



## Engineering Requirements for Subdivision Development

Effective January 2012

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*The following requirements apply to all individuals or parties wishing to develop a subdivision within the Town of Cochrane. Please note these guidelines are in addition to the City of Calgary guidelines.*

## **1.0 REVIEW AND APPROVAL PROCESS**

Review will not commence until all required submissions have been received to the satisfaction of the Town of Cochrane. This includes all relevant reports and drawings.

- 1.1 The Town of Cochrane will review the submission and provide comments in writing to the applicant or appointed Consulting Engineer within forty five (45) days. This applies to each submission.
- 1.2 For the first submission of the engineering drawings and reports, the applicant or appointed Consulting Engineer is to provide a hardcopy and digital copy as per section 2.1.
- 1.3 When revisions are required, the applicant or approved Consulting Engineer is required to resubmit in hard copy format only. At the Town's discretion, single revised sheets may be accepted.
- 1.4 When the submission adequately addresses all of the requirements of the Engineering Department, the applicant or appointed Consulting Engineer will receive written notification from the Town of Cochrane's Planning Department.
- 1.5 Upon approval of the engineering drawings and reports, the applicant or appointed Consulting Engineer is to provide a hardcopy and digital copy as per section 2.1.
- 1.6 Please note that the all reviews are subject to a review fee as per the Town of Cochrane fees and fines schedule in "Appendix C" of this document. Review of Engineering drawings will not proceed until all fees have been paid

***Please be advised that approval of the Engineering component of the project does not suggest overall approval of the project. All requirements of the Town of Cochrane Planning Department must be met prior to commencement of any construction activities.***

## **2.0 DRAWINGS AND REPORTS SUBMISSIONS**

All developers or developer's consulting engineer will be required to submit each of the following items for every proposed phase of subdivision development within the Town of Cochrane

### **2.1 Engineering Drawings**

The Town of Cochrane requires that engineering drawings submitted for the purpose of obtaining approval for constructing infrastructure for a proposed subdivision comply with the requirements set in "Appendix A" of this document.

All drawings shall be signed and sealed by a professional engineer/P.Tech(Eng) entitled to practice in the province of Alberta.

First and approved final submission of engineering drawings is to be submitted as follows:

- 2 complete sets of engineering drawings 24X36 inches in size
- 1 CD containing a complete set of engineering drawings in CAD and PDF format. PDF copy to contain the professional engineer's signature and seal.

### **2.2 Stormwater Management (SWM) Report**

The Town of Cochrane requires that a Storm Water Management reports comply with requirements set in the City of Calgary's latest version of the Stormwater Management & Design Manual

All Storm Water Management reports are to be submitted as follows:

- 2 hard copies of the Stormwater Management report
- 1 CD containing a PDF copy of the report

### **2.3 Geotechnical Report**

The Town of Cochrane requires that all Geotechnical reports comply with the minimum requirements set in "Appendix B" of this document.

All geotechnical reports are to be submitted as follows:

- 2 hard copies of the Geotechnical report
- 1 CD containing a PDF copy of the report

Please note that "Appendix B" also contains minimum requirements for geotechnical and material testing during construction.

## **2.4 Additional Submissions**

At the sole discretion of the Engineering Department, the following submission may be required. This will be determined on a project to project basis.

### **2.4.1 Master Drainage Plans, Staged Master Drainage Plans and Pond Reports**

The Town of Cochrane requires that all Master Drainage Plans, Stage master Drainage plans and Pond reports comply with the City of Calgary's Latest version of the Stormwater Management & Design Manual.

All the above noted reports are to be submitted as follows:

- 2 hard copies of the reports
- 1 CD containing a PDF copy of the reports

### **2.4.2 Slope Stability Analysis Report**

The Town of Cochrane requires that a comprehensive Slope Stability Analysis report be submitted for all slopes within a proposed phase of development.

All Slope Stability Analysis Reports are to be submitted as follows:

- 2 hard copies of the Slope Stability Analysis report
- 1 CD containing a PDF copy of the report.

### **2.4.3 Deep Fills Report**

The Town of Cochrane requires that a Deep Fills Report be submitted when the proposed phase of development is within an area where fill material has been or will be placed in excess of 2.0

meters in depth. The report must include a detail cut and fill plan identifying all areas where fill material exceed 2.0 meters in depth.

All Deep Fills Reports are to be submitted as follows:

- 2 hard copies of the Deep Fills Report
- 1 CD containing a PDF copy of the report

#### **2.4.4 Traffic Noise Analysis and/or Sound Attenuation Report**

All Traffic Noise and/or Sound Attenuation Analysis reports are to comply with the City of Calgary Standards and are to be submitted as follows:

- 2 hard copies of the Traffic Noise / Sound attenuation report
- 1 CD containing a PDF copy of the report

#### **2.4.5 Traffic Impact Assessment**

All Traffic Impact Assessment reports are to be submitted as follows:

- 2 hard copies of the Traffic Impact Assessment report
- 1 CD containing a PDF copy of the report

#### **2.4.6 Traffic Management Plan**

When construction related to a particular proposed subdivision will have a direct impact to existing traffic and pedestrian conditions, the applicant will submit a Traffic Management Plan showing how traffic will be managed during construction so it does not interfere with the flow of traffic or pedestrians. Please note that the Traffic Management Plan will be subject to review and approval.

In addition to the reports noted above, the Town of Cochrane reserves the right to request any additional reports or submissions that in the opinion of the Engineering Department are deemed relevant or necessary for a particular proposed phase of development.

## 3.0 SPECIAL DESIGN STANDARDS

The developer shall construct the Public Utilities and Improvements to the standards provided for in the Design Guidelines and the Construction Specifications, all of the city of Calgary, which are in force and effect as of the date of this agreement, except as modified as follows:

### 3.1 Introduction

- 3.1.1 Requirements of the Design Guidelines and the Construction Specifications alone do not constitute the only conditions of development in Cochrane. The Planning and Engineering Services Department should be contacted to determine pertinent development requirements.
- 3.1.2 The Planning and Engineering Services Department aims to ensure that development is done safely and meets required engineering-oriented standards and specifications. Any development must link effectively to the existing infrastructure, which includes sewers, water, roads, etc.
- 3.1.3 The Development & Infrastructure Sustainability Department also works with Alberta Environment (a provincial approval authority) to ensure development does not adversely impact systems, both man-made and natural, on a larger scale and that any local contaminants found are dealt with properly.

### 3.2 Town of Cochrane Development Process

- 3.2.1 Developers shall refer to the Town's Subdivision Servicing Agreement and the Planning and Engineering Services Department for details with respect to the Development process specific to the Town of Cochrane.
- 3.2.2 The following is a list of additional reference documents published by the Town of Cochrane:
  - i. **Land Use Bylaw (LUB)** refers to the document that prohibits, regulates, and controls the use and development of land and buildings in Cochrane.
  - ii. **Municipal Development Plan (MDP)** refers to the document outlining Cochrane's current, approved by Council, plan for future development.



- iii. **Stormwater Management Plan and Policy** refers to the document outlining Cochrane’s current, approved by Council plan for future development of the stormwater system. It also includes the approved Stormwater Management Policy for new developments.
- iv. **Cochrane Transportation Plan** refers to the document outlining Cochrane’s current, approved by Council, plan for future development of the transportation network.
- v. **Cochrane Water System Master Plan** refers to the document outlining Cochrane’s current, approved by Council, plan for future development of the water distribution network including design criteria.
- vi. **Cochrane Sanitary Sewer Master Plan** refers to the document outlining Cochrane’s current plan for future development of the sanitary sewer system including design criteria.
- vii. **Cochrane Sustainability Plan** refers to the document outlining Cochrane’s commitment to approach growth in a sustainable manner.

### 3.3 Waterworks

#### 3.3.1 General

- 3.3.1.1 The current ***Cochrane Water System Master Plan*** outlines the design policies for water systems for future development areas. Those policies shall overrule the Design Guidelines in the event of a variance.

#### 3.3.2 Valves

- 3.3.2.1 All valves shall open counter-clockwise.

#### 3.3.3 Hydrants

- 3.3.3.1 Hydrant steamer ports shall be equipped with a 5 inch Storz adapter.
- 3.3.3.2 Hydrants, as well as other Utilities facilities (valves, services, mains, etc.), shall have a minimum of three (3.0) meter clearance between power poles, light standards, transformer pads, catch basins, etc. The Developer’s consultant is responsible to ensure compliance with all regulatory and safety codes including the three (3.0) meter minimum separation.

3.3.3.3 All "Temporary Flushing Hydrants" shall be clearly labeled as such on the Engineering Drawings and be clearly identified in the field by placing an out of service ring.

3.3.3.4 Hydrants are to conform to the yellow/lime green color scheme used in the City of Calgary. Hydrants are to be painted at the factory with corrosion resistant paint.

3.3.3.5 Hydrants approved for use in the Town of Cochrane include:

- i) Clow Brigadier (formerly McAvity M-67)
- ii) Mueller

### **3.3.4 Pressure Reducing Valves**

3.3.4.1 Pressure Reducing Valves shall be required on all commercial, industrial and residential units. For residential services, the recommended pressure that the reducing valve is set at is 60 psi.

### **3.3.5 Pressure Testing**

3.3.5.1 Pressure testing of watermains shall be carried out twice after installation. The first test will be completed after the mains have been installed. The second test, after all water services have been connected. Watermains are to be tested at 150 psi and service connections at 125 psi.

## **3.4 Wastewater**

### **3.4.1 Inspection Manholes**

3.4.1.1 Sanitary Inspection (Test) manholes shall be installed on all commercial and industrial developments at the property line where the service connects to the main.

3.4.1.2 Sanitary Inspection (Test) manholes shall be installed on multi-family developments greater than 4 dwelling units at the property line where the service connects to the main.

### **3.4.2 Manholes**

- 3.4.2.1 The Town of Cochrane requires all manhole covers to be as per “Appendix D”.
- 3.4.2.2 All unused manhole channels not connected to an incoming pipe shall be filled in with mortar or other material as approved by the Town of Cochrane.

### **3.4.3 CCTV Video/ Deflection Testing**

- 3.4.3.1 The Town of Cochrane requires that all CCTV Video and Deflection testing conforms to the City of Calgary’s Standards and Specifications for Sewer Construction latest version.

## **3.5 Service Connections**

### **3.5.1 Lot Servicing**

- 3.5.1.1 All lots including residential, multi-family, commercial and industrial shall be serviced by the developer with storm, sanitary and water connections.

### **3.5.2 Water Service**

- 3.5.2.1 A “CC” stamp shall be placed in the sidewalk at the location of the water service valve for each residential, commercial, or industrial lot. In the event that sidewalk is not present, the “CC” stamp is to be placed in the concrete gutter.

### **3.5.3 Sanitary Services**

- 3.5.3.1 All Sanitary services tied into PVC mains 250mm and smaller require Inline Tees as the approved method of connection, unless otherwise directed by the Town of Cochrane. In the event that there are dual serviced lots on both side of the street, Insert-A-Tees or an approved equivalent will be accepted.

## **3.6 Surface Features**

### **3.6.1 Signs, Sign Posts and Street Blades**

The Town of Cochrane has adopted the signage standards established by the Transportation Association of Canada's Manual of Uniform Traffic Control Devices of Canada. All developers conducting work within the Town of Cochrane will have to adhere to these guidelines. Please note that the following specifications are only the most commonly used signs and the TAC manual should be consulted for more detailed information.

- 3.6.1.1 All signs to be high intensity retro reflective sheeting (3M finish).
- 3.6.1.2 All stop signs to have "no parking within 5 meters" at the bottom of the sign.
- 3.6.1.3 All yield signs to have "no parking within 5 meters" at the bottom of the sign.
- 3.6.1.4 All Pedestrian signs to have "no parking within 5 meters of crosswalk" at the bottom of the sign.
- 3.6.1.5 All islands must have meridian signs at both ends.
- 3.6.1.6 All speed limit signs to have black letters on a white background. Note that the Town of Cochrane's speed limits are 30 km/hr on residential roads and 50 km/hr on collector roads unless otherwise specified.
- 3.6.1.7 All post to be 2 3/8" galvanized heavy wall pipe. All post must be anchored in concrete a minimum of 1.0m in the ground. Due to extra windy conditions in the Town of Cochrane, the concrete must be cured for at least 12 hours prior to attaching signs to the post.
- 3.6.1.8 All signs to be 2.1m high from the bottom of the lowest sign to finish grade.
- 3.6.1.9 The leading or outside edge of the sign should be a minimum of 300mm to a max of 1.5m from the back of the curb.
- 3.6.1.10 All street blades in the Town of Cochrane to have black letters on a white background.

- 3.6.1.11 All street blades are to be located on top of Stop and Yield signs; however street blades can be placed on Street Lights if required.

### **3.6.2 Crosswalks**

- 3.6.2.1 All pedestrian crosswalk signs to have pedestrian symbol in black on a white background.
- 3.6.2.2 All pedestrian crosswalk signs to be double sided and placed on both sides of the road with the pedestrian symbol facing the road.
- 3.6.2.3 All pedestrian crossing signs located within school zones, playground zones, and roads with a speed limit of 50 km/hr or greater must have a vertical yellow-green crosswalk stick on both sides of the post. There is no parking allowed within 5m of sign.
- 3.6.2.4 Pedestrian crosswalk signs are not permitted in driveways.
- 3.6.2.5 All pedestrian crossings must have wheel chair ramps on both sides of the road.
- 3.6.2.6 All yield signs must have painted yield bars on the road (on top lift).

### **3.6.3 School and Playground Zones**

- 3.6.3.1 All Start and End of school zone signs must be black letters on a bright lime background.
- 3.6.3.2 All school zones signs must be black on a bright lime background.
- 3.6.3.3 Speed limit changes must be posted at the end of school zones and playground zones. Please note that playground zones have different specifications depending on the type of play structure present. Please refer to the TAC manual for more details.
- 3.6.3.4 All playground zones signs to be black on a bright lime background.

### **3.6.4 Wheelchair Ramps**

- 3.6.4.1 For safety reasons, the Town of Cochrane requires that wheelchair ramps are not located within driveways.

### **3.6.5 Water Testing**

- 3.6.5.1 All swales shall be cleared of any debris and flushed with water during the FAC inspection.
- 3.6.5.2 Roads and gutters may require flushing of water on a case by case basis at the discretion of the Town of Cochrane.
- 3.6.5.3 At the sole discretion of the Engineering department, water testing may be required on curb and gutters less than 2% in grade.

### **3.6.6 Line Painting and Road Markings**

- 3.6.6.1 All line painting and road markings are to follow either the Transportation Association of Canada (TAC) guidelines, the Manual of Uniform Traffic Control Devices for Canada (MUTCD) and/or specifications set out by Alberta Infrastructure and Transportation, whichever the Roads departments feels is appropriate for the project.
- 3.6.6.2 All road marking and line painting specifications to be used are to be indicated on the signage and road marking drawing at the time of engineering review.
- 3.6.6.3 Approved highway traffic paint to be applied at a minimum of 38 liters per line kilometer or at the discretion of the Roads department.
- 3.6.6.4 All stop signs must have a painted stop bar on the road (on top lift).
- 3.6.6.5 The Roads department must be contacted prior to any installation of line painting or road markings as they may wish to be present to ensure quality application.
- 3.6.6.6 New technologies may be accepted at the discretion of the Roads department.

### 3.7 Parks and Pathway

#### 3.7.1 Waste Containers, Bag Dispensers, Signage

- 3.7.1.1 A minimum of one waste container and one dog bag dispenser shall be installed at each access point to a pathway system.
- 3.7.1.2 The waste containers and dog bag dispensers shall meet all requirements of the Town of Cochrane Parks and Bylaw Services Departments.
- 3.7.1.3 All parks related signage (location and material) to be approved by the Parks Manager during the landscaping drawing review.

#### 3.7.2 Irrigation

- 3.7.2.1 Irrigation systems shall not be installed above or below a retaining wall or directly on, above, or below a slope in excess of fifteen per cent (15%).

## 4.0 AutoCAD SUBMISSION STANDARDS

The standards described in this manual are to assist applicants in providing the required digital Computer Aided Drafting (CAD) information in the correct format and appearance for acceptance by the Town of Cochrane. ***These standards apply to coversheets only.*** Block profiles are to remain consistent with the City of Calgary's Standard Block Profiles Specification, most recent version.

### 4.1 Drawing Format

All AutoCAD files submitted to the Engineering Department are to be AutoCAD 2004 or newer. All other formats will not be accepted.

### 4.2 Drawing Submission

AutoCAD files (.dwg) will be placed on a CD-ROM or DVD-ROM with the associated PDF files for the current submission. All information needed to reproduce the submitted PDF's is required to be included on the disc. The disk will be clearly labeled with the subdivision/development name,

phase number (if applicable), Consultant information, and date submitted. The use of AutoCAD's "etransmit" command creates a zip file that can be placed on the disc and should contain all required information, however there is no guarantee that utilizing 'etransmit' will capture all pertinent information (.ctb files, .lin files, .shx files, etc.) Shapes files in general, need to be added manually.

Please note that As-Built submissions in this format will be required prior to the release of Construction Completion Certificates (CCC) and Final Acceptance Certificates (FAC).

### 4.3 Drawing Presentation

Drawings submitted must conform to the following rules:

1. All drawing objects and text must be located in model space.
2. All drawing objects to be shown at actual length and in ground coordinates based on NAD83 3TM projection, central meridian - 114 with no scaling, rotating, or shifting required. Local Datum is not permissible. The template available on [www.cochrane.ca](http://www.cochrane.ca) contains the Town of Cochrane's municipal boundary for a spatial representation of where the CAD data is to be located within model space.
3. Drawing must be purged of all definitions that are not used such as: layers, layer filters, text styles, dimension styles, blocks, etc.
4. Drawing must contain line work relevant only to the current submission (Existing and future information **not** pertaining to the development shall be removed). The line work of existing utilities is to be included when it has been tied into for reference purposes only.
5. All objects must be on its correct layer. A template is available by request from the Engineering Dept and is also distributed with this manual. Figure 1: Standards Blocks and *Layering Conventions* provides a visual representation of what colors and line types are associated with each layer/object.
6. Duplicate objects and text are to be removed.
7. External References are to be bound within the drawing (and their layer names converted to conform). All other references are to be removed that are not required.

### 4.4 Digital Data Structure

All objects contained within the drawing are to be of the following:

- Line
- Point Feature



- Text
- Dimension

#### **4.4.1 Line**

All linear features within the drawing are to be on its correct layer. Linear features are created by the AutoCAD commands, line, circle, arc and polyline. Lines representing a segment of any utility are to be one segment from point feature to point feature. For example, a water main is drawn as a polyline or line from each valve, reducer, etc. to the next point feature. The lines representing utilities are not to be broken at curves; they are to be one polyline until the next point feature. The exceptions to this rule are water mains that have a 45° or greater bend; the bend is treated as a point feature without requiring symbolic representation.

#### **4.4.2 Point Feature**

Point features within the drawing are to be represented by a point or a block. Points or Blocks shall be 'snapped' to linear features. For a complete list of features to be represented by points or blocks, and how they are to appear, refer to *Figure 1: Standard Blocks and Layering Conventions* on pages 16-17. All blocks are to be inserted on the layer that corresponds with the feature. Point Features are not to be exploded.

#### **4.4.3 Text**

All text within the CAD file is to be in model space. Text is to be on a layer associated to its purpose, with a '-TXT' suffix. For example, text that is labeling water would be on the "WAT-TXT" layer. For a complete list of layer conventions, refer to *Figure 1: Standard Blocks and Layering Conventions* found within this document. Only true AutoCAD fonts are to be used.

#### **4.4.4 Dimensions**

All dimensions within the CAD file are to be in model space. Dimensions are to be on a layer associated to its purpose, with a '-DIM' suffix. For example, dimensions that are labeling water would be on the "WAT-DIM" layer.

## 4.5 Layer Naming Conventions

All drawings submitted to the Town of Cochrane are to follow a specific format for layer names. This assigned format ensures that the incorporation of CAD data into the Town's GIS system is accurate and complete. Please refer to *Figure 1: Standard Blocks and Layering Conventions* for all required layer names. Other information included in the submitted CAD file but is not listed within figure 1 must follow the same naming structure as outlined below:

11-222-333

- 1- Group: storm, sanitary, surface, water, pond, etc.
- 2- Actual Feature: manhole, lip of gutter, watermain, etc.
- 3- Extra Definition: abandoned, material, existing, etc.

Figure 1



# Town of Cochrane Standard Blocks and Layering Conventions

## BLOCKS

GEO-BH		SAN-5A		STM-5A		WAT-HYD	
GEO-MW		SAN-5A-EX		STM-5A-EX		WAT-HYD-EX	
GEO-TP		SAN-CHMK		STM-1S		WAT-RED	
		SAN-FLOW		STM-1S-EX		WAT-RED-EX	
				STM-CB		WAT-VLV-LIN	
				STM-CB-EX			
				STM-CHMK			
				STM-FLOW			

## LAYER AND LINETYPES

LAYER NAME	DESCRIPTION	APPEARANCE	ADDITIONAL
<b>CONTOURS</b>			
CNT-MJR-DD-MM-YYYY-XX	CONTOUR MAJOR		DATE OF WHICH SURVEY WAS CONDUCTED- IF DESIGN CONTOURS, DATE NOT APPLICABLE BUT DESCRIPTION TO SUIT.
CNT-MNR-DD-MM-YYYY-XX	CONTOUR MINOR		
*XX- ABBREVIATION OF WHAT THE CONTOURS ARE DISPLAYING- OG,EG,GW,ETC.			
<b>GEOTECHNICAL</b>			
GEO-BH	BOREHOLE		
GEO-MW	MONITORING WELL		
GEO-TP	TEST PIT		
<b>LEGAL</b>			
LGL-BLK	BLOCK LINE		LABEL ACCORDINGLY
LGL-LOT	LOT LINE		
LGL-RW	RIGHT OF WAY		
<b>POND</b>			
PND-BTM	POND BOTTOM		
PND-HWL	HIGH WATER LEVEL		
PND-INLT	POND INLET		
PND-NWL	NORMAL WATER LEVEL		
PND-OTLT	POND OUTLET		
<b>SANITARY</b>			
SAN-DIM	SANITARY DIMENSIONS		
SAN-FLOW	SANITARY FLOW ARROW		
SAN-FM	SANITARY FORCE MAIN		
SAN-LFT STA	SANITARY LIFT STATION		
SAN-MAIN	SANITARY MAIN		
SAN-MAIN-AB	SANITARY MAIN ABANDONED		
SAN-MH	SANITARY MANHOLE		
SAN-SRV	SANITARY SERVICE		
SAN-SYP	SANITARY SYPHON		
SAN-TXT	SANITARY TEXT		
SAN-XXX-EX	ANY EXISTING SANITARY INFO		

ALL BLOCKS AND LINETYPES ARE AVAILABLE IN THE COCHRANE-CAD TEMPLATE.dwt DISTRIBUTED WITH THIS MANUAL. THE TEMPLATE MAY ALSO BE REQUESTED FROM THE TOWN OF COCHRANE ENGINEERING OR GIS DEPARTMENTS.

CONTINUED ON NEXT PAGE.

Figure 1 cont'd



# Town of Cochrane Standard Blocks and Layering Conventions


## LAYER AND LINETYPES

LAYER NAME	DESCRIPTION	APPEARANCE	ADDITIONAL
<b>SURFACE</b>			
SF-DIM	SURFACE DIMENSIONS		
SF-EOP	EDGE OF PAVEMENT		
SF-EOP-TXT	EDGE OF PAVEMENT TEXT		
SF-FNC-BRB	BARBED WIRE FENCE		LABEL ACCORDINGLY
SF-FEN-CL	CHAIN LINK FENCE		LABEL ACCORDINGLY
SF-FNC-PC	POST AND CABLE FENCE		LABEL ACCORDINGLY
SF-FNC-WD	WOOD FENCE		LABEL ACCORDINGLY
SF-GDRL	GUARDRAIL		
SF-LOG	LIP OF GUTTER		
SF-LOG-TXT	LIP OF GUTTER TEXT		
SF-PATH	PATHWAY		
SF-STNAME	STREET NAME		
SF-SWL	SWALE		
SF-TXT	SURFACE TEXT		
SF-WALK	SIDEWALK		
SF-XXX-EX	ANY EXISTING SURFACE INFO		
<b>STORM</b>			
STM-CB	CATCH BASIN		
STM-CB-LEAD	CATCH BASIN LEAD		
STM-CVT	CULVERT		
STM-DIM	STORM DIMENSIONS		
STM-FLOW	STORM FLOW ARROW		
STM-MAIN	STORM MAIN		
STM-OTFL	STORM OUTFALL		
STM-SCTR	STORM SCEPTOR		
STM-SRV	STORM SERVICE		
STM-TRP LOW	STORM TRAP LOW		
STM-TXT	STORM TEXT		
STM-WTD	STORM WEEPING TILE		
STM-XXX-EX	ANY EXISTING STORM INFO		
<b>WATER</b>			
WAT-DIM	WATER DIMENSIONS		
WAT-FCLT	WATER FACILITIES		
WAT-FIT	WATER FITTINGS		
WAT-HYD	WATER HYDRANT		
WAT-HYD-LEAD	WATER HYDRANT LEAD		
WAT-MAIN	WATER MAIN		
WAT-MAIN-AB	WATER MAIN ABANDONED		
WAT-PMP-STA	WATER PUMP STATION		
WAT-RES	WATER RESERVOIR		
WAT-SRV	WATER SERVICE		
WAT-TXT	WATER TEXT		
WAT-VLT	WATER VAULT		
WAT-VLV-LIN	WATER VALVE-LINE		
WAT-VLV-PRV	WATER VALVE-PRV		
WAT-XXX-EX	ANY EXISTING WATER INFO		

ALL BLOCKS AND LINETYPES ARE AVAILABLE IN THE COCHRANE-CAD TEMPLATE.dwt DISTRIBUTED WITH THIS MANUAL. THE TEMPLATE MAY ALSO BE REQUESTED FROM THE TOWN OF COCHRANE ENGINEERING OR GIS DEPARTMENTS.

## APPENDIX A

### Engineering Drawing Submission Requirements For Subdivision Development

		<b>TOC Engineering Services</b>
<b>TOWN OF COCHRANE</b> <b>ENGINEERING SERVICES</b>		<b>➤ Subdivision Drawing Requirements</b>
No.	DESCRIPTION	Drawing No.
1	Title Sheet and Index of Drawings	To Suit
2	Outline / Concept Plan	To Suit
3	Tentative Plan	To Suit
4	Roads and Sidewalks and Road Cross Sections	A
5	Sanitary Layout	B
6	Storm Layout	C
7	Water Mains	D
8	Building Grade Plan	E
9	Drainage Areas	F
10	Overland Drainage	G
11	Special Details	H
12	Pond Details	J
13	Signage and Road Marking Plan	SNG
14	Cut and Fill Plan	GRD (x)
15	Erosion and Sediment Control - Pre/Post Development / Details	ESC (X)
16	Lanscaping Plan / Irrigation Network Details	LND
17	Turning Movements and Radii Plan **	TNR
18	Retaining Walls / Details / Design Calculations **	RTW (x)
19	Traffic and Noise Analysis Plan **	SND (x)
20	Site Plan **	SP (X)
21	Electrical **	ELT (X)
22	Mechanical **	M (X)
23	Structural **	S (X)
24	Plan / Block Profiles	XX
➤ All drawings to be presented in the above order.		
➤ All drawings to have a scale bar		
➤ <b>( X )</b> Denotes a numerical or alphanumeric identification to be determined by the consulting engineer when more than 1 of the drawing categories is required.		
➤ <b>( ** )</b> These drawings will be required at the discretion of the Senior Engineering Manager. This will be determined on a project to project basis.		
➤ All storm manholes are to be labeled ST-XX. Manhole types are to be shown.		
➤ All sanitary manholes are to be labeled S-XX. Manhole types are to be shown.		
➤ All catch basins to be labeled CB-XX including type and ICD size when applicable. Labeling shall be required by each catch basin lead.		
➤ Storm and sanitary mains must show pipe curvature data on coversheets and profiles.		
➤ All hydrants are to be labeled HYD-XX.		
➤ All valves are to be labeled VLV-XX.		
➤ All watermain fittings (tees, reducers, bends, etc) are to be shown and labelled with sizes.		
➤ Lot numbers and block numbers are to be shown in roads and sidewalks, deep utilities, building grade plan and profile drawings.		
➤ Subdivision number is to be shown on each sheet. The subdivision number is to be provided by the planning department at the time of subdivision application.		
➤ All block profiles to comply with latest edition of the City of Calgary's standard block profile specifications for CAD and manual formats.		
➤ <b>( XX )</b> Denotes a numerical or alphanumeric identification to be determined by the consulting engineer		
➤ All swales including direction of flow are to be shown on the storm coversheet.		
➤ All driveways and garage locations are to be shown on the roads and sidewalks coversheet and on the signage plan		

## APPENDIX B

### Geotechnical Requirements

## **1.0 Geotechnical Report Requirements**

A geotechnical report and investigation will be required for every subdivision phase of development within the Town of Cochrane. This report will be required in addition to any preliminary geotechnical investigation and reports carried out for the entire area of the subdivision. The geotechnical report must be signed and sealed by a qualified Geotechnical engineer entitled to practice in the province of Alberta.

The geotechnical report and investigation shall address all pertinent aspects including but not limited to:

- Purpose, site description and methodology.
- Subsurface soil conditions and groundwater levels.
- Geotechnical evaluations and recommendations including but not limited to site preparation, grading, excavations, foundations systems, soil bearing capacity, frost protection, concrete, weeping tile, lateral earth pressures, Utility trenches and roads.
- Retaining Wall design (if applicable)
- Slope Stability Analysis
- Site diagram and test hole locations
- Test Hole Logs
- Laboratory testing including but not limited to particle size distribution (sieve and hydrometer), Atterberg Limits, moisture contents, sulphate content, moisture content, California Bearing Ration(CBR), and unconfined compressive strength.

Additional information relevant to all aspects of the geotechnical report may be requested at the discretion of the Engineering Department.

## **2.0 Geotechnical and Material Testing Requirements**

In addition to the City of Calgary Guidelines, the Town of Cochrane requires that all contractors and consultants adhere to the following requirements pertaining to material testing for subdivisions. These requirements are applicable to all new construction *and* all existing subdivisions where outstanding soil, asphalt or concrete work is present.

### **COMPACTION TESTING**

All compaction testing shall be carried out by a qualified geotechnical consultant. The Geotechnical consultant shall monitor the backfill operation on a full time basis. Failure to have a geotechnical consultant on site during backfill operations may result in the issuance of a stop work order.

Density test shall be carried out using a nuclear densometer in good standing with the Canadian Nuclear Safety Commission. The geotechnical consultant shall ensure that a minimum of 98% of the Standard Proctor Maximum Dry Density is achieved in the field during all backfill operations. Representative



soil samples are to be collected by the geotechnical consultant to ensure that accurate proctor density and moisture values are being used. The geotechnical consultant shall ensure that soil moisture contents in the field are as follows:

Fine Grained Soils to have moisture content of 0 to +3% of its optimum moisture content

Coarse Grained Soils to have moisture content of +/- 3% of its optimum moisture content.

### ***Rough Grading***

Density test are to be carried out at a minimum of 30 meter grids at no less than every 500mm per total depth of fill.

### ***Underground Utilities***

Density test are to be carried out at a minimum of every 75 linear meters within the trench and at a minimum of every 500mm of the total trench depth.

Density test are to be carried out at every manhole, watermain valve, watermain hydrant, and any other underground structure such as a valve chambers, or oversized manhole structures.

### ***Service Connections***

Density test are to be carried out at no less that every third service connection and at a minimum of every 500mm of the total trench depth.

Tests are to be located adjacent to the curb box or within the service trench.

### ***Shallow Utilities Crossings***

Density test are to be carried out on every shallow utility crossing trench at a minimum of every 300mm of the total trench depth.

### ***Roads, Lanes and Pathways Sub-grade***

Density tests are to be carried out at a minimum of 50 linear meters per total length at finished grade.

### ***Roads, Lanes and Pathways Sub-base***

Density tests are to be carried out at a minimum of 50 linear meters per total length at finished grade. A particle size analysis will be required.

***Roads, Lanes and Pathways Base-course***

Density test are to be carried out at a minimum of 50 linear meters per total length at finished grade. A particle size analysis will be required.

***Sidewalk Sub-grade***

Density test are to be carried out at a minimum of 50 linear meters per total length at finished grade.

Please note that these requirements apply to all types of sidewalks.

***Curb and Gutter Sub-grade***

Density test are to be carried out at a minimum of 50 linear meters per total length at finished grade.

Please note these requirements apply to both curbs and gutters individually.

***Drainage Swales Sub-grade***

Density tests are to be carried out at a minimum of 50 linear meters per total length at finished grade.

***Catch Basins***

Density test are to be carried out on every catch basin lead trench at a minimum of every 300mm of the total trench depth.

**PROOF ROLLS**

Proof rolls are required for all sub-grade and base-course. The engineering department must be notified of all proof rolls and may choose to attend at our discretion.

Proof roll results are to be submitted in the form of a drawing detailing all undercuts and any other recommendations made by the geotechnical consultant. All results and detailed rehabilitation recommendations are to be provided to the Town prior to the release of the Paved Roads and Lanes CCC.

The engineering department reserves the right to reject any CCC or FAC application should these requirements are not complied with or issue a stop work order in the field.

**DROP TEST ON BEDDING GRAVELS**

As per The City of Calgary Guidelines, The Town of Cochrane requires drop tests on all bedding materials within the pipe zone during underground utilities construction including catch basin leads.

The Drop Test will include Class 1A and 1B materials both for pipe 375mm and smaller, and pipe larger than 375mm in diameter.

Type 1 installation embedment shall achieve a minimum of 95% of the SPD utilizing Class 1A or 1B material. Type 1 installation requires that the material, density and method of installation be certified by a Professional Engineer.

Type 2 installation embedment shall achieve a minimum of 90% of the SPD utilizing Class 1A, 1B, or II material or shall be compacted to a minimum of 95% of the SPD utilizing Class III material.

Type 3 installation embedment shall achieve a minimum of 85% of the SPD utilizing Class 1A, 1B, or II material or shall be compacted to a minimum of 90% of the SPD utilizing Class III material.

Type 4 installation embedment with no extra compaction utilizing Class 1A, 1B, II or III material, or compacted to 85% of the SPD utilizing native materials.

Drop Test will be required for every new phase of construction, and/or every time the material source changes. Drop test submissions are to include a particle size analysis (sieve analysis), density test on each of the material types, drop distance, location of the test and material source.

Drop test will now be a requirement before Construction Completion Certificates for underground utilities are issued by The Town of Cochrane.

### **CONCRETE TESTING**

All concrete testing is to be carried out by a qualified materials testing consultant. All field testing personnel must be CSA certified to test fresh concrete mixtures. All concrete testing is to be performed using CSA approved testing equipment and following CSA guidelines for testing fresh concrete mixtures.

Concrete curing temperatures must be monitored to ensure CSA minimum standards are followed. The engineering department reserves the right to suspend or terminate concrete placing operations should the overnight low temperature fall below 10 degrees Celsius or between September 30<sup>th</sup> and May 1<sup>st</sup>.

Concrete that does not meet the specified 28 day compressive strength, shall be removed and replaced at no cost to the Town of Cochrane.

### ***Sidewalks and Curb and Gutter***

A minimum of two tests per each day of concrete placing will be required or one test per every 75 cubic meters of placed concrete whichever is the greatest.

Should the engineering department authorize the placing of concrete in temperatures below 10 degrees Celsius; a minimum of three field cured cylinders will be required. Field cured cylinders are to be tested for compressive strength at 3, 7, and 28 days.

These requirements will apply individually to both sidewalks and curb & gutters.

These requirements will apply to all concrete placing activities including hand poured tie-ins and FAC concrete maintenance repairs.

The engineering department reserves the right to reject any CCC or FAC application should these requirements are not complied with or issue a stop work order in the field.

### ***Drainage Swales***

A minimum of one test per every 300 linear meters of swale will be required.

Should the engineering department authorize the placing of concrete in temperatures below 10 degrees Celsius; a minimum of three field cured cylinders will be required. Field cured cylinders are to be tested for compressive strength at 3, 7, and 28 days.

### ***Manhole Benching***

A minimum of one test per every ten manholes benched should all ten manholes be benched on the same day.

If the ten manholes are benched on separate days, a minimum of one test per day of manhole benching shall be required.

## **ASPHALT TESTING**

### ***Paved Roads and Paved Lanes Asphalt Testing***

All asphalt testing shall be carried out by a qualified geotechnical consultant. In order to ensure that adequate asphalt densities are achieved during all asphalt placing operations, full time supervision by a qualified geotechnical consultant is mandatory. Failure to have a geotechnical consultant on site during all asphalt placing operations will result in the issuance of a stop work order.

Density test must be performed during the asphalt placing operations at every 50 linear meters. Density test shall be carried out using a nuclear densometer in good standing with the Canadian Nuclear Safety Commission.

The geotechnical consultant must ensure that a minimum of 96% of the maximum design density is achieved during all asphalt placing operations.

A minimum of one asphalt core will be required at every 100 linear meters in order to ensure and confirm that the minimum design asphalt thickness was achieved.

A complete Marshall Test for Bituminous Mixtures will be required for every asphalt sample collected.

A minimum of two Hot Mix asphalt samples per each day of asphalt placing operations will be required. Each sample taken must contain the following information when the report is submitted to the Town:

- Time sample taken
- Exact location of where the sample was taken
- Type of mix of the sample
- Temperature of the sample at the time it was taken
- Ambient temperature at the time the sample was taken
- Source of sample
- Specific Lift information: first or final lift and lift thickness

Minimum placing temperatures as per the City of Calgary must be complied with at all times. The engineering department reserves the right to suspend or terminate asphalt placing operations should the ambient temperature fall below 4 degrees Celsius during placing operations or between October 31 and May 1<sup>st</sup>.

Please note that these requirements will apply to ALL asphalt placing operations including first lift and the top lift at FAC time.

All asphalt settlements and/or failures must be assessed by a qualified geotechnical engineer prior to any repairs being undertaken. Rehabilitations are to be done as per geotechnical engineer's recommendations. All rehabilitation recommendations are to be submitted to the Town prior to repairs being done.

The engineering department reserves the right to reject any CCC or FAC application should these requirements not be complied with or issue a stop work order in the field.

## APPENDIX C

### Fee Schedule

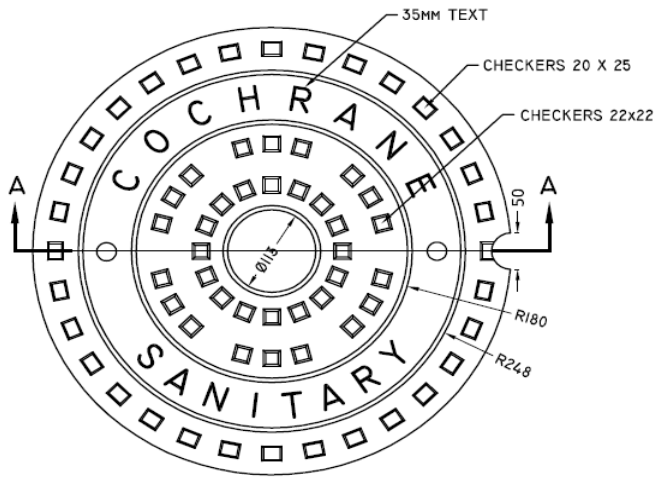
**2012 Engineering Fees**

Subdivisions & Development Permits		
<b>Larger than 10 Ha - \$1425.00 plus \$575.00 per Hectare as broken down:</b>		
Engineering Service	Fees	Notes
Engineering Review	Flat fee \$500.00 plus \$250.00 per ha	Drawing and report review
Servicing/Development Agreement	Flat fee \$500.00 plus \$250.00 per ha	Draft and execution of SSA
Inspections and Meetings	Flat fee \$100.00 plus \$25.00 per ha	Mandatory site meetings/inspections
CCC&FAC	Flat fee \$250.00 plus \$50.00 per ha	Inspection and administration
CAD Fee	Flat fee \$75.00 plus \$0.00 per ha	Provision of digital data
<b>2 Ha to 10 Ha - \$1425.00 plus \$455.00 per Hectare as broken down:</b>		
Engineering Service	Fees	Notes
Engineering Review	Flat fee \$500.00 plus \$200.00 per ha	Drawing and report review
Servicing Agreement	Flat fee \$500.00 plus \$200.00 per ha	Draft and execution of SSA
Inspections and Meetings	Flat fee \$100.00 plus \$15.00 per ha	Mandatory site meetings/inspections
CCC&FAC	Flat fee \$250.00 plus \$40.00 per ha	Inspection and administration
CAD Fee	Flat fee \$75.00 plus \$0.00 per ha	Provision of digital data
<b>Less than 2 Ha - \$1425.00 plus \$340.00 per Hectare as broken down:</b>		
Engineering Service	Fees	Notes
Engineering Review	Flat fee \$500.00 plus \$150.00 per ha	Drawing and report review
Servicing Agreement	Flat fee \$500.00 plus \$150.00 per ha	Draft and execution of SSA
Inspections and Meetings	Flat fee \$100.00 plus \$10.00 per ha	Mandatory site meetings/inspections
CCC&FAC	Flat fee \$250.00 plus \$30.00 per ha	Inspection and administration
CAD Fee	Flat fee \$75.00 plus \$0.00 per ha	Provision of digital data
Special Projects		
<b>Special Projects - Infrastructure (Storm Pond, Offsite, Reservoir etc.) Flat Rate of \$3775.00 per application as broken down:</b>		
Engineering Service	Fees	Notes
Engineering Review	Flat fee \$1,500.00	Drawing and report review
Servicing Agreement	Flat fee \$1,500.00	Draft and execution of SSA
Inspections and Meetings	Flat fee \$200.00	Mandatory site meetings/inspections
CCC&FAC	Flat fee \$500.00	Inspection and administration
CAD Fee	Flat fee \$75.00	Provision of digital data
<b>Special Projects - Stripping and Grading Application Flat Rate of \$750.00 per application as broken down:</b>		
Engineering Service	Fees	Notes
Drawing and Report Review	Flat fee \$550.00	
Inspections/Site Meetings	Flat fee \$200.00	
Additional Engineering Charges		
Engineering Service	Fees	Notes
Drawing and Report Review	\$300.00	For 3rd and all subsequent submissions
Final Inspection	\$500.00	3rd Inspection
Final Inspection	\$750.00	Inspections after 3rd inspection
Request for variance after approval	\$130.00	Per request. Changes to approved engineering design
Emergency/after hours inspection	\$250.00	Per inspection

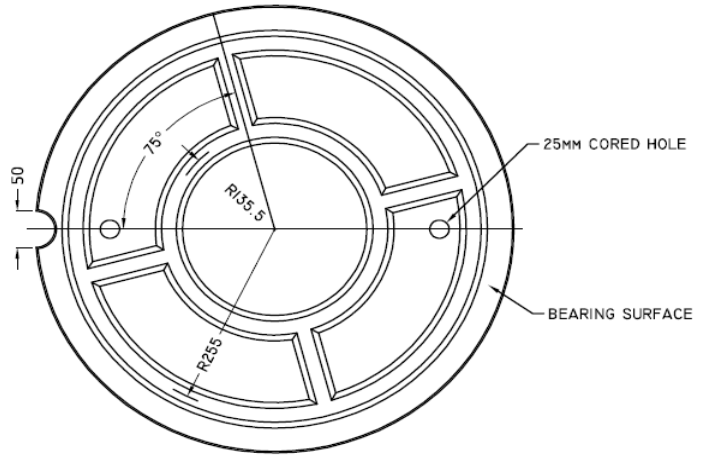
## APPENDIX D

### Manhole Lid Requirements

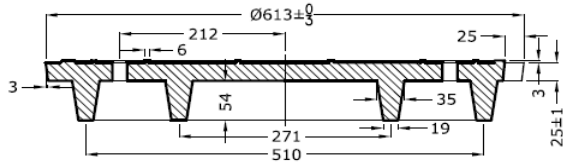




PLAN



BOTTOM VIEW



SECTION A-A

**NOTE:**  
BEARING SURFACE SHALL BE GROUND  
OR MACHINED TO PREVENT ROCKING

NO.	DATE	REVISION	BY	Town of Cochrane			
				TF-50 STANDARD COCHRANE SANITARY COVER			
				SCALE: 1:10	DATE: DEC 16, 2010	DRAWING NO: SAN-001	MATERIAL SPECIFICATIONS AND MASS: GREY CAST IRON TO CONFORM TO CLASS 20 A,S,T,M, A48 NOMINAL MASS 72KG
				DRAWN BY: R.S.	CHECKED BY:		METRIC DIMENSIONS ARE IN MILLIMETERS

