5.16.18 Storm Water Management

1. ***Stormwater Collection, Conveyance and Treatment Systems***

a. Stormwater management systems for all new development and major renovations on campus will manage on site the runoff for the 98th percentile rain fall event using low impact development (LID) measures and green infrastructure (GI). The 98th percentile rain fall event for the City of Calgary is 31mm over 24 hours.

b. All new buildings and building additions shall incorporate a rainwater harvesting system to capture runoff volume from the 98th percentile rain fall event. Harvested rainwater shall be used for approved uses including irrigation and/or toilet flushing.

(i) *Rainwater harvesting system design shall follow the following technical guidelines: (1) the City of Calgary LID Guidelines, Module 5 - Rainwater Harvesting and Reuse, and (2) the City of Calgary Rainwater Harvesting Guidelines: For Internal Non-Potable Use*

(ii) *Detailed information on codes and standards, contained in the City of Calgary Rainwater Harvesting Guidelines: For Internal Non-Potable Use shall be followed in the design of rainwater harvesting systems*

(iii) *Sizing of cisterns/tanks for rainwater harvesting systems shall be based on water balance analysis. The tools used for cistern/tank sizing shall include (1) the City of Calgary Water Balance Spreadsheet, and (2) Sizing tables available in the City of Calgary LID Guidelines, Module 5 - Rainwater Harvesting and Reuse. For irrigation use, cistern withdrawal shall be based on 25mm/week over irrigation area for a 16 week period or other appropriate value as determined by the landscape architect and irrigation consultant.*

c. All new buildings and building additions shall incorporate an area of absorbent landscaping, equivalent to an 8 meter buffer around the building perimeter. Absorbent landscaping shall have a minimum depth of 300mm of absorbent topsoil with 25% permeability.

(i) *Stormwater runoff from all non-building impervious areas in the contributing sub-catchment shall be routed to absorbent landscaping.*

(ii) *Priority landscape improvements shall be implemented as stipulated in the most recent version of the University of Calgary Integrated Stormwater Management Plan and University of Calgary Landscape Master Plan.*

(iii) *Biofilters (bioretention areas and bioswales) shall be implemented as stipulated in the University of Calgary Landscape Master Plan and as required on development sites to effectively manage on site the runoff for the 98th percentile rain fall event.*

(iv) *Design and construction of bioretention areas, bioswales and absorbent landscaping shall follow the City of Calgary LID Guidelines, Module 2 - Vegetative Practices.*

(v) *Prior to LID implementation, geotechnical and hydrogeological investigations shall be conducted to follow the requirements in the City of Calgary LID Guidelines, Module 1 - Geotechnical and Hydrogeological Considerations.*

d. Other stormwater management approaches which meet the requirements of section 5.16.16.1(a) above and the Service Delivery Goals of the University of Calgary Integrated Stormwater Management plan may be considered if sufficient supporting analysis demonstrating their equivalency is produced by the design team. Any alternative approach to stormwater management requires approval by University of Calgary.

e. All stormwater collection, conveyance and treatment systems should be designed and constructed in accordance with the latest editions of the City of Calgary Design Guidelines for Subdivision Servicing, the City of Calgary Standard Specifications for Sewer Construction, the City of Calgary Stormwater Management & Design Manual and Amendments and the City of Calgary LID technical Guidelines; except as amended below.

City of Calgary Design Guidelines for Subdivision Servicing Amendments

- Approvals

  All references for approval by the City of Calgary or City departments shall be replaced with the University of Calgary except where work is connecting to infrastructure owned and operated by the City of Calgary.

- Wastewater and Stormwater D. Mains and Services 2. Sizing add text to read:

  "Storm sewer catchment areas, mains sizes and layout shall be in accordance with the most recent version of the University of Calgary Integrated Stormwater Management Plan."

  - Wastewater and Stormwater I. Stormwater Management and Design, revise the text in a) to read:

  "Stormwater management design for landscaped/open space areas should indicate the need for catch basins and leads to intercept overland flows entering open space areas.

  - Wastewater and Stormwater I. Stormwater Management and Design, revise the text in c) to read:

  "Please refer to the most recent version of the City of Calgary LID Guidelines and Stormwater Source Control Practices Handbook."

  - Wastewater and Stormwater J. Erosion and Sediment Control and Construction Stormwater Pollution Prevention, remove b. and revise a. to read:

  "Prior to commencements of soil disturbance, Erosion and Sediment Control (ESC) reports and drawings must be prepared and submitted to University of Calgary for review."

(ii) City of Calgary Standard Specifications Sewer Construction Amendments

- Approvals

  All references for approval by the City of Calgary or City department shall be replaced with the University of Calgary except where work is connecting to infrastructure owned and operated by the City of Calgary.

(iii) City of Calgary Stormwater Management and Design Manual Amendments

- Approvals

  - All references for approval by the City or City department shall be replaced with the University of Calgary except where work is connecting to infrastructure owned and operated by the City of Calgary.

- Chapter 1, Stormwater management and planning, Section 1.4 – Planning Levels, refer to the latest version of University of Calgary Integrated Stormwater Management Plan

- Chapter 2, Authorization and Processes, Section 2.1 General, replace text of second paragraph to read:

  - The designated consultant is responsible preparing the application and required information, which must be forwarded to University of Calgary. Construction of work is not permitted without the necessary permits and authorisations in place.

- Chapter 2, Authorization and Processes, Section 2.4, replace text to read:

  Municipal by-laws and permitting apply at tie-ins to City of Calgary infrastructure and boundaries of University of Calgary

- Chapter 3, Stormwater Design, add text to read:

  - Level of service, minor system sizing and layout shall be in accordance with the most recent version of University of Calgary Integrated Stormwater Management Plan.

  - Low Impact Development (LID) and Best Management Practices (BMP) used for stormwater servicing shall be in accordance with the most recent version of University of Calgary's Integrated Stormwater Management Plan.

- Chapter 4, Development Site Servicing Plans, add text to read:

  - Level of service, minor system sizing and layout, and runoff volume control targets shall be in accordance with the most recent version of University of Calgary's Integrated Stormwater Management Plan.

  - Low Impact Development (LID) and Best Management Practices (BMP) used for stormwater servicing shall be in accordance with the most recent version of University of Calgary Integrated Stormwater Management Plan.

- Chapter 8, Best Management Practices, add text to read:

    - Design and construction of any Low Impact Development (LID) and/or Best Management Practices (BMP) used for stormwater servicing shall be in accordance with the most recent version of the University of Calgary Integrated Stormwater Management Plan and The City of Calgary LID Technical Guidelines.

- Chapter 11, Technical Requirements, the applicable section is Section 11.1.8, Development Site Servicing Plans. If Stormwater Management Report is required, it shall follow the additional technical requirements presented in subsection (iv) and include the following information:

    - site description
    - design objectives
    - criteria for storm system and LID/BMP sizing
    - allowable minor system discharges
    - rates and volumes of overland flow spills
    - plans, details, or cross sections depicting site conditions and LID/BMP strategies, highlighting topography, soil qualities, direction of water flow, and area of site that each strategy addresses
    - anticipated runoff volume from the 90^{th} percentile rain fall event
    - LID/BMP location, sizing calculations (including runoff volume managed by each strategy), and design details