Stormwater Management System shall not:

1. increase runoff peak flows by more than 10% to the existing City Stormwater Management systems;
2. increase surface ponding depths or create additional risk of flooding on adjacent properties;

3. adversely impact runoff quality; or

4. increase the risk of spilled materials discharging to receiving systems.

K. The Stormwater Management System shall be a gravity system. Pumping of stormwater runoff is prohibited.

L. Provide accessible flow monitoring points upstream and downstream of all water quality treatment facilities, except catch basins, and peak flow reduction facilities.

M. Provide trash guard systems to intercept trash and other materials that are likely to reduce the conveyance capacity of any existing City Stormwater Management systems.

N. Surface velocity of stormwater runoff shall not exceed 3 m/s for events up to and including the 1:100 year design event.

O. Backflow prevention valves shall be installed on the discharges from the following Stormwater Management System components when discharging to the existing City combined sewer system:

1. Trackway drainage systems;

2. Trackway foundation drainage systems;

3. stormwater storage elements; and

4. stormwater LID measures.

3-4.3.2 Water Quality Treatment

A. Discharges from the Stormwater Management System shall not contain substances that are deleterious to the environment. Discharges from the Stormwater Management System into the existing City Stormwater Management systems shall comply with the water quality requirements set out in the documents referenced in Section 3-4.2 *[Reference Standards]* of this Schedule.

B. Provide grit management measures to capture and prevent grit from being transferred to the City's Stormwater Management systems or to the natural environment. Grit management measures are to be sized to capture all grit from events up to and including the 1:2 year design event. Provide easy access to all grit management measures for maintenance.

C. Grit management measures shall be designed to prevent trapped materials from being flushed for all events up to and including the 1:100 year design event.

D. Provide runoff water quality treatment measures, in addition to grit management, and spill containment measures, where runoff water quality, other than grit, may be degraded, including at the following locations:

1. Davies Site;

2. the Gerry Wright OMF;

3. Tawatinâ Bridge;

4. Whitemud Drive LRT Bridge;

5. Elevated Guideways; and

6. the Quarters Tunnel.

E. Provide a multi-barrier approach to stormwater quality treatment to ensure site discharge water quality complies with the water quality requirements of this Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule including infiltrating LID measures.

F. Maintain all water quality treatment measures regularly, including removing collected materials at intervals demonstrated to ensure the treatment capacities of the treatment measures are not exceeded at any time for the duration of the Operating Period.

G. Provide grit management at all stormwater inlets except on elevated structures where, if the slope of the conveyance pipe can be shown to pass grit at low flows, the grit management measures may be allowed at the base of the structure.

3-4.4 MINOR DRAINAGE

A. The Minor Drainage systems provided as part of the Stormwater Management System shall provide seamless connectivity to the City's existing Minor Drainage systems.

3-4.4.1 Peak Flow Mitigation

A. Peak runoff discharges from the Lands to the City's existing Minor Drainage systems during the 1:5 year design event shall not exceed the predevelopment rates by more than 10%.

B. Peak runoff discharges from the Lands to the City's existing Minor Drainage systems during the 1:100 year design event shall not exceed the discharges during the 1:5 year design event by more than 10%.

C. The applicable Final Designs shall include the expected increase in peak runoff discharges from the Lands to the City's Minor Drainage systems during:

1. the 1:5 year design event; and

2. the 1:100 year design event,

as a result of the Project at all locations along the LRT Corridor.

3-4.4.2 Peak Flow Reduction Measures

A. If LID measures are used as peak flow reduction measures, they shall be sized to achieve the greater of the following criteria:

1. limit peak runoff discharges from the Lands during the 1:5 year design event to not more than 110% of the predevelopment rates;

2. limit peak runoff discharges from the Lands during the 1:100 year design event to not more than 110% of the 1:5 design event flows; and

3. soil volume sizing criteria set out in the *City of Edmonton Stormwater Low Impact Development Best Management Practices Design Guide*.

B. If Structural Soil Cells are used as peak flow reduction measures, they shall:

1. comply with the *City of Edmonton Low Impact Development Best Management Practices Design Guide*;

2. comply with the specifications provided by the manufacturer of the selected product;

3. use a soil mix engineered to provide a minimum 0.4 void ratio for water movement, and adequate water retention features to retain water for use by trees and other plantings;

4. incorporate trees and other plantings as required by Section 2-14 *[Landscape Architecture]* of this Schedule;

5. incorporate catch basins to collect grit and convey local surface runoff for events up to and including the 1:5 year design event into the Structural Soil Cells, spaced:

    a. at maximum intervals of 50m; and

    b. so as to provide balanced distribution of flows;

6. incorporate means of distributing flows from the catch basins to the engineered soils in a uniform manner;

7. incorporate means of preventing the movement of fine materials into the Minor Drainage system and to provide Positive Drainage through the Structural Soil Cell;

8. the Structural Soil Cells shall discharge to the Minor Drainage system at maximum intervals of 200m; and

9. all distribution and underdrain systems shall:

    a. incorporate means of direct access from the surface; and

    b. shall be minimum 200mm diameter pipe with minimum diameter bends as specified by the applicable pipe manufacturer,

    to accommodate inspection and flushing.

In the event of any conflict, ambiguity or inconsistency between or among the requirements of this Section 3-4.4.2B *[Peak Flow Reduction Measures]* of this Schedule 5 *[D&C Performance Requirements]*, the most stringent requirements shall prevail.

C. If Structural Soil Cells are used as peak flow reduction measures, provide catch basins that route surface runoff directly to the Minor Drainage systems:

1. for events in excess of the capacity of the Structural Soil Cells up to and including the 1:5 year design event; and

2. during periods when the soils within the Structural Soil Cells are frozen.

D. Utility Infrastructure may be located through or longitudinally within Structural Soil Cells under agreement with the applicable Utility Companies.

E. Structural Soil Cells and any Utility Infrastructure contained within them shall comply with the ULA requirements set out in the ULA Process.

3-4.5 MAJOR DRAINAGE

A. The Major Drainage systems provided as part of the Stormwater Management System shall provide seamless connectivity to the City's existing Major Drainage systems.

B. The Major Drainage system shall be:

1. a surface grading configuration that contains all surface runoff during events up to and including the 1:100 year design event within the road right-of-way; or

2. storage facilities, with surface inlets and leads, capable of conveying surface runoff from contributing areas from events up to and including the 1:100 year design event into the storage facilities, and providing Positive Drainage to an existing City Stormwater Management system.

C. The Major Drainage system shall include measures to prevent erosion or undermining of infrastructure.

3-4.5.1 Flood Mitigation of Trackway

A. Ponding and overland flow within the Trackway shall not exceed the top of rail for any type of Track, other than Embedded Track, during events up to and including the 1:100 year design event.

B. Ponding and overland flow within the Trackway shall not exceed the top of rail for Embedded Track during events up to and including the 1:5 year design event.

C. Ponding and overland flow within the Trackway of Embedded Track except on 102 Avenue within 100m of 97 Street during a design event in excess of the 1:5 year design event, up to and including the 1:100 year design event, shall not exceed the lesser of:

1. 100mm; or

2. the maximum depth of water through which the LRV can pass without damage or disruption to Operations.

D. Ponding and overland flow within the Trackway of Embedded Track on 102 Avenue within 100m of 97 Street during a design event in excess of the 1:5 year design event, up to and including the 1:100 year design event, shall not exceed the maximum depth of water through which the LRV can pass without damage or disruption to Operations.

E. Ponding and overland flows shall not be permitted at any point of safety, emergency egress pathway or crosswalk (each as described in NFPA 130) or in refuge areas within the Trackway, for events up to and including the 1:100 year design event.

3-4.5.2 Overland Flow Control

A. Peak runoff discharges from the Lands to naturalized environments, other than directly into the North Saskatchewan River, shall not exceed the predevelopment rates for events up to and including the 1:100 year design event.

B. The Stormwater Management System shall not alter or disrupt existing overland flow patterns from areas external to the Lands that flow onto, across and off of areas in the LRT Corridor that will consist of Embedded Track or Direct Fixation Track sections, unless otherwise specified herein or required to comply with Section 3-4.5.1 *[Flood Mitigation of Trackway]* of this Schedule. Wherever existing overland flow patterns from areas external to the Lands are altered or disrupted, such flow volumes shall be controlled by the Stormwater Management System for events up to and including the 1:100 year design event.

C. Existing overland flow patterns from areas external to the Lands that flow across areas in the LRT Corridor that will consist of Ballasted Track sections shall be prevented from entering the Ballasted Track sections by being intercepted, controlled and redirected away from the Ballasted Track sections by the Stormwater Management System for events up to and including the 1:100 year design event.

D. Peak runoff discharges from the Lands for events greater than the 1:5 year design event can overflow the Minor Drainage system and run off the Lands onto the adjacent existing Major Drainage systems or to the natural environment, subject to Section 3-4.5.3 *[Flood Mitigation of Properties]*.

3-4.5.3 Flood Mitigation of Properties

A. The Stormwater Management System shall contain runoff within the road right-of-way and shall not make any currently occurring discharge to any adjacent properties worse, or allow new discharge to, adjacent properties for events up to and including the 1:100 year design event except:

   1. on 102 Avenue where all runoff from events up to and including the 1:100 year design event shall be contained within the road right-of-way with no impact to adjacent properties.

3-4.6 STORMWATER MANAGEMENT – SPECIFIC AREAS

3-4.6.1 Track Drainage

A. The Stormwater Management System shall include such Minor Drainage and Major Drainage systems as required to comply with the flood mitigation requirements of Section 3-4.5.1 *[Flood Mitigation of Trackway]* of this Schedule.

B. Provide Trackway drain inlets upstream of all crosswalks to prevent ponding or overland flows across crosswalks for events up to and including the 1:5 year design event.

C. Provide Minor Drainage systems for all Ballasted Track sections of the LRT Corridor sized to convey runoff from within the Trackway for events up to and including the 1:25 year design event. Discharges from the Minor Drainage systems for Ballasted Track sections to the City's existing Minor Drainage systems shall comply with the requirements of Section 3-4.4.1 *[Peak Flow Mitigation]* of this Schedule.

3-4.6.2 Quarters Tunnel

A. Stormwater runoff from events up to and including the 1:100 year design event shall not flow through the Quarters Tunnel.

B. Any stormwater runoff from the Quarters Tunnel and the North River Valley Tunnel Approach shall not flow onto the Tawatinâ Bridge for events up to and including the 1:100 year design event.

C. Stormwater runoff from events up to and including the 1:100 year design event shall be prevented from entering the 102 Avenue Cut and Cover Tunnel. Collected runoff is to be conveyed by gravity and may be discharged directly to the existing deep storm sewer tunnel at 96 Street and 102 Avenue. If the stormwater runoff is discharged into any other storm sewer, the discharge rate must be controlled to a maximum of 35 L/s/ha for all events up to and including the 1:100 year design event.

D. Provide a deep manhole at 96 Street and 102 Avenue to connect the Minor Drainage system conveying stormwater from the 102 Avenue Cut and Cover Tunnel to the existing deep storm sewer tunnel.

E. The Stormwater Management System within the Quarters Tunnel shall be designed to accommodate all water from:

   1. stormwater runoff in excess of the capacity of the stormwater inlet immediately inside the 102 Avenue Cut and Cover Tunnel;

   2. melt waters from drifted snow and off LRVs;

   3. groundwater seepage; and

   4. wash waters.

F. All stormwater runoff from the North River Valley Tunnel Approach, including any flows through the Quarters Tunnel, up to and including a 1:100 year design event, shall be directed to the NSRV for infiltration into the valley slopes, or to the North Saskatchewan River, in a manner that:

1. provides Positive Drainage of the North River Valley Tunnel Approach;

2. prevents erosion or undermining of the North River Valley Tunnel Approach, the NSRV slopes, and the Tawatinâ Bridge foundation structures; and

3. ensures discharge water quality complies with the water quality requirements of Section 3-4.3.2 [*Water Quality Treatment*] of this Schedule.

If a rain garden stormwater LID feature is used to manage stormwater runoff from the North River Valley Tunnel Approach, it shall comply with the City of Edmonton Stormwater Low Impact Development Best Management Practices Design Guide.

3-4.6.3 Tawatinâ Bridge Deck Drainage

A. Stormwater runoff from the Tawatinâ Bridge shall be directed to the North Saskatchewan River in accordance with the requirements of all applicable Permits. If discharge of stormwater runoff from the Tawatinâ Bridge to the North Saskatchewan River is not permitted, the Stormwater Management System shall collect and discharge all stormwater runoff from the Tawatinâ Bridge to the Minor Drainage systems downstream of the Tawatinâ Bridge.

B. Subject to compliance with all applicable Project Approvals, stormwater runoff from the Tawatinâ Bridge, for events up to and including the 1:100 year design event, shall:

1. be conveyed to inlets and routed through grit traps, sized to contain all grit from events up to and including the 1:5 year design event, on the deck prior to discharge;

2. be discharged below the deck of the Tawatinâ Bridge SUP;

3. be discharged directly onto the river water surface, with no discharge onto the river bank slopes or embankments; and

4. be discharged in such a way as to prevent any erosion or impact to pedestrians.

C. Uncontrolled stormwater runoff from the deck of the Tawatinâ Bridge is not permitted for events up to and including the 1:100 year design event.

D. Any ”request for review” submitted to the applicable Governmental Authorities in accordance with Schedule 10 *[Environmental Performance Requirements]* shall include details of the Stormwater Management System for the Tawatinâ Bridge.

E. No new stormwater outfall on the river bank slopes anywhere in the NSRV will be allowed.

3-4.6.4 Muttart Stop and Approaches

A. Provide a Stormwater Management Facility east of the LRT Corridor and south of the Muttart south access road to collect and manage all stormwater runoff from the Muttart Stop and the Trackway between the south end of the Tawatinâ Bridge and the top of Connors Hill. The Stormwater Management Facility shall:

1. be sized to manage all stormwater runoff from the Muttart Stop and the Trackway between the south end of the Tawatinâ Bridge and the top of Connors Hill from events up to and including the 1:100 year design event, less a controlled maximum discharge rate during the 1:100 year event equal to the lesser of:

a. 4.0 L/s/ha of contributing area; or

b. the maximum allowable discharge rate to prevent overloading of the City's existing Stormwater Management systems receiving the flow;

2. discharge directly into the existing 1500mm storm sewer located immediately west of the Muttart Stop;

3. have a naturalized pond bottom treatment designed to accommodate frequent wet conditions and provide water quality treatment in accordance with the requirements of Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule;

4. include energy dissipation measures at all inlets to prevent erosion; and

5. control stormwater discharges to the City's existing Stormwater Management systems to the discharge flow rates specified in Section 3-4.6.4A.1 *[Muttart Stop and Approaches]* of this Schedule.

B. All stormwater runoff from the Muttart Stop and from the Trackway between the south end of the Tawatinâ Bridge and the top of Connors Hill shall be isolated from all other sources of stormwater runoff. Between the south end of the Tawatinâ Bridge and the top of Connors Hill:

1. the Muttart Stop and the Trackway shall not contribute runoff to the Roadway or any other area outside the Muttart Stop and the Trackway; and

2. the Roadway and any other area outside the Muttart Stop and the Trackway shall not contribute runoff to the Muttart Stop or the Trackway,

for events up to and including the 1:100 year design event.

C. Storm sewers shall not be located north of the Trackway along Connors Road.

3-4.6.5 Elevated Guideway Drainage

A. Uncontrolled stormwater runoff from the deck of any Elevated Guideway is not permitted for events up to and including the 1:100 year design event.

B. Stormwater runoff from Elevated Guideways shall be collected at intervals no greater than 120m and directed through downspouts at support piers.

C. Downspouts from the Elevated Guideways shall:

1. be directly connected into the Minor Drainage systems; or

2. discharge directly onto surface areas not designated for regular pedestrian use (e.g. Roadway gutters, vegetated areas, etc.),

and shall minimize impacts on the public.

D. Direct all stormwater runoff from the Elevated Guideway within the vicinity of SE402 into the ravine located within SE402.

E. Wherever downspouts discharge directly onto surface areas, provide energy dissipation measures sufficient to prevent erosion.

3-4.6.6 Davies Site

A. All stormwater runoff from the Davies Site shall be isolated from all sources of stormwater runoff outside of the Davies Site, for events up to and including the 1:100 year design event.

B. Runoff from the Davies Site from events up to and including the 1:100 year design event shall be released into MH232864 on Wagner Road at Davies Road at a controlled maximum discharge rate during the 1:100 year design event equal to the lesser of:

1. 35.0 L/s/ha over the Davies Site; or

2. the maximum allowable discharge rate to prevent overloading of the City's existing Stormwater Management systems receiving the flow.

C. The maximum depth of any overland flow or ponding on any parking lot within the Davies Site shall not exceed 300mm for any event up to and including the 1:100 year design event.

D. Surface ponding on pedestrian or driving areas within the Davies Site shall not be permitted for any event up to and including the 1:5 year design event.

E. Provide a multi-barrier approach to stormwater quality treatment and stormwater LID measures employing natural treatment processes to ensure site discharge water complies with the water quality treatment requirements of Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule.

3-4.6.7 Gerry Wright OMF

A. All stormwater runoff from the Gerry Wright OMF Site for events up to and including the 1:100 year design event shall be managed and discharged east into the existing Minor Drainage system leading to Mill Creek.

B. Provide a Stormwater Management Facility within the Gerry Wright OMF Site to collect and manage all stormwater runoff from the Gerry Wright OMF Site. The Stormwater Management Facility shall:

1. be sized to manage all stormwater runoff from the Gerry Wright OMF Site for events up to and including the 1:100 year design event, less a controlled maximum discharge rate during the 1:100 year design event equal to the lesser of:

   a. 35.0 L/s/ha over the Gerry Wright OMF Site; or

   b. the maximum allowable discharge rate to prevent overloading of the City's existing Stormwater Management systems receiving the flow;

2. have a naturalized pond bottom treatment designed to accommodate frequent wet conditions and provide water quality treatment in accordance with the requirements of Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule;

3. include energy dissipation measures at all inlets to prevent erosion;

4. control stormwater discharges to the City's existing Minor Drainage system to the discharge flow rates specified in Section 3-4.6.7B.1 *[Gerry Wright OMF]* of this Schedule; and

5. be lined with an impermeable liner to contain run-off and migration of any contaminants from the surrounding soils and groundwater to the Stormwater Management Facility.

C. Provide a multi-barrier approach to stormwater quality treatment and stormwater LID measures employing natural treatment processes to ensure site discharge water complies with the water quality treatment requirements of Section 3-4.3.2 *[Water Quality Treatment]* of this Schedule.

3-4.6.8 66 Street

A. Provide a swale along the east side of the Trackway along 66 Street at the low spot south of 41 Avenue.

B. If Ballasted Track is used near 41 Avenue provide a flow equalization chamber with large capacity inlets and an underdrain that provides Positive Drainage, below the Trackway at the low spot south of 41 Avenue to equalize ponding water levels between the swale and the Roadway during events up to and including the 1:100 year design event. The flow equalization chamber and inlets shall be sized to ensure a maximum water level differential of 0.1m is achieved between the swale and the Roadway during events up to and including the 1:100 year design event. The underdrain system shall provide Positive Drainage of the chamber to the local Minor Drainage system post event.

C. If Direct Fixation Track or Embedded Track is used near 41 Avenue then provide a catch basin and lead at the lowest point of the swale, sized to pass swale runoff the 1:5 year design event, with flows directed to the existing storm sewer system on 66 Street.

3-4.6.9 102 Avenue

A. If a new conveyance pipe or stormwater storage facility is provided from 97 Street, it shall discharge to the existing deep storm sewer tunnel at 96 Street with a controlled maximum discharge rate of 35 L/s/ha for the area contributing runoff to that location during a 1:5 year design event, for all events up to and including the 1:100 year design event. The conveyance pipe or stormwater storage facility may be located below the Trackway.

3-4.7 SEWER RELOCATIONS

3-4.7.1 Relocation Criteria

A. Existing sewer infrastructure and appurtenances (e.g. manholes, catch basins, etc.) that impede the Construction, Operations or Maintenance shall be relocated.

B. Without limiting Section 3-4.7.1A *[Relocation Criteria]* of this Schedule, the following sewer infrastructure and appurtenances shall be relocated:

1. existing sewer infrastructure (up to 7m cover – depth from existing ground to top of pipe) running parallel within the Trackway shall be relocated outside of the Trackway. Existing sewer infrastructure running parallel within the Trackway deeper than 7m are not required to be relocated;

2. existing surface sewer infrastructure (e.g. manholes, catch basins, catch basin manholes, etc.) within the Trackway shall be relocated outside the Trackway so as to accommodate Roadway and Track infrastructure;

3. existing sewer infrastructure crossing the Trackway or under any other Structure with less than 2.0m cover from the top of pipe to the bottom of the Trackway or Structure shall be relocated so as to provide a minimum of 2.0m cover;

4. existing sewer infrastructure on 95 Street with a clearance of less than 3.0m between the sewer infrastructure and the Quarters Tunnel shall be relocated so as to provide a minimum 3.0m clearance. Existing sewer infrastructure having at least 3.0m clearance to the Quarters Tunnel need not be relocated; and

5. existing sewer infrastructure within the footprint of the 102 Avenue Tunnel Approach shall be relocated outside of the footprint of the 102 Avenue Tunnel Approach.

3-4.7.2 Abandonment

A. Portions of any existing sewer infrastructure that is relocated shall be removed if it would be within 2.0m of the Infrastructure.

B. All other portions of existing sewer infrastructure that are relocated shall be abandoned in-situ by confirming that the infrastructure has been disconnected from operating infrastructure and abandoned in accordance with *Section 02535 3.11 Abandonment of Sewers* of the *Valley Line LRT Project Drainage Design and Construction Standards*.

3-4.7.3 Relocation Standards

A. All sewer infrastructure that is relocated shall be replaced with equivalent sizes/carrying capacities as the infrastructure that is replaced.

B. All new sewer infrastructure shall comply with the *Valley Line LRT Project Drainage Design and Construction Standards*, and the separation requirements identified in this Section 3-4.7 *[Sewer Relocations]* of this Schedule.

C. All sewer services to be relocated shall be replaced with the equivalent type of service (e.g. combined sewer services replaced with combined sewer services, etc.).

D. Relocated sewer infrastructure shall be located such that City and URP Companies standard clearance criteria with other infrastructure is achieved, and that relocations are coordinated with relocations of other URP Infrastructure.

E. Where catch basins are relocated, they shall be relocated to an adjacent Roadway in accordance with the *Valley Line LRT Project Drainage Design and Construction Standards* and the Roadways shall be graded to provide Positive Drainage of the Roadway drainage system and all other areas contributing to the catch basins.

3-4.8 NEW SEWER INFRASTRUCTURE

A. All new sewer infrastructure shall comply with the *Valley Line LRT Project Drainage Design and Construction Standards*.

B. New sewer infrastructure shall be located such that City and URP Companies' standard clearance criteria with other infrastructure is achieved, and such that new sewer installations are coordinated with installation of other URP infrastructure.

C. All new storm sewers shall be located outside the Trackway.

D. All new Minor Drainage systems located in combined sewer service areas shall discharge into the City's existing Minor Drainage system. Discharge to the City's combined sewer system will not be permitted except where no feasible connection can be made to a separate storm sewer of the City's existing Minor Drainage system.

SECTION 3-5 UTILITIES, RAILWAYS, AND PIPELINES

3-5.1 GENERAL

3-5.1.1 Scope

A. This Section 3-5 *[Utilities, Railways, and Pipelines]* sets out the technical requirements for all temporary and permanent URP Work. Refer to Schedule 28 *[Project Approvals and URP Matters]* for the administrative protocols to be followed in coordinating, proceeding, and completing URP Work.

B. Project Co shall confirm the location of, protect and maintain all existing URP Infrastructure and Utility services that may be affected by the Project Work, unless approved in writing by the applicable URP Company and in compliance with any conditions imposed in the applicable approval.

C. The City has undertaken some URP investigation and compiled a list of known Utility Infrastructure and Pipeline Infrastructure within or in proximity to the City Lands, a copy of which is included in the Disclosed Data, together with such information as have been provided by the applicable URP Companies with respect to their standards and procedures. The list of known Utility Infrastructure and Pipeline Infrastructure may not be exhaustive and is provided subject to Section 22.4 *[Project Co's Reliance on Information].*

3-5.1.2 Codes & Standards

A. Without limiting Section 1-1.7 [*Reference Documents*] of this Schedule and except as otherwise specified herein, the URP Work and all associated infrastructure shall comply with the following codes, standards and regulations:

1. all codes, standards, and regulations applicable to URP Work;

2. codes and standards identified in the applicable URP Agreements, copies of which are included in the Disclosed Data; and

3. City design and construction standards for Utilities including:

    a. *Valley Line Project Drainage Design and Construction Standards*;

    b. *City of Edmonton Design and Construction Standards Volume 4: Water*; and

    c. *City of Edmonton Design and Construction Standards Volume 7: Power*.

B. Materials incorporated into the URP Work shall be approved by the relevant URP Company prior to installation.

3-5.1.3 Design and Construction Principles

A. Design and Construction of the Utility Work shall be on a like-for-like basis, unless an alternative standard has been agreed to with the relevant Utility Company.

B. Make arrangements with, and obtain the necessary Utility connections for Operation and Maintenance of the System from the applicable Utility Companies. Confirm equipment compatibility and interoperability in compliance with each applicable Utility Company's connection requirements.

C. Project Co shall comply with the Stray Current Sub-Plan and co-ordinate with the URP Companies to protect the URP Infrastructure from corrosion exposure. Utility Companies will be responsible for design and construction of corrosion protection for their own Utility Infrastructure.

D. Utility Work designs are subject to ULA application approval in accordance with the ULA Process. Construction shall not commence until granting of the applicable ULA permit(s).

E. Project Work shall never encroach upon minimum horizontal or vertical separation requirements from other URP Infrastructure as established by Applicable Law, URP Agreements (to the extent disclosed), or as agreed to through the ULA Process.

F. Project Co shall maintain the flow in existing water services, storm and sanitary sewers, drains and water courses encountered in conjunction with the Construction. Effluent from drains shall not flow into an open trench.

G. The Infrastructure shall be designed and constructed such that it shall not impede the future replacement or repair of URP Infrastructure.

H. A minimum of 1m vertical separation shall be maintained between any soil disturbance or the Infrastructure, and Pipeline Infrastructure, unless the applicable Pipeline Crossing Agreement specifically identifies a different clearance requirement.

3-5.1.4 Project Co URP Work

3-5.1.4.1 General

A. For URP Work to be undertaken by Project Co:

1. obtain all required Project Approvals, including rights of entry or access agreements;

2. liaise, arrange, and coordinate with URP Companies, Governmental Authorities, and other Interested Parties in connection with URP Work;

3. observe and comply with any instructions or directions including meeting advance notification requirements, as listed in the Disclosed Data, relating to URP Work issued by the URP Company or any Governmental Authority with jurisdiction over the URP Infrastructure including:

    a. secured access to URP Infrastructure;

    b. operation of URP Infrastructure;

    c. monitoring/inspection by a URP Company; and

    d. protection of URP Infrastructure;

4. secure, or cause to be secured, entry into or execution of all relevant construction or other agreements required in connection with URP Work;

5. secure and protect URP Work from deleterious material intrusion;

6. give such notices as required by the relevant URP Company;

7. identify, design, coordinate, and construct any URP Work and any upgrades to existing URP Infrastructure that may be required to service the System; and

8. identify, design, coordinate, construct, and remove any temporary URP Infrastructure that may be required to accommodate the Design or Construction of the Infrastructure.

B. Project Co shall develop, implement and maintain a system for retaining and tracking design submissions, applications, agreements, correspondence, quality control and quality assurance documentation with respect to all Project Co Utility Work. The system shall be capable of being interrogated remotely by the City in accordance with Section 8 *(Remote Data Queries]* of Schedule 7 *(O&M Performance Requirements]*.

C. Project Co shall map all Project Co Utility Work and Project Co Pipeline Work in accordance with CSA S250-11 and shall maintain, share and submit such mapping in accordance with the ULA Process. All Utility Work and Pipeline Work drawings shall comply with the City cadastral convention as set out in Section 1 [*Drafting Guidelines and Instructions*] of Appendix 4C [*Project Drawing Standards*] of Schedule 4 [*Design and Construction Protocols*] and shall differentiate between the status of Utility Infrastructure and Pipeline Infrastructure, including “abandoned” and “inactive”.

3-5.1.4.2 Tie-ins and Utility Crossings

A. Project Co shall not undertake tie-ins to operational mains unless expressly approved in writing by the applicable Utility Company:

1. Water - EPCOR Water;
2. Power – EPCOR D&T;
3. Gas – ATCO Gas;
4. Sewer – City; and
5. Telecommunications – applicable service Utility Company.

B. Installation of Utility Infrastructure that will cross the Trackway shall be designed and constructed as close to perpendicular as is possible to the Trackway.

C. Where casing is installed at locations where Utility Infrastructure crosses the Trackway, it shall be continuous and extend at least 4m beyond the Track centreline, and where possible, casing pipe shall be comprised of non-ferrous materials, or otherwise be provided with suitable cathodic and corrosion protection. Casing pipes shall accommodate all loads and settlements of the Trackway, and shall have a Design Service Life of at least 100 years.

3-5.1.4.3 Utility Trenches

A. Project Co shall backfill utility trenches in accordance with the provisions establishing the higher quality, manner or method between either of the URP Company specifications or *City Design and Construction Guidelines* applicable for the utility trench type and installation methodology.

B. Project Co shall provide final lift pavement to span an entire lane for any part of the Roadway through which a utility trench is constructed**.**

C. Final Roadway restoration shall be in accordance with Section 3-2 *[Roadways, Sidewalks and Shared Use Paths]* of this Schedule*.*

3-5.1.5 Utility Service Connections

A. Project Co shall undertake its own investigation to confirm all Utility service connections required for Operation and Maintenance of the System, including performing field investigations, and identifying all conflicts with the Construction.

B. All new Utility service connections shall be installed underground and within the City Lands.

C. Project Co shall be responsible for all alterations required to modify or replace existing Utility service connections, including any infrastructure required to support the connection, arising from modifications required to accommodate the Infrastructure, regardless of who performs the work.

3-5.2 ACCESS TO AND PROTECTION, ABANDONMENT AND REMOVAL OF URP INFRASTRUCTURE

A. Project Co shall not access URP Infrastructure except with the prior consent of the applicable URP Company.

B. If URP Infrastructure is deemed redundant by a URP Company, Project Co may abandon or remove it as specifically approved by the URP Company in accordance with agreed upon limits and terms. Approved abandonment or removal work shall be undertaken by Project Co.

C. Existing URP Infrastructure may contain hazardous materials. Limited information has been compiled and is available to Project Co as Disclosed Data. Project Co shall identify and properly dispose of redundant URP Infrastructure materials encountered in compliance with Section 1.13 *[Hazardous Substances and Waste Management]* of Schedule 10 *[Environmental Performance Requirements]*.

3-5.3 URP INFRASTRUCTURE REPAIRS

A. Where Project Co encounters as part of the Project Work existing URP Infrastructure in poor condition, Project Co shall notify the URP Company verbally and in writing and afford the URP Company an opportunity to investigate. The URP Company shall be afforded such time and access to make repairs as can be reasonably accommodated within the Construction Schedule.

B. Where replacement of URP Infrastructure that is found to be in poor condition forms part of the Project Work, Project Co shall complete repairs to the URP Infrastructure to a location agreed upon with the applicable URP Company, extending no further than the next logical connection point that would afford the URP Company the ability to undertake future repairs without affecting Construction Schedule or the Operations.

3-5.4 PIPELINE CROSSING RECORDS

A. At each location where URP Work or other Project Work is adjacent to or on Pipeline Company property, a pipeline crossing record shall be kept and shall contain the following:

1. name and phone number of the Pipeline Company field representative;
2. special provisions of the Pipeline Crossing Agreement;
3. records of:
    a. calls to the Pipeline Company field representative;
    b. Pipeline Company field representative visits – time, date, comments, and signature;
    c. City representative visits – time, date, comments, and signature; and
    d. Project Co's superintendent's comments or observations related to work on or adjacent to Pipeline Company property; and
4. commencement and completion dates of URP Work or other Project Work on or adjacent to Pipeline Company property.

APPENDIX 5-3A

Access and Road Closure Drawings

APPENDIX 5-3B

102 Avenue Drawings