1.1 GENERAL

1.2 Related Technical Requirements

.1 33 82 01 CCTV Pipeline Inspection

1.3 System Description

.1 The campus has a dedicated storm sewer system that connects to the Burnaby Storm system.

2.1 MATERIALS AND DESIGN REQUIREMENTS

2.2 Responsibilities

.1 SFU is primarily responsible for operation, maintenance, and overall stewardship of the storm sewers system on campus.

.2 The Project Designer must incorporate all specific requirements for design and materials and Execution of this section into the contract drawings in the form of job-specific notes. Only making reference to SFU Technical Requirements in the drawings is not sufficient.

2.3 Stormwater Objectives and Standards

.1 The latest revisions of the following standards shall apply to storm sewers at SFU.

.1 City of Burnaby Engineering Design Criteria

.2 B.C. Master Municipal Construction Documents (MMCD).

.3 GVRD Sewer Use Bylaw No.164.

.4 Fisheries Act.

.2 Should there be discrepancies in the above standards or with this document, the City of Burnaby Design Criteria will prevail with the SFU Facilities Mechanical Superintendents approval.

2.4 Storm Sewer Connections

.1 The first step to install any new or substantially modify connections to the storm sewer system at SFU is to seek project approval form SFU Facilities.

.2 Any new connections to the storm sewer system will be reviewed for consistency with the existing sewer infrastructure.

.3 A Plumbing Permit is required to meet provisions of the B.C. Building Code Plumbing Provisions. It is preferred all communications with the City of Burnaby be channeled through SFU Facilities.

2.5 Stormwater Management Plan

.1 The designer must review and address the latest version of the Burnaby Campus Stormwater Management Plan hosted at http://www.sfu.ca/fs/planning/stormwater-management-strategy.html.
The storm water management plan must be discussed with and approved as necessary by SFU Facilities as part of the campus infrastructure development plan.

### 2.6 Storm Sewer Design

.1 Control of stormwater quality shall be addressed in the Stormwater Management Plan. Best Management Practices (BMP's) shall be implemented to protect stormwater runoff quality. A reference document for applicable BMP’s is GVRD’s Best Management Practices Guide for Stormwater. This document should also be consulted for associated design information.

.2 The Designer is encouraged to incorporate methods of biofiltration into the site design to assist with water quality treatment. This includes such features as grassed swales, vegetated buffer strips, french drains, engineered wetlands, etc. Engineered BMP’s described above may be reduced or eliminated if adequate biofiltration measures are incorporated into the site design. If biofiltration is proposed for a development, it shall be included in the Stormwater Management Plan.

.3 Combined data from Confederation Park and WestBurco rain gauges are to be used in designing drainage infrastructure. Rainfall Intensity Duration Frequency (IDF curves) are provided in City of Burnaby Design Criteria Manual.

.4 The Designer shall select a time of concentration (Tc) and run-off coefficient (R) which are appropriate for the proposed development. The “Tc” shall be the sum of the inlet time and travel time. In most cases, the inlet time shall be 10 minutes when the impervious surface flow path length to the storm inlets is 100 meters or less.

.5 Storm water shall flow only by gravity into the SFU storm system. Only under unique circumstances will pumped storm water be considered. Perimeter drains can be pumped into the SFU storm system, but a request for a permission to do so shall be submitted to SFU Facilities with an explanation why the storm water cannot be discharged by gravity, the proposed pump capacity (L/s) at operating head (kPa), a diagram showing pump curve with superimposed piping system curve at operating flow and head and sump dimensions with elevations at which pump starts and stops. Sump volume between pump start and stop elevations shall be sized so that the maximum number of On/Off cycles does not exceed six per hour.

.6 When extending the existing trunk lines, sufficient size, depth and slope of the sewer shall be maintained to facilitate the future extension of service in accordance with the Storm Drainage Master Servicing Plan.

.7 All storm sewer piping shall be designed with a minimum velocity of 0.6 m/s when flowing full or half full, based on the Manning’s formula. Special provisions must be provided for supercritical flow or where the velocity exceeds 3.0 m/s to ensure structural stability and durability concerns are addressed.

.8 The minimum slope shall be 1.0% for CB leads, 0.2% for storm mains smaller than 600 mm in diameter, and 0.1% for storm mains 600 mm in diameter and larger.

.9 All catch basins, lawn drains and inlet shall provide a sump and trash hood in accordance with MMCD standard drawings.

.10 An American Petroleum Institute (API) Oil Water Separator or equivalent product such as Lafarge’s Stormceptor chamber shall be incorporated at the most downstream point of the on-site storm drainage system for all parking facilities providing 20 or more parking stalls.
The system shall be appropriately sized and include a bypass to reduce flushing of contaminants during elevated flows.

.11 Manholes at maximum 100 m spacing shall be installed at each branch connection and each change of direction. Top of manholes shall be 150 mm above the ground in all landscaped areas, otherwise flush with surface. Pipe shall be straight between manholes.

.12 A minimum pipe size at 200 mm shall be used for gravity service mains in residential areas and 250mm in research/industrial areas. A minimum pipe size of 150mm shall be used for all service connections.

.13 The downstream sewer pipe shall be equal or larger diameter.

.14 Where drop manholes are required, drops shall be outside, with clean-outs. For standard details refer to MMCD manhole installation standards.

.15 Catch basins shall be spaced to service a maximum area of 500 m² on grades up to 3%. For grades exceeding 3% the spacing shall be reduced to an area of 350 m². Special consideration shall be given at low spots to ensure that adequate capacity is provided. A minimum pipe size of 150 mm shall be used for CB leads.

.16 The length of service between the building face to the first storm sewer connecting manhole shall be a maximum 75 m.

.17 A minimum 750 mm horizontal clearance is required where the storm sewer is installed within a common trench with the sanitary sewer. If the invert of the sanitary sewer varies significantly from the storm sewer, the Designer shall give special consideration to the horizontal spacing.

.18 When crossing electric duct bank, run pipe below electrical duct bank with minimum 150 mm vertical clearance from the bottom of electric duct bank. Crossing angle shall be between 45° and 90°.

.19 Provide positive slopes away from entrances and exits (not less than 4%) to adequate storm drains or gratings that will allow a ponding depth of at least 100 mm. (This will, in normal cases, give sufficient lead time to remedy flooding situations before interior floor finishes are damaged). Install continuous gratings in lieu of catch basins and drains where broad sheets of water are anticipated to flow down pathways and roads towards entrances. Where possible provide alternate means for water to escape if a drain is plugged such as overflow scuppers, secondary French drains, etc.

### 2.7 Materials

.1 Unless otherwise approved by the city of Burnaby, only the following pipe material shall be used for the gravity storm sewer system:

.1 PVC, class SDR 28 (150 mm diam. and smaller) and SDR 35.
.2 Concrete (reinforced C76 required for all pipes 600 mm in diameter and larger).
.3 Corrugated HDPE having a minimum pipe stiffness of 320 kPa may be permitted under unique circumstances.
.4 PVC piping is preferred for all piping 300 mm in diameter or smaller.

### 3.1 EXECUTION REQUIREMENTS

.1 Storm sewer works and appurtenances shall be installed in accordance with the current
MMCD standards and specification, unless otherwise noted.

.2 Minimum cover on all storm sewers shall be 1.0 meters in accordance with the MMCD standards. Where no future main line extension or connection of services, lawndrains, or catch basins is required, and where no traffic road exists or in future will exist, minimum cover may be reduced to 600 mm with special approval.

.3 Site grading and surface inlets shall be located to ensure that stormwater is contained and controlled within the boundaries of the site.

.4 All pipe surround material shall consist of clean granular MMCD Type 1 bedding.

.5 Native backfill may be used in non-traveled areas if free of rock greater than 25 mm in boulevards and easement areas only. Approval by SFU Facilities is required.

.6 Prior to covering the pipe, all installed and bedded pipe shall be inspected by the City of Burnaby with SFU Facilities present.

.7 Records of pipe sizes and inverts shall be provided to SFU Facilities; in accordance with Sections 01 78 39 Project Record Documents and 33 00 10 Underground Utilities Services of these guidelines.

.8 Where notification requirements are not met, services may need to be re-excavated for inspection and/or testing upon request of the SFU Facilities.

***END OF SECTION***