ENGINEERING DESIGN PROCEDURES MANUAL

CAPITAL WORKS CONTRACT DESIGN PROCEDURES

1/26/2017

NOTES TO REMEMBER…

TIPS and HINTS - HELPFUL

NOTES TO PAY ATTENTION TO - IMPORTANT

LAWS OF PROCESS - VERY IMPORTANT

**For ALL Consultant work, Copy the complete contents of
G:\WTDESIGN\CONSULTANT CD BURN\CAPITAL WORKS DELIVERABLES\...
to a CD at the outset of a project.**

**For ALL Internal project work, obtain templates & files from
G:\WTDESIGN\ENGINEERING STANDARD SETUPS\DESIGN…\
As they are required. DO NOT COPY FROM PREVIOUS CONTRACTS!**

2

TABLE OF CONTENTS

3

Pat Z.

4

Pat Z.

Pat Z.

6

Pat Z.

8

Pat Z.

10

Pat Z.

11

Pat Z.

PROLOGUE

As a guide to in house Capital Projects, this manual is designed to standardize the process used to produce Capital Works engineering drawings. Standardization enables present employees to work consistently and effectively while giving new employees a format to follow when integrating their skills to their new position.

An Example project process is shown as STEP BY STEP instructions, starting with Section 8.

There is a 'quick list' of the City's in house process starting with Section 1. The City of Brampton design & drafting process, outlined in this manual, blends Inroads and Microstation commands. Design, profile creation and x-sections creation will be done through Inroads. Inroads commands are used to re-display modified features, and can be utilized to update x-sections rather than redrawing or regenerating them. Final cleanup, base plan preparation, utilities and underground information will be done using Microstation commands. This process is to be followed for all in house capital projects.

The Capital Works Contract Design Procedures Manual is to be read in conjunction with the CAPITAL WORKS DELIVERABLES.

There are three basic types of Capital projects covered in this manual...

1. In house projects
2. Contracted projects (including Landscaping and Structures work, contracted as part of an in house project)
3. Contracted 'as constructed' projects

Consultants will find a working guideline for Capital Works projects. Capital Works 'as constructed' submissions provided to the City of Brampton must follow specified protocol as outlined in this manual. A list of required items for Capital Works projects and 'as constructed' drawings, which will be reviewed in each submission, is included in the manual.

Subdivision development submission of 'as constructed' information to the City of Brampton must follow specified protocol as outlined in the Development Digital Submissions Requirements Manual. A list of required items, which will be reviewed in each submission, is included in that manual.

Any portion of a development that falls into the Capital Works category will be required to follow this manual.

Any changes that occur to the document will necessitate an updated manual being printed for each employee. This will create consistent and accurate output from, and for, Public Works, Capital Construction & Engineering Department at the City of Brampton.

Processes are outlined for reviewing PUCC, Site Plan and Subdivision/Development applications.

Samples are also provided at the end of this manual for some of the templates, forms, spreadsheets and drawings utilized by the Capital Engineering section for application reviews and Capital works projects.

13

Pat Z.

CAPITAL WORKS DELIVERABLES

This package is maintained by the Capital Construction & Engineering Department. It contains all information required by a consultant to produce drawings for our capital projects.

> **This folder is updated periodically as processes and / or seed files are modified so always burn the CD at the time it is required.**

> **Prior to any outside work being started on, or for, a Capital Project, a CD must be prepared, and the consultant is to be provided with this information.**

The package contains the seed files and directions required to achieve City of Brampton, Construction & Engineering standards.

The projects this would apply to include…

- A contracted Capital works design.
- Any contracted portion of an In House Capital works design, such as structures or landscaping.
- Any 'as-constructed' drawings being completed by a consultant for a completed Capital project.

> **Copy the latest named ZIP file of CAPITAL WORKS DELIVERABLES, to a CD for the consultant at the outset of a new project. Label the CD "City of Brampton, Capital Works Deliverables" with the current date.**

This folder, with all its sub-folders, is under G:\wtdesign\CONSULTANTs CD burn\

> **For In House Capital projects, all the information and seed files required can be found in our Engineering Standard Setups folder and its sub-folders.**

ENGINEERING STANDARD SETUPS

> **This is an In House Folder and is not intended for consultant circulation. Consultant information is in Capital Works Deliverables, as indicated above.**

This is a list of the design related files and folders found in

G:\wtdesign\Engineering Standard Setups\
- 256PLOT.CTB
- 256PLOT.TBL
- BRAMPTON.itl
- BRAMPTON.pltcfg
- BRAMPTON.xin
- BRAMPTONroll.pltcfg
- font.rsc
- lstyle.rsc
- SEED-2DUTM.dgn
- SEED-3DUTM.dgn
- 📁 _IN-HOUSE FILE STRUCTURE – Street – From – To
  - Contains all the folders required for a given project and is copied in it's entirety to create the contracts working directory.
  - *See CONTRACT DIRECTORY STRUCTURE FOR IN HOUSE DESIGN (SECTION 8.3)*
- 📁 _LIGHTING PACKAGE
  - Contains all the files required for lighting drawings

14

- 📁 _TRAFFIC PACKAGE
  - Contains all the files required for traffic drawings
- 📁 \DESIGN CELL LIBRARIES
  - Contains cell libraries utilized for design and patterning, including logos and radius templates for turning radius checks
- 📁 \DESIGN DRAWING BASES
  - Contains drawing bases for contract drawings and title sheets as well as bases for required miscellaneous drawings that are not necessarily part of a contract set.
  - Contract base drawings are named so as to describe the function and location of the plan within the contract set.
  - Miscellaneous drawings are identified as 'MISC-REQUESTS...' With the size of plan indicated in the title, and for the smaller two sizes the file contains both landscape and portrait orientations of the base.
- 📁 \DESIGN SAMPLES
  - Contains samples of completed drawings and spreadsheets
- 📁 \DESIGN SPREADSHEETS
  - Contains spreadsheets for calculation of cut/fill quantities, storm design, hydro elevations, circulation comments, CADD review comments, etc.
- 📁 \DESIGN TEMPLATES and CHECKLISTS
  - Contains templates of letters and memos to be used as needed for circulations, transmittals, checklists etc.
- 📁 \EXTERNAL LINKS
  - Contains shortcuts and hyperlinks to reference materials, web pages and drawings.
- 📁 \MISC DETAILS—INTERNAL USE ONLY
  - Contains a culmination of details that have been used on previous contracts and may be used as needed instead of creating a new detail every time.
- 📁 \PRELIMINARY ESTIMATES
  - Contains an assortment of previous estimates that can be used to generate a preliminary estimate.
- 📁 \PROPERTY PACKAGE BASES
  - Contains the Microstation files required for producing the Property Base Map and the IPRP drawings, including samples as well as links to the documents & spreadsheet found in the Appendix A package under the Property Closeout Report folder
- 📁 \PUCC
  - Contains the application generator for PUCC circulations

Pat Z.

1. QUICK LIST OF IN HOUSE DESIGN PROCESS

1) RETRIEVE FROM ENGINEERING STANDARD SETUPS FOLDERS…

- Retrieve the folder in G:\wtdesign\Engineering Standard Setups\, '_ **IN-HOUSE FILE STRUCTURE - Street - From - To'**, with all its sub folders and copy it to the appropriate street directory under G:\wtdesign\Street Names – CONTRACTS\"streetname"\. Change the main folder name, '_**IN-HOUSE FILE STRUCTURE…**', to represent the project file number, street name and description. (i.e. **##-####-### - Project Street Name - Road A to Road B**)
- Retrieve from the G:\wtdesign\Engineering Standard Setups\DESIGN TEMPLATES and CHECKLISTS\ folder the Design Criteria template and copy it into the COMMUNICATIONS folder within your project folder. Rename it to identify the project information and remove the write lock on the file.
- Retrieve the preference and template files, 'BRAMPTON.xin' & 'BRAMPTON.itl' and copy them to the INROADS folder, you can rename them '*streetname*.xin' & '*streetname*.itl' respectively.
- From SubFolder \DESIGN DRAWING BASES\ Retrieve the drawing files '4-PLANnPROFILE-sheet-2D.dgn', '1-TITLEPAGE-2D.dgn' and '2-DGN_LISTPAGE-2D.dgn' and copy them into the project's main directory. Rename them to 'PnP-*Streetname*.dgn', 00-*Dwg#*_TITLEPAGE.dgn, 00-*Dwg#*_DGN_LISTPAGE.dgn' respectively.

  See GETTING READY – GATHERING FILES (SECTION 8.2)

2) RETRIEVE FROM THE SURVEY GROUP…

- Retrieve the surface file 'streetname-base.dtm' and copy it into the INROADS folder.
- Retrieve the drawing file 'streetname-base.dgn' and copy it into the project's main directory. You will place a second, write protected copy, into the survey data folder. (as a backup for checking original survey data)

3) GENERATE NEW DRAWINGS…

- Working in the main project directory, create a copy of 'streetname-base.dgn' and rename it 'streetname-DESIGN.dgn'
- Open streetname-DESIGN.dgn in Microstation
- Turn on ALL levels and delete ALL information in this drawing file
- Reference 'streetname-base.dgn'
- Attach cell library 'BRAMPTON CELLS V8i.cel' (in Engineering Standard Setups\DESIGN CELL LIBRARIES)
- Save the settings
- In drawing 'streetname-DESIGN.dgn' Select >File >*Save As* and create files named 'streetname-PROFILE.dgn', 'streetname-UTILITIES.dgn', 'streetname-SECTIONS.dgn', 'streetname-WORKING.dgn', 'streetname-PROPERTY.dgn' and so on...

  See CREATE DRAWING SHEETS (SECTION 20.5)

16

4) CIRCULATE PRE-ENG PUCC

- Copy the circulation letter 'PUCC-1 – PRE-ENG Letter.docx' to the appropriate folder and rename to reflect project information.
- Forward to the Sr. Secretary (Lucia), via email, for generation of cover letters to the utilities' PUCC coordinator.
- Sign the letters returned to you.
- Return the signed letters, along with the folded packages, using strip plans if necessary, to Lucia to have the packages prepared for the circulation/courier.

   See ENGINEERING SUBMISSIONS (SECTION 2.1)

5) GENERATE PROPERTY DRAWING...

- Populate the property drawing in the REALTY folder, with information from the Teranet block files in M:\Vector\Prop\
- Include any EA information available for required properties. Ensure that any ongoing property acquisitions are included in the process.
- Ensure that the correct ROW levels are being used.
- Upon approval of the property plan, from Surveys section, create Individual Property Request Plans (IPRP's) for each affected property.

   See PROPERTY BASICS (SECTION 9)

6) DESIGN FLOW

- Open either the DESIGN file or a WORKING file in the main directory

INROADS COMMANDS...

- Load preference file (xin)
- Load template library (itl)
- Load existing surface (dtm)
- Create names for geometry (alg) and surfaces (dtm)
- Create geometry project (rwk)
- Import property fabric to utilities dtm (draping elements on existing surface)
- Populate Horizontal alignments (Main Street and Cross Roads or T Intersections)
- Add Horizontal event points (driveways, connecting walkways...)
- Display Horizontal alignments to verify
- Display stations on Horizontal alignment
- Generate profiles
- Populate Vertical alignments (Main Street and Cross Roads or T Intersections)
- Annotate Profiles
- Annotate Vertical Alignments
- Use 'Review Horizontal Geometry' to cut and paste curve data for plan
- Create Horizontal / Vertical alignments for the quadrants of any Cross Roads and T-Intersections

MODIFY TEMPLATES...

- Modify templates to suit project

17

Pat Z.

CREATE ROADWAY FILE

- Create a new roadway file in Roadway Designer (ird)

ADD CORRIDORS

- for Main Street, Cross Roads and T Intersections

TEMPLATE DROPS

- Specify which templates are dropped at what stations for each corridor and the intervals for the remaining distance to the next template drop

TARGET ALIASING

- Set target surface as existing and select clipping corridor for each corridor (the alias is the corridor which will be clipped)

POINT CONTROLS

- Add point controls to stretch template(s) using features such as EP on storage and taper sections (offset is measured from c/l of template)

TOOLS >> PARAMETRIC CONSTRAINTS

- Use parametric constraints to modify feature widths such as EP or LTL for turn lanes, or KS for working around bus pads. This works like Point Controls but the offset is measured from previous feature, instead of the c/l of the template.

END CONDITION EXCEPTIONS

- Allows you to override the template for a specified length of the active corridor

DISPLAY REFERENCES

- Allows you to display alignments and/or features in the plan view of the Roadway Designer interface

SECONDARY ALIGNMENTS

- Allow you to redirect the features in the Primary Alignment using an additional alignment (horizontal and/or vertical) in Point Controls

KEY STATIONS

- Input stations where you specifically want a template to be placed in addition to the ones placed at the interval placement specified i.e. critical template drops such as taper change point, end of radius

CREATE SURFACE

- Name the new surface PROPOSED and specify the corridors to be included in surface creation, then apply
- Adjusting the settings will allow you to create the design surface and an alternate surface (LIMESTONE), and display the features in the plan

18

SAVE

- Save the new surface (PROPOSED)
- Change surface properties to be displayed as feature style "PROPOSED"

RE-SAVE GEOMETRY PROJECT

- Use 'save as' to add the new surface to the roadworks file (rwk) and overwrite the previous file

MODIFY FEATURES

- Create a smoother surface by matching the sidewalk feature to a curb radius and adjusting features at intersections and corridor junctions

DRAWING CREATION...

- Create Base sheet(s)
- Populate PnP drawing with all common information (key plan, street name, legend...)
- Create Drawing sheets
- On an ongoing basis, add Pre Eng utilities circulation information received.

  See *CONTRACT DRAWING PREPARATION (SECTION 20)*

GENERATE CROSS SECTIONS

  See *CROSS SECTIONS – INROADS |EVALUATION (SECTION 26)*

CALCULATE VOLUMES

- Generate an End Area Volume Report for granular quantities, then another for limestone quantities using the alternate surface LIMESTONE

  See *END AREA VOLUMES (SECTION 29)*

POPULATION OF CUT/FILL SPREADSHEET

- Use values from End Area Volume Reports to populate the cut/fill spreadsheets and modify for intersections or other discrepancies, label these calculations as GRANULAR or LIMESTONE
- If an alternate surface was not used, copy GRANULAR sheets and adjust for LIMESTONE by measuring the difference on the cross sections and adjusting the figures accordingly.

DRAFTING WORKS...

- Complete the title page and drawings list page
- Add shading, patterns and hatching
- Add labels to plan and profiles
- Set up profile to match page breaks, duplicate information between sheets
- Add grading and storm pipe information to profile
- Adjust elevations and stations on profile so that it will be displayed in the correct location on each sheet
- Create REMOVALS drawings (Sheet#-Dwg#-REMOVALS.dgn)

Pat Z.

- Create DIMENSIONS drawings (Sheet#-Dwg#-DIMENSIONS.dgn)
- Create Details and/or Typicals drawing(s) (Sheet#-Dwg#-DETAILS.dgn / Sheet#-Dwg#-TYPICALS.dgn)
- Create Pavement Markings drawings (Sheet#-Dwg#-PVMNT-MKGS.dgn) and copy all associated files to G:\wtengmain\pavement mkgs\streetname\
- Create Pavement Elevations drawings at 1:250 scale, for intersection grading (Sheet#-Dwg#-ELEV-STREET.dgn)
- In streetname-QUANTITIES.dgn outline areas of asphalt, sod, sidewalk, multi use path... and reproduce lengths of storm lines and leads to facilitate measurements
- Create a list of quantities in the drawing from the shapes and lines drawn, this will be modified as necessary by crossing out the existing information and adding the new measurements
- Produce a spreadsheet outlining quantities to be provided to the project manager. A sample of this spreadsheet can be found in Engineering Standard Setups\DESIGN SAMPLES (Streetname-Quantities.xlsx)

  See FINAL CHECKLIST – COMPLETING THE PACKAGE (SECTION 31)

PLOT CONTRACT DRAWINGS

- Generate 'i' files, and place in the 'PRINT FILES' directory, for both full and half scale prints (corner points have been set up for both in the base drawings to allow for a true half scale plot on 11x17 paper)
- Create 'ips' files in the 'PRINT FILES' directory to include all the 'i' files for each scale set
- Generate PDFs to be used for printing

  See PLOTTING CONTRACT DRAWINGS (SECTION 30)

7) PROJECT CIRCULATIONS 30/60/90/TENDER/CONSTRUCTION

- Provide a hard copy of the master list to the Project Manager to identify those to whom the submission is NOT being circulated. These contacts will remain on the list with a note in the address area **'NOT CIRCULATED'**. For sections that have two names, add a note in the address area either **'ONE COPY EACH'** or **'SHARE ONE COPY'**.

ISSUED FOR TENDER DRAWINGS

- Prior to plotting the Issued for Tender Drawings, digital files are to be submitted to Doug Lawr (Surveys Group) for property review. Provide surveys with a folder location for the property drawing.
- When an email has been received from Surveys confirming the property information, the drawings can be plotted, sealed and signed

  See ENGINEERING SUBMISSIONS (SECTION 2.4)

DESIGN HANDOVER DRAWINGS (ISSUED FOR CONSTRUCTION)

- Final sheet drawing files to include only those references which are shown in the drawing. Remove any references used for information but not utilized in the final product.

20

- Complete the DESIGN CD Handover Checklist and ensure that all information is included for the CD. There is a file structure set up for the handover CD, it can be found in Engineering Standard Setups.

  See APPENDIX 4 (SECTION 33.4.XII)

This form must be signed by Doug (Surveys Group will confirm property) and by the Supervisor CADD before CD can be handed over to Construction Group.

QUICKLIST OF ISSUED FOR CONSTRUCTION CD HANDOVER CONTENTS...

- ✓ Appendix A package
- ✓ Title Page & Drawings List Page
- ✓ Removals
- ✓ New Construction
- ✓ Traffic Control (City & Peel Region)
- ✓ Street Lighting
- ✓ Dimensions
- ✓ Structural
- ✓ Culverts
- ✓ Pavement Markings
- ✓ Landscaping
- ✓ Watermain / Sanitary (Peel Region)
- ✓ Cross Sections
- ✓ Inroads
- ✓ Survey Surface
- ✓ Property Plan and layout file (Provided by Surveys section)
- ✓ PDF set of drawings

Pat Z.

2. ENGINEERING SUBMISSIONS

The folders have been set up for all the submissions in the file structure you copied from the Engineering Standard Setups folder.

See CONTRACT DIRECTORY STRUCTURE FOR IN HOUSE DESIGN (SECTION 8.3)

1) PRE-ENG PUCC SUBMISSION

- Complete the Pre Eng Letter (PUCC-1 – PRE-ENG Letter.docx) copied from the Engineering Standard Setups/DESIGN TEMPLATES and CHECKLISTS to the folder named **Pre Eng PUCC** under **DIGITAL SUBMISSIONS**.
    - Project number MUST BE INCLUDED on letter.
- Email completed letter to Sr. Secretary (Lucia) for generation of the letters to the utilities' PUCC coordinator
- Send project drawings out for copies, you will need eight (8) full size, folded hard copies,
    - When you send out the plan(s) for copying, request a PDF copy and place it in the folder **DIGITAL SUBMISSIONS/Pre Eng PUCC.** This will ensure you have a static copy of what was sent
- Sign the letters returned to you
- Return the signed letters, along with the folded packages, to Sr. Secretary (Lucia) to have the packages prepared for the circulation/courier

> **Note the Utility File/Reference number on the status sheet, if one is provided…this reference is to be used for all future correspondence and circulations to the utilities**

See APPENDIX 3 (SECTION 33.3.V)

> **ADD UNDERGROUND UTILITIES TO THE PLANS AS THEY ARE RECEIVED**
>
> **The linework will need to be added to either the DESIGN file or the EXISTING base plan as well as the UTILITIES plan to be used to add the information as features to UTILITIES.dtm for display on cross sections.**

See IMPORTING FEATURES (SECTION 13)

Copy **...\Engineering Standard Setups\PUCC STATUS.xlsx** to the Contract Directory under **COMMUNICATIONS**…rename it to **"COLLECTOR PUCC STATUS.xlsx".** Keep this file updated with current status information i.e. dates, information format, special considerations, contacts...

2) 30 & 60 PERCENT SUBMISSIONS

In Engineering Standard Setups/DESIGN SPREADSHEETS you will find a circulation comments spreadsheet to be modified with the appropriate contract information. The distribution sheet is always to be retrieved from Engineering Standard Setups, to ensure that you are using the latest list, it is updated as contact information changes.

> **Avoid carrying forward a list from a previous submission or another contract. Print a copy of the distribution lists to confirm, with Project Manager, the names to be included in the distribution list.**

22

- Complete project information in header/footer of the circulation lists (Capital Projects – Design Circulation-INTERNAL.docx & Capital Projects – Design Circulation-UTILITIES.docx)
  - **Be sure to place the reference # received from the Pre-Eng Circulation, for each utility, in the column provided; these drawings may be bound and rolled**
- Provide hardcopies of the distribution lists to the Project Manager; PM is to strike out any contacts that will **not** be included in the circulation
- The uncirculated contacts will remain on the list, to identify them, replace and highlight, '**DateS**' in the 'Date Sent for Review' column with '**NOT CIRCULATED**'.
- Circulations will be done through the portal; however contacts that are receiving hard copy drawings will require a highlighted note in the address area. Identify the number and size of the drawings to be provided… **Number of FULL SIZE, Number of HALF SIZE**. If there are two contacts named, identify the drawing recipient(s) with a highlighted note either '**ONE COPY EACH**' or '**ONE COPY to Name**'
- Determine the required number of copies from the distribution sheets reviewed by the PM
- Coordinate with the Engineering Technician (Sandra) to have the drawings sent to MC Reproductions for copies, order enough copies for all of the external contacts that remain on the circulation list, as well as the internal contacts identified on the inter-office distribution sheet to receive a hard copy.
- At the same time, have MC scan the drawings to PDF files to be provided on a CD. Standard verbiage on the MC form is to be as follows…

  "Please scan a complete set to PDF format, 300dpi, with drawing number as name."

- Provide the Project Coordinator (Shamsul) with the CD (of PDF file(s)), distribution lists, the comments spreadsheet (with the project information completed) and the hard copy drawings. Shamsul will…
  - Combine the PDF files, if necessary, and place them/it on the portal for review by inter-office contacts
  - Distribute the inter-office copies
  - Co-ordinate with Lucia for courier to external contacts
- Shamsul will send out emails with notification of the circulation with a CC to the designer & PM. The email to internal contacts will have a link to the portal location, and the verbiage on the internal email is to read…

"Hello All,

Please be advised that the XX% design drawings for the STREET-LOCATION project, being undertaken by the City of Brampton, can now be found on our portal for review. If you receive a hard copy, it will be distributed to you shortly.

Please use the link below to provide your comments, on or before DD/MON/YR. If you have not provided your comments by this deadline, it will be assumed that you have NO comments.

If you have designated another to review this project, please ensure that they have this email and utilize the link below to review the project and provide their comments on the portal.

Portal Link Here

Pat Z.

23

Thank you for your cooperation.

Best Regards,
Shamsul Huda
Project Coordinator
Planning & Infrastructure Services Department
Public Works Division, Capital Works Section
Capital Engineering
phone…fax…email…."

- An email, with the following verbiage, and the Excel spreadsheet 'Capital Projects – Design Circulation-Comments.xlsx' attached, will be sent to the utilities/external contacts.

"Hello All,

Please be advised that the XX% design drawings for the STREET-LOCATION project being undertaken by the City of Brampton, will be distributed to you shortly.

Please use the spreadsheet attached to provide your comments, on or before DD/MON/YR. If you have not provided your comments by this deadline, it will be assumed that you have NO comments.

If you have designated another to review this project, please ensure that they have this email and utilize the attached spreadsheet to provide their comments.

Utilities…

Please be advised that these drawings are being distributed, for your information.

This is not a markup request; it is to keep you abreast of the design progress for the above project.

A separate circulation will be done for PUCC review.

If you have any questions, or concerns, please feel free to contact me.

Best Regards,

Shamsul Huda
Project Coordinator
Planning & Infrastructure Services Department
Public Works Division, Capital Works Section
Capital Engineering
phone…fax…email…."

See APPENDIX 3 (SECTION 33.3.VII & SECTION 33.3.VIII)

24

ASSIGN DRAWING NUMBERS

At the 60% submission stage, provide the Intermediate Engineering Technician with a small hardcopy of the drawings on which they will note the assigned drawing numbers. Incorporate these numbers in the drawing file name, index sheet and drawing number spreadsheet. As new drawings are created, a small copy is to be provided for numbering.

See ASSIGNING NUMBERS FOR CONTRACT DRAWINGS (SECTION 20.2)

3) 90 PERCENT SUBMISSIONS AND FINAL PUCC

At the 90% submission stage, add thirteen folded copies of the plan and profile drawings for the Final PUCC. This PUCC submission requires that all contract drawings be included.

The blank form, found in Engineering Standard Setups/DESIGN TEMPLATES and CHECKLISTS, can be copied to this folder and modified with all the pertinent project information.

See APPENDIX 3 (SECTION 33.3.VI)

- Repeat steps outlined in the 30%/60%
- In addition to the internal & utilities circulations, the final PUCC circulation is to be done at this time
- Print and complete the blank form (PUCC-2 – FINAL Submission Form.docx)
- Provide the completed PUCC form and thirteen (13) sets of folded hard copies to the Project Coordinator (Shamsul). Shamsul will provide the PUCC number, generate the PUCC application forms for the utilities and circulate the packages, working with Lucia as needed for courier delivery
- The Project Coordinator will provide a PUCC number, circulate the drawings to the utilities and track the responses. You will need to check in with them periodically to determine the status of the responses.

> **Copies being made for all submissions will include the request to provide a PDF copy on disk. The note on the order form will be...**
>
> **"Please scan a complete set to PDF format, 300dpi, with drawing number as name."**

These PDF drawing files will be placed in the submissions folder, along with the comment sheets, distribution sheet and any other information provided by the reviewers, as a static record of the submission and responses.

> For contract circulations having upwards of 100 plans, discuss with the Project co-ordinator the possibility of providing CDs of the package, in lieu of hard copies, for the final PUCC. A hard copy will be required should one be requested by any of the utilities.

Pat Z.

The header has now been set up as a 'form', with areas to be completed either with text or using a dropdown menu

CITY OF BRAMPTON
DETAIL DESIGN ENGINEERING DOCUMENT REVIEW

Date Documents Issued for City's Review: DateS   Required Turnaround Time: Fifteen (15) Working days
Project Info.: PROJECT ST. from ST. A to ST. B, File #: Enter file #
For Review of... SELECT THE STAGE Design Submission   Clear this for 30/60...At 90% include PUCC # for ref.

INTER-OFFICE/DEPARTMENT CIRCULATION TRANSMITTAL

Circulation	Department Name Hard copy recipients are noted, all others review on portal.	Date Sent for Review	Required Date for Return	Reviewer's Initials

Footer

PLEASE FILL IN YOUR COMMENTS ON THE ELECTRONIC FORM BEING SENT VIA E-MAIL AND RETURN TO NAME – NUMBER – E-MAIL

Template Last Updated – February 10, 2016 - PMZ

At 30 and 60 percent, the field on the lower right of the header is to be removed (highlight and add a space)

Utilities are to have the corresponding reference number in the last column

At 90 percent, include the PUCC number Shamsul has provided you

CITY OF BRAMPTON
DETAIL DESIGN ENGINEERING DOCUMENT REVIEW

Date Documents Issued for City's Review: DateS   Required Turnaround Time: Fifteen (15) Working days
Project Info.: PROJECT ST. from ST. A to ST. B, File #: Enter file #
For Review of... SELECT THE STAGE Design Submission   Clear this for 30/60...At 90% include PUCC # for ref.

UTILITIES CIRCULATION TRANSMITTAL

One (1) Full Size Hard copy is provided to each Utility on this list.
For multiple names, highlight the person to receive it.

Circulation	Utility Name	Date Sent for Review	Req'd Date for Return	Reference # Provided at Pre-Eng
	Hydro One Brampton			

All correspondence is to contain the applicable reference/file numbers; this will reduce confusion when submitting the various circulations and improve turnaround times for PUCC. The goal here is to connect the utilities' reference number and our PUCC number to provide continuity throughout the project.

26

Pat Z.

4) ISSUED FOR TENDER AND ISSUED FOR CONSTRUCTION

Prior to plotting the Issued for Tender Drawings, digital files are to be submitted to Doug Lawr (Surveys Group) for property review. The property will be compared to a plan developed in Surveys Group using Realty information with respect to the property acquisition status. This plan will ultimately be provided to the CA as a final property information package.

When an email has been received from Surveys confirming the property information, the drawings can be plotted, sealed and signed.

> **Before doing the Issued for Construction plan plotting, check with the Surveys Group to see if their property drawing has been finalized i.e. all property has been acquired.**

If this has been completed, the information can be used in place of the previous property plan information for the printing of the Issued for Construction drawings.

> **The engineer's stamp will be signed, and dated, in BLUE ink.**
> **A signed engineer's stamp is to be placed on "Issued for Tender" drawings, and again on "Issued for Construction" drawings, unless the Manager of Engineering waives the requirement at tender for extenuating circumstances.**

Determine, with the Project Manager, how many full size copies (1:500) will be needed and how many half size (1:1000 on 11"x17"). As with the previous submissions, you will be adding a note to the printing order form for PDF files. This note will read as follows...

> **"Please scan a complete set to PDF format, 300dpi, with drawing number as name."**

These PDF drawing files will be placed in the appropriate folders as a static copy of the drawings provided for these submissions. The PDF files can quickly be printed as a full size (24"x36") or half size (11"x17") as needed.

A PDF copy of the construction drawings will also be provided to the successful bidder on the Tender along with all the Microstation files and other information as indicated on the checklist for the Issued for Construction handover. This form must also be signed off by the survey and design supervisors.

See APPENDIX 4 (SECTION 33.4.XII)

Pat Z.

3. CIRCULATION FORMS & CHECKLISTS

1. FORMS

There have been forms created for most of our circulations. These will be utilized by the design group when circulating plans/packages to internal and external reviewers. Our form letters are available in Engineering Standard Setups\DESIGN TEMPLATES and CHECKLISTS... and are to be copied to the appropriate project folder, as needed.

Always acquire the latest from the Engineering Standard Setups folders at the time of use, avoid carrying it forward or using one from another project.

PUCC applications received for review and approval on, or near, a capital project that is being done by a consultant are to be circulated to the consultant through the project manager. The project manager is to initial the top of the PUCC form to indicate that they are aware of the work proposed by the utility in the area of their project.

See REVIEW OF SUBMISSIONS FROM EXTERNAL SOURCES (SECTION 5)

Each template is named according to the situation, in which it will be used, with a few generic templates for use as needed. If you are required to circulate information, check here to find the appropriate template to use. More are created as the need arises.

- BLANK Letterhead.docx
- General MEMO Form.docx
- General TRANSMITTAL Form.docx
- General UTILITIES Markup Request.docx
- PUCC-1 – PRE-ENG Letter.docx
- PUCC-2 – FINAL Submission Form.docx
- Capital Projects – Design Circulation-INTERNAL.docx
- Capital Projects – Design Circulation-EXTERNAL.docx
- PUCC – CONSULTANT circulation – Memo.docx
- Siteplan – CONSULTANT circulation – Memo.docx
- Siteplan – INTERNAL circulation – Memo.docx
- Siteplan Review – SP XXX-XX – COMMENTS.docx
- Subdivision – CONSULTANT circulation – Memo.docx
- Subdivision – INTERNAL circulation – Memo.docx
- Subdivison Review – DSRXX-XX-XX – COMMENTS.docx
-
-

See APPENDIX 3 (SECTION 33.3)

28

2. CHECKLISTS

There have been checklists created for each type of review that we do and, as with the circulation documents, these are named for their use.

They have been designed to be easy to follow and fill out, with check boxes for each item of review.

Checklists include…

Capital Projects – Design In House

Capital Projects – Design by Consultant

Capital Projects – As Constructed Review

Development – As Constructed Review.

See APPENDIX 4 (SECTION 33.4)

4. REQUIREMENTS FOR SUBMISSIONS FROM CONSULTANTS

1. FILE STRUCTURE TO BE USED FOR CONSULTANT SUBMISSIONS…

This is what you should find on the Issued for Consruction CD received from the consultant

📁 PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE

📁 CONSTRUCTION - DGNs
- ALL existing, design and contract drawings including all references

📁 CONSTRUCTION - INROADS
- ALL InRoads files associated with the capital works portion of the contract

📁 DESIGN BRIEF
- Report of design criteria, project challenges and solutions

📁 SURVEY
- One plan containing triangles and contours of the original surface

Sub folders may be created for any additional information or calculations etc.

A copy of this page is included in Capital Works Deliverables, in the folder ('_CONSULTANT FILE STRUCTURE - …' containing all the folders to be used by consultants.

Pat Z.

2. FILE STRUCTURE TO BE USED BY THE CITY'S TECHNOLOGIST WHEN CREATING THE "CD'S FOR HANDOVER"…

In a folder named '**CD for DESIGN HANDOVER FILE STRUCTURE – Street-Date'**, the following folders will be created and populated.

- 📁 CAPITAL WORKS DELIVERABLES
  Copy the folder 'Capital Works Deliverables', from wtdesign/CONSULTANTs CD burn
- 📁 PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE
  CONSTRUCTION - DGNs
- ALL design and contract drawings including all references
  From Consultant Submission
- 📁 CONSTRUCTION - INROADS
- ALL InRoads files associated with the capital works portion of the contract
  From Consultant Submission
- 📁 CONSTRUCTION - PDFs
- ALL contract drawings
  From Consultant Submission
- 📁 LAYOUT
- Final property plan, with aerial and text file of layout points (provided by surveys)
  From Surveys Group
- 📁 SURVEY
- One plan containing triangles and contours of the original surface
  From Consultant Submission

3. BASIC REQUIREMENTS FOR ALL SUBMISSIONS
(PRIOR TO ISSUED FOR CONSTRUCTION)

- All base plans are to be 3D and georeferenced. Elements that have been surveyed, and features that have been generated through design programs such as Inroads, are to have true X,Y,Z coordinate locations. (Planar information is only acceptable for design work at the 30% stage)
- Elements such as linework placed for utilities, notes, shading and plate information can be planar. (Refer to levels chart in this manual for settings and elevations for shading and patterning)
- ALL PLANS MUST BE GEOREFERENCED
- The following design files may be submitted in 2D.
  - Landscaping
  - Streetlighting
  - Traffic Signals
  - Structures
  - X-Sections
  - Details
  - Pavement Markings

Review plans in an iso view to find, and correct, linework which is neither planar nor in its correct special location.

See APPENDIX 5 (SECTION 33.5.IV)

- Base plans and profiles are to be referenced to sheet drawings, not merged.
- References are to have NO live nesting
- Each drawing file is to contain only one drawing, view ports are not permitted.

30

Pat Z.

- Each folder is to contain both sheet drawings and referenced drawings. Do not separate sheet drawings and their references.
- Digital drawings required for each submission must be consistent with the provided hard copy drawings. Each submission must be complete with...
  - ✓ Title pages
  - ✓ Removals
  - ✓ New construction
  - ✓ Traffic control
  - ✓ Street lighting
  - ✓ Dimensions
  - ✓ Landscaping
  - ✓ Pavement markings
  - ✓ Property
  - ✓ InRoads files.
  - ✓ Watermain, sanitary, structural and culverts to be included if applicable.

> **The City does not entertain the notion of gathering information from various submissions provided because the information "hasn't changed" and is therefore not provided with the current submission…ALL submissions must be a complete package…**

4. REVISIONS SUBMISSIONS PROVIDED AFTER "ISSUED FOR CONSTRUCTION"

- All changes post "Issued for Construction" will be identified as revisions
- "Issued for Tender" and "Issued for Construction" notes made in the revisions chart shall remain, each group of subsequent changes will be noted under the respective revision number
- Each revision will include all changes made at that time under one revision number
- Revisions are to be clouded on the drawing(s) and noted in the revisions chart(s)
- For subsequent revisions, the previous revision clouds will be removed and new ones placed around the applicable changes, the chart will be updated to include the next revision number All revision numbers and notes in the revisions chart shall remain

See APPENDIX 5 (SECTION 33.5.IX)

- Only drawings which have been revised, including references, are to be included on the CD
- All revised drawings shall have a revision number, date and description of changes
- The CD is to have one folder (Named with the project file name, description and Revision #) with two sub folders
  - o PDF – is to contain all PDF files of the revised drawings
  - o CAD – is to contain all Microstation and Inroads files associated with the revisions (this includes sheet files and reference files in accordance with Capital Works Deliverables)
- The sheet files are to be named using the following format…dwg#-revision#.pdf or dwg#-revision#.dgn
- The CD is to contain…
  - ✓ A Revisions Log document appended with each revision completed
  - ✓ A Summary Brief identifying all changes made as part of the current revision submission

31

Pat Z.

- ✓ A spreadsheet with the Quantity Changes outlined for the current revision submission
- Hard copy drawings to be submitted include
  - ✓ one (1) full sized original
  - ✓ one (1) half sized original (Cross Sections will be full sized only, 1:200 H, 1:100 V)

EXAMPLE OF FILE STRUCTURE OF CD PROVIDED FOR REVISIONS…

- 📁 ***Collector St- Arterial Rd A to Arterial Rd B – Revision 2***
  - *Collector St - Revisions Log – REV 2 – 06-AUG-14.docx*
  - *Collector St – Summary Brief – REV 2 – 06-AUG-14.docx*
  - *Collector St – Quantity Changes – REV 2 – 06-AUG-14.xlsx*
  - 📁 ***PDF***
    - *C1-11-5-REV 2.pdf*
  - 📁 ***CAD***
    - *C1-11-5-REV 2.dgn*
    - *Collector-EXISTING.dgn*
    - *Collector-DESIGN.dgn*
    - *Collector-PROFILES.dgn*
    - *Collector-PROPERTY.dgn*

Pat Z.

5. REVIEW OF SUBMISSIONS FROM EXTERNAL SOURCES

1) PUCC REVIEW PROCEDURE

    i.   Review the PUCC

    ii.   Confirm the location and determine if the project falls within 500m of a current or future EA or Capital Contract

    iii.   If yes, review the application with the assigned engineer and have them apply their initials to sign off on any circulation requirements. This is done to document that the application has been circulated/reviewed with them.

Initials required as per email memo outlining new procedure dated 20JAN14

    iv.   Scan the required plans in the application for the information to be forwarded to the engineer, who will then circulate it to the consultant assigned to the EA/Capital contract.

    v.   Review the PUCC to ensure that it meets the city's requirements

    vi.   Note your comments on the application and attach any related correspondence that may have been provided by the engineer, or consultant, responsible for the EA or Capital Contract.

    vii.   If you encounter issues/conflicts with the application, skip to step 12.(xii)

    viii.   Once all the issues, if any, are resolved and the application can be approved, provide the package to the Design Supervisor for signature

    ix.   Scan and email the signed form to the PUCC Applications emailbox (copy yourself and the Design Supervisor)

    x.   Note the date in the portal spreadsheet, with a hyperlink to the email.

    xi.   File the package in the appropriate cabinet, in numberical order, once approved.

If the application is not acceptable 'as is' i.e. conflicts with City infrastructure

    xii.   Add a comment in the portal spreadsheet to outline actions being taken and/or status of the review, including the date

    xiii.   Work with the consultant and/or the applicant to find a resolution that meets the needs of all parties.

    xiv.   Once a resolution has been accomplished, follow previous steps 6-11 (vi – xi)

Pat Z.

2) SITE PLAN REVIEW PROCEDURE

    i.   Review the Site Plan drawing(s)

    ii.   Confirm the location and determine if the project falls within 500m of a current or future EA or Capital Contract

    iii.   If yes, review the application with the project engineer and have them apply their initials to the cover letter provided by the planner (this is done to document that the application has been circulated/reviewed with them)

    iv.   Scan the required plans in the application and forward the information to the engineer, along with a cover letter; he/she will then circulate the information to the consultant.

       See APPENDIX 3 (SECTION 33.3.XI, XII & XIII)

> **Include a deadline, set to one week prior to planner's stated date for responses**

    v.   Review the Site Plan to ensure that it meets the city's requirements

    vi.   Complete the site plan review memo, found in Engineering Standard Setups\TEMPLATES…, there is a shortcut to it in the main site plan review directory. Include your comments and attach any related correspondence that may have been provided by the engineer responsible for the related EA or Capital Contract.

    vii.   Forward an email to the appropriate contacts, as listed on the site plan memo

> **DO NOT INCLUDE the planner in the circulation**
> **As per email memo dated 11FEB14**

    viii.   Note the date in the portal spreadsheet, with a hyperlink to the email sent to Planning.

    ix.   File the package in the appropriate cabinet, in numberical order

34

Pat Z.

3) SUBDIVISION REVIEW PROCEDURE

i. Review the Subdivision Package drawings
ii. Complete a memo for the Lighting section and another for the Traffic section, then circulate the respective drawing package to each section with the matching section's cover letter

See APPENDIX 3 (SECTION 33.3.XIV, XV & XVI)

iii. Confirm the location and determine if the project falls within 500m of a current or future EA or Capital Contract
iv. If yes, review the application with the project engineer and have them apply their initials to the cover letter provided by the planner (this is done to document that the application has been circulated/reviewed with them)
v. Scan the required plan(s) in the application and forward the information to the engineer, along with the cover letter; he/she will then circulate the information to the consultant.

Include a deadline, set to one week prior to planner's stated date for responses

vi. Review the Development to ensure that it meets the city's requirements
vii. Complete the subdivision review memo, found in the templates and checklists directory. Include your comments and attach any related correspondence that may have been provided by the engineer responsible for the related EA or Capital Contract.
viii. Forward an email to the appropriate contacts, as listed in the memo.
ix. Note the date in the portal spreadsheet, with a hyperlink to the email sent to Planning.
x. File the package in the appropriate cabinet, in numberical order

Pat Z.

6. CAPITAL PROJECT REQUIREMENTS & DELIVERABLES - CONSULTANT

Drawing numbers are to be assigned as drawings are created; drawing files are to be named using drawing number.

Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers.

1) 30% SUBMISSION FROM CONSULTANTS (CAPITAL PROJECTS)

30% CADD REVIEW

- ✓ Check File Structure Compliance
  - 📁 *PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE*
    - 📁 *CONSTRUCTION - DGNs*
      - ALL existing, design and contract drawings including all references
    - 📁 *CONSTRUCTION - INROADS*
      - ALL InRoads files associated with the capital works portion of the contract
    - 📁 *DESIGN BRIEF*
      - Report of design criteria, project challenges and solutions
    - 📁 *SURVEY*
      - One plan containing triangles and contours of the original surface
- ✓ Check format (Microstation)
- ✓ Confirm Georeferencing
- ✓ Check for level compliance (Level use is outline in this manual's Appendix 1)
- ✓ Check drawings for compliance to drafting standards
- ✓ Check for 3D plan elements (survey, designed roadway and stormpond elements must be Geospacially Correct including the 'Z' value)
- ✓ Check for Viewport usage in Contract Drawings (Each dgn file is to contain only 1 sheet)

See APPENDIX 4 (SECTION 33.4.VIII)

30% DELIVERABLES

The following must be included on the CD (if applicable to the project)

- ✓ 1 Original Full Size Hard Copy set
  - o Rolled, not folded
  - o Unbound
- ✓ 1 CD

  The following must be included on the CD
  - o Design Criteria
  - o Property Plan
  - o Title Page(s)
  - o Removals
  - o New Construction

36

2) 60% SUBMISSION FROM CONSULTANTS (CAPITAL PROJECTS)

Drawing numbers are to be assigned as drawings are created; drawing files are to be named using drawing number.

Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers.

60% CADD REVIEW

✓ Check File Structure Compliance
  - 📁 ***PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE***
    - 📁 ***CONSTRUCTION - DGNS***
      - ALL existing, design and contract drawings including all references
    - 📁 ***CONSTRUCTION - INROADS***
      - ALL InRoads files associated with the capital works portion of the contract
    - 📁 ***DESIGN BRIEF***
      - Report of design criteria, project challenges and solutions
    - 📁 ***SURVEY***
      - One plan containing triangles and contours of the original surface
✓ Check format (Microstation)
✓ Confirm Georeferencing
✓ Check all drawings for compliance to drafting standards
✓ Ensure contract drawing reference the plan(s) and profile(s) i.e. NOT merged
✓ Check for level compliance (Level use is outline in this manual's Appendix 1)
✓ Check for 3D plan elements (survey, designed roadway and stormpond elements must be Geospacially Correct including the 'Z' value)
✓ Check InRoads files for Compatibility
✓ Check Landscape drawings, if applicable, for compliance to drafting standards
✓ Check Structures drawings, if applicable, for compliance to drafting standards
✓ Check for Viewport usage in sheet drawings (Each dgn file is to contain only 1 sheet)
✓ Check for Nested reference files in sheet drawings (No nested references permitted)
✓ Check for Missing reference files in sheet drawings (All reference files must be present)
✓ Check for Unused reference files in sheet drawings (All referenced files must be displayed)

See APPENDIX 4 (SECTION 33.4.IX)

60% DELIVERABLES

✓ 1 Original Full Size Hard Copy set
  - Rolled, not folded
  - Unbound
✓ 1 Original Full Size Hard Copy set of the Cross Sections
✓ 1 CD
  The following must be included on the CD (if applicable to the project)
  - Design Criteria
  - Inroads Files
  - Property Plan
  - Title Page Drawing(s)
  - Removals Drawing(s)
  - New Construction Drawings
  - Traffic Control Drawing(s)

37

Pat Z.

- o Street Lighting Drawing(s)
- o Landscape Drawing(s)
- o Structural Drawing(s)
- o Pavement Marking Drawing(s)
- o Watermain Drawing(s) (Peel)
- o Sanitary Drawing(s) (Peel)
- o Cross Sections Drawing
- o Storm Design Sheet(s) and Drawing(s)

3) 90% SUBMISSION FROM CONSULTANTS (CAPITAL PROJECTS)

Drawing numbers are to be assigned as drawings are created; drawing files are to be named using drawing number.

Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers.

90% CADD REVIEW

- ✓ Check File Structure Compliance
    - 📁 *PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE*
        - 📁 *CONSTRUCTION - DGNs*
        - • ALL existing, design and contract drawings including all references
        - 📁 *CONSTRUCTION - INROADS*
        - • ALL InRoads files associated with the capital works portion of the contract
        - 📁 *DESIGN BRIEF*
        - • Report of design criteria, project challenges and solutions
        - 📁 *SURVEY*
        - • One plan containing triangles and contours of the original surface
- ✓ Check format (Microstation)
- ✓ Confirm Georeferencing
- ✓ Check all drawings for compliance to drafting standards
- ✓ Ensure contract drawing reference the plan(s) and profile(s) i.e. NOT merged
- ✓ Check for level compliance (Level use is outline in this manual's Appendix 1)
- ✓ Check for 3D plan elements (survey, designed roadway and stormpond elements must be Geospacially Correct including the 'Z' value)
- ✓ Check InRoads files for Compatibility
- ✓ Check Landscape drawings, if applicable, for compliance to drafting standards
- ✓ Check Structures drawings, if applicable, for compliance to drafting standards
- ✓ Check for Viewport usage in sheet drawings (Each dgn file is to contain only 1 sheet)
- ✓ Check for Nested reference files in sheet drawings (No nested references permitted)
- ✓ Check for Missing reference files in sheet drawings (All reference files must be present)
- ✓ Check for Unused reference files in sheet drawings (All referenced files must be displayed)

See APPENDIX 4 (SECTION 33.4.X)

90% DELIVERABLES

- ✓ 1 Original Full Size Hard Copy set
    - o Rolled, not folded
    - o Unbound
- ✓ 1 Original Full Size Hard Copy set of the Cross Sections
- ✓ 1 CD

38

Pat Z.

The following must be included on the CD (if applicable to the project)
- o Design Criteria
- o Inroads Files
- o Property Plan
- o Title Page Drawing(s)
- o Removals Drawing(s)
- o New Construction Drawings
- o Traffic Control Drawing(s)
- o Street Lighting Drawing(s)
- o Landscape Drawing(s)
- o Structural Drawing(s)
- o Pavement Marking Drawing(s)
- o Watermain Drawing(s) (Peel)
- o Sanitary Drawing(s) (Peel)
- o Cross Sections Drawing
- o Storm Design Sheet(s) and Drawing(s)

4) ISSUED FOR TENDER OR CONSTRUCTION SUBMISSION FROM CONSULTANTS (CAPITAL PROJECTS)

Drawing numbers are to be assigned as drawings are created; drawing files are to be named using drawing number.

Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers.

ISSUED FOR TENDER OR CONSTRUCTION CADD REVIEW

- ✓ Check File Structure Compliance
  - 📁 *PROJECT FILE NAME, NUMBER & DESCRIPTION – SUBMISSION STAGE*
    - 📁 *CONSTRUCTION - DGNS*
      - ALL existing, design and contract drawings including all references
    - 📁 *CONSTRUCTION - INROADS*
      - ALL InRoads files associated with the capital works portion of the contract
    - 📁 *DESIGN BRIEF*
      - Report of design criteria, project challenges and solutions
    - 📁 *SURVEY*
      - One plan containing triangles and contours of the original surface
    - 📁 *DOCUMENTS*
      - All pertinent documents and permits…Tender, TRCA, MNR, MOE…
- ✓ Check format (Microstation)
- ✓ Confirm Georeferencing
- ✓ Check all drawings for compliance to drafting standards
- ✓ Ensure contract drawing reference the plan(s) and profile(s) i.e. NOT merged
- ✓ Check for level compliance (Level use is outline in this manual's Appendix 1)
- ✓ Check for 3D plan elements (survey, designed roadway and stormpond elements must be Geospacially Correct including the 'Z' value)
- ✓ Check InRoads files for Compatibility
- ✓ Check Landscape drawings, if applicable, for compliance to drafting standards
- ✓ Check Structures drawings, if applicable, for compliance to drafting standards
- ✓ Check for Viewport usage in sheet drawings (Each dgn file is to contain only 1 sheet)
- ✓ Check for Nested reference files in sheet drawings (No nested references permitted)

Pat Z.

✓ Check for Missing reference files in sheet drawings (All reference files must be present)
✓ Check for Unused reference files in sheet drawings (All referenced files must be displayed)

> ***See APPENDIX 4 (SECTION 33.4.XI)***

ISSUED FOR TENDER OR CONSTRUCTION DELIVERABLES

✓ 1 Original Full Size Hard Copy set
  - o Rolled, not folded
  - o Unbound
✓ 1 Original Full Size Hard Copy set of the Cross Sections
✓ 1 CD

  The following must be included on the CD (if applicable to the project)
  - o Design Criteria
  - o Tender document
  - o Quantities
  - o Inroads Files
  - o Property Plan
  - o Title Page Drawing(s)
  - o Removals Drawing(s)
  - o New Construction Drawings
  - o Traffic Control Drawing(s)
  - o Street Lighting Drawing(s)
  - o Landscape Drawing(s)
  - o Structural Drawing(s)
  - o Pavement Marking Drawing(s)
  - o Watermain Drawing(s) (Peel)
  - o Sanitary Drawing(s) (Peel)
  - o Cross Sections Drawing
  - o Storm Design Sheet(s) and Drawing(s)

40

5) CADD REVIEW OF CAPITAL PROJECTS WHERE "AS CONSTRUCTED" WORK IS BEING DONE BY CONSULTANTS

REVIEW THE FOLLOWING...

- ✓ Check format (Microstation)
- ✓ Check for Georeferencing and 3D elements
- ✓ Check for level compliance
- ✓ Check to ensure that the contract drawings reference the strip plans & strip profile and are not merged. Base plate may, or may not, be referenced to contract drawings.
- ✓ Check contract drawings for missing reference files
- ✓ Check contract drawings for nested reference files...these are not permitted
- ✓ Check contract drawings for unused references, there are to be no files referenced to the contract drawing that are not required for that drawing
- ✓ Check contract drawings for use of layout views or portals to create multiple numbered drawings in one drawing file, these are not permitted
- ✓ Check drawings for compliance to City requirements

  See REQUIREMENTS FOR CAPITAL "AS CONSTRUCTED" DRAWINGS (SECTION 7)

- ✓ Cross check against redline drawings to ensure field changes have been reflected in the drawings
- ✓ Provide Traffic Section with their digital and hard copy traffic drawings for review

Traffic requires that the cells for proposed information be replaced with cells for existing information...See 'Traffic Drawings' (SECTION 7.5)

- ✓ Provide Lighting Section with their digital and hard copy lighting drawings for field review

Lighting must do an onsite verification of the installation...See 'Lighting' (SECTION 7.6)

  See APPENDIX 4 (SECTION 33.4.XIII)

41

Pat Z.

6) CADD REVIEW OF "AS CONSTRUCTED" DEVELOPMENT DRAWINGS

CADD REQUIREMENT IMPLEMENTED FOR...	
Georeferencing	**...on projects starting Construction after 2000**
3D Elements	**...on projects starting Construction after 2003**
Level Structure (Level 1 to 63)	**...on projects starting Construction after 2006**
Level Structure (named levels)	**...on projects starting Construction after 2010**

This section of the manual, pertaining to **Development** As Constructed drawings, has been extracted to a separate document. Refer to 'Development Digital Submissions Requirements Manual' for the specifics of, non-capital, Development As Constructed submissions.

The review checklist can be found in Standard Setups under DESIGN TEMPLATES and CHECKLISTS\.

See APPENDIX 4 (SECTION 33.4.XIV)

7. REQUIREMENTS FOR CAPITAL "AS CONSTRUCTED" DRAWINGS

See APPENDIX 3 (SECTION 33.3) [memos, circulation letters and transmittals]

See APPENDIX 4 (SECTION 33.4) [checklists to be completed during review]

See APPENDIX 5 (SECTION 33.5) [Examples of finished product]

1) GENERAL REQUIREMENTS

- Indicate, using 'redline' on applicable sheets, all changes made during construction.
- One complete, bound, hard copy set of drawings, with redline information, is to be verified, and initialed. (by CA/Inspector) This drawing set will be retained by the Public Works, Capital Construction and Engineering Department.
- The note "As Constructed", including date and project file number, shall be placed on all drawings.
- A signed engineer's stamp to be on all "as constructed" drawings.
- All plan and profiles should have at least one benchmark as a reference for elevations.
- All as constructed drawings must be submitted in digital format and must comply with the latest version of the Appendix A document (Sections 2.0 and 6.0).
- One complete set of As-Constructed Cromaflex / Mylar reproductions to be retained by the Public Works, Capital Construction, Engineering Department.
  Mylars to be approved for quality by Intermediate Engineering Technician prior to acceptance of package.

42

2) DIGITAL REQUIREMENTS

- Drawings to be provided in ".pdf", scanned from completed drawings
- Drawings to be provided in Microstation V8 (or V8i) ".dgn"
- Microstation drawings, engineering base plans to be "3D"
- Microstation drawings, traffic/lighting/landscaping/structures, may be "2D"
- Level system to follow current Capital Works Deliverables seed file. (SEED-3DUTM.dgn)
- Drawing elements to be georeferenced and 3D, i.e. in correct spacial co-ordinates, and shall include surveyed information, proposed/as constructed roadway information and ditch lines.
- Drawing elements to be placed in a planar fashion include property lines, utility lines, shading, notes and borders.
- Elements to be deleted from the drawings, during the "as constructed" process, shall include any items which have been removed in the field i.e. pre construction edge of pavement, shoulders, curbs, MHs, trees…
- All proposed shading is to be deleted with the exception of rip rap, gabion baskets and engineered fill (profile).
- Submission shall include a **COMPLETE** drawing set with references intact including strip/base plans and profiles.
- NO live nested references are permitted
- NO view ports are permitted, each sheet plan must be it's own CAD file

Levels are to follow City of Brampton level system. Anything that is not surveyed or proposed can be placed on the GIS levels, with the exception of underground utilities which will be on the UGS levels. Above ground utilities, such as bell pedestals, shall be on the GIS levels. Most commonly used levels for "as constructed" submissions have been highlighted.

See APPENDIX 1 (SECTION 33.1)

3) PLAN VIEW-ENGINEERING DRAWINGS

- All construction notes are to be removed.
- Identifying notes are to have "PROP" or "PROPOSED" removed from the text.
- Any elements that have been modified or added during construction are to be identified with a note outlining the change. i.e. moved MHs or additional DICBs
- All street names shall be indicated as per registered plans.
- Manhole identifications are to be left on.
- Items to be changed if different than proposed:
  - ✓ Sewer Locations
  - ✓ Curb widths
  - ✓ Sidewalk locations
  - ✓ Manhole locations
  - ✓ Catchbasin locations
  - ✓ Curb radii
- All street lighting infrastructure and pole/fixture details are to be shown on a separate plan.
- Lot grading elevations are to be as constructed and proposed elevations are to be removed.
- All sewer connections must be shown.

43

Pat Z.

4) PROFILE VIEW-ENGINEERING DRAWINGS

- All as constructed sewer invert elevations are to be shown. If difference is greater than 300mm between the as constructed and the proposed sewer then the sewer shall be redrawn. Invert information is to remain with any changes to the designed invert identified by crossing out the proposed invert and placing actual invert adjacent to it.
- Any manhole location that differs by 1.0m or more from proposed position on the plan is to be re-drawn and shall include a note identifying the change to design location.
- Items to be changed if different than proposed by crossing out proposed information and adding as constructed information:
    - ✓ Types of manholes
    - ✓ Pipe Information (Size, Slope, Length, Class)
    - ✓ Road grade
    - ✓ Sewer material
    - ✓ Type of bedding
- Manhole identifications are to be left on.
- Sanitary sewer and watermain information should have Regional approval prior to City acceptance.
- Remove obsolete road profile, culverts and ditches.

    See APPENDIX 5 (SECTION 33.5.VIII & SECTION 33.4.X)

5) TRAFFIC DRAWINGS

- All permanent design drawings are to be "As Constructed"
- Temporary design drawings, which have not been replaced by a permanent design drawing, are to be "As Constructed"
- Temporary design drawings, which have been replaced by a permanent design drawing, will remain unchanged but will be reproduced on mylar as part of the "As Constructed" package
- Removals drawings do not need to be "As Constructed" but will be reproduced on mylar as part of the "As Constructed" package
- All drawings are to be georeferenced
- All design symbology on the main plan is to be replaced with existing symbology, as shown in the main legend
- All symbology on the schematic wiring diagram is to be dashed for existing infrastructure
- A legend, if one is not present, is to be added to the schematic indicating a dashed line as existing and a solid line as proposed
- No note pertaining to moved items is required, items are to be placed accurately based on any changes indicated on the redline drawings and/or during a field investigation
- Signal pole, mast arm, Handwell, Manhole, street lighting, traffic controller, transformer, power supply and signal head details chart information is to be changed based on any changes indicated on the redline drawings and/or during a field investigation
- Maintain 0.4m offset between duct runs & wiring in schematic diagram
- Provide horizontal and vertical distance from the curb or property line for the conduit path (between Hydro one Brampton transformer and power supply)

    See APPENDIX 5 (SECTION 33.5.XI & SECTION 33.5.XII)

44

6) LIGHTING DRAWINGS

Redline drawings, with the application for inspection, are to be provided for the inspection process prior to drawing modifications. Upon approval, "as constructed" drawings may be completed.

- All construction notes are to be removed.
- Identifying notes are to have "PROP" or "PROPOSED" removed from the text.
- Any elements that have been modified or added during construction are to be identified with a note outlining the change. i.e. Luminaire wattage , bracket length, duct size/location
- All street names shall be indicated as per registered plans.
- Details chart to be updated with any field changes. Cross out the designed value and add the revised value in the same box.
- Final "as constructed" drawings require an engineer's stamp & signature verifying accuracy of drawing information.

   See APPENDIX 5 (SECTION 33.5.XIII & SECTION 33.5.XIV)

Pat Z.

8. IN HOUSE PROCESS FOR CAPITAL WORKS DESIGN

1) EXAMPLE PROJECT

This is the example being referred to in the following sections. A full explanation of drawing preparation and numbering, using this example, can be found in Contract Drawing Preparation.

See CONTRACT DRAWING PREPARATION (SECTION 20)

EXAMPLE LAYOUT
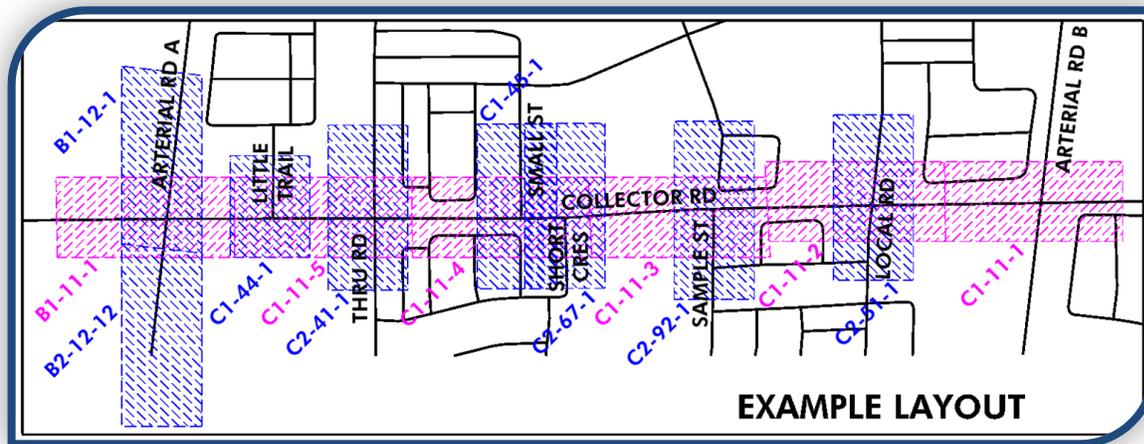
2) GETTING READY – GATHERING FILES

Capital Works Projects begin with the Pre-Engineering Process. An overview of this process is as follows: the site to be constructed (or reconstructed) is surveyed for relevant, up-to-date information. The survey information collected is downloaded, processed and then quality checked under the direction of the Survey Supervisor. The information is then provided to a technologist for Base Plan Preparation and detailed design.

FOLDER TO BE RETRIEVED/COPIED FROM "…\ENGINEERING STANDARD SETUPS\"

Copy the folder '_ IN-HOUSE FILE STRUCTURE - Street - From – To', with all its sub folders, from "G:\wtdesign\Engineering Standard Setups\" to G:\wtdesign\Street Names - CONTRACTS\"

> There is a separate folder, in Capital Works Deliverables, for the consultant's file structure, as it is a simplified version for external Capital submissions.

> **Make sure you are COPYING and NOT MOVING this directory, using the right click to drag the folder to the new location will allow you to select copy/move/create shortcut/cancel. Because it is being copied from one location to another within the same drive i.e. G:\, the default is to move it. Using the right mouse button you can cancel the action if you inadvertently let go before getting to the correct location.**

- Rename with the Project file number, street name and description, in this example the renamed folder would be...G:\wtdesign\Street Names – CONTRACTS\Collector**13-3251-213 Collector St-Arterial A to Arterial B**

46

Pat Z.

- The project file number is to be obtained from either the co-ordinator or the supervisor of the Engineering Design group.
- Anywhere there is a sub folder labelled with a non specific name such as "Consultant Name" or "Project file number", rename the folder with the appropriate information, once it is obtained. Not all of these folders will be used all of the time, however, for consistency they should not be deleted. This will ensure that all Technologists will have virtually identical file structure setups and drawings can be readily located should you be out of the office when they are needed.
- The full list of directories, and what will be kept in them, is detailed in this manual.

   See CONTRACT DIRECTORY STRUCTURE FOR IN HOUSE DESIGN (SECTION 8.3)

FILES TO BE RETRIEVED/COPIED FROM "…\ENGINEERING STANDARD SETUPS\…"

COPY THESE FILES TO THE "INROADS" FOLDER IN THE MAIN CONTRACT DIRECTORY.

   Library file - "BRAMPTON.itl"

- This file is the road template library or typical section library; it contains basic components and templates for the "200 series" City of Brampton Standards.
- These templates will need to be modified for each specific project and set of conditions, thus you can rename this file to "COLLECTOR.itl", making it project specific. This file will also need to be changed to read/write access to allow these modifications to be saved.

   Preference file - "BRAMPTON.xin"

- This will be the latest preference file available and contains the setup for all the features, alignments, profiles, sections etc. that will be generated / displayed during the design process.
- The preferences will be modified to be project specific and can be renamed "COLLECTOR.xin" Ensure that the file properties show read/write access. Variables may include elevation ranges for profile and x-sections, station ranges within the x-sections to more fully cover critical areas of the project, titles for the sections and event points (i.e. driveways, HP's). These variables will be saved back to this preference file within the contract directory structure.

COPY THE FOLLOWING DRAWING FILES TO THE MAIN CONTRACT DIRECTORY; CHANGE THE PROPERTIES TO "READ/WRITE".

   "4-PLANnPROFILE-sheet-2D.dgn"

- This file is the base for all drawing sheets; it will be referenced to the numbered sheets created. Once copied to the contract folder this file can be re-named "PnP-COLLECTOR-sheet.dgn"

   "1-TITLEPAGE-2D.dgn"

- This file is the base for the Title Sheet and has Truebram.dgn referenced. Once copied to the contract folder, ensure that the properties are set to read/write, it can then be re-named using the drawing number assigned to it "00-C1-8-15-TITLEPAGE.dgn"

   "1-DGN_LISTPAGE-2D.dgn"

47

   Pat Z.

- This file is the base for the Drawing List Sheet. Once copied to the contract folder, ensure properties are set to read/write, it can then be re-named using the drawing number assigned to it "00-C1-8-16-LISTPAGE.dgn"

FILES TO BE RETRIEVED/COPIED FROM SURVEY GROUP

- Survey will create four files; these are a surface file, a base plan / design file, an alignment file and a preference file.
- The alignment file is Survey's equivalent to our surface file and is not utilized in our design process.
- The preference file may, or may not, be the latest depending on when the survey was done relative to the start of the design process.

COPY THIS FILE TO THE "INROADS" FOLDER IN THE MAIN CONTRACT DIRECTORY

The surface file… named "Collector-base.dtm"

- This file contains all the feature and surface information and is generally identified as the "survey" surface, it will be used in roadway design and for the display of features in cross sections i.e. headwalls, gardens, buildings etc..

COPY THIS FILE TO THE MAIN CONTRACT DIRECTORY.

The design file… named "Collector-base.dgn"

- For roads that extend through multiple areas, there may be an additional letter or number after the Streetname. i.e. Collector St… could be named "Collector-BC" representing the City quadrants the street is in (B1 & C1).
- This file will contain the surveyed information that was cleaned up with information added such as tree sizes, CSP sizes, corrections and additions plus any other information thought to be pertinent to the design of the road. The cleanup is primarily done by the survey section and this existing information drawing is provided to be referenced to the drawing sheets. There may be some cosmetic changes required for clarity on the drawings, to adjust labels at page breaks and around design and property linework.

*See **SECTION 20.2** & **SECTION 21** [For the assignment, and registration, of drawing numbers by the Engineering Technician]*

48

3) CONTRACT DIRECTORY STRUCTURE FOR IN HOUSE DESIGN

...As set up in Engineering Standard Setups

📁 13-3251-213 Collector St-Arterial A to Arterial B

This main directory will contain all Microstation files directly associated with the project. Once copied, this folder will be renamed, as indicated here, with the appropriate contract information.

Always keep the current version in the main inroads directory.

📁 _CD for DESIGN HANDOVER FILE STRUCTURE – Street-Date

Use this folder to compile all files associated with the contract, including Consultant produced drawings i.e. structures, landscaping and Regional works being done as part of the contract. Copy all of the contract files and drawings to the appropriate folders. Ensure that only the reference files that are being used in each numbered drawing are attached; detach any references not needed. As an example, for a typical plan and profile drawing the only reference files attached/used would be Property, Existing, Design, Profile, Base, Hydro.

All capital projects, whether designed in-house or by a consultant, must have a completed check list for Design Handover to ensure that all relevant files have been included. It is the responsibility of the Technologist assigned to the project to have this list completed, verified, and signed off.

This folder will be for the Issued for Contruction drawings and files. The form can be found in Engineering Standard Setups and must be signed off by the Supervisor of CADD and Surveys Group.

See Appendix 4 (SECTION 33.4.XII)

Once all the files have been compiled, this folder can be copied to a CD, or CDs for distribution to the contractor and an additional CD will be created for the files, as a record of what was provided.

📁 Capital Works Deliverables

Ensure that the latest 'Capital Works Deliverables' package is included on the CD, creating a shortcut to the "Consultants CD Burn" folder will help you locate it quickly when making the CD(s)

📁 LANDSCAPING

Files provided by consultant for landscaping work done on behalf of the City

📁 MICROSTATION FILES

Microstation files associated with the contract drawings, this would include Plans, Profiles, Property, Sections, Numbered Drawings, Base Drawings

📁 PDF FILES

Use this folder for a PDF copy of the Issued for Construction drawings

📁 REGIONAL WORK

49

Pat Z.

Files provided by the Region, or a consultant on their behalf, for Region works

📁 STRUCTURES

Files provided by consultant for any structure/bridge work done on behalf of the City

📁 SURVEY

Drawing files with the contours and triangles of the original surface displayed.

📁 AUTOTURN

Contains any files used or created during the running of Autoturn

📁 BACKGROUND

Tiff/PDF files and Previous Contract(s) Drawing files retrieved during background research for the contract. Create sub folders for each source of information i.e. contracts, as constructed.

📁 COMMUNICATIONS

Contains files such as drawing numbers lists, progress notes, design criteria with sub folders added for any site plan or development reviews adjacent to the project

📁 E-MAIL 13-3251-213

Contains all e-mail correspondence, creating a "pst" file in this folder will ensure that all have access to information relayed through e-mails.

Access can be attained by others through Outlook...File> Open> Open Outlook Data File
Browse to the communications folder of the contract and select pst file

📁 CONSERVATION AUTHORITY

Files related to permitting, including any drawing files, permit submissions and responses.

📁 CREDIT VALLEY
📁 TORONTO REGION

📁 CONSULTANTS

📁 GEO-TECH

Files to/from Consultant for Geo-Tech work i.e. reports and drawings

📁 LANDSCAPE

Files to/from Consultant for Landscape work i.e. drawing files and PDF files

📁 REGIONAL WORKS

Files to/from Consultant for Regional work being done as part of the contract i.e. drawing files and PDF files

📁 STRUCTURES

Files to/from Consultant for Structures work i.e. drawing files and PDF files

📁 DEVELOPERS

50

Areas surrounding the contract site may be required for calculations and matching alignments & storm systems. Rename the sub folder to the subdivision name and add a folder for each additional subdivision.

- 📁 Subdivision Name

Files to and from Consultants for areas surrounding project

📁 DIGITAL SUBMISSIONS

Sub folders are to contain pdf files of all submissions, as a static record of what was circulated. A Pre-Eng PUCC letter, blank distribution documents and comment spreadsheets shall be copied and filed in the appropriate folder; modify as needed, with file number & name, prior to circulation. As comments are returned, compile one spreadsheet with all stakeholders' comments for each submission.

- 📁 1 – Pre Eng PUCC
- 📁 2 – 30 Percent
- 📁 3 – 60 Percent
- 📁 4 – 90 Percent
- 📁 5 – Final PUCC
- 📁 6 – ISSUED FOR TENDER
- 📁 7 – ISSUED FOR CONSTRUCTION

See ENGINEERING SUBMISSIONS (SECTION 2) [Processes]

See APPENDIX 3(SECTION 33.3) [TEMPLATES]

See APPENDIX 4 (SECTION 33.4.V) [Capital Projects –Design Circulation-Comments.xlsx]

📁 EAs
- 📁 Consultant Name

This folder is for links to, and/or, files pertaining to, any relevant EA study. Change the folder name from "Consultant Name" to the consultant's name and EA information. An example would be "ABC Engineering–Arterial Rd A–Region of Peel" Add a folder for each additional EA, if applicable.

📁 INROADS

All associated Inroads files...dtm, xin, rwk, ird, itl, alg. Sub folders can be created for backup purposes and to keep trial designs, they will be identified by description and date. For example "BACKUP 03OCT13".

Always keep the current version in the main inroads directory.

📁 OBSOLETE

Old designs and other files no longer relevant to the current design, this is your "just in case" folder. Sub folders can be created for different versions of a project; these can also be identified by description and date.

📁 PDFs

Massive numbers of PDF files can be generated throughout the working term of any given contract; these files may be created for information exchanges, clarification, problem areas requiring consultation or any number of other reasons. These should be named logically and dated for quick location when needed. When there are multiple

Pat Z.

plans created specifically for a particular issue/development/utility, they can be placed in the corresponding folder(s), the "one offs" can be placed in this folder.

📁 SECTIONS

Creating a PDF of each section and then combining them into one PDF for printing is an effective way of generating hard copies on demand. It is easier to select and combine these individual files if they are in a separate folder where they can be selected en mass.

You can also set up an "ips" file with the individual sections saved as "i" files in case changes/additions need to be made and the sections reprinted. Follow the same procedure as Plotting Contract Drawings.

📁 PRE ENG PHOTOS

This folder contains any photos or videos taken prior to construction.

📁 PREPARATION

When preparing drawings for stakeholders, merging files, clipping or converting files, copying them to this folder before working on them, will reduce the chances of mistakenly modifying your working files. Create folders for each new group of files

i.e. "TO FTP 15FEB15" or "TO HYDRO 22MAR15"

📁 PRINT FILES

".i" files and ".ips" file(s) to be set up with contract information for generation of PDF files used for printing full size or half size plans, this is fully explained under Plotting Contract Drawings

📁 PDFs

Utilizing the "ips" file, you can create PDF files for printing various submissions, individual drawings or parts of the contract for review by others or as check prints without the need to open the drawing each time.

📁 SECTIONS

Creating a PDF of each section and then combining them into one PDF for printing can be a tedious process, especially, if it needs to be done more than once. Generating and storing the print files and creating an "ips" file, while still tedious, only needs to be done once. Regeneration of PDF files can be done en mass and printed from one file.

📁 QUANTITIES

Drawings/shortcuts, spreadsheets, documents or links associated with quantity take offs.

📁 TENDER

Any documents or spreadsheets prepared or received relating to the tender package.

Pat Z.

📁 **REALTY**

Files would include property plan, property acquisition mapping, and owners' lists. Sub folders can be created for specific properties of particular concern identified by ID number assigned, pin number or address and name of owner. These may be needed during negotiations for property when additional plans and/or explanations are required.

SEE PROPERTY BASICS (SECTION 9)

📁 IPRPs

Individual property request plans for each property affected by the contract i.e. areas where property is required from landowners.

📁 PDFs

PDFs of IPRPs used for distribution and printing.

📁 **STORM**

Drawing file of storm plan, or shortcut to storm plan drawing if it is filed in the main folder. Spreadsheets/drainage sheets generated as part of the contract or attained for background information.

📁 REPORTS

Storm water management reports, or links to the reports, pertinent to the project.

📁 **STREET LIGHTING**

Files received pertaining to street lighting design. To be checked against design files for conflicts with storms, structures, hardware and for obvious errors and omissions.

📁 **SURVEY DATA**

Raw survey data files, dgn, alg, dtm, including drawings with triangles and contours generated from the dtm.

📁 CONTROL
📁 LEGAL PLANS
📁 PREENG SURVEY – TOPO

Drawing file(s) containing displayed contours and triangles of original surface.

📁 **TRAFFIC SIGNALS**

Files received pertaining to traffic signals design. To be checked against design files for conflicts with storms, structures, hardware and for obvious errors and omissions.

📁 **TRANSIT**

Files transferred between Transit Dept and Designer identifying Transit requirements. These may include notes, PDFs and drawing files.

📁 **UTILITIES**

Each utility has two sub directories..."Pre Eng PUCC" and "PUCC Approvals"

Pat Z.

Files found in the "Pre Eng PUCC" folder of each utility would be any CAD files received in association with the pre-eng PUCC request you send out to gather information. The information in these files will be used to populate the "Collector-UTILITIES" drawing with linework to be used to import them as features to a utilities surface. It can then be copied into the existing plan for display in the numbered drawings.

Files found in the "PUCC Approvals" folder of each utility would be related to new construction or relocations required for the commencement of construction, including but not limited to drawing files. It contains PDF files and documents with comments made on PUCC submissions received, for each utility; this would include information exchanged to clarify comments and finalize the submission. Sub files can be created, if necessary, for each PUCC submission and named based on the submission number.

Hydro One Brampton is provided, as soon as functionally possible, drawings with the existing information, proposed or EA information and a blank plan to work in. In return, you will receive their design, geo-referenced, which can be referenced into the sheet drawings for the contract.

📁 WORKING

When multiple options are required you can create a separate folder for each trial with a description and date.

4) CONTRACT DIRECTORY FOR EXAMPLE IN HOUSE DESIGN

...A sample of how a typical contract directory would be populated

Name
- 📁 UTILITIES
- 00-C1-8-15-TITLEPAGE.dgn
- 00-C1-8-16-LISTPAGE.dgn
- 01-B1-11-1.dgn
- 02-C1-11-5.dgn
- 03-C1-11-4.dgn
- 04-C1-11-3.dgn
- 05-C1-11-2.dgn
- 06-C1-11-1.dgn
- 07-B2-12-12-ARTERIAL-A.dgn
- 08-B1-12-1-ARTERIAL-A.dgn
- 09-C1-44-1-LITTLE.dgn
- 10-C2-41-1-THRU.dgn
- 11-C1-45-1-SMALL.dgn
- 12-C2-67-1-SHORT.dgn
- 13-C2-92-1-SAMPLE.dgn
- 14-C2-51-1-LOCAL.dgn
- 15-C1-8-22-REMOVALS.dgn
- 16-C1-8-23-REMOVALS.dgn
- 17-C1-8-24-DIMENSIONS.dgn

- 17-C1-8-24-DIMENSIONS.dgn
- 18-C1-8-25-DIMENSIONS.dgn
- 19-C1-8-26-PVMNT-SIGNS.dgn
- 20-C1-8-27-PVMNT-SIGNS.dgn
- 21-C1-8-32-ELEV-ARTERIAL_A.dgn
- 22-C1-8-33-ELEV-LITTLE-THRU.dgn
- Collector-base.dgn
- COLLECTOR-DESIGN.dgn
- COLLECTOR-DETAILS-sheet.dgn
- COLLECTOR-DIMENSIONS-sheet.dgn
- COLLECTOR-ELEVATIONS-sheet.dgn
- COLLECTOR-PROFILES.dgn
- COLLECTOR-PVMNT-SIGNS-sheet.dgn
- COLLECTOR-REMOVALS-sheet.dgn
- COLLECTOR-WORKING.dgn
- PnP-COLLECTOR-sheet.dgn
- PnP-CROSSROADS-sheet.dgn
- Thumbs.db
- X-KEY.dgn

54

5) CREATE MAIN WORKING FILES

Copy "COLLECTOR-base.dgn", to "COLLECTOR-DESIGN.dgn"

In "COLLECTOR-DESIGN.dgn" attach cell library "BRAMPTON CELLS V8i.cel" (Found in the directory ...*Engineering Standard Setups**DESIGN CELL LIBRARIES*) if it is not already attached. Turn on all levels and delete all information.

Reference "Collector-base.dgn" to the DESIGN file.

Compress the DESIGN file and save settings (*Ctrl + F*).

Do not remove unused levels, cells...when compressing files.

Check the options setup under the Compress command.

>> File>Compress>Options...
We don't have any of the boxes selected because we want to keep all cells, linestyles and levels. The process removes the ghosted linework changes applied to the files, as a result, once compressed; there is no undo function available.

Select	Action	Alias
☐	Delete Empty Cell Headers	EMPTY_CELL
☐	Delete Empty Text Elements	EMPTY_TEXT
☐	Delete Text Elements Containing Only Spaces	SPACE_TEXT
☐	Delete Pre 8.11 Render Setup Entries	RENDER_SETUP
☐	Delete Unused Named Shared Cells	SC_NAMED
☐	Delete Unused Anonymous Shared Cells	SC_ANON
☐	Delete Unused Line Styles	LINESTYLES
☐	Delete Unused Dimension Styles	DIMSTYLES
☐	Delete Unused Text Styles	TEXTSTYLES
☐	Delete Unused Levels	LEVELS
☐	Delete Unused Nested Attachment Levels	LEVELTABLES
☐	Delete Unused Multi-line Styles	MLINESTYLES
☐	Delete Unused Element Templates	ELEMENTTEMPLATES

☐ Include References

[Compress]   [OK]   [Cancel]

Copying the cleaned up survey file to a newly named file brings with it all levels and text styles as well as any view rotations that have been set up which saves time in trying to set up the exact rotation of the view to match the text placed by survey section. This file has been created using a seed file which has the overrides set for printing without using pen tables.

The colour/weight overrides of the seedfile are to be kept, or reinstated, in the active file for printing purposes. The Working levels may be adjusted as needed.

If "BRAMPTON CELLS V8i.cel" is not attached to the file, the feature style manager will not be able to find the cells associated with items to be displayed. This becomes extremely important when generating a profile & x-sections since these processes require access to these cells for the proper display of the features.

Pat Z.

LIST OF DRAWINGS THAT CAN BE CREATED USING "COLLECTOR-DESIGN.DGN"

COLLECTOR-DESIGN.dgn

COLLECTOR-SECTIONS.dgn

COLLECTOR-PROFILES.dgn

COLLECTOR-STORM.dgn

COLLECTOR-UTILITIES.dgn

01-B1-11-1.dgn"
(Where 01 is the sheet #)

…these can all be created at this time by copying "COLLECTOR-DESIGN.dgn" to create as many of the blank design files needed, this will save time later. Keep the drawing names consistent…"COLLECTOR-???". The result will be a series of drawing files, each having the correct rotation, attached cell file & referenced base plan.

If, in future, you are called upon to produce specialty drawings, copying one of these files to a new name will give you a head start in setup.

Always <u>reference</u> the main files..DO NOT copy information into each new drawing. By referencing the base information, any changes made to the design will be reflected in the drawings that reference it.

Extras may be required for resident interaction, legal plan clarification…the drawing bases named "MISC-REQUESTS-2D-**size**.dgn" can be used for these drawings.

With the exception of the title & base sheets, ALL engineering drawings will be 3D and are to remain 3D

When working in 3D it is helpful to have a dedicated iso view in order to monitor linework to ensure your lines are being placed correctly. Linework which has elevations ranging from the existing surface elevation to zero is not acceptable and can throw off your quantities calculations.

See APPENDIX 5 (SECTION 33.5.IV) [3D Linework – ISO Views]

Inroads files can be called the same name, each is a different type of file and different extensions will be assigned by Inroads, the exception being surfaces, which will be saved to "EXISTING" (or COLLECTOR-EXIST), "PROPOSED" or "UTILITIES".

The alignments will be named based on the street or intersection they are created for, a list of typical alignment names can be found in the following pages.

See INROADS – CREATING GEOMETRY & SURFACE NAMES (SECTION 12)

Pat Z.

A TYPICAL LIST OF NAMES THAT WILL APPEAR IN THE CONTRACT DIRECTORIES

INROADS FILES…

COLLECTOR.rwk   [project file]

COLLECTOR.itl   [template library]

COLLECTOR.alg   [alignment]

Collector-base.dtm [exist surface]

COLLECTOR.ird   [roadway designer]

COLLECTOR.xin   [preferences]

PROPOSED.dtm   [prop surface]

LIMESTONE.dtm   [prop subsurface]

MICROSTATION FILES…

Collector-base.dgn (provided by survey)

COLLECTOR-DESIGN.dgn

COLLECTOR-SURFACE.dgn

COLLECTOR-PROFILE.dgn

COLLECTOR-SECTIONS.dgn

COLLECTOR-QUANTITIES.dgn

PnP-COLLECTOR-sheet.dgn

COLLECTOR-STRIP.dgn   (strip Plan/Profile)

COLLECTOR-PVMNT_SIGNS.dgn

COLLECTOR-WORKING.dgn

PROPERTY FILES…

COLLECTOR-ROLLPLAN.dgn

COLLECTOR-AERIAL.dgn   **(aerial only)**

COLLECTOR-PROPERTY.dgn

Property#-Pin#-Owner.dgn**(IPRPs)**

EXTREMELY IMPORTANT TO REMEMBER…

ALWAYS KEEP THE CURRENT DESIGN FILES IN THE MAIN FOLDERS
TRIALS AND ALTERNATE DESIGNS ARE TO BE KEPT IN A WORKING FOLDER
AND IDENTIFIED BY DESCRIPTION AND DATE!!!

Anyone required to access the contract can determine, quickly and with no trouble, which files are current & connected to the contract and what each file contains.

Pat Z.

9. PROPERTY BASICS

1) INCLUDED IN THE PROPERTY PACKAGE WILL BE...

✓ an excel spreadsheet
✓ a strip plan with aerial photo attached - all the properties will be identified with a sequential number & pin number
✓ a roll plan with multiple strip plan attachments within the base
✓ an Individual Property Request Plan (IPRP) for each property. (Named "Property#-Pin#-Owner.dgn")

Samples of the drawings can be found in Engineering Standard Setups\PROPERTY PACKAGE BASES\.. Also to be found in this folder, are the bases to be used for the strip plan and IPRPs.

General guidelines for colour, a blank spreadsheet and cover letters can also be found in the Property Closeout Report folder in Capital Works Deliverables. Specific levels, colours, weights and styles are outlined in this manual for the linework and hatching to be placed in these drawings.

See APPENDIX 1 (SECTION 33.1) [LEVELS & SYMBOLOGY]

Examples of the names for these plans would be as follows:

COLLECTOR-PROPERTY.dgn - the strip plan that is referenced to Sheet Drawings, ROLLPLAN and IPRPs, has aerial plans attached for IPRP references

COLLECTOR-AERIAL.dgn - can be referenced to other plans & clipped as a reference file

COLLECTOR-ROLLPLAN.dgn - will have the strip plan attached, possibly multiple times...always keep at least one reference in its original position

04-14209-0018-JONES.dgn

05-14209-0017-SMYTHE.dgn - IPRP for property identified as numbers 4 & 5 on Roll Plan

2) PROPERTY STRIP PLAN

The property strip plan is the first drawing to be completed; it will include the required property and easement linework, owner information, number assignments for each property affected and hatching. Aerial information is to be attached to this file as well. The strip plan will not generally be plotted with aerial information on it, however, when the IPRP's are being done, the aerial information will follow when the property strip plan is referenced to the IPRP. Standard naming convention is to be used. "COLLECTOR-PROPERTY.dgn". Use information from levels 1 and 7 in the block files, these can be found in *M:\Vector\Prop*.

To determine which blocks are required, attach bramkey.dgn from the portal, as the reference file, "*ourbrampton.brampton.ca \ sites \ 025 \ Business-Services \ TS \ TRUEBRAM *", to find the block numbers for the area you are working in. This drive is in your network places on the portal. The property drawing will be the base property information referenced to the rollplan and IPRPs, as well as the various contract drawings.

> **Confirm property ownership, include any registered plans that may be in process and not yet on the Teranet database.**

Pat Z.

Once this plan is complete, <u>and approved</u> by the Survey's Group, the Roll Plan and IPRP's can be completed using this file as a reference.

3) ROLL PLAN

The roll plan will have multiple segments of the strip plan placed above one another on larger sheets. The size of these sheets will be determined by the length of the project area, for very long projects there will be multiple drawing sheets to keep the hard copies to a manageable size. The Roll Plan will also have a chart identifying the owners (on each sheet) along with their identification number, the PIN and the address. There is a plate in the package that can be used as a starting point and stretched to fit the length.

At least one of the segments on each sheet must be georeferenced.

4) IPRPS

Drawings are to be letter sized, portrait where possible. Reference the roll plan, multiple times if necessary, to cover the identified property. Complete the titleblock with the pertinent information

When the IPRP's are being done, the aerial information will follow when the property strip plan is referenced to the IPRP. In cases where the property is too long to be effectively shown as one piece, or if enlargements are needed on the IPRP for clarity, there can be more than one referenced section on the drawing.

IPRPs do not have a set scale, adjust the included frame/border to surround the applicable property and print to fit a letter size sheet.

Always keep at least the main portion georeferenced and unscaled.

The aerials will be displayed with each piece that is referenced, including the additional one(s) that are moved and/or scaled to be arranged clearly on the page.

See APPENDIX 5 (SECTION 33.5.l)[Realty Plans]
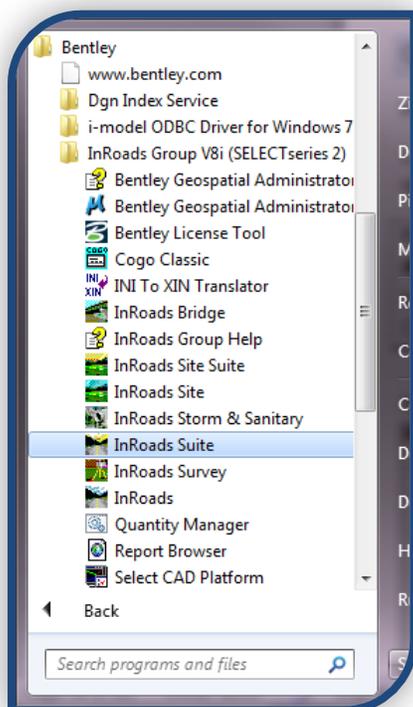
10. STARTING WITH INROADS V8I

Open the InRoads Suite from your start button

Microstation will open first; select the design file COLLECTOR-DESIGN.dgn

You can Rightclick InRoads Suite to pin it to the task bar to make it quicker to initiate in future.

You can reload Inroads, using the key-in, by typing… **"mdl l civustat"** (this can be set up under an "F" key for faster access).

If InRoads does not start up...Go to <u>Workspace >Configuration >Primary Search Paths >MDL Applications</u> Edit to add *";C:\Program Files (x86)\Bentley\InRoads Group V8.11\bin\"* (Or the location of your MDL applications), to the end of the list of directories. OK to close Edit Configuration Variable dialog, OK in configuration dialog, YES to save the changes.

The **main menu** will open and it and will be accessible at all times…
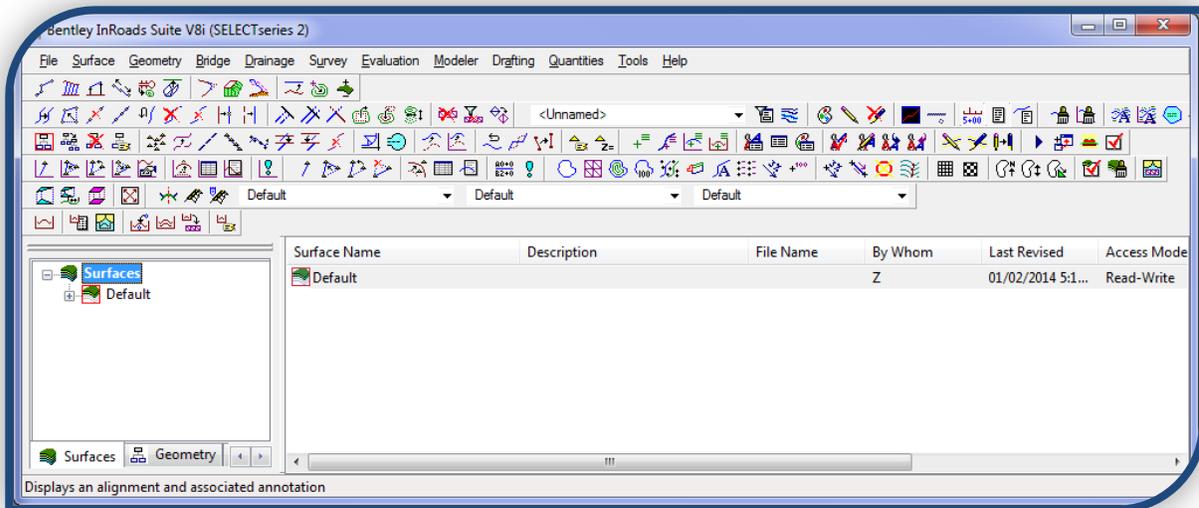
Open your preference file, surface file and template library … These files should all have been **copied** to the **INROADS** folder in the Contract Directory and reset with read/write access. They can be renamed as they will need to be customized for each project.

<u>>> File > Open…</u>

"COLLECTOR.xin"	Preference file
"Collector-base.dtm"	Surface file
"COLLECTOR.itl"	Template file

You may notice a difference in the names for the surface created by Survey…although the name listed in your Windows Explorer directory (the one you load) may be "Collector-base.dtm", when it is listed under the surfaces option in the main menu may read "Survey" this is normal. The external name and the internal name can be different however this does become confusing if none of the names match.
Inroads will create a surface from the corridors selected and save it to the name given by you when generating the surface. "PROPOSED" would be the name for the surface created using InRoads, an alternate surface, "LIMESTONE", can also be created.

The name "survey" can be changed to match the dtm name by right clicking and selecting 'properties', modify the name to be "COLLECTOR-EXIST" or "EXISTING" then save the surface. By re-naming the survey surface it will be less confusing when working with multiple survey surfaces that may be needed for comparisons.

Multiple survey surfaces, i.e. additional survey information collected after construction in the area, may be listed as "survey" "survey1" "survey2"…

Pat Z.

1) LOAD / SAVE PREFERENCES

City of Brampton Drawing Standards for level, colour, fonts, cell and text sizes, to name a few, are all set up, in the preference file **"COLLECTOR.xin"** [formerly BRAMPTON.xin], under the name "*default*". At this point determine the scale the drawings will be plotted and set this up under Tools.

>> File > Project Options >

Preferences

Load Default

Close Preferences Dialog
    Set Scale factors for drawings at a scale of
        1:250 or 1:500 (urban or rural)

>> File > Project Options

Select Factors Tab, *Input Scale Factor of 1 or 2,* *Tab* on keyboard, Then *Apply* and

Close

To save the selected scale factor, open the preferences dialog box again…
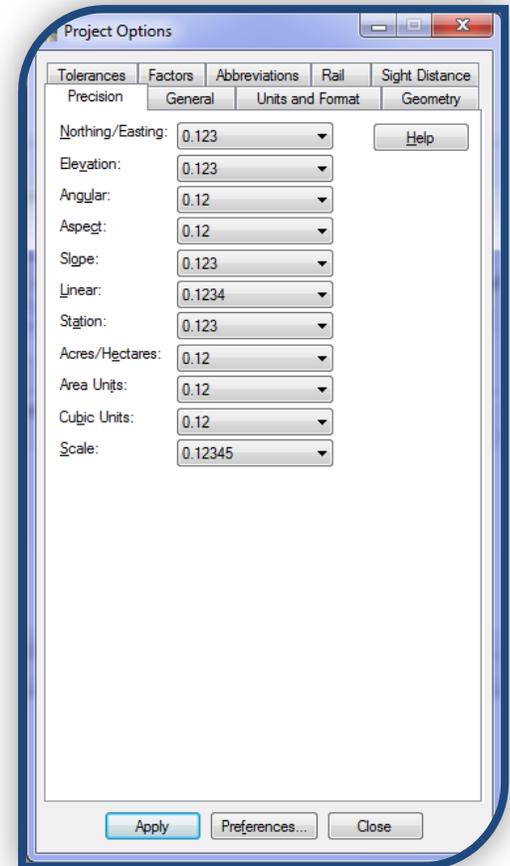
Preferences

Save Default

Close Preferences Dialog
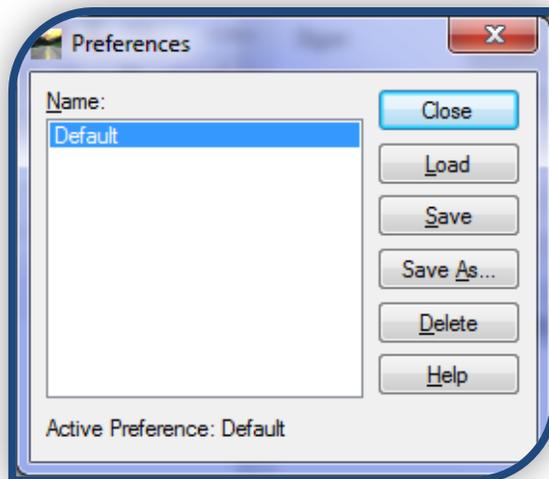
By returning to the preferences dialog box and saving them, the information regarding scale factor has been written to the preference file you opened, presumably in the Contract Directory, **"COLLECTOR.xin"**.

>> File > Project Options

Unlike other dialog boxes, the options can be accessed even when other dialog boxes are active allowing you to check the scale factor at any time before beginning any process in InRoads that may be affected. (i.e. Feature Display, Profile or X-Section Generation (sections always have a scale factor =1)…)

Pat Z.

2) INROADS GENERAL SETUP

> **This step needs to be done only one time, modifications of this sort do not need to be saved every time, the general look and configuration of InRoads will remain, any tool bars and lock settings active when Inroads is exited, will re-display as they were when it is opened the next time. Tools used most frequently can be customized by docking the toolbars for quick and easy access.**

>> Tools > Application Add-Ins...

___

ACTIVATE ☒ THE FOLLOWING ADD-INS...

- ☒ *Active Project Settings Add-In* – provides a floating dialog that displays the active surface, horizontal and vertical alignments and *superelevation. [Commands placed in Tools menu]*

- ☒ *Compare Surface Add-In – compares the elevations of two surfaces at user-specified points. [>> Surface>Utilities>Compare Surfaces...]*

- ☒ *Copy Preference Add-In* – copies a portion of another preference file into the active preference file. [>> Tools>Copy Preferences...]

- ☒ *Cross Section ASCII Report Add-*In – lets you output reports to ASCII, binary, and GEOPAK format. [>> Evaluation>Cross Section>Cross Section ASCII Report...]

- ☒ *Design Checks Add-In* – includes criteria, which are used in design formulas whenever the Design Checks Lock is turned on while using alignment design commands. [>> Geometry>Utilities>Design Checks...]

- ☒ *Display Superelevation in Plan Add-*In – displays superelevation data along the alignment in plan view. [>> Drafting>Display Superelevation in Plan...]

- ☒ *Drive Roadway Add-In* – allows you to view the path along a roadway as if you were driving along it. [>> Modeler>Drive Roadway...]

- ☒ *Find Near Points Add-*In – finds DTM points that are near each other within user-specified tolerances. [>> Surface>Utilities>Find Near Surface Points...]

- ☒ *Generate Grade Contour Add-*In – displays the path of a specified grade across a surface. [>> Surface>Utilities>Generate Grade Contour...]

- ☒ *Horizontal and Vertical Elements Add-In* – provides commands for the powerful component method of creating and modifying alignments. This method differs from the PI method of design because you define linear and circular components, or elements, instead of by locating, adding and inserting points of intersection and curve sets. These components are then computed and fit together to form an alignment. *[This method is not covered in this manual] [>> Geometry>Horizontal Element>Add... / >> Geometry>Vertical Element>Add...]*

- ☒ *Hydrology and Hydraulics Add-In* – lets you display features that affect water flow on a DTM, display flow paths (trickles) and tributaries, compute water volume in retention ponds, and generate water surface decks for HEC-2, WSPRO, and HEC-RAS. [>> Evaluation>Hydrology and Hydraulics>...]

- ☒ *Import Subsurface Add-In* – imports a surface based on the selected surface and alignment. [>> File>Import>Import Subsurface...]

62

☒ *Multiple Horizontal Element Regressions Analysis Add-In* **AND**

☒ *Multiple Vertical Element Regression Analysis add-In* **–** provide commands for horizontal/vertical alignment creation and editing with the inclusion of regression by least squares analysis. [>> Geometry>Vertical Regression…Geometry>Horizontal Regression…]

☒ *Named Symbology Tools Add-In* **–** provides commands for verifying, editing, exporting and importing named symbologies. [>> Tools>Named Symbology Tools>Verify Named Symbology… / >> Tools>Named Symbology Tools>Global Named Symbology Edit… / >> Tools>Named Symbology Tools>Export Named Symbology to CSV… / >> Tools>Named Symbology Tools>Import Named Symbology from CSV…]

☒ *Remove User Data Add-In* **–** removes user data from elements singly or by layer/level or region/fence. [>> Tools>Remove User Data…]

☒ *Thin Random Points Add-*In – removes random points from a DTM based on user-specified parameters. [>> Surface>Utilities>Thin Random Points…]

☒ *Update Design Add-*In – allows the user to update a selection a selection of design surface graphics without rerunning Roadway Designer. The surfaces must be created by Roadway Designer initially, and the correct alg and ird files must be loaded. [>> Modeler>Update Design Settings…Modeler>Update Design]

☒ *Variable Manager Add-*In – allows the user to enable or disable user specific enhancements. These enhancements alter the behavior of specific commands based on a specific point solution for a single or limited number of customers. [>> Tools>Variable Manager…]

☒ View Drainage as Solids Add-In – displays Storm and Sanitary structures as 3D solids. [>> Drainage>View>Drainage as Solids…]

11. STARTING THE DESIGN PROCESS

1) DETERMINE PROJECT DESIGN PARAMETERS

- ✓ Design Speed
- ✓ Road Cross Section and any modifications to it
- ✓ Lane Configuration Requirements [Through, Rt Turn, Lt Turn]
- ✓ Taper Lengths
- ✓ Island Locations [if applicable]
- ✓ Transit Requirements
- ✓ Traffic Signal Requirements
- ✓ Lighting Requirements
- ✓ Structures
- ✓ Property Requirements
- ✓ Storm requirements
- ✓ Other services [if applicable]

2) DETERMINE EXTERNAL INVOLVEMENT

Notify the Project Manager (PM) of any external involvement required, as soon as it is known. The PM will co-ordinate meetings with the affected parties. These may include…

- ✓ Utility conflicts with Gas, Hydro, Water, Sanitary, Bell…
- ✓ Regional intersections where sanitary, water, signals or lighting are affected
- ✓ Conservation Authorities for any waterway works or restricted areas
- ✓ Consultant Bridge Crossings
- ✓ Archaeological Assessments

The PM will also create RFPs (Request for Proposals) and co-ordinate meetings with outside agencies or consultants for things like landscape work and structures work.

3) DESIGN CRITERIA SPREADSHEET

Complete Design Criteria Spreadsheet, with all known information. i.e. criteria developed through the EA process, or through other directions. Provide to PM for confirmation, changes and signature.

See APPENDIX 4 (SECTION 33.4.I) [In House DESIGN CRITERIA.docx (2pages)]

4) MINIMUM DESIGN CRITERIA SUMMARY

STORM SEWERS

- ✓ Minimum pipe size to be 300mm diameter
- ✓ Minimum 1.5 meters of cover below centerline of road to obvert.
- ✓ Co-efficient of 0.9 to be used for all Right of Ways
- ✓ Concrete pipe under roadway, NO PVC pipe is permitted under roadway
- ✓ PVC Leads are accepted

FLOW VELOCITY

- ✓ Maximum flow velocities 4.5 m/s
- ✓ Minimum flow velocities 0.75 m/s

64

MAINTENANCE HOLES

- ✓ Minimum size 1200mm
- ✓ Maximum manhole spacing 100m for pipe diameter less than 1200mm
- ✓ Maximum manhole spacing 150m for pipe diameter 1200mm or larger
- ✓ Maximum change in direction 90 deg for pipes 900mm or less
- ✓ Maximum change in direction 45 deg for pipes over 900mm
- ✓ Minimum required drop vs change in direction
    - o 20mm – 0 deg
    - o 50mm – 1-45 deg
    - o 80mm – 46-90 deg
    - o Obverts to match where pipe size changes
    - o Drop pipes provided where difference in obverts between incoming and outgoing pipes exceeds 500mm

CATCHBASINS

- ✓ Max. catchbasin height, grate to pipe invert to be no greater than 2.4m
- ✓ Min. Cover from finished road grade to obvert of lead to be 1.2m
- ✓ Lateral minimums - single 200mm @ 2%, double 250mm @ 2%
- ✓ Maximum spacing...
    - o >10m pavement – < 4.5% , 75m
    - o >10m pavement – > 4.5% , 60m
    - o ≤10m pavement – < 4.5% , 90m
    - o ≤10m pavement – > 4.5% , 75m

If a CB/DCB connection cannot be made at the standard of 1.2m cover & 2% slope, a detail of the connection will be required on the engineering drawing identifying the slope/cover.

Refer to the Subdivision Design Manual for complete list of criteria.

Pat Z.

5) TYPICAL CITY STREETSCAPE COMPONENTS

SIDEWALKS

- ✓ 125mm concrete / 150mm driveway / 200mm industrial driveway
- ✓ OPSD 310.010, 310.030, 310.050.

MULTI USE PATH

- ✓ Asphalt as per Parks standard L511

KILLSTRIP AND MEDIAN

- ✓ 150mm concrete + 200mm Granular A

PATTERNED CONCRETE KILLSTRIP AND MEDIAN

- ✓ 150mm concrete + 200mm Granular A
- ✓ at major intersections for a distance of 75m
- ✓ or to the nearest change i.e. end of island, taper

GRASSED MEDIAN

- ✓ minimum 3m width, accessible by mowing vehicle, minimum 50m length

CURBS

- ✓ OPSD 600.040 for roadway
- ✓ OPSD 600.080 for islands
- ✓ OPSD 600.011 for parking lots
- ✓ OPSD 600.060 depressed for bus bays

  See APPENDIX 6 (SECTION 33.6) [Commonly Used OPSD]

Pat Z.

12. INROADS – CREATING GEOMETRY AND SURFACE NAMES

BEFORE BEGINNING, ENSURE THAT...

- ✓ InRoads is loaded
- ✓ You are in the design file **"COLLECTOR-DESIGN.dgn"**
- ✓ Preferences are loaded
- ✓ Template Library is loaded
- ✓ Existing surface is loaded

1) CREATE GEOMETRY NAMES...

Only the names are being created in this step, information will be added later.
To create names for geometry and surfaces

>> File > New|Select the Geometry Tab...fill in the name ("COLLECTOR")

and add a description...>**Apply**

Select the ▼ to the right of **"Geometry Project"** to select **Horizontal Alignment**, then **Vertical Alignment**, filling in the **name/description/style** for each and **Apply** for each. The style selected refers to information set up in **"COLLECTOR.xin"** to determine how it will display later.

Horizontal Alignment style = **"DESIGN-H"** / Curve definition = **"arc"**

Vertical Alignment style = **"DESIGN-V"** / Curve definition = **"parabolic"**

Alignments names can be created for the Main alignment (Collector St) and any crossing road alignments (Local Rd, Sample St, Short Cres….)

Don't forget to save the alignments as they are created...

>> File > Save > Geometry Project ("alg")

Type in the names or select them ▼ in the dropdown list, then **Save**.
Saving the Geometry Project will save all the Horizontal and Vertical Alignment names you have just created.

Pat Z.
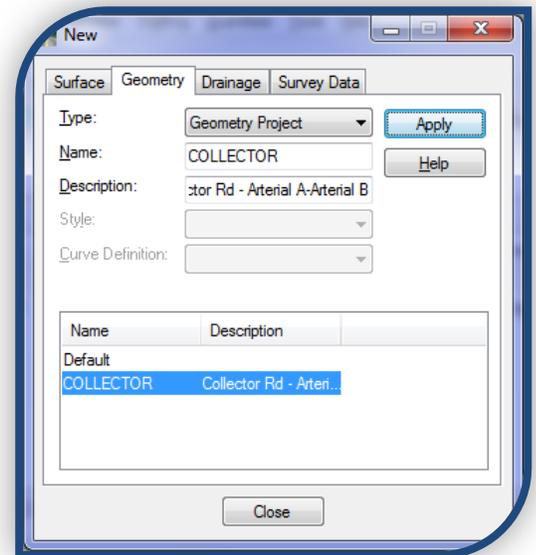
2) CREATE SURFACE NAMES...
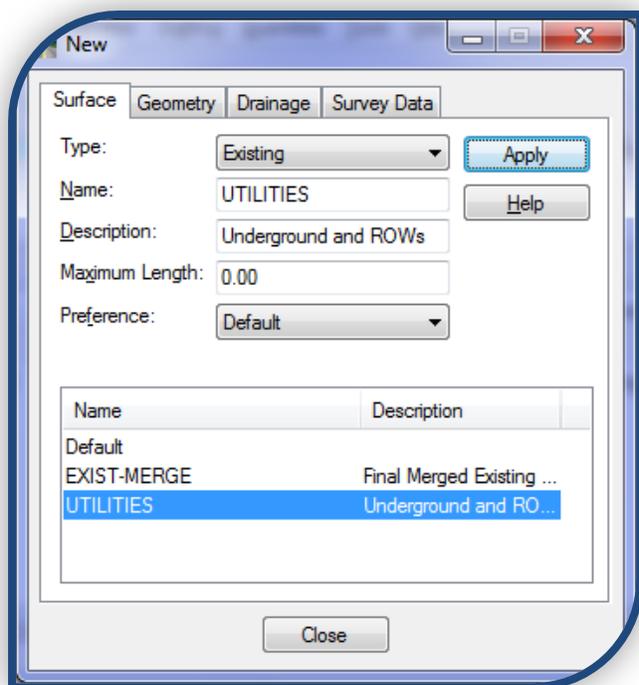
Select the **Surface** Tab and create a file named **UTILITIES**. This file will eventually have imported information such as utility linework that will be needed to display cells in the cross sections at the appropriate locations.

Now that the names have been created, **Close** the dialog box and then save them to the **INROADS** folder in the contract directory...

>> File > Save > Surface ("dtm")

Type in the names or select them ▼ in the dropdown list, then **Save**.

Saving the Geometry Project will save all the Horizontal and Vertical Alignment names you have just created.

3) MULTIPLE ALIGNMENTS WITHIN A GEOMETRY PROJECT

For simplicity, the Geometry Project, Main Horizontal Alignment and Main Vertical Alignment will all have the same name **i.e. "COLLECTOR".** There is only one **Geometry Project,** however, there can be multiple vertical and/or horizontal alignments linked to the Geometry Project.

Multiple options can be tried at any time by creating new horizontal or vertical alignment names. A separate horizontal alignment for each alternate horizontal layout under the same Geometry Project name can be created, likewise for the Vertical alternatives under each Horizontal Alignment.

You may use combinations of vertical & horizontal...Select the Horizontal Alignment then Select a Vertical Alignment from the list displayed. Only associated vertical alignments are available under each horizontal alignment.

i.e. you would not be able to select vertical alignment "SE Local" if the active horizontal alignment was anything other than "SE Local" in the list shown on the next page.

Pat Z.

4) POSSIBLE GEOMETRY ALIGNMENTS CREATED FOR EXAMPLE PROJECT

All main and crossroads alignments must be under the same Geometry Project in order to create your curb radius alignments.

EXAMPLE LAYOUT
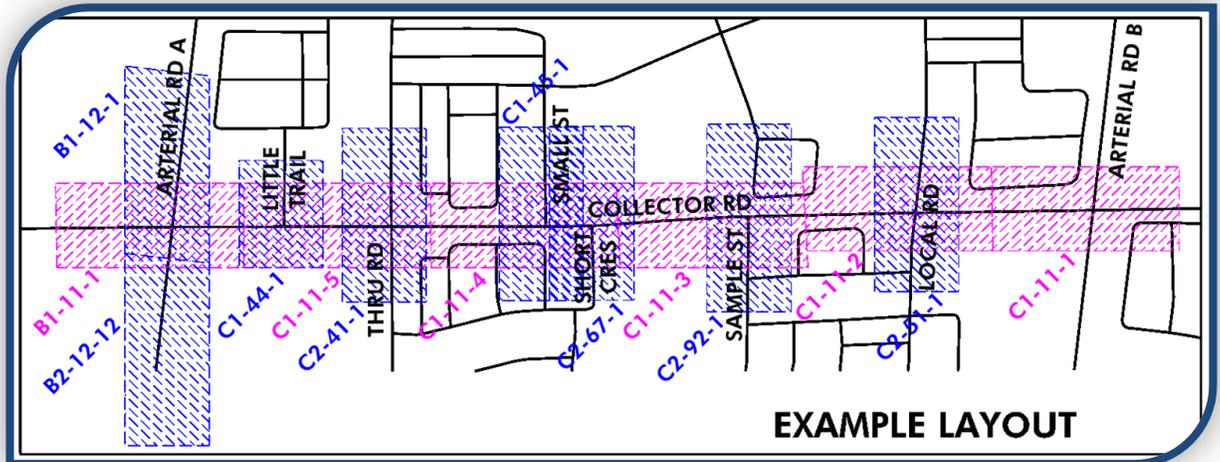
A partial list, for the example project, may look like this…

COLLECTOR - *[GEOMETRY PROJECT]*

COLLECTOR, (Collector Road – Main alignment) - [horizontal alignment name - description]

    COLLECTOR - [vertical alignment name]

    Local, (Local Road – Cross Road alignment)

      Local

    Arterial A, (Arterial Road A – Cross Road alignment)

      Arterial A

    Small, (Small Street – Cross Road alignment)

    Road B

    ****SW Local**, (SW corner - curb radius at Local Road)

      ****SW Local**

    ****SE Local**, (SE corner - curb radius at Local Road)

      ****SE Local**

    ****NE Arterial A**, (NE corner - curb radius at Arterial Road A)

      ****NE Arterial A…**

    ****NW Small**, (NW corner - curb radius at Small St)

      ****NW Small…**

*   The creation of the Project name and Geometry names (for the main alignment and any Cross Road alignments) will be done as per the directions under Creating Geometry & Surface Names.

See INROADS – CREATING GEOMETRY & SURFACE NAMES (SECTION 12)

**   The curb radius vertical & horizontal alignments will be created, along with their names, once the horizontal and vertical alignments have been established for the cross roads and the main road. This is covered under Create Horizontal/Vertical Alignment

See CREATE HORIZONTAL/VERTICAL ALIGNMENT (SECTION 19.1)

Pat Z.

5) SAVING A PROJECT FOLDER

At this point the preference file, the survey/existing surface and the template library are all open and the newly named geometry project and surface have been saved…

It is now time to save the **Project Folder**…this is **not** the same as the **Geometry Project**…the **Project Folder,** also refered to as the roadworks file, will contain all the links to the pertinent files for this particular project i.e. preference file, template library, surfaces…

>> File > Save > Project > Options
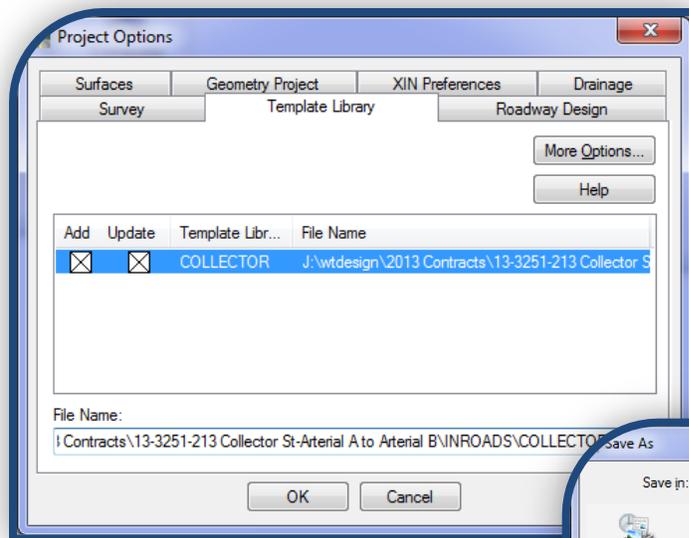
Select each tab in turn, verify the file name then activate ☒ the add/update boxes beside each filename. The existing/survey surface will not be updated so activate only the Add box.

Select **OK** to get back to the previous dialog box.

Type in a filename, you guessed it…**"COLLECTOR.rwk"**
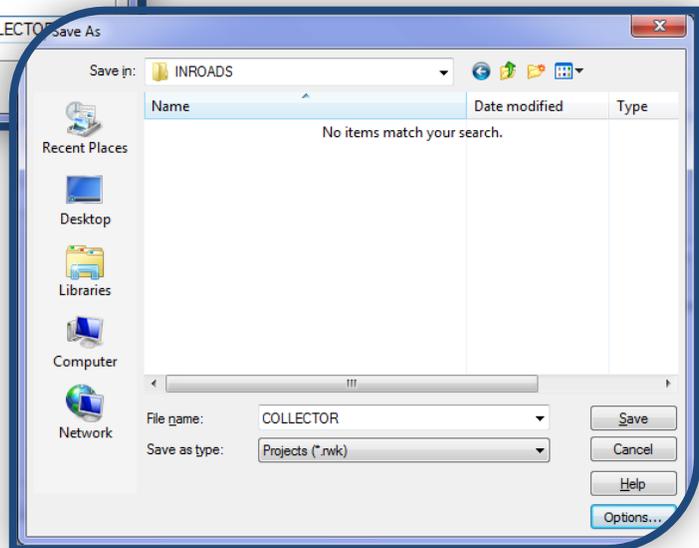
Save it.

The next time Inroads is loaded, this is the file to be opened first; it in turn will open all the associated files you have identified here.

At any time during work, any of these files can be saved by right clicking on the name and saving, OR through the pull downs >> File > Save… then select the type. Alternately the Ctrl+ keys are a quick way to save the active file…

Project -- Ctrl + P   Surface -- Ctrl + S   Geometry Project -- Ctrl + G

Typical Section Library -- Ctrl + T   Roadway Library -- Ctrl + R

It is always a good idea to save periodically as each surface or design phase has been completed. As new components are created, overwriting the **Project Folder** with add/update activated for each addition will be necessary if they are to be loaded with the Project Folder (roadworks file **"rwk"**). Keeping the roadworks file up to date allows others to use the correct files, should they be required while you are away.

70

13.   IMPORTING FEATURES

Using the City's property information (Teranet), copy or place linestrings to duplicate property locations. Modify the levels and symbology to coincide with the City's Level and Symbology standards.

See APPENDIX 1 (SECTION 33.1)

These elements can now be imported as a feature to the surface as described below. Any element can be imported this way to any surface.

BEFORE BEGINNING TO IMPORT FEATURES, DETERMINE…

- ✓ the surface to create the feature in
- ✓ whether to use the element's elevation or drape the element onto a selected surface
- ✓ whether it is a Random point or Breakline
- ✓ the feature style (how it will display on screen)
- ✓ if these added elements can be included in the triangulation of the surface, or excluded.

IMPORT PROPERTY FABRIC AND UTILITIES LINEWORK…

>> File > Import > To Surface… the R.O.W. elements

Surface:	*UTILITIES*	This is the surface the feature will be saved in
Load From:	single element/fence/layer	
Elevations:	*Drape to Surface*	Use elevations from surface, not the element elev.
Intercept Surface:	*COLLECTOR-EXIST*	Surface to drape linework on
Seed name:	*ROW* or *P_ROW*	Feature names to be used for existing & proposed
Feature style:	*ROW_ROW* or *ROW_ENG_ROW*	Style dictates how it will look when plotted
Point Type:	*Breakline*	Indicates feature as linework not random points
Check off	*Exclude from Triangulation*	

Apply and follow the prompts   >> File > Save > Surface ("dtm")

Type in the name or select it 🔽 from the dropdown list, then Save.

> **Utilities such as bell, water, gas etc. and Regional Conservation Authority (RCA) Regulation & Flood lines can be added in a similar manner as may be necessary. As each *Pre-Eng PUCC* response arrives, with the utility locations marked, add the underground linework for existing & proposed utilities to the existing & proposed drawing files. All utilities can be added to the drawing "COLLECTOR-UTILITIES.dgn" to be imported to the surface you have created named "UTILITIES.dtm". As a feature they have been set up in the preferences file to be displayed as a cell, only in the cross sections. This can be used to avoid conflicts when designing details in troublesome areas such as where services may be in close proximity to storm design.**

> **UGS_?_UTIL are for existing services, ENG_?_UTIL are for proposed services.**

71

Pat Z.

IMPORT FEATURES / NAMING OF IMPORTED FEATURES...

>> File > Import > Surface

Under "Duplicate Names" for the treatment of duplicate names...

Append

Replace

Rename

determines how to resolve naming conflicts in the event a feature already exists with the specified name.

APPEND

adds the points from the new feature being added to the existing feature.

...e.g.

you need to add some ROW lines not included originally...

use APPEND with the 'seed name' 'ROW' linework added in this manner will be added to the original set of lines without adding a new feature name for each selection

REPLACE

deletes the existing feature and replaces it with the new one.

...e.g.

using the same scenario with the exception that the old ones were removed...

use REPLACE with the 'seed name' 'ROW' lines added in this manner will be added as a new ROW feature using the same name but without saving the previous one...in the end you will have only one ROW line that being the last one added.

RENAME - **Primarily use this one as it allows you to remove individual lines with ease.

renames the new feature, using the specified name as a seed name. The name of the original feature goes unchanged.

...e.g.

using the same scenario

names would change... ROW, ROW1, ROW2, ROW3...all features, old and new are saved.

Feature ROW would hold the initial linework, ROW1 would have a single ROW line or linestring, ROW2 would have a single ROW line or linestring and so on.

Segments can be removed / replaced without re-doing all of the ROW or placing discontinuity points

72

14.   MICROSTATION WORK WARNING

1) START MICROSTATION PROCESSES

Once you begin manipulating the elements, DO NOT re-display the features…doing so will remove any changes made to the elements from this point on and replace them with the original features.

This means that any manipulation of individual elements completed will need to be re-done. Any information or elements added to the design file independent of the generated elements will not be affected since they are not connected to the feature.

A copied feature is still connected to the original feature by a data tag and it will vanish in a "re-display". Features such as lanes that may be offset (parallel copy) will revert back to the single line feature saved within the surface.

This applies to any feature element copied, whether InRoads was active or not while copying.

2) REMOVE USER DATA

InRoads must be active with the appropriate files open to remove the user data tags from copied elements…

>> Tools > Remove User Data

Select by single element, fence or level to remove the link.

As with the existing plan information, done by survey, there will need to be some cleanup and labelling for the proposed information in the strip plan **"COLLECTOR-DESIGN.dgn"**. You may also need to do some cleanup on the existing plan provided by survey to duplicate information at sheet breaks.

Both existing and proposed drafting and cleanup will be done on the profile drawing **"COLLECTOR-PROFILES.dgn"**

Shading / patterning for proposed features will be done either on the design plan (if the roadway is straight and all portions are in the same alignment) or in the individual drawing sheets (if there are multiple orientations of the primary roadway or for crossroads). So sidewalks, multi use paths, killstrips and medians can be done in the strip plan if all drawings are oriented the same way, if not; they will be done in the individual sheets.

Storm lines on the profile can be patterned in the profile drawing. The profile is always displayed in the same orientation for each sheet drawing.

73

Pat Z.

## 15.   WORKING AND PATTERNING IN 3D

1) WORKING IN 3D

> When working in 3D it is advantageous to have a window open with an iso view of the project shown. This allows you to spot immediately if the snap lock is not on and your linework is going astray.

Note, in the lower view of the example (3D Linework – ISO Views) in APPENDIX 5, that the utilities have been placed in a planar fashion below the working surface and above the patterning and property. Priorities are not active in the 3D environment; elements are shown at relative elevations. This means that if your roadway linework is at an elevation of around 250m and the pattering is generated at an elevation of around 260m, the patterning will display above the design linework. If the patterning is an opaque shape, such as for the proposed asphalt surface, the roadway linework will be blocked from displaying.

- To ensure opaque shading is behind design linework, set your active depth prior to placing shapes. To set the active depth to negative fifteen, key in the command 'AZ=-15' enter, and then select the view.

- To ensure the white opaque island shape displays above the pavement…Set your active depth, to negative ten, prior to placing the shape.
  (Command line is 'AZ=-10' then select the view)

- To have the patterning for centre median display above the opaque island shape…Set your active depth, to negative five, prior to placing shape for median patterning. (Command line is 'AZ=-5' then select the view)
  The level names will be 'ENG_SH_*' Shading / patterning levels and symbology information is outlined in Shading and Patterning Levels.

See APPENDIX 1 (SECTION 33.1.XIV) [Shading and Patterning Levels]

> **To ensure patterning displays properly, all points on the shape must be planar, i.e. all on the same elevation. Set 'ACS Plane Snap' lock ON prior to placing shapes, this will allow you to tentative snap to roadway linework, for accuracy, while maintaining the desired elevation plane for these elements.**
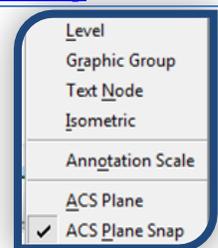
Placing patterns and shades below zero will allow them to display behind the property linework which is generally on elevation zero. If you inadvertently place your shape at an elevation which places it above the design elements you can move it to a lower elevation by selecting the shape and using the command line 'dx=0,0,-Z' where 'Z' is a distance which will place the shape at an elevation below the lowest design element, preferably at zero or negative five or ten. You can also use the information button to display the shape segments and edit the elevation(s) there.
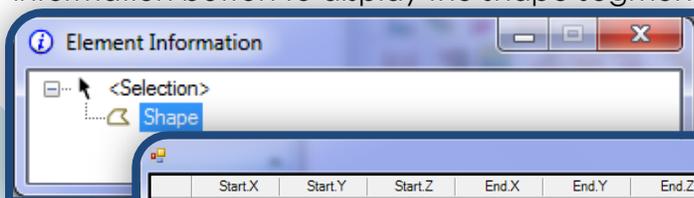
	Start.X	Start.Y	Start.Z	End.X	End.Y	End.Z	Length	Direction	Elevation Ang	DeltaX	DeltaY	DeltaZ
▶	592865.49	4839115.26	1.00	591778.72	4837724.25	1.00	1765.21	S38°0'0"W	N90°0'0"E	-1086.77	-1391.01	0.00
	591778.72	4837724.25	1.00	592292.54	4837322.81	1.00	652.04	S52°0'0"E	N90°0'0"E	513.82	-401.44	0.00
	592292.54	4837322.81	1.00	593379.31	4838713.82	1.00	1765.21	N38°0'0"E	N90°0'0"E	1086.77	1391.01	0.00
	593379.31	4838713.82	1.00	592865.49	4839115.26	1.00	652.04	N52°0'0"W	N90°0'0"E	-513.82	401.44	0.00

74

2) A WORD ABOUT ROTATION

> **A View can be rotated…**
>
> **A Reference File can be rotated…**
>
> **An Element can be rotated**

Rotating a View does not modify any elements; it is comparable to rotating a matt frame to display a better view of the picture, the elements have not been moved relative to the original frame.

Rotating a Reference File moves a temporary copy of the original file within a design file. (The design file is the file currently active i.e. the elements can be modified) this moves the origin, and changes the location, of the "link" to the original file; it does not move the original file's elements.

Rotating Elements actually moves the individual elements (or a group of elements by fence or graphic group); it is comparable to erasing and replacing information in a different location/orientation. Doing this will cause the information to not be GeoReferenced, GeoReferencing must be maintained for all information. Some manipulation of survey information is needed to correctly reorient single elements such as CB's, IB's, Guy Wires or Posts, to name a few, this must be done using the origin of the element being rotated.

> **EXTREMELY IMPORTANT…The only mass movement or rotation of elements is done to move the information of the base sheets to fit over the co-ordinate information. With the exception of the initial rotation about the origin of the cells to match the alignment orientation, done during initial cleanup, moving the survey or InRoads generated elements in the baseplan drawing or the profile drawing is an absolute NO NO**

1) BASIC DRAFTING GUIDELINES...

DIMENSIONING FOR STORAGE/TAPER LENGTHS, LANE WIDTHS ETC...

- ✓ TEXT STYLE = "PR-250" OR "PR-500"
- ✓ LEVELS will be ENG_DIMENSIONS and ENG_TX_DIMENSIONS

LABELLING FOR PROPOSED STORM WILL INCLUDE A DESCRIPTION OF THE PIPE...

- ✓ *"PROP 675mm STORM SEWER"* with a direction of flow arrow for plan portion.
- ✓ *"PROP 52.6m - 675mm CONC STORM @ 0.5% CL 50-D"* for profile portion

ROAD NAMES

- ✓ TEXT STYLE = "STREET-250" OR "STREET-500"
- ✓ LEVELS for linework and text are identified in the list of levels and symbology

  See APPENDIX 1 (SECTION 33.1.III) [PROPERTY LINEWORK AND LABELS]

ADJUST ALL LABELS AROUND PROPERTY LINES FOR LEGIBILITY.

Text Styles have been created and can be imported into your drawing, if they are not already there. These are set up based on the plot scale...

EX-200	exist info for X sections
EX-250	existing info
EX-500	existing info
PR-200	prop info for X sections
PR-250	proposed info
PR-250-BOLD	proposed info for profile
PR-500	proposed info
PR-500-BOLD	proposed info for profile
STREET-250	Street name
STREET-500	Street name

.

.

.

**The number (200/250/500) represents the scale of drawing the text will be plotted on.

All levels/over-rides & text styles are in the City's seed file (Seed-2DUTM.dgn) and can be imported to provide/replace drafting standards. This seed file can be found in Engineering Standard Setups for internal users. Consultants will find it in Capital Works Deliverables\Engineering Standard Setups\MicroStation v8i\Blank DGN.

76

Pat Z.

TO ACCESS STANDARD TEXT STYLES

Select Place Text

Then the 🔍 next to the Text Style selection

<u>>> Style > Import</u>

Select the file **SEED-3Dutm.DGN** from the directory ...*Engineering Standard Setups*

OPEN

You should now have all the styles listed above in your text styles list. Save your settings and the next time you need to change from existing to proposed or plan to profile or x-section you can select the text style by using the drop down list beside **text style** under 'place text'
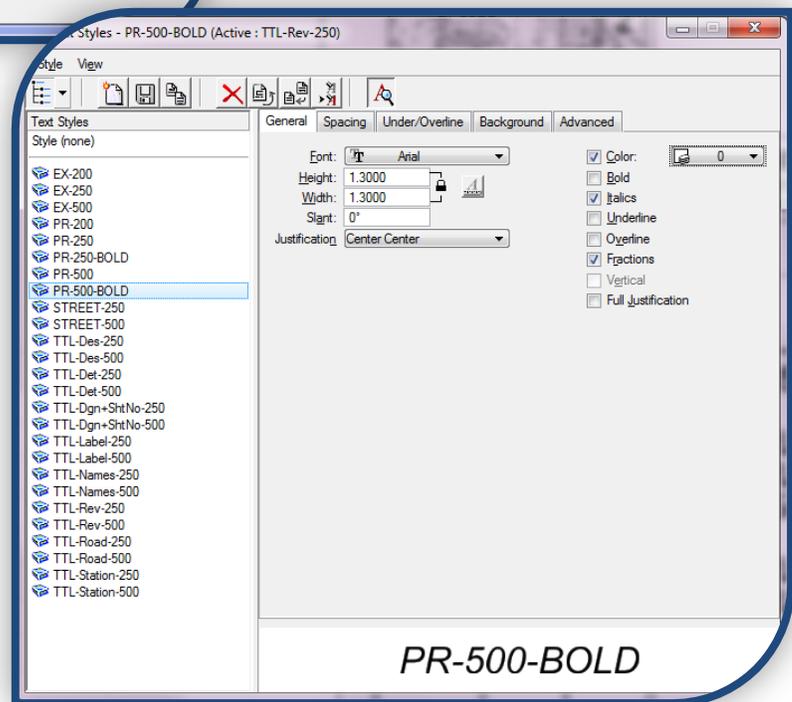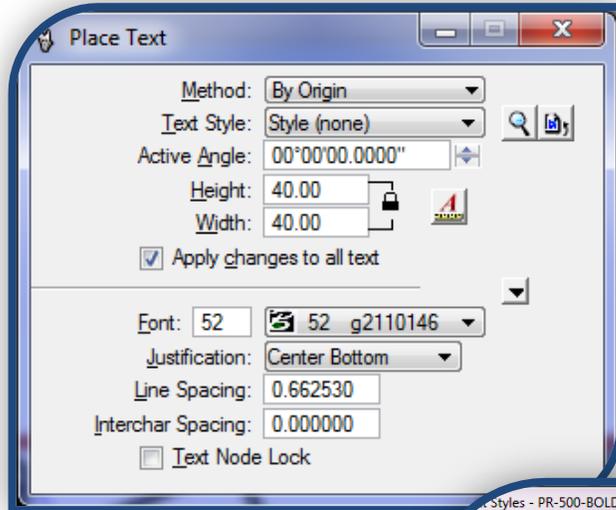
A list of levels including symbology, patterning & cells, is included in this manual

A list of some engineering cells, used for design work [BRAMPTON CELLS V8i.cel], is included in this manual

77

Pat Z.

16. INROADS - GEOMETRY

1) CREATING & MODIFYING HORIZONTAL ALIGNMENTS

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ You are in Design file "**COLLECTOR-DESIGN.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ Project is open
- ✓ Preferences are loaded
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Horizontal Alignment is active [the alignment is empty at this point, the active name will be the one points will be added to]

2) CREATE HORIZONTAL ALIGNMENT

Use **"Collector-base.dgn"** referenced information for the Horizontal Alignment...

- ✓ determine a starting point at the lower chainage, stationing will start at the first point indicated
- ✓ determine the intersection point(s),
- ✓ determine the end point...ignore any curve information at this time.

> It may be advantageous to place a line from each of these points to a point well away from the bulk of the information. On a long project this allows all of the points to be shown in one window when adding them to the alignment. This can also be done for the Vertical Alignment
>
> The lines are guidelines only and can be on a miscellaneous level and/or removed later. Once these points have been determined, start adding them to the geometry / horizontal alignment, in the direction of increasing chainage.

78
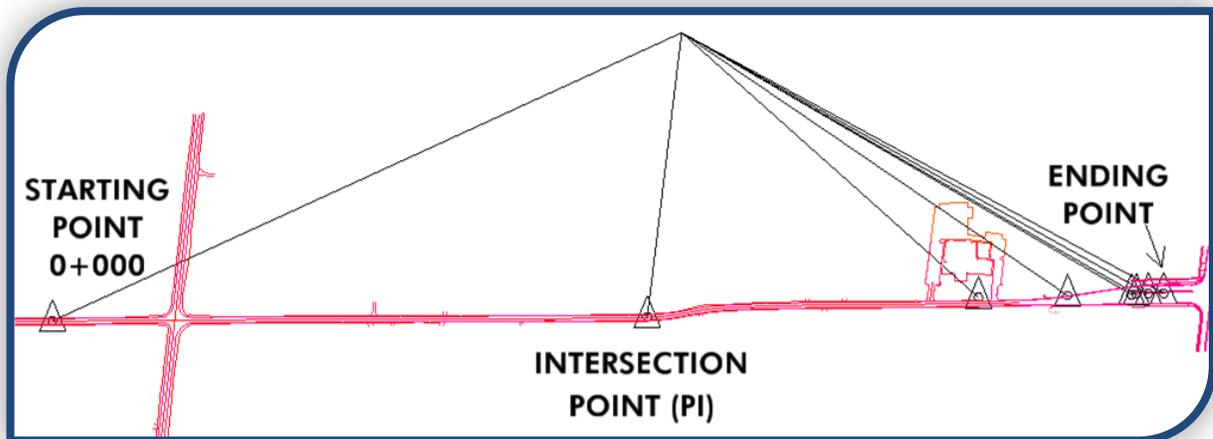
3) ADD POINTS TO HORIZONTAL ALIGNMENT.

>> Geometry > Horizontal curve set > Add PI

There will be no additional display window, but the prompt in the message area of Microstation window indicates the need to…

>**Identify First Point** – Indicate first [starting] point in alignment…from this point the alignment will dynamically follow any moves connecting the last PI and the cursor. Always use tentative selection to identify points.
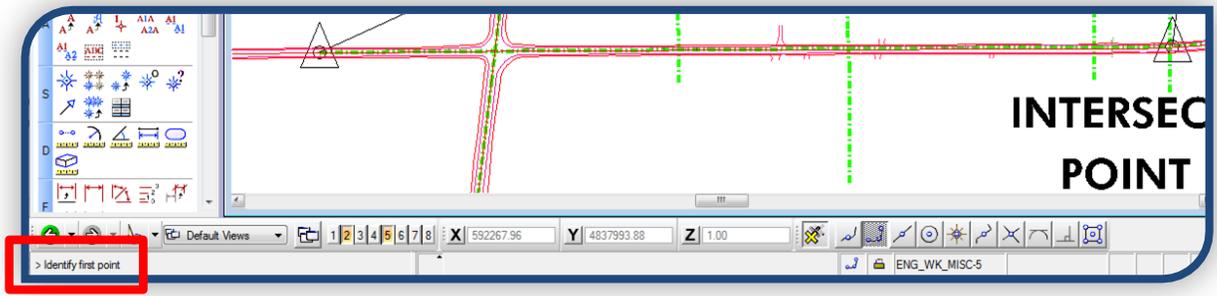
>**Identify Point/Reject** – Indicate next point in alignment…continue until the last [end] point of the alignment has been identified
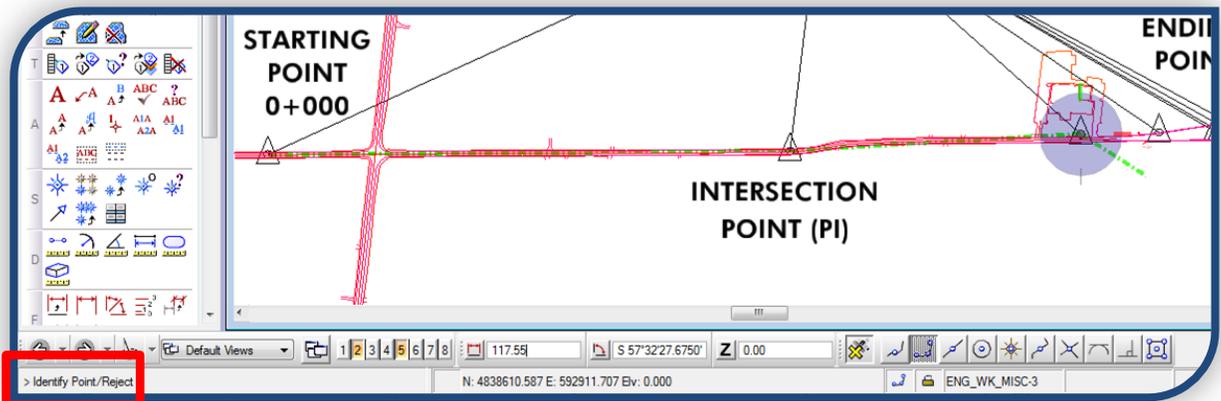
>**Identify Point/Reject** – Reset

>**Identify alignment end** – Reset

You must reset the second time to exit from the ADD PI mode.

At this point check to see if the Alignment is where it is intended it to be…

>> Geometry > View geometry > Active horizontal

The horizontal alignment will be displayed on the level named "**ENG_ALIGNMENT**"

Ctrl + G to save the geometry once verified.

79

Pat Z.

4) MODIFY HORIZONTAL ALIGNMENT

>> Geometry > Horizontal curve set

Add PI - allows the initial placement of the horizontal alignment points, it also allows a PI to be added on either end of the alignment, it will not allow the placement of a point between the two end points.

Insert PI - allows a PI to be added between two other PI's

Move PI - allows any PI to be moved along the alignment between the two PI's adjacent to it, InRoads will select the nearest PI to the data point.

Delete PI – allows the deletion of any PI.

Define Curve - allows a curve to be placed between two tangents.

If the alignment is to be modified, zooming in to the area in question to move or insert PI's may make the task easier.

>> Geometry > Horizontal curve set > Add PI

The prompt in the message area of Microstation window indicates the need to ...

>Identify alignment end

Place a data point where you would like to extend your alignment, a data point between the alignment ends, will automatically select the closest end of the alignment....message will then read

> **Identify point / reject**

Accept, with another data point, and the alignment extension will dynamically follow your cursor.

Continue adding your PIs to complete the alignment, and then reset.

The next message is…

>Identify alignment end

Reset again to finish.

Pat Z.
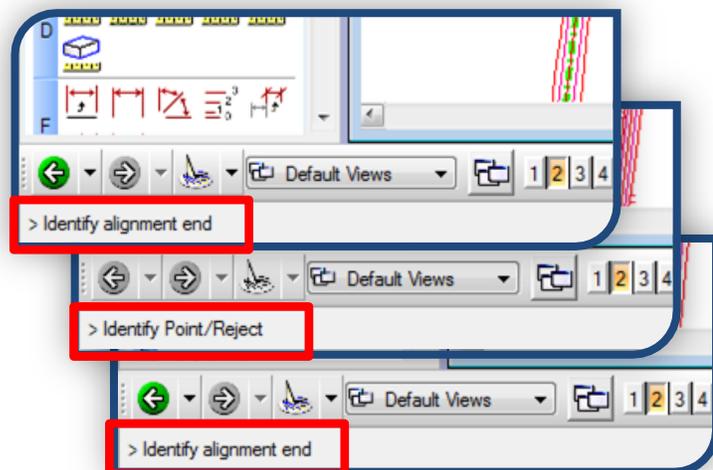
>> Geometry > Horizontal curve set > Insert PI

The prompt in the message area of Microstation window indicates the need to …

>*Identify element*

Place a data point anywhere between two existing PIs and another PI will be created with the linework dynamically displayed. If your selection is beyond either end of the alignment, "No element found" will display.

>*Identify point / reject*

Place your data point where you would like the new PI to be.to identify the new PI location

>*Accept overall solution / reject*

Accept with a data point

>*Identify element*

Place another data point to select another PI to move **OR**

Reset to end the command
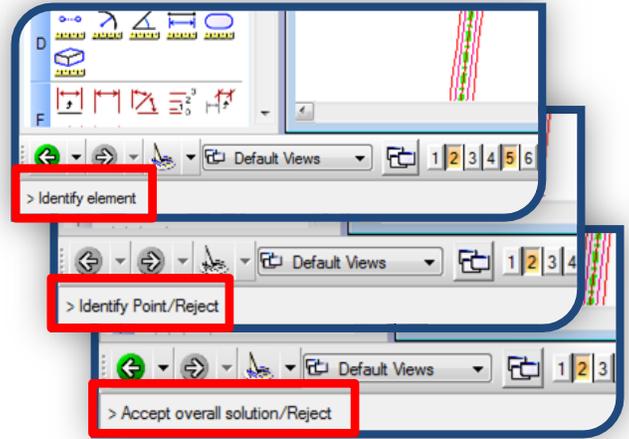
>> Geometry > Horizontal curve set > Move PI

The prompt in the message area of Microstation window indicates the need to …

>*Identify element*

Place a data point in the area of the PI to be moved, it will select the closest PI to your data point, accept the PI with another data point, to confirm the selection, and the alignment PI will dynamically follow your cursor.

>*Identify point / reject*

Select the new PI location

>*Accept overall solution / reject*

Accept the displayed change with a data point

>*Identify element*

Place another data point to select another PI to move **OR**

Reset to end the command

Pat Z.

81
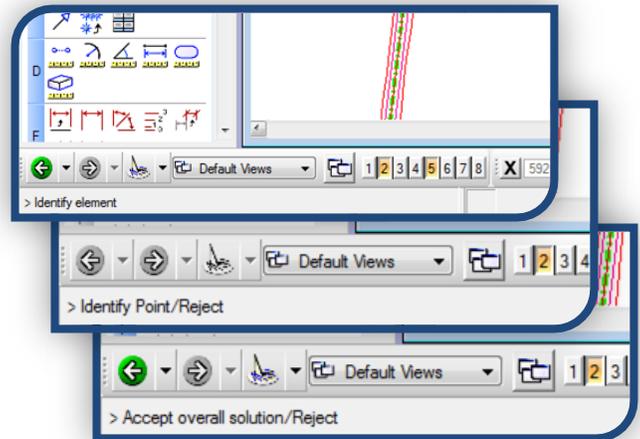
>> Geometry > Horizontal curve set > Delete PI

The prompt in the message area of Microstation window indicates the need to …

>*Identify element*

Place a data point in the area of the PI to be removed, it will select the closest PI to your data point and remove it

>*Accept overall solution / reject*

Accept the displayed change with a data point, to confirm the selection, or reset to reject the selection and the PI will be restored.

>*Identify element*

Place another data point to select another PI to remove **OR**

Reset to end the command
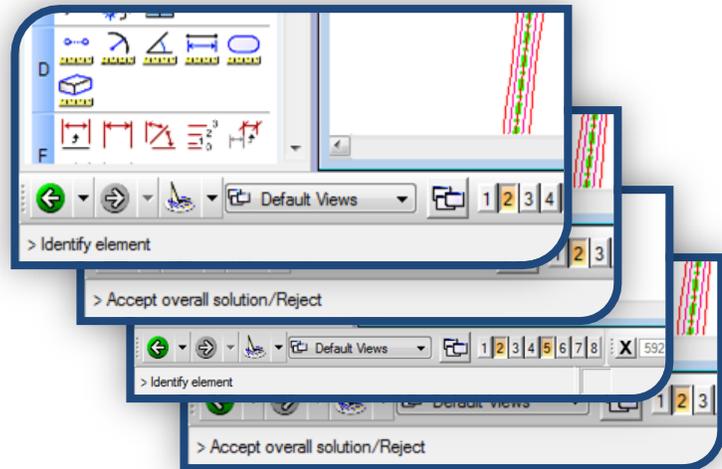
**Watch the MicroStation prompts…
the overall solution must be accepted in order to capture the change
Save the geometry (Ctrl + G) when the changes are complete.**

Pat Z.

5) ADD HORIZONTAL CURVES

>> Geometry > Horizontal curve set > Define Curve
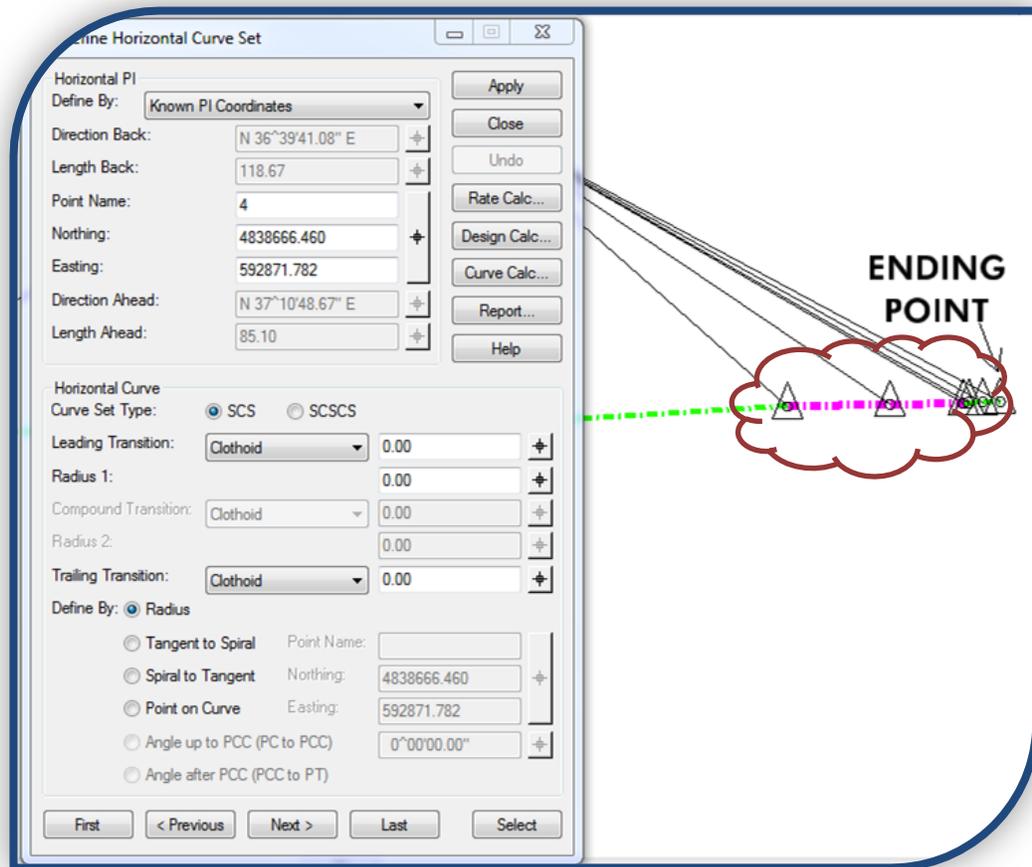
In order to define a curve, there must be at least two tangents in the alignment. The **Define Horizontal Curve Set** dialog allows direct input of the radius of the curve between any two tangents.

The two tangents and associated PI will be highlighted, in the design file, to indicate the location of the intersection.

The Display starts with the first set of tangents and by inputting a radius and selecting **apply** then **next >** you will temporarily save the curve information just added and move to the next possible location for a curve.

Setting the radius equal to zero will, in effect, remove the curve. When annotation of the alignment is initiated, PI's are shown as a radius of zero.

Apply for each addition in turn

Close when all the curves have been added

If **Apply** is not selected for each change as it is input, it will be lost as soon as the next intersection displays.

Pat Z.

6) RE-DISPLAY THE MODIFIED GEOMETRY…

>> Geometry > View Geometry > Active Horizontal

The current alignment configuration will be displayed in the design file, check the results, and if all is well…***SAVE!!!*** (Ctrl +G or > File > Save > Geometry***)***

REVIEW ALIGNMENTS

>> Geometry > Review Horizontal
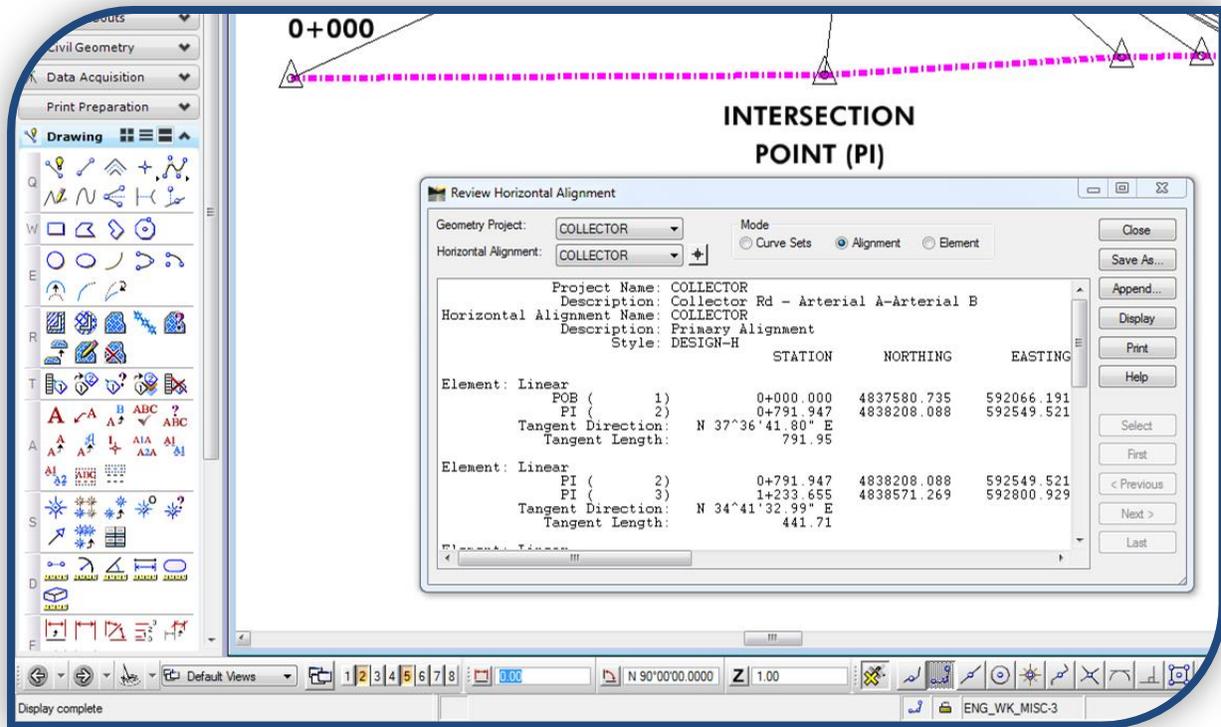
>> Geometry > Review Vertical

These commands allow you to review any horizontal or vertical alignment, whether active or not. If there is no vertical alignment created, obviously there is nothing to review and only the name and style created would be displayed.

Use the ▾ to the right of the Alignment Name to select an alignment or use the ⊕ to select one graphically from the design file.

On either Horizontal or Vertical Alignments **Set Mode** to **Element** to see individual tangent or curve information.

> This information can be used to label the plan with the required curve data, display the data in the design file and move it to label the alignment.
> Current display & text settings are used to display the alignment text.
> Annotating the Vertical Alignment will display this information on the Profile.

84

7) CHANGE THE INITIAL STATION

BEFORE BEGINNING, ENSURE THAT…

- ✓ Inroads is loaded
- ✓ You are in Design file "**COLLECTOR-DESIGN.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ Project File is open
- ✓ Preferences are loaded
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Geometry Project and Horizontal Alignment are active

Once the Horizontal Alignment has been determined, and SAVED, the stationing can be displayed.

There are times when the starting station is something OTHER THAN ZERO, an example of this would be a continuation of another project where the chainage must run continuous throughout the two projects. If this is the case and the initial station must match the previous baselines…

>> Geometry > Horizontal curve set > Stationing

Indicate

Horizontal Alignment [COLLECTOR]

Indicate

Starting Station [in this case = "1+250.00"]

Apply

Close

85

Pat Z.
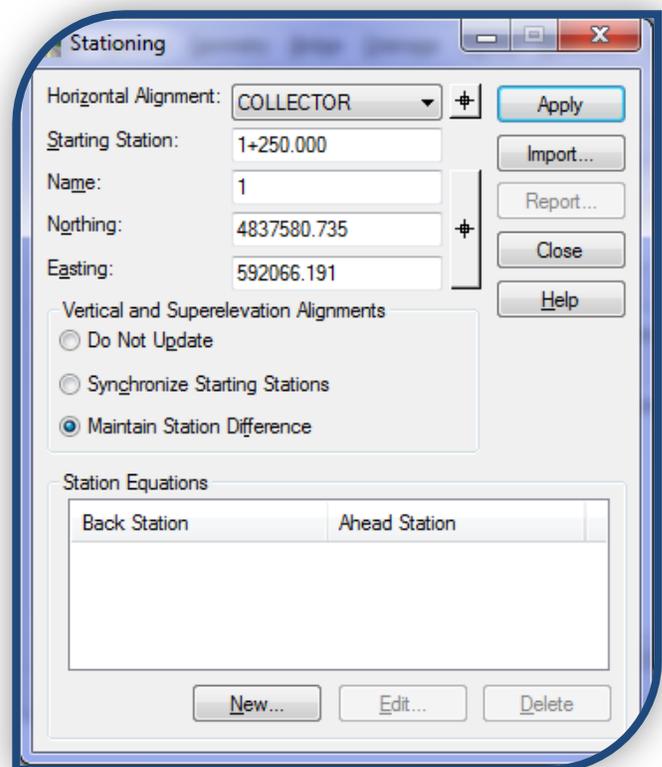
8) ADD HORIZONTAL EVENT POINTS

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ You are in Design file "**COLLECTOR-DESIGN.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ Project is open
- ✓ Preferences are loaded
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Geometry Project and Horizontal Alignment are active

There will always be instances where extra cross sections are required, these sections could be needed for Hydro Poles, D/W or field access, cross roads or where grading may be a problem.

With a list of Stations on hand...

>> Geometry > Horizontal curve set > Events

Indicate Define By Single Station

Input Station

Apply

Continue adding stations & **Select** **Apply** each time.
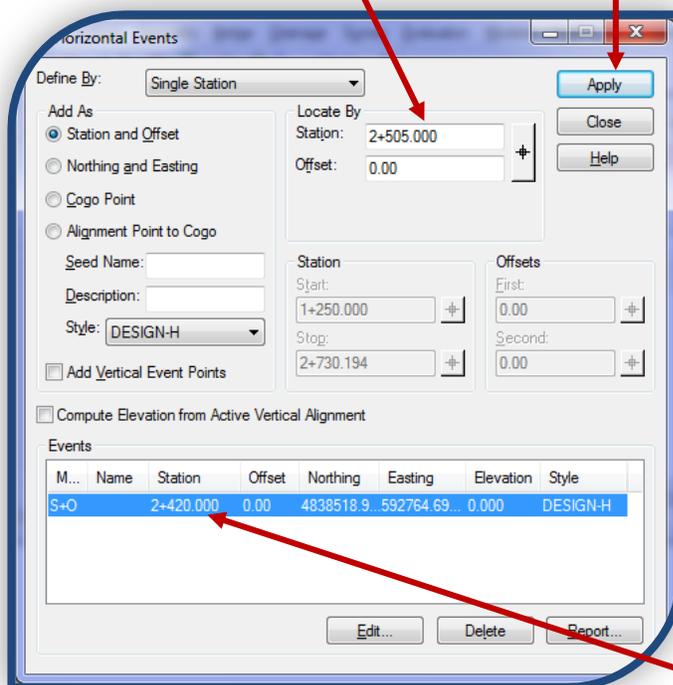
Conversely you can use the ⊞ to the right of the input field and select the location graphically.

To select a single point graphically...

>> Geometry > Horizontal curve set > Events

Indicate Define By >Single Station

Select the ⊞, the dialog box will collapse

Place a data point at the event (D/W, HP), the dialog box will expand **Apply**

As before, continue adding event points graphically, selecting **Apply** each time.

As event points are added, the information will be listed in the area on the bottom of the dialog box, they can be accessed for editing or deleting by highlighting them in the "Events" box.

Pat Z.

EVENT POINTS FOR HYDRO POLE LOCATIONS

Adding event points for driveways or field entrances using the main alignment is common practice, however, for Hydro pole locations, you may want to copy your main alignment to one called "Streetname-Hydro" and use this alignment when identifying HP locations. For these points make sure you identify ☑ Compute Elevation from Active Vertical Alignment, and again you may select them graphically, or type in the stations.

When the Cross Sections are being created, set the interval to zero (> General) and only display the horizontal event points (> Controls > Critical Sections), this will give you a set of sections which is totally devoted to the hydro pole locations.

Advantages to a separate alignment/section set for Hydro Pole locations...

- It can be identified as Hydro sections in the set title
- It is easier to provide as a "dgn" to Hydro with only their sections
- It is more efficient when generating PDF files of each section
- It avoids either mixing the hydro pole sections in with the main body of sections (which makes it more tedious to identify them for printing), or displaying each location as a set of one cross section (which would require annotation or updates to be done on each section individually)
- It is easier to annotate or update them as a group, rather than individual sections

9) DISPLAY STATIONS IN THE DESIGN FILE

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ You are in Design file "**COLLECTOR-DESIGN.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ Project is open
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Geometry Project and Horizontal Alignment are active
- ✓ Preference files are loaded and Factor is set correctly for the plotting scale of the working drawings.

See LOAD / SAVE PREFERENCES (SECTION 10.1)

>> Geometry > View geometry > Stationing...

GENERAL

Identify the horizontal alignment to be annotated by selecting either the dropdown list ▼ or graphically ⊞ Station limits can also be set here.

Pat Z.
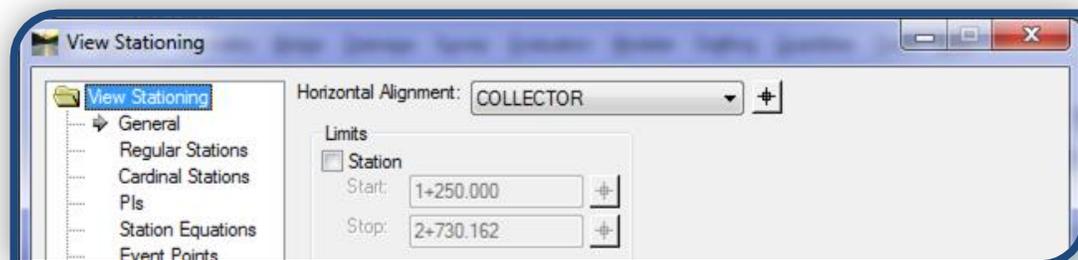
REGULAR STATIONS

Variables allow the chainage to be re-oriented to display either up-station or down-station. Remember that the preferences have been set up to our standard in BRAMPTON.xin (which you have renamed COLLECTOR.xin) and are utilized by selecting the default preferences. Modifications may need to be made to suit the project, make sure your factor has been set correctly for your drawing scale. Changing the orientation can be done by double clicking on the far right of the 'Object' you want to modify.

Apply

Close

88
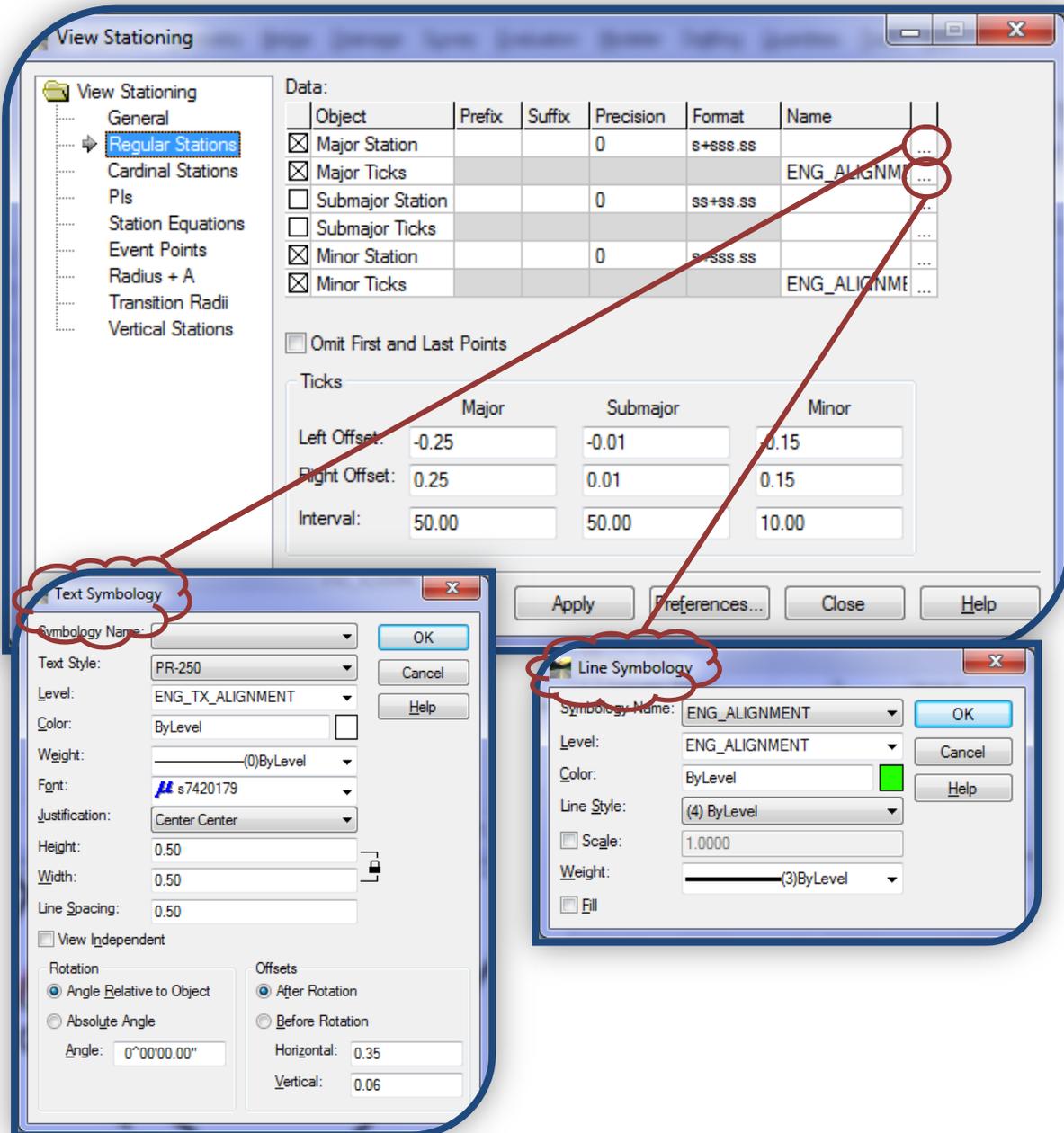
MODIFY THE STATION DISPLAY

The preferences have been set up to display stationing linework and text on the correct levels with City Standard colours etc. If the style **"DESIGN-H"** was indicated when the horizontal geometry name was created; the Stations will be displayed at an interval of 50m, with ticks every 10m along the alignment. Intermediate stations are on level "MISC" where they can be utilized for reference but will not plot on the final drawings.

UP-CHAINAGE STATIONING IN THIS CASE IS NOT ACCEPTABLE

### DOWN CHAINAGE STATIONING IS PREFERED
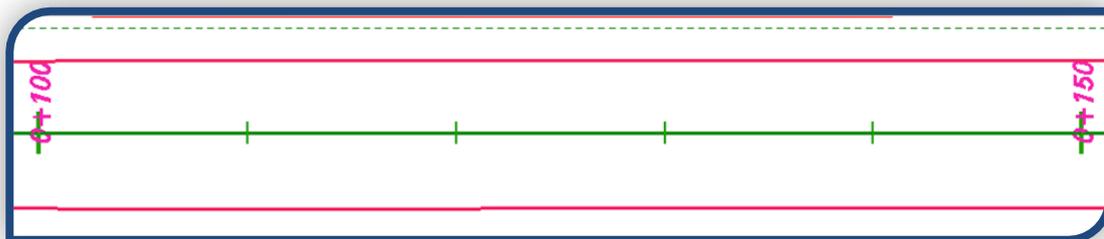
The station numbers can be adjusted to align the **"+"** of the station with the "tick" on the chainage line by modifying the offsets under Major and Minor Stations. The stationing may have to be displayed a number of times, with minor adjustments each time until the text displays in the correct location. Once the offsets have been setup, save the preferences, stationing can be re-displayed indefinitely without the need to move the station text. This is strictly for aesthetics; the "tick" is the actual station location-not the label.

Alternately, the individual station text can be moved to be on the tick; however, if the stations are re-displayed they will need to be moved again.

Pat Z.
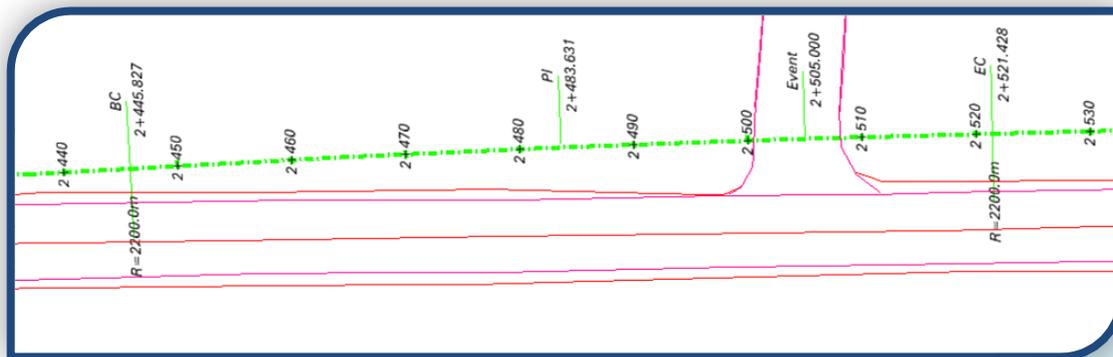
17.   PROFILE - INROADS | EVALUATION

1) GENERATE A PROFILE

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ You are in Design file "**COLLECTOR-PROFILES.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ "**COLLECTOR-DESIGN.dgn**" is referenced
- ✓ "**BRAMPTON CELLS V8i.cel**" has been loaded
- ✓ Project File is opened
- ✓ Preferences are loaded
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Geometry Project and Horizontal Alignment "**COLLECTOR**" are active

2) CHECK SURFACE PROPERTIES

Before starting, check that the existing surveyed surface has the style "EXISTING" assigned to it, generally it does. A proposed surface should be style "PROPOSED" to correctly display the surfaces in profile and cross sections; it will need to be changed each time it is generated. The limestone surface will be generated by InRoads as an alternate surface and will have the style "LIMESTONE".

>> Surface > Surface Properties > Advanced Tab

Also in the advanced area you can identify distances for offsets you may want displayed along with how they will be displayed.

These offsets will generate a line in the profile representing the surface along a line parallel to the main alignment at the distance specified here.

90

Pat Z.
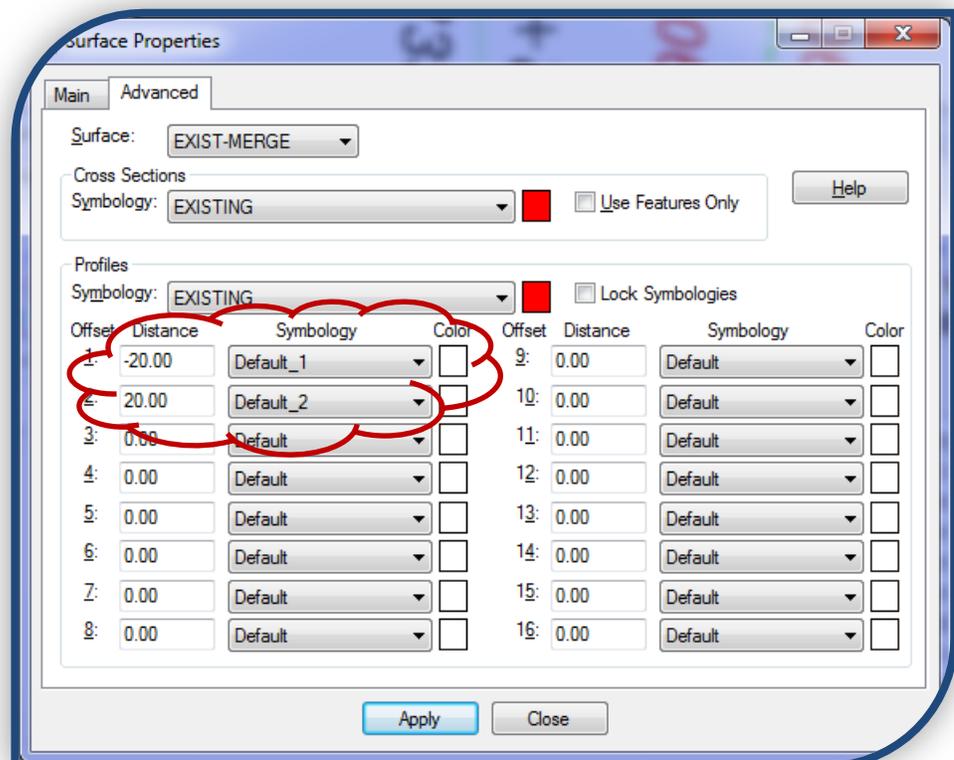
3) SET UP THE PROFILE

Before getting into the setup for the profile generation, make sure that your options have the scale factors set to two (2), for 1:500 scale plans.
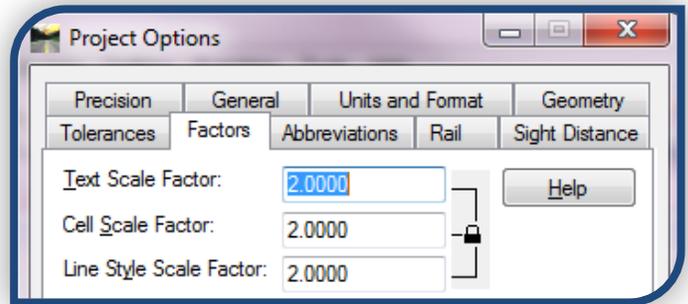
>> Evaluation > Profile > Create Profile

GENERAL

Provide a **Set Name**…In this case "COLLECTOR"

If stationing runs Left to Right, make sure **Direction** is also set to Left to Right, the profile should always be generated in the same direction as the chainage.

Vertical Exaggeration is 10:1 for 1:500 scale, 5:1 for 1:250 scale. (Set up in the xin)

Surfaces…Identify surface(s) to be displayed in the profile
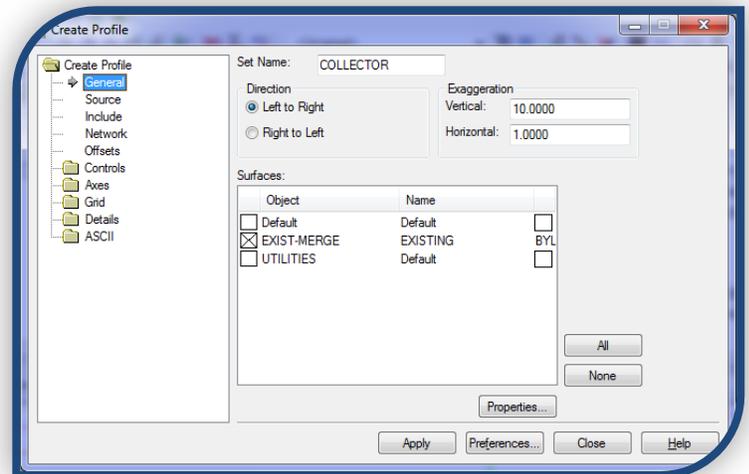
SOURCE

Identify the **Alignment** using either the dropdown ▼ or graphic ⊞, method of selection.

Pat Z.

91
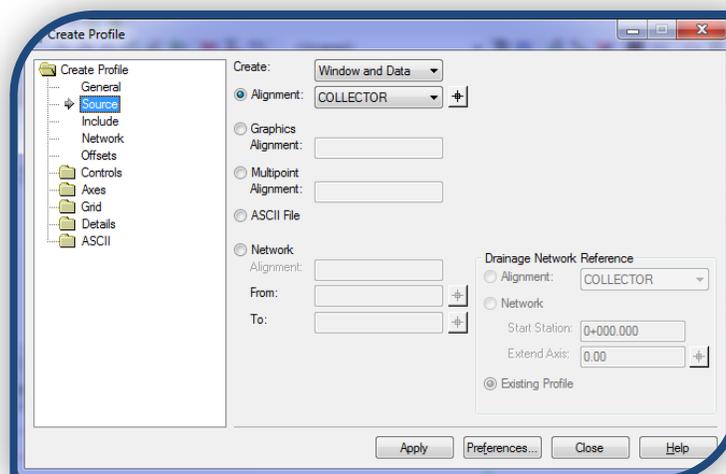
INCLUDE

Add or remove the **crossing Features** and/or **Projected Features**, then set the **Bandwidth** within which these features must reside.

These would be features such as ditches, CSPs and bridges.
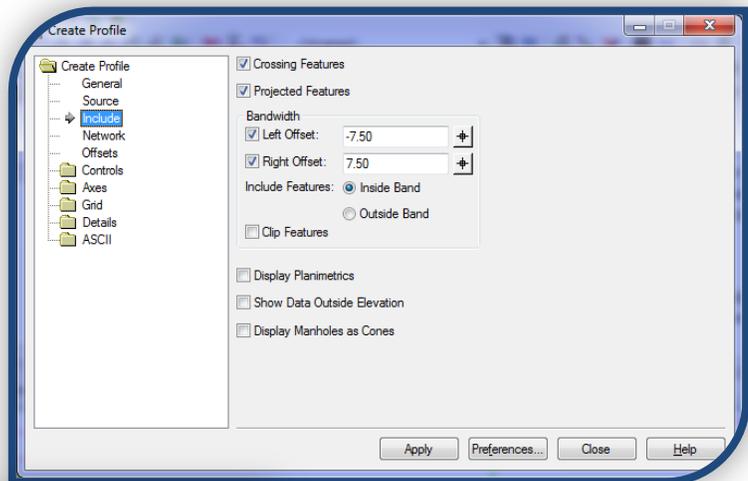
OFFSETS

If you wish to display a profile on a line parallel to the alignment as well, you can turn on and set that offset and how it displays under Offsets, if you did not do it under **"**Check Surface Properties".
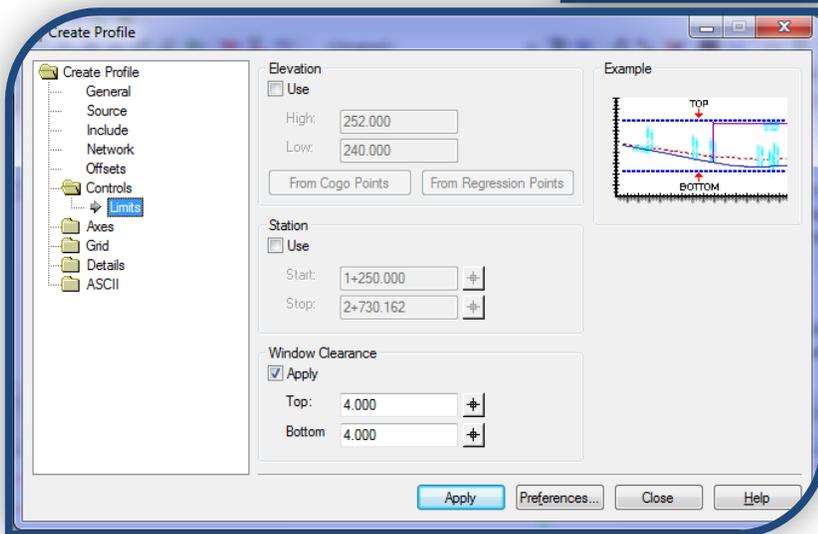
CONTROLS > LIMITS

Generally, a profile for the entire alignment will be generated, however, if only a portion of the profile is to be generated, say, to check on some numbers in a problem area, set the **station** limits here to produce a smaller portion of the profile.

Adjust your **elevation** limits to specify maximum/minimum elevation to be shown, or you can use the "**Window Clearance**" option to set the number of grid lines above and below the features displayed in the profile.

To determine the minimum and maximum elevations on a surface…

On the InRoads Main menu, expand "**Surfaces**" then highlight the surface, the first two lines will display the minimum and maximum information for random elements and breakline elements.

	Total	Blocks	Min Northing	Min Easting	Min Elevation	Max Northing	Max Easting	Max Elevation
Surfaces								
Default	11064	1	4837153.747	591756.451	242.667	4839202.613	594570.608	261.562
EXIST-MERGE	11	1	4838583.731	592808.361	252.525	4838762.848	592945.854	254.266
UTILITIES	0	0	0.000	0.000	0.000	0.000	0.000	0.000

92

Pat Z.

AXES AND GRID

These parameters, including symbology, have been set up in the preference file.

DETAILS > TITLE

Change the **Title Text:** on the profile to be descriptive of the profile i.e. use the street name, date and contract limits.

Once the setup has been tailored for your project, save the preferences…

Preferences

Save

Close

These changes to the profile setup (stations, elevations, title...) will be saved to the loaded preference file, **"COLLECTOR.xin"** Any time you need to generate a profile, in this project, these parameters will be used.
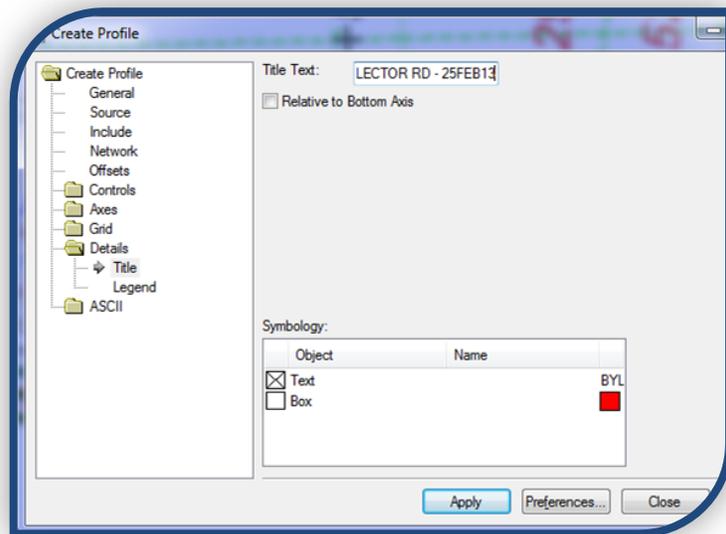
When these preferences have been loaded, modified to meet the requirements of the contract, and saved, select… **Apply**

> **The profile will be generated relative to the top view; make sure there is clearance for the entire length and height, make note of the direction it will be generated (right to left or left to right). The point selected will become the lower Elev/Sta corner of the grid (lower right or lower left); place the profile in such a location so as to avoid conflict with the plan information (including any referenced files).**

The Create Profile dialog box will be reduced and the prompts in the message area of Microstation window indicate the need to … **>Identify Location**


93

Pat Z.
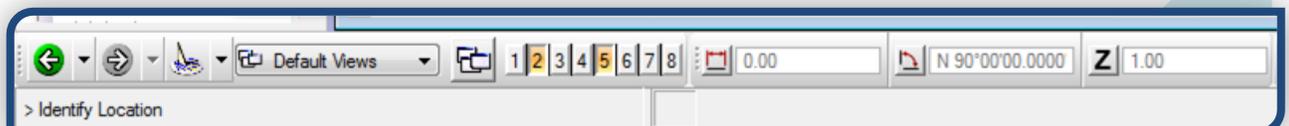
Select the location of profile origin.

You can regenerate the profile as many times as needed to "tweak" the display, delete them, using your graphic group lock, as you make changes, once you have it the way you want it, save the preferences and make sure you have the final one displayed.

THESE PROFILES SHALL NOT BE MOVED OR ROTATED…
The reference file will be moved and rotated to place it in the plan & profile sheets.

Place information to identify what drawing number it will be on, street name and the date it was generated and any other information which may be useful in identifying the use for the profile i.e. specialized or alternate profiles. You can scale/copy the profile title, or place the text independently.

Any profile generated should be labeled with large enough text that it can be read when they are all shown, this way it is not necessary to zoom in to each one to figure out which is the one you are looking for.

The profiles generated will eventually look something like this…

Pat Z.
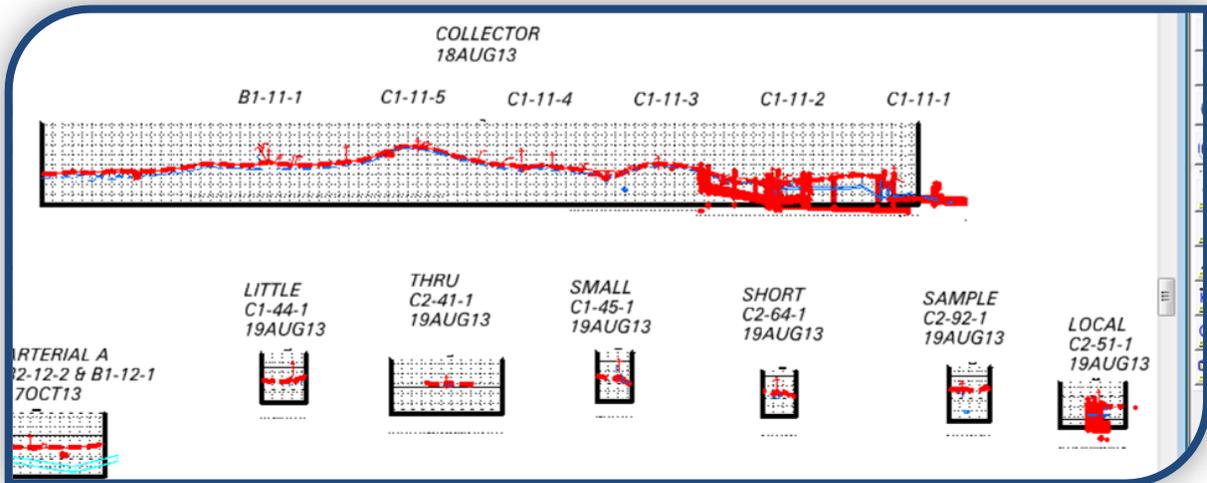
18.   INROADS - USING ALIGNMENTS AND CORRIDORS

> **ALIGNMENTS…**
>
> **can be defined as a series of tangents, PIs and curves defining a centerline.**
>
> **CORRIDORS…**
>
> **are identified by the swath of land outlined by the template limits along an alignment.**

Alignments, and then Corridors, will be created for

✓ the Main Alignment (Collector)
✓ the Cross Road Alignments (Little, Thru, Small…)
✓ the Curb Radius and connecting Alignments (Little-NW, Little-N-Cross, Little-NE…)

The preliminary layout and design work can be done in 2D, on a working level such as ENG_WK_MISC-#, in the DESIGN file. This will be done, as a drafting exercise, to produce linework that can be used as a guide for the changes along an alignment. i.e. tapers, bus bays, bus pad/shelters, intersections etc. You will notice that there are a number of levels which can be used to do alternatives, construction linework, background information, and notes to self (or others) and so on.

During your InRoads design phase, do your trials in a working drawing (COLLECTOR-WORKING.dgn) with the DESIGN file referenced.

> Since much of the work to be done, in this exercise, is information that will be displayed, evaluated, modified and utilized to produce multiple alignments and corridors, it is a good idea to do this in a WORKING drawing. i.e. COLLECTOR-WORKING.dgn
>
> Any trial work being done is best to be done in the working drawing where you will not be interfering with the preliminary design linework and/or other design information, notes and dimensioning. The working file can be wiped clean as often as needed to work out the details of the design without risk of loosing any finalized linework.

✓ Create names and define Horizontal Alignments for roadways…

- COLLECTOR
- LITTLE
- THRU
- SMALL
- SAMPLE
- LOCAL

✓ Create names and define Vertical Alignments for roadways…

- COLLECTOR
- LITTLE
- THRU
- SMALL
- SAMPLE
- LOCAL

✓ Define corridors for the roadway alignments
✓ Identify Template Drops for each corridor, using standard templates (200 series)
✓ Generate surfaces for the cross roads corridors to provide accurate 3D information with which you can work to define the connection between radius ends. You will use the EPs, CROWN and any lanes or other changepoints between the EPs to define a cross connection Vertical / Horizontal Alignments between the ends of the curb radii at each cross road. (Curb radius at this point will be the working level initial information.)
✓ Create Horizontal / Vertical Alignments along the edge of pavement for each curb radius on all o f the cross roads.

Pat Z.

19. ALIGNMENTS - INROADS | GEOMETRY

### 1) CREATE HORIZONTAL/VERTICAL ALIGNMENT

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ You are in Design file **"COLLECTOR-DESIGN.dgn"**
- ✓ **"Collector-base.dgn"** is referenced
- ✓ Project is open
- ✓ Preferences are loaded
- ✓ Surface **"Collector-base.dtm"** is open
- ✓ Horizontal/Vertical Alignment **"COLLECTOR"** is populated
- ✓ Horizontal/Vertical Cross Road Alignment is populated

>> Geometry > Utilities > Multicenter Curve

This command allows you to create a Horizontal / Vertical alignment using two existing Horizontal and Vertical alignments by specifying offsets and gradients from the existing alignments. The options are self explanatory, the Example shown on the "Main" tab identifies what each option represents.

Before starting this command, use rough linework, drawn on a miscellaneous level, determine the radii, offsets and slopes for the intersection.

Pat Z.
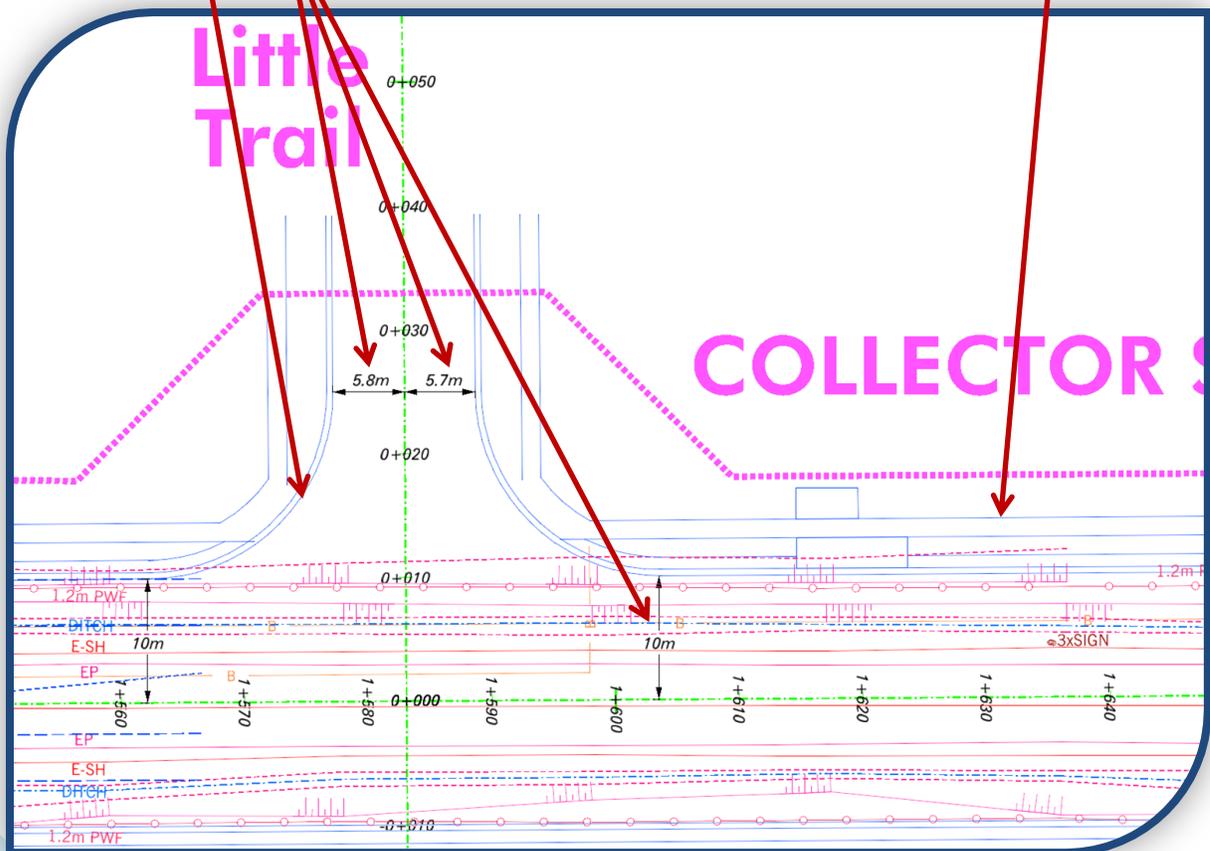
Main Tab & Advanced Tab
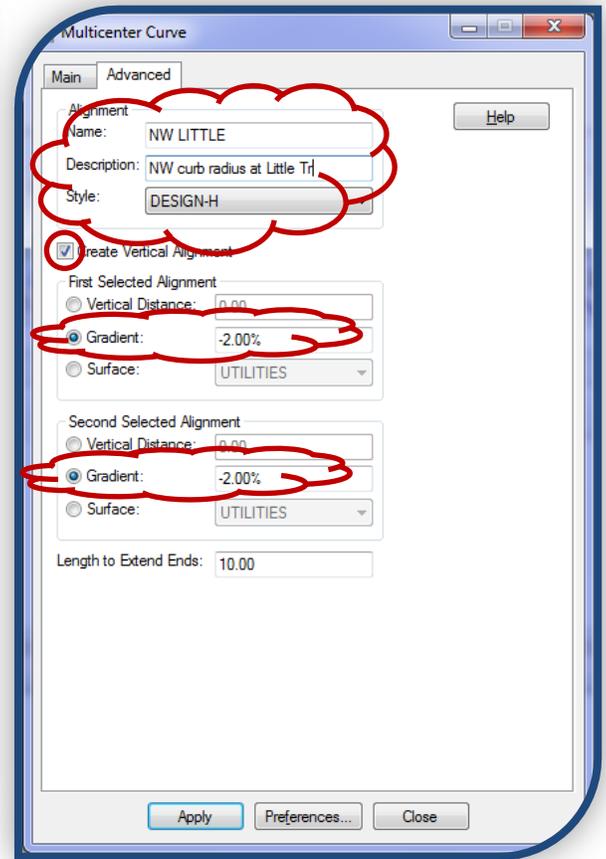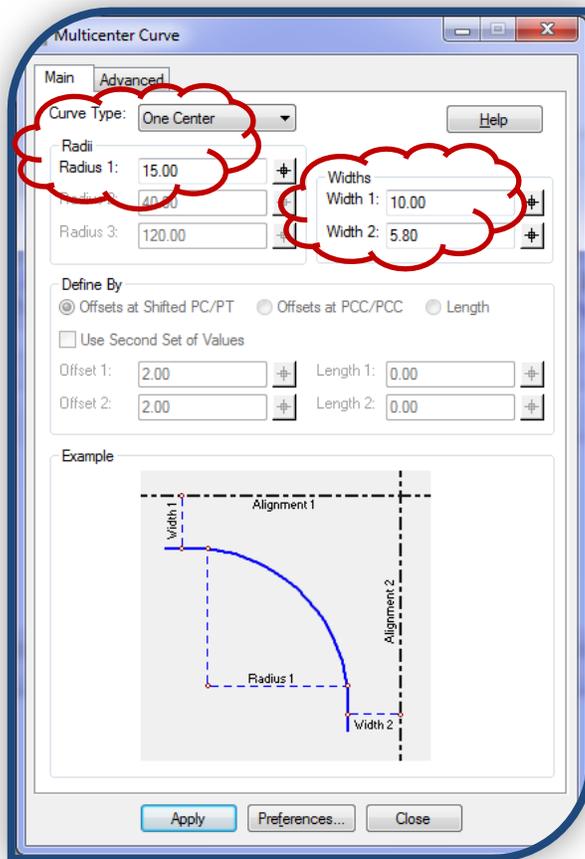
Select the Curve Type: One Center Input the determined values for Radius and Widths as measured on your rough work from E/P to Alignment.

Select the Advanced Tab and fill in the Name / Description / Style for the new alignment. You can use "DESIGN-H" and it will display the same as the main alignments on the plan.

To create a Vertical Alignment, based on the two alignments being used and the crossfall of the roads, make sure the check box beside Create Vertical Alignment is marked, choose Gradient and input the slope required. Remember that negative values fall from the alignment and positive values rise from the alignment.

Select Apply and the dialog will disappear so that you can select the first, then second alignment, work in the direction of the chainage and follow the prompts in the message area.

>*Identify first alignment / Reset*

97

Pat Z.
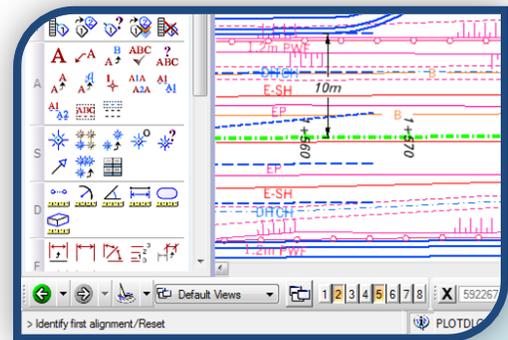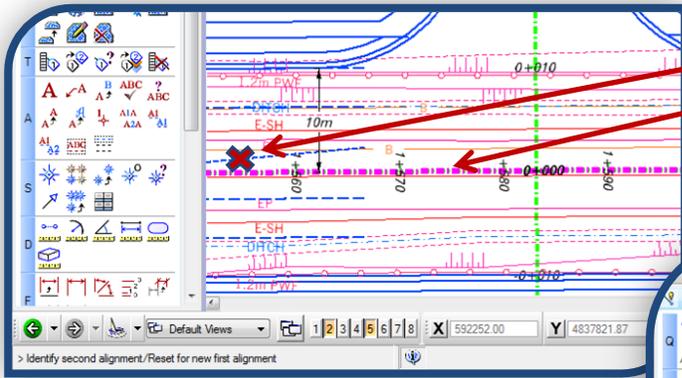
Place a data point in the vicinity of the first alignment, if the intended alignment highlights, place a data point near the second alignment, if the intended

second alignment highlights, place a data point in the area of the correct quadrant for the placement of the radius. Place a data point to accept the displayed results
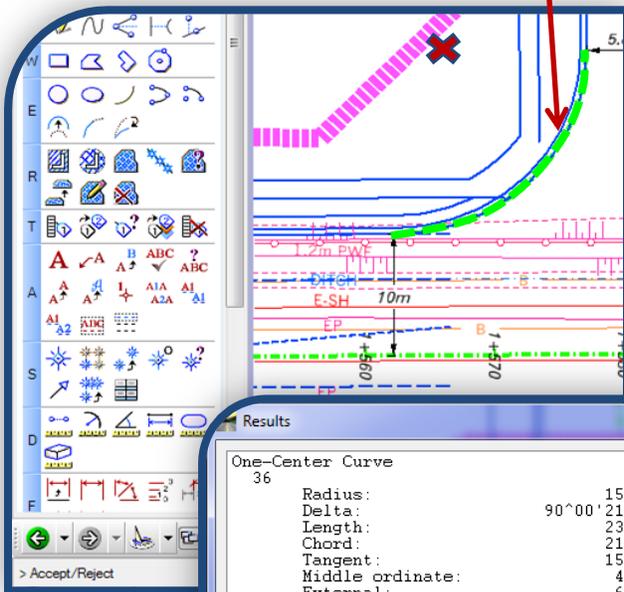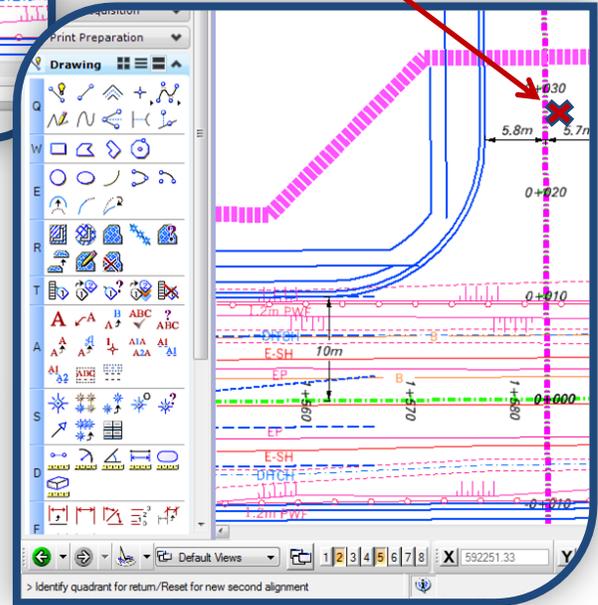
and a Results Report dialog will display with the alignment information.


```
Results
One-Center Curve
36                                      4837834.213    592248.854    0.000
        Radius:                 15.00
        Delta:          90^00'21.33"
        Length:                 23.56
        Chord:                  21.21
        Tangent:                15.00
        Middle ordinate:         4.39
        External:                6.21
        N 52^23'18.20" W (Radial)
37                                      4837843.368    592236.971    0.000
        N  7^23'28.86" W (Chord )
        N 37^36'20.47" E (Radial)
38                                      4837855.251    592246.125    0.000
```

Pat Z.
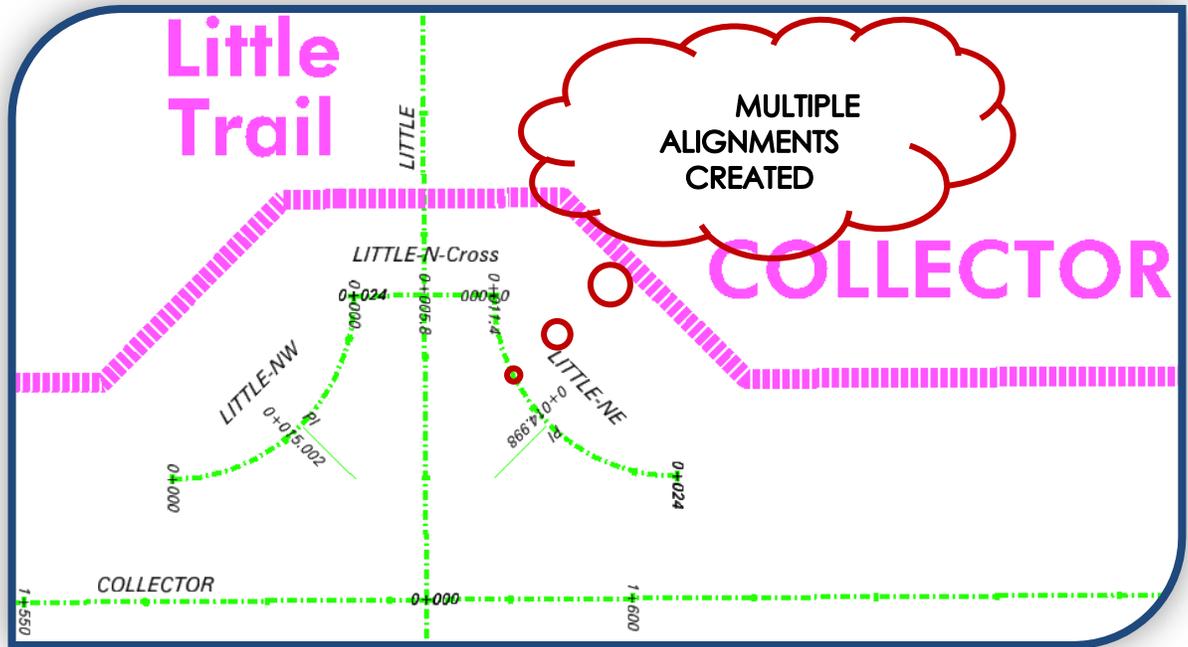
The curb radii and connecting alignments will be used to create corridors along the EP of the intersections. Define corridors for the curb radii, and the connection across the crossroad. Place your template drops, using templates LEP-MATCH / REP-MATCH, the the entire length of the three alignments.
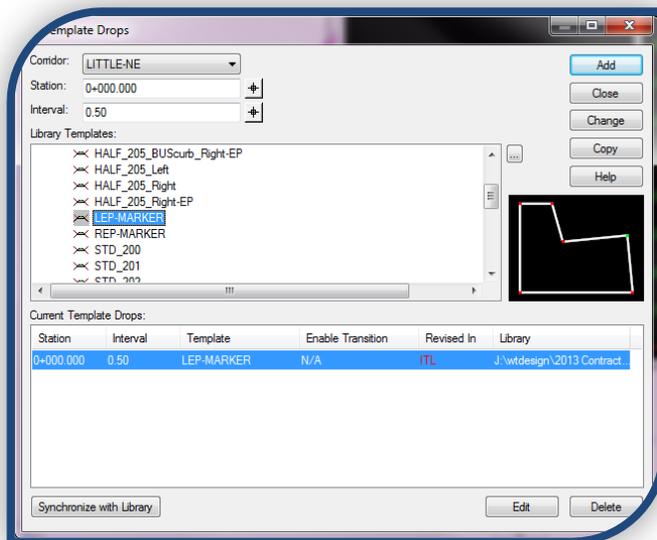
Generate surfaces for the Corridors defined for the curb radii and cross connection, the Curb elements will be displayed in plan (EP/GUT/FC/BC).

Pat Z.

Working in Microstation, and using the EP line, make sure that there are no gaps at the ends of the three features displayed.
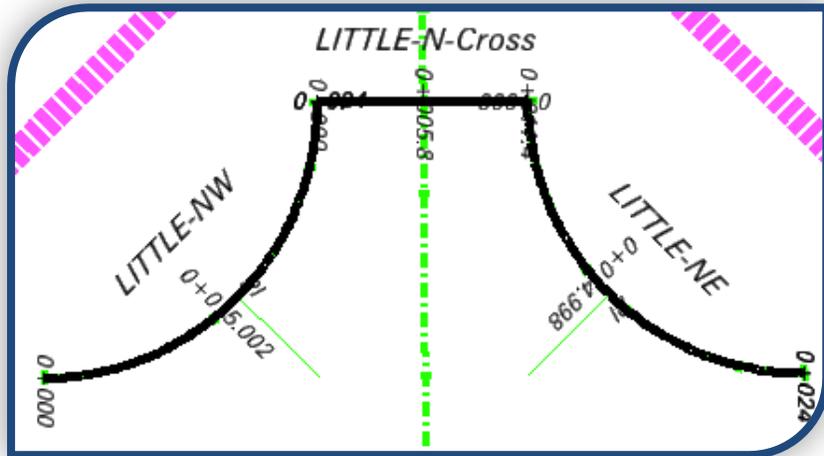
These features need to provide a continuous link from the EP on the main corridor, along the first curb radius, the cross connection, the second curb radius and finally back to the main corridor EP.

The ultimate goal of this exercise is to create accurate linework to be imported to generate a Horizontal/Vertical alignment, along the EP of the cross road radii. The newalignment, LITTLE-N, will be followed using Point Controls in the Roadway Modeler

This Iso View shows the result of the manipulations, you can see how it is in relative proximity to the existing information in the area.

>> File > Import > to Geometry... select the three linestrings...

Pat Z.

Use the settings as shown here…

- Select Horizontal and Vertical Alignment from the **Type** dropdown
- **Name** the new Alignment with an appropriate description
- **Style** is DESIGN-H
- As with the alignments created previously, the **Curve Definition** is Arc for Horizontal and Parabolic for Vertical.
- Make sure the **Target** is set to the main Geometry Project
- Check off the boxes for …
    - Resolve Gaps'
    - 'Resolve Nontangencies'
    - 'Join Elements'
   - 'All Selected Elements Added to Single alignment'

Select **Apply** and follow the prompts…

> Identify element (with Data point)

> Accept / Reject (Data / Reset)

> Identify element (Data))

> Accept / Reject (Data / Reset)

Continue until you have identified and accepted all three elements, then Reset to stop the process.

The new alignment, with stationing shown, will look like this…

Pat Z.
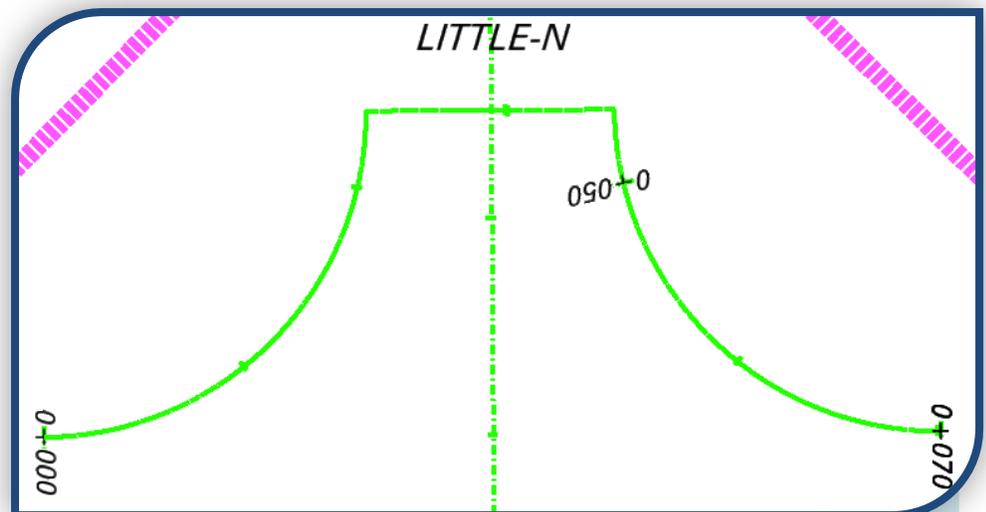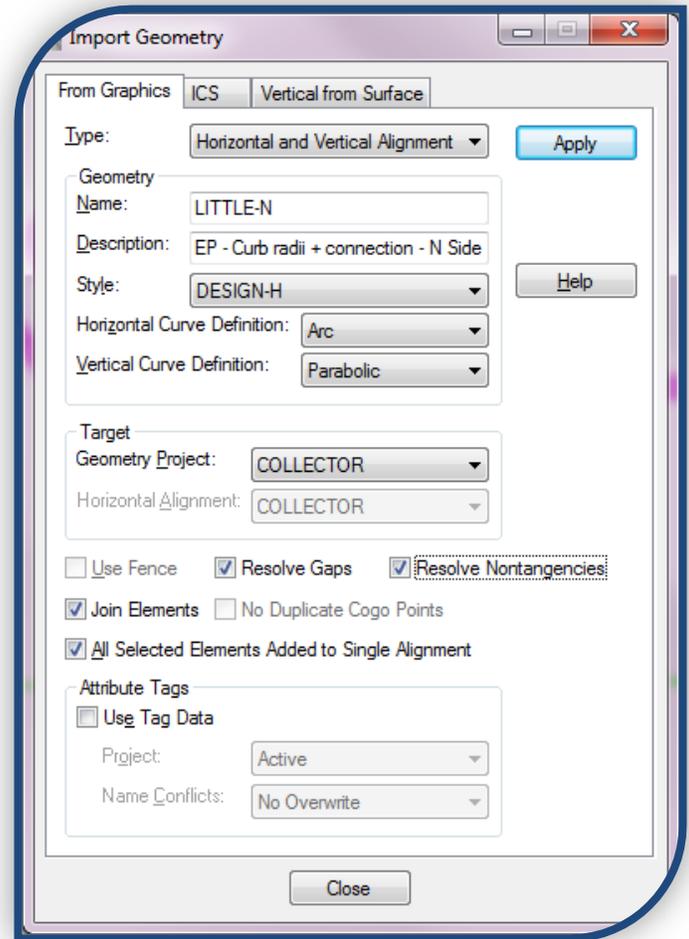
Now that you have a single geometry (vertical/horizontal alignment) for the edge of pavement through both radii and the connecting pavement crossing, you can utilize this as a second alignment to redirect the EP, on your main corridor, around the intersection smoothly.

As a second alignment, this will 'bend' the template to be perpendicular to the EP / secondary alignment and produce a more accurate section through the radii.

The radius and crossing corridors will not be used in the creation of the final surface and can be removed when the combined alignment has been utilized and verified. This will remove clutter from the alignment list and make it easier to find the corridors that are being used to generate the final surface.

This will be done for each cross road.

Sometimes there will be a need to go beyond the radius on a cross road, for matching purposes. If this is the case, a corridor (or corridors) can be created using the cross road alignment and specifying a station range which begins/ends at the radius ends and will clip the main alignment using Target Aliasing.

- Create a corridor for each of the quadrants of an intersection and have them clip the main alignments in the roadway modeling process, producing one surface with all the corridors.
- Use as a secondary alignment in conjunction with control points, or paremetric constraints, to have the edge of pavement follow the horizontal alignment, with (or without) the vertical alignment.

Pat Z.

2) CREATE VERTICAL ALIGNMENT

BEFORE BEGINNING, ENSURE THAT...

- ✓ Inroads is loaded
- ✓ In Design file "**COLLECTOR-PROFILES.dgn**"
- ✓ "**Collector-base.dgn**" is referenced
- ✓ "**COLLECTOR-DESIGN.dgn**" is referenced
- ✓ Project File is open
- ✓ Preferences are loaded
- ✓ Surface "**Collector-base.dtm**" is open
- ✓ Geometry Project and applicable Horizontal / Vertical Alignments are active [An alignment can be active but empty, at this point the vertical alignment is empty, horizontal alignment must have at least two tangents / one PI.]
- ✓ Profile has been generated

ADD POINTS TO VERTICAL ALIGNMENT (CREATE VERTICAL ALIGNMENT)

Working on each profile, place and modify the vertical alignment in the same manner as the Horizontal Alignment. Ignore curves at this point.

>> Geometry > Vertical curve set > Add PI   Follow the prompts...

> Identify first point

- The alignment will be shown dynamically and the station, elevation and slope displayed numerically at the bottom.
- Any attempt to place points outside the profile grid or where the alignment would cross itself, the dynamic display will stop until you are back to an area in the profile acceptable for the next point.
- Place points in the same direction as the Horizontal Alignment (left ->right / right ->left).

>**Identify Point/Reject** – Indicate the next point in the alignment...continue until the last [end] point of the alignment has been identified.

>**Identify Point/Reject** – Reset

>**Identify Point/Reject** – Reset

> **It is necessary to reset twice to exit from the ADD PI mode, the "Add Vertical PI" dialog box will return**

Close to exit

SAVE (Ctrl +G)

103

Pat Z.
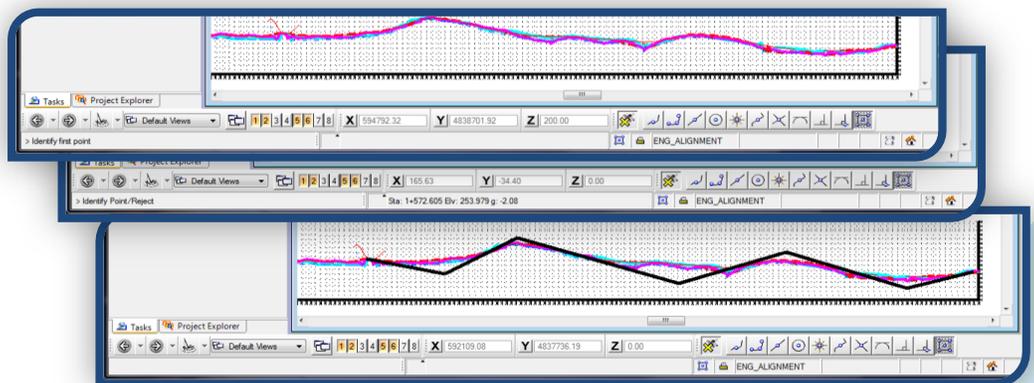
ADD CURVES TO VERTICAL ALIGNMENT

Now that you have the basic vertical alignment completed, you can go back and add the vertical curves and/or move the PIs to better fit the alignment to the project.

>> Geometry > Vertical curve set > Define Curve...

The two tangents will be highlighted in the design file starting with the first PI, this is a visual check of the active PI location.
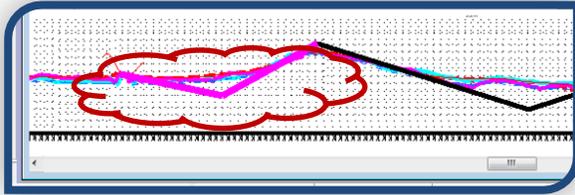
Complete the **Calculate By:**

and **Update By:** fields.

Vertical Curve...Calculate By:

specifies the method for calculating curves.

***This is where the selection of curve type, made when creating the alignment name, comes into play. Choosing the Parabolic curve will provide options to calculate by Length of Curve, r (rate of change), K value, middle ordinate, pass through point or Unsymmetrical length.

Using a circular curve gives radius, pass through and tangent options.

 Adjacent Curves...Update By:

specifies which parameter to preserve in recalculated adjacent curves. The adjacent curves may be recalculated by Length of Curve, r= (g2-g1)/L, or K=L/ (g2-g1).

For example...

If Length of Curve is selected, the length of curve is preserved and the software will recalculate the curve.

Select r= (g2-g1)/L, and the software recalculates the curve length based on the original rate of change.

Select K=L/ (g2-g1), and the software will recalculate the curve length based on the original K.

>> Adjacent Curves
☑ Distance ...rounds the recalculated length of vertical curves up or down to the nearest multiple of the value specified. This applies only when Update By is set to r= (g2-g1)/L or K=L/ (g2-g1). A zero value (0.0) has no effect; a positive value will restrict the changes to increments of that value. If you wanted to, for some reason, restrict the curve length to whole meters, you could do that here.

Select Report to display current element, Ctrl+ Report to display whole alignment.

104

Pat Z.
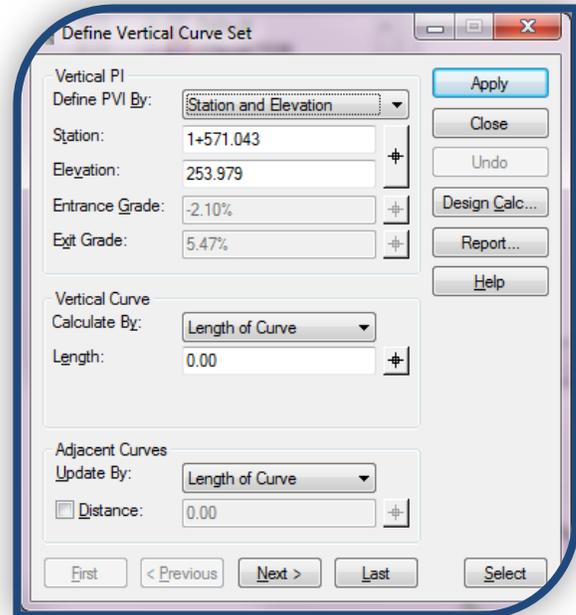
USING THE DESIGN CALC… OPTIONS

Select… "Design Calc…"

The Vertical Design Calculator dialog window will appear. You can utilize the parameters and methods in this dialog to calculate the optimum vertical curve using the design speed, K factor, or length of curve, whatever the limiting factor is. InRoads provides two ASSHTO options, 1990 & 2001.
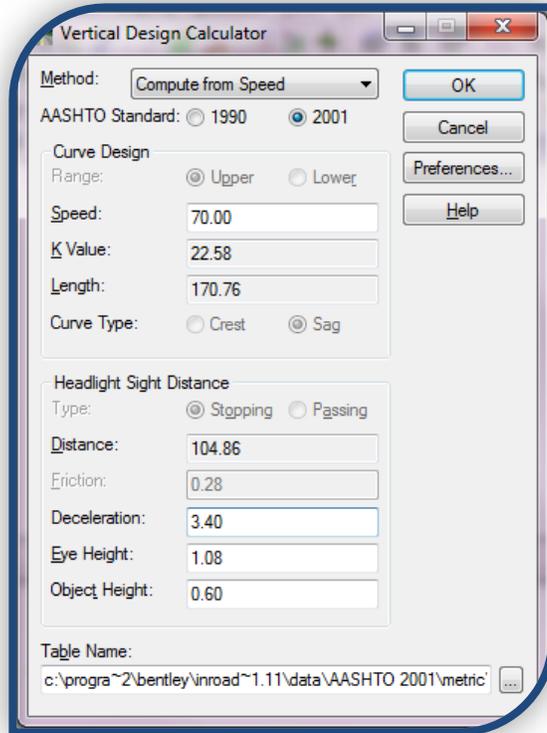
Select the method Compute from Speed , input the design speed and place a data point anywhere in the drawing and the K value and Lengths will be calculated, then either… cancel to reject the calculations or select OK to accept the calculation and it will place the calculated values in the Define Vertical Curve Set dialog box and close the Design Calc… dialog box.   apply

Select the method Lookup K to select the 'K' value and the calculations are automatic, then either… cancel to reject the calculations or select OK to accept the calculation and it will place the calculated values in the Define Vertical Curve Set dialog box and close the Design Calc… dialog box.

apply

The program will attempt to match the parameters indicated, to the PI, there will be a Microstation window message indicating if the process was completed, **"successful completion"** or not completed, **"solution overlaps or contains discontinuities"**
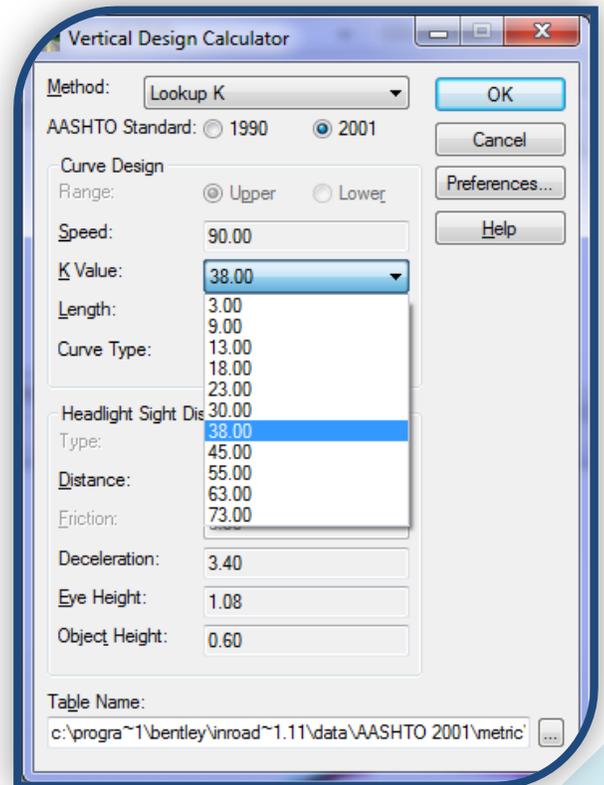
Using a 'K' value for the **Adjacent Curves…Update By**: will maintain the 'K' values as previously set at the other PI's. Continue modifying the parameters until you have a successful completion.

Pat Z.

USING VERTICAL DESIGN CALCULATOR

In this example, using Lookup K , K value is chosen to correspond with design speed of project roadway. OK was selected and the values are transferred to the Define Vertical curve Set dialog.
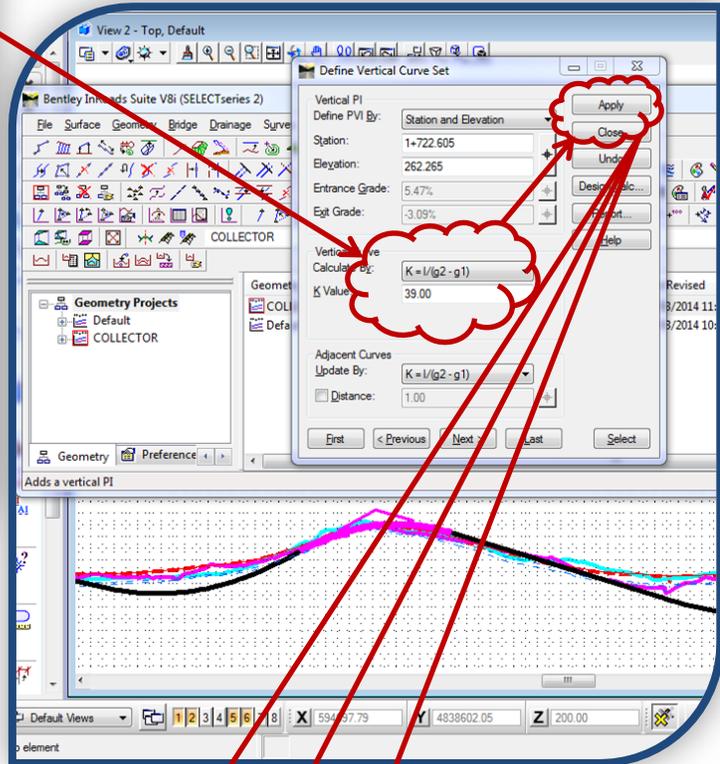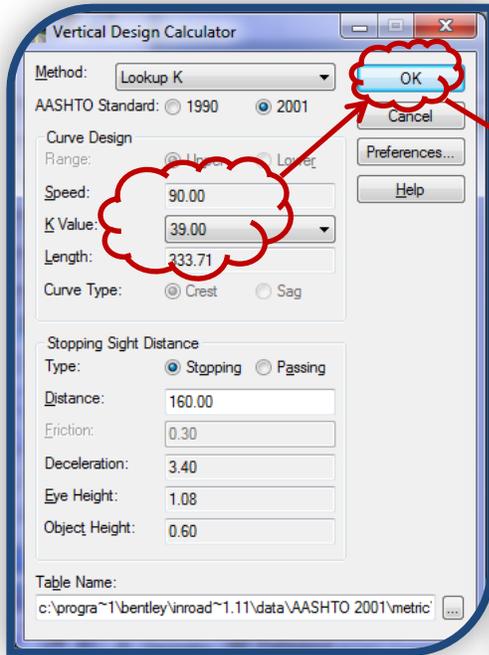
It is not until you select Apply on this dialog that you know if the values are acceptable, in this case, they are not...

Keep trying and once satisfied, select Next> to get to the next possible curve location

in the

vertical alignment and follow the same procedure for each location...

Apply

Close

To exit.

>> File > Save >

Geometry Project

OR Ctrl +G

to Save the

alignment

106
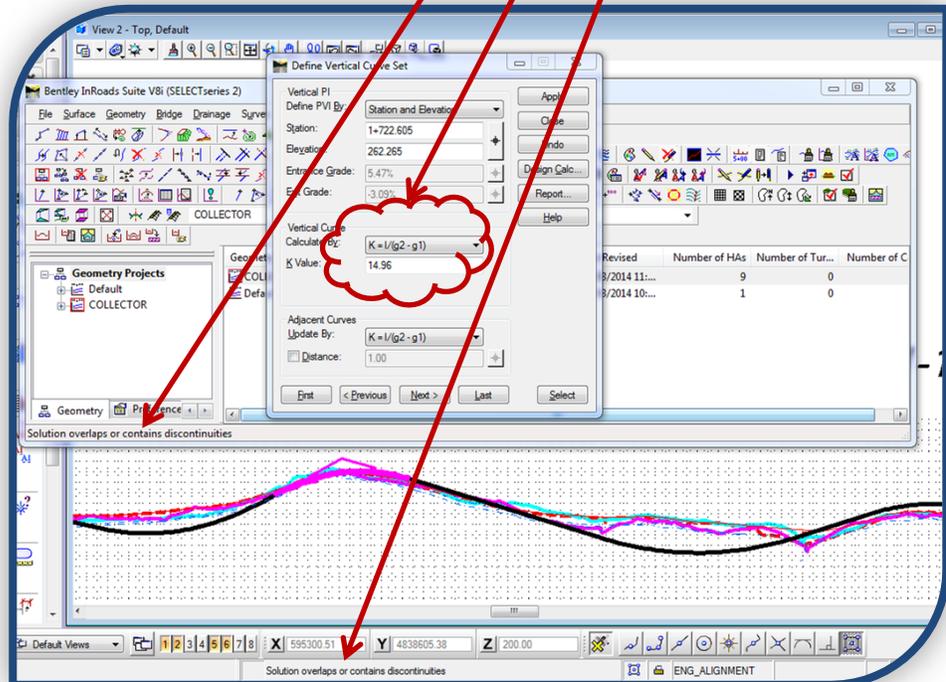
3) ANNOTATE VERTICAL ALIGNMENT

…displays PI's, tangent distances, and vertical curve data.

>> Geometry > View Geometry > Vertical Annotation
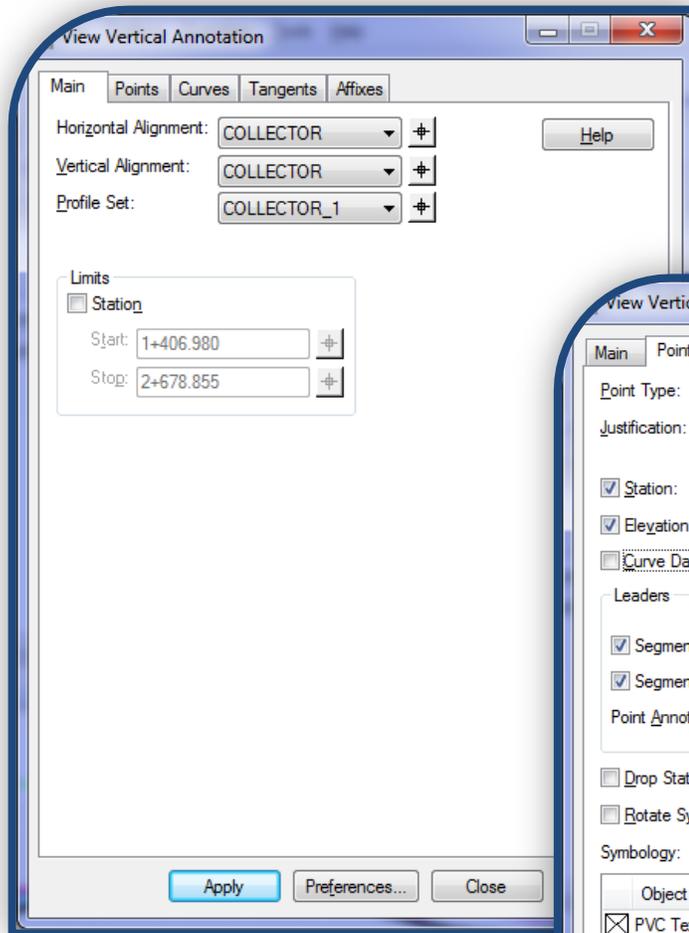
The tabs for **Points**, **Curves** and **Tangents** allow modifications to the display parameters for the vertical annotation.
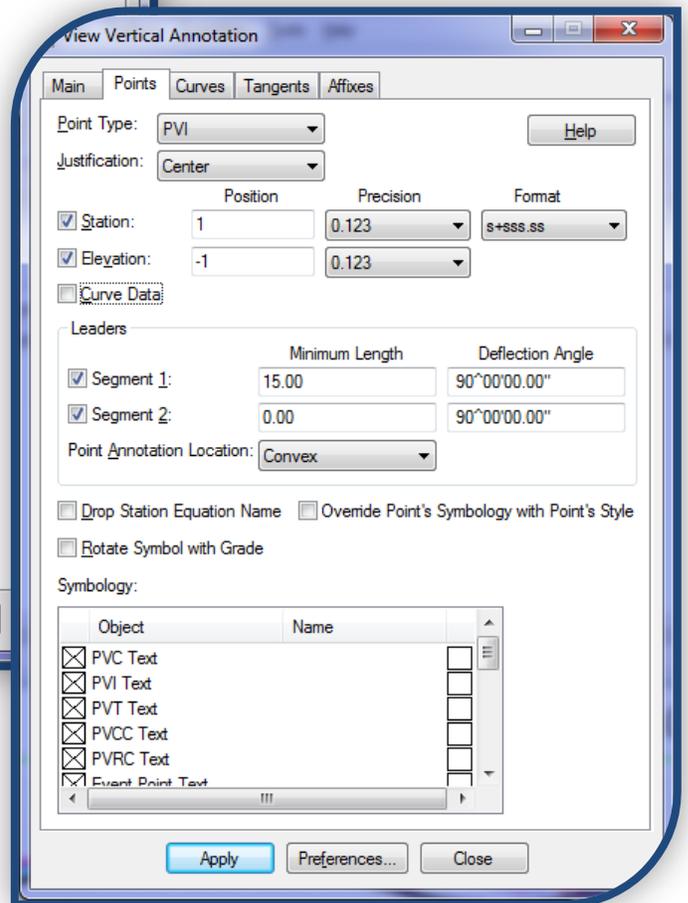
Default preferences have been set up for this information… colour, level, number of decimals, text height and font; they are saved in "COLLECTOR.xin" (formerly BRAMPTON.xin)

Pat Z.

20.   CONTRACT DRAWING PREPARATION

1) SETTING UP THE PROFILE FOR SHEET BREAKS

Page break locations should be marked on the plan and on the profile, these break lines can be on a "misc" layer and are not to be shown on the final drawing. (ENG_WK_MISC-2 for example) Information will need to be duplicated on either side of each break line, in Plan and Profile views, so that it will be shown on both drawing sheets sharing the information.
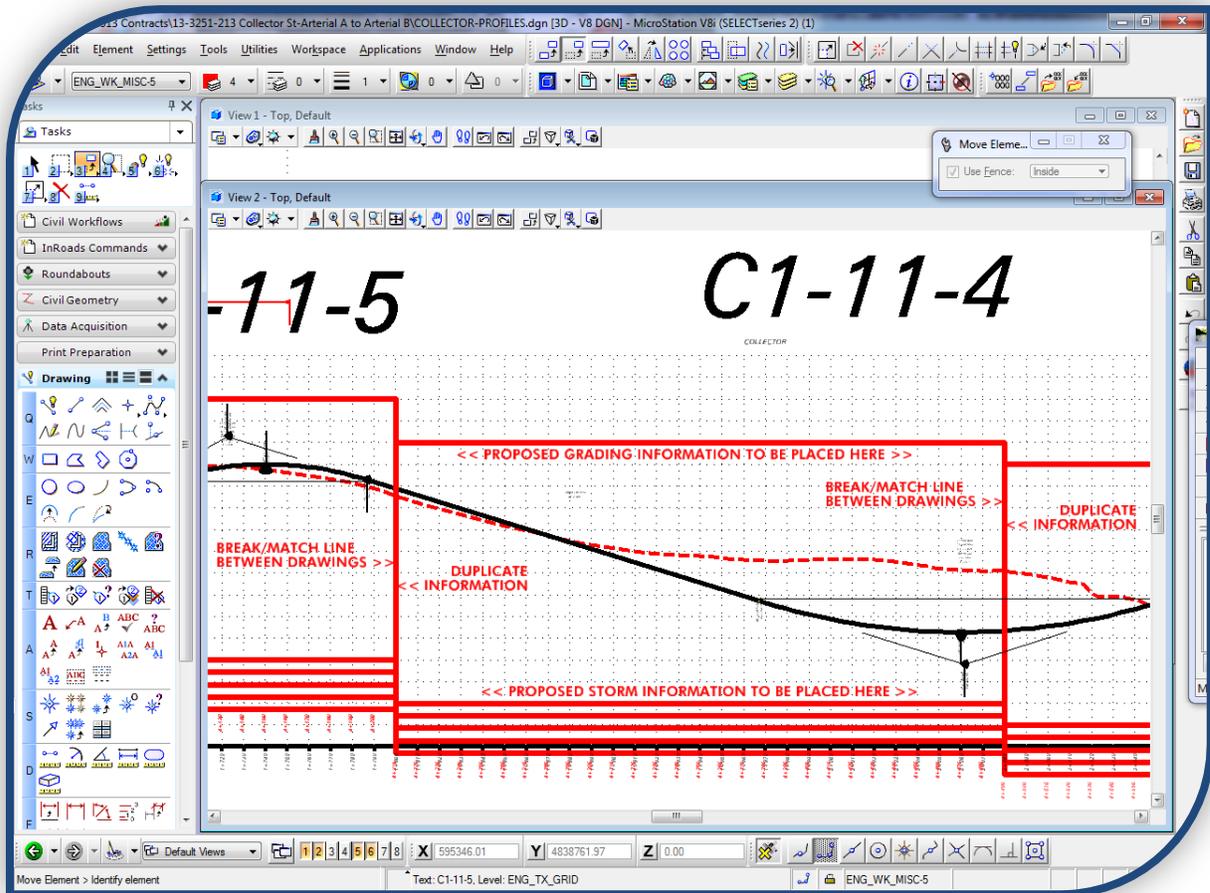
This example demonstrates how the profile can be set up when, over a distance, the elevation range of the first sheet is not suitable for the entire road length or where the slopes change considerably.

For the elements covered in drawing sheets 2 & 3, in this example, changes will be needed for the rotation to match the sheet orientation. Because the area affected is only a portion of the whole project, this re-orientation may have to be done by rotating individual or fenced cells rather than graphic groups as was done initially, and as always around the origin of the cell.

108

Pat Z.

Further and final cleanup of all plans is to be done in "COLLECTOR-??????.dgn" using standards as set out in City of Brampton Standard level Setup and Symbology.

See APPENDIX 1 (SECTION 33.1)

Some information will need to be completed on the individual drawing sheets, i.e. information that is not common to all drawing sheets, including…

- some of the information in the titleblock
- proposed asphalt surface and island areas
- match lines with text and chainage
- elevations (if not the same on all drawings)
- Limit of Contract notes and lines
- profile connective information (pipe ends etc)
- a typical section (if there will be no "typical sections" sheet created).

2) ASSIGNING NUMBERS FOR CONTRACT DRAWINGS

Now that you have determined your main horizontal and vertical alignments and displayed your stationing, the individual drawings can be segmented at even chainages i.e. at a 10m mark.

The drawings can be created and the names changed to reflect the sheet and drawing numbers as they become available. Consultant drawings provided for structures, landscaping etc… will require numbers by the 60% stage, and for each drawing created thereafter.

Determining the correct drawing / sheet numbers is to be completed by the Intermediate Engineering Technician. He/she is most familiar with EDDI and can quickly supply the most up to date information, as well as update EDDI with the new drawing information to prevent duplication between contracts.

The new drawings may update currently listed drawings (thereby assuming their numbers) or may be completely new drawings for details, removals dimensions or where no drawings exist for the stretch of road to be worked on.

The Intermediate Engineering Technician is the point of contact for ALL drawing numbers and SHALL BE CONTACTED for drawing number assignments.

A small hardcopy of the drawings, including the stationing and descriptions in the title blocks is to be supplied to the Intermediate Engineering Technician to assign the drawing numbers and input the information into EDDI. Be sure to include the project's file number and job description as these will also be included in EDDI so that they can be used as part of the search function when looking for these drawings later.

If you know the order, area & street #, the list could be started with something like this…with the sheet number assigned sequentially as the drawings are order in the contract placed first to allow for a properly ordered drawing list in the main directory.

File No. 13-3251-213   Collector Street, Arterial Rd 'A' to Arterial Rd 'B'

SHT	DGN #	STATION	DESCRIPTION
01	B1-11-__	Sta 1+270 to Sta 1+550	165m W to 115m E of Arterial Rd 'A'
02	C1-11-__	Sta 1+550 to Sta 1+830	115m E of Arterial Rd 'A' to 70m E of Thru Rd…

109

Pat Z.

If you are not sure of the area or street numbers, this chart can be created using the information provided by the Intermediate Engineering Technician. He/She will return the set that you have provided, with the numbers assigned on each page. As new numbers are needed and assigned they can be added to the list and this list can be used to populate the contract's index page.

See APPENDIX 5 (SECTION 33.5.III) [Drawing Numbers List / Spreadsheet]

3) OVERVIEW OF EXAMPLE PROJECT

Collector Street is the project target street, it is in areas "B1" & "C1" and the assigned street number in each of those areas is 11. The main street of the contract will require five (5) drawing sheets in area C1 and one (1) in area B1, shown in magenta. There is no curve in this example that would require a rotation of the plate drawing,

EXAMPLE LAYOUT
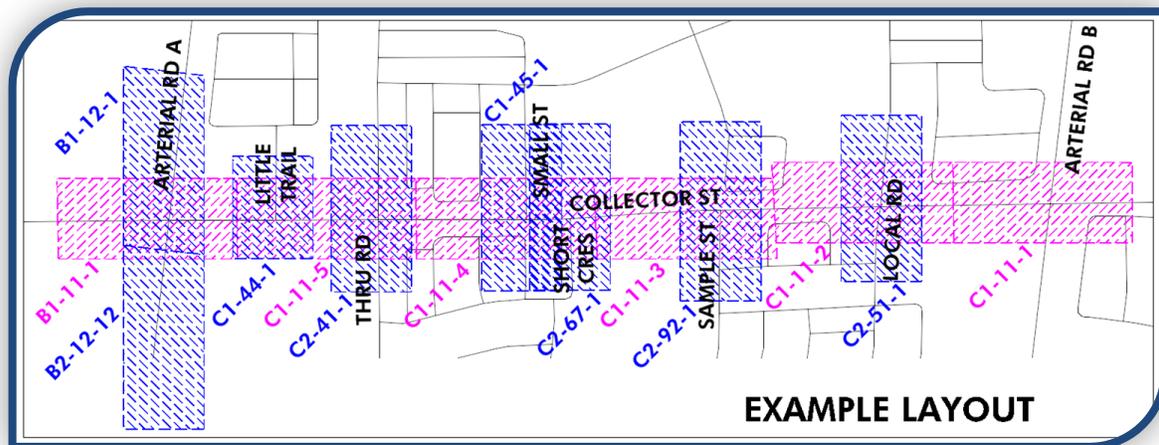
however, the cross roads will require drawings to be prepared for them, in this case, **Little Trail, Thru Road, Small Street, Short Crescent, Sample Street** and **Arterial Roads A & B**, shown in blue.

There are a couple of methods of doing base sheets or "plates". Both ways start with a drawing plan that will cover the orientation of the greatest number of drawings, using the example project it would be drawing…**B1-11-1** which would cover all of the Collector St drawings.

One method references the base sheet to each of the numbered drawings, the other, has the base sheet information in each of the numbered drawings (copied, or merged, into numbered drawing from reference).

Copy, from Engineering Standard Setups\DESIGN DRAWING BASES\, the design file **"4-PLANnPROFILE-sheet-2D.dgn"** (if you haven't already done so) and rename it **"PnP-COLLECTOR-sheet.dgn"**

Enter ALL COMMON information on the Base Sheet (plate) to make it as complete as possible for this project. Start by rotating the P&P information to be in line with the plan drawings, which are referenced, and move plate information to the appropriate location for stationing and orientation using a reference of the design alignments.

DO NOT MOVE STRIP PLAN REFERENCES – EXISTING, PROPOSED, PROPERTY…

110

Pat Z.

4) KEY PLAN

Complete the key plan, a border for the keyplan is provided in this drawing, utilizing information from the street map in the City Portal. (My Network Places...TRUEBRAM\ truebram.dgn) Reference Truebram, then clip, scale/copy the appropriate area to fit within the key plan border. This can be done in a separate keyplan drawing and referenced into the plate and scaled to fit the border before copying the linework.

Highlight the copied information and change the levels to match City of Brampton Standard Level Setup and Symbology for key plan information. [ENG_KEY & ENG_TX_KEY]

See APPENDIX 1(SECTION 33.1.I) [GENERAL LINEWORK AND TEXT LEVELS]

The key plan should...

- ✓ include at least one city quadrant
- ✓ have at least the collector and arterial streets and the project street(s) identified
- ✓ identify major landmarks in the vicinity and watercourses
- ✓ have a North arrow
- ✓ identify drawing locations (basic outlines on base sheet, hatching on individual dgns)
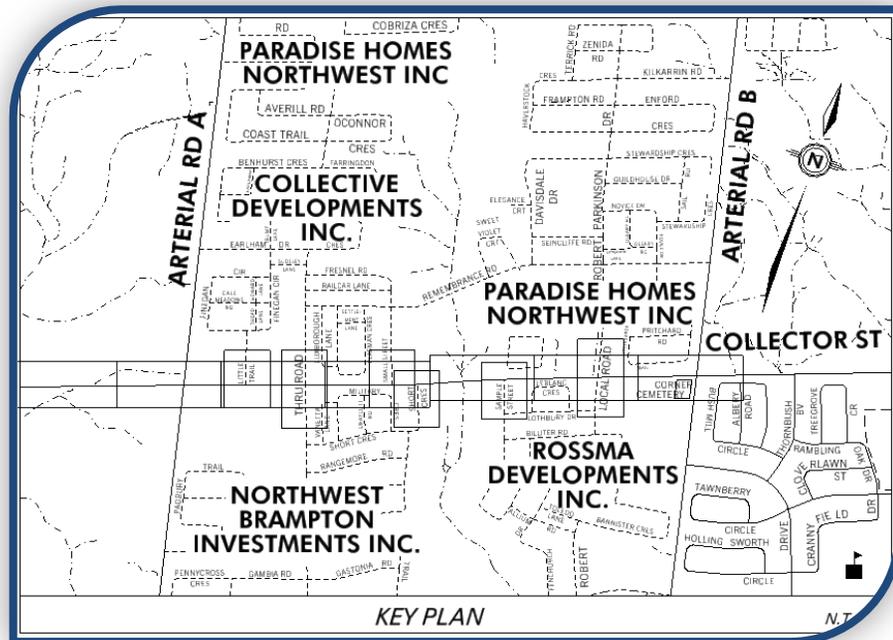
Orient the drawing's main North arrow, based on the plan information, use the most common direction and adjust it in the individual drawing sheets as needed.

Complete the legend and as much of the title block as is common to the drawings…

- ✓ Road --- *Collector Street*
- ✓ Proposed Construction Information…
- ✓ Drawing No. --- *-11-*
- ✓ Scale, Dates, Names and File Number

111

Pat Z.

A basic Legend has been provided, modify the notes and Benchmark information as needed.

This setup may take some time but it will ultimately save time by reducing the unnecessary duplication of information input.

This drawing **"PnP-COLLECTOR-sheet.dgn"** will either be...Referenced to the numbered drawings**...**

> **This method is preferred as much of the repetitive work required for changes to the base is eliminated by referencing the base, along with the exist & design plans & profile.**

...Or copied to the numbered drawings**...**

If you are using the copy method, the more information you complete here, the fewer times you will need to repeat any future changes or additions.

Move and rotate the profile reference to line up with the information on the plan & profile sheet (plate). Ensure that the stationing matches the plan portion and that the elevation linework matches.

> **The column of information from Top to Bottom of the Sheet shall be present on all plan & profile drawings.**
> **The information from the Notes: to the bottom of Titleblock shall be present on any plan only drawings**
> **i.e. Detail Sheets, Removals etc.**

There are three types of rotation in Microstation. Rotate the **VIEW** to match the border of the plan and profile sheet if necessary.

See A WORD ABOUT ROTATION (SECTION 15.2)

112
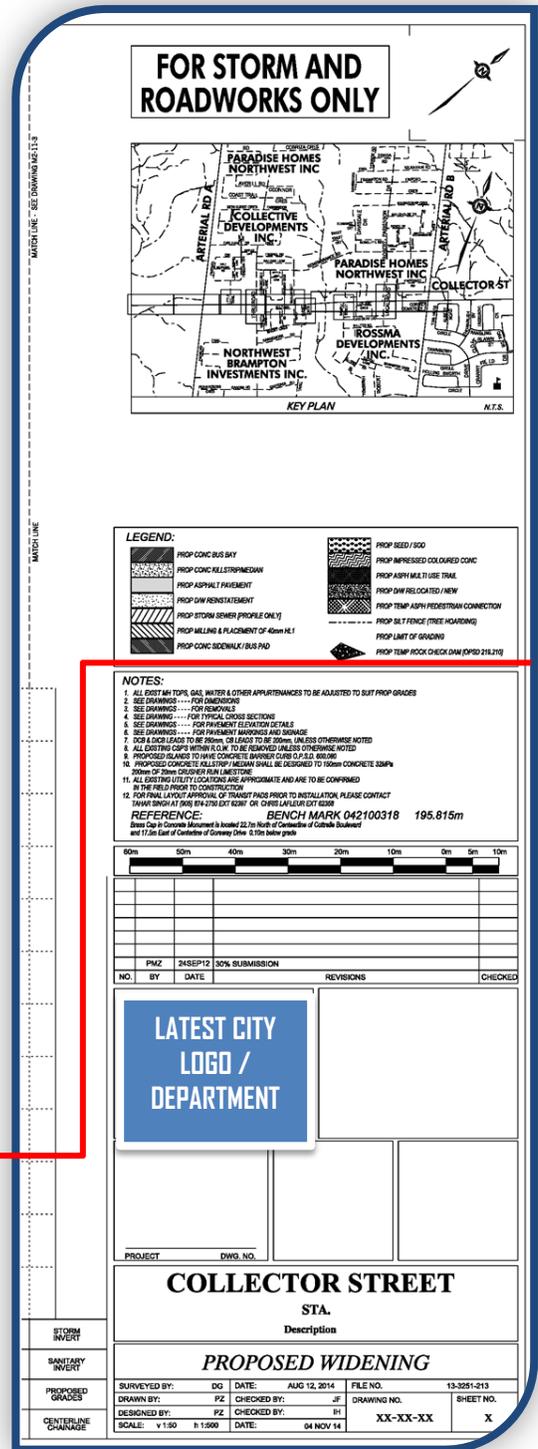
When the information has been added and manipulation is complete in the sheet/plate drawing...

>> File > Compress Design

> **When compressing a design, do not eliminate unused levels, styles etc. Check the setup to make sure there is nothing checked off…**

>> File > Compress > Options
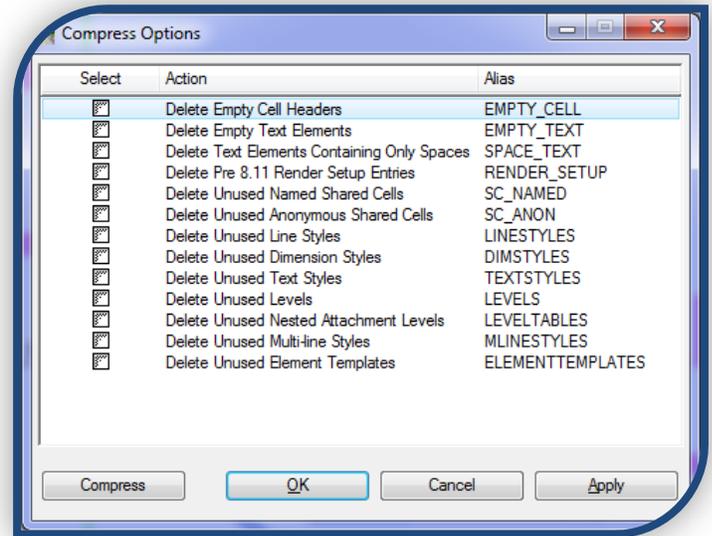
>> File > Save Settings

>> File > Save As

"PnP-CROSSROADS-sheet.dgn" (For use with the crossing road drawings)

In the Design file "PnP-CROSSROADS-sheet.dgn"

Rotate the base information to match the orientation of the cross roads for the project, change the titleblock to modify any information specific to the cross roads i.e. north arrow…Follow the process as outlined for creating the drawings for the main project street to create drawings for each of the cross roads.

For the typical sections, details, removals, dimensions and so on, there are drawings set up in Engineering Standard Setups. **3-REMOVALS-sheet-2D.dgn, 5-DIMENSIONS-sheet-2D.dgn, 6-DETAILSnTYPICALS-sheet-2D.dgn** and so on. These can be utilized for all of the different detail drawings associated with the contract. Each base has been slightly tailored to the use of the drawing. The "typicals" drawing has some of our standard details already drawn, pavement markings and removals each have their own legend. Rename the files to reflect the street name and the type of detail.

> **These base sheets / plates can be used as references, just as the P&Ps are. (COLLECTOR-REMOVALS-sheet.dgn, COLLECTOR-DIMENSIONS-sheet.dgn...)**

113

Pat Z.

5) CREATE DRAWING SHEETS

BEFORE BEGINNING...

- ✓ Copy design file **"COLLECTOR-base.dgn"** and rename it to one of the contract drawing numbers... **"'sheet#'-'dwg#'.dgn"**
  ...In this example that name would be **"01-B1-11-1.dgn"**
- ✓ Open the newly named Design file **"01-B1-11-1.dgn"**
- ✓ Turn on all levels and Delete all information
- ✓ Reference design file **"PnP-COLLECTOR-sheet.dgn"**
- ✓ Reference design file **"Collector-base.dgn"** (If it isn't already)
- ✓ Reference design file **"COLLECTOR-PROPERTY.dgn"**
- ✓ Reference design file **"COLLECTOR-DESIGN.dgn"**
- ✓ Reference design file **"COLLECTOR-PROFILES.dgn"**
- ✓ Reference design file(s) received from Hydro

Move reference file **"PnP-COLLECTOR-sheet.dgn"** to match the desired location & chainage on reference file **"COLLECTOR-DESIGN.dgn"**

> **The ultimate result for this initial drawing is to move the referenced sheet (plate)drawing and profile drawing(s) to the correct chainage position for the first drawing, based on the referenced existing strip plan.**
>
> **To manipulate a reference file, you will be working within the Reference Files toolbox.**

> **AGAIN, I REPEAT...**
> **Strip plan information, whether referenced or live, is not to be moved.**
> **Only the border information and referenced profiles are to be moved.**

When satisfied with the position of the referenced plate on the strip plan and the position of the referenced profile(s), in relation to the plate and the strip plan chainage...

>> File > Save Settings

Make note of the stations you will use for the match lines at the beginning the end of each drawing sheet.

Not all drawing sheets are required to have the full 280m (140m in a 1:250 scale drawing), page breaks may need to be adjusted to avoid splitting an intersection.

If you have opted to copy the plate information into the numbered drawings, this is the point at which you can do that. Although not the preferred method, it may be unavoidable in some situations.

CREATING DRAWING SHEETS

Once your first sheet has been set up to your satisfaction, with the settings saved, you can begin to copy it to create the rest of the numbered drawings.

Use **"save as**", from within Microstation, to create the other drawing sheets in the project **(02-C1-11-5,03-C1-11-4,04-C1-11-3,05-C1-11-2 and 06-C1-11-1**) By moving either the reference file of the plate, and/or the plate information, along the referenced file **"COLLECTOR-DESIGN.dgn"** you will be creating a design file for each of the numbered drawings. Save the settings before using "**save as**" to create the next drawing sheet.

114

Pat Z.

> **If you use an element (shape) to clip the reference files, the drawing will automatically be adjusted to show the new area of the reference files as you move the shapes along the alignment. There are shapes in the PnP sheet on level ENG_WK_MISC1 that can be used for this purpose.**

6) CLIPPING INFORMATION FOR DRAWING SHEETS

The drawings should now be set up for clipping the referenced files. Fence an area, using the match lines as a guide and snapping to the line ends, or copy the shape from the PnP drawing, modify and use it to clip the referenced strip plan(s). The referenced profile can be clipped using the profile linework as a guide for fence/shape placement. The referenced base sheet will not be clipped.
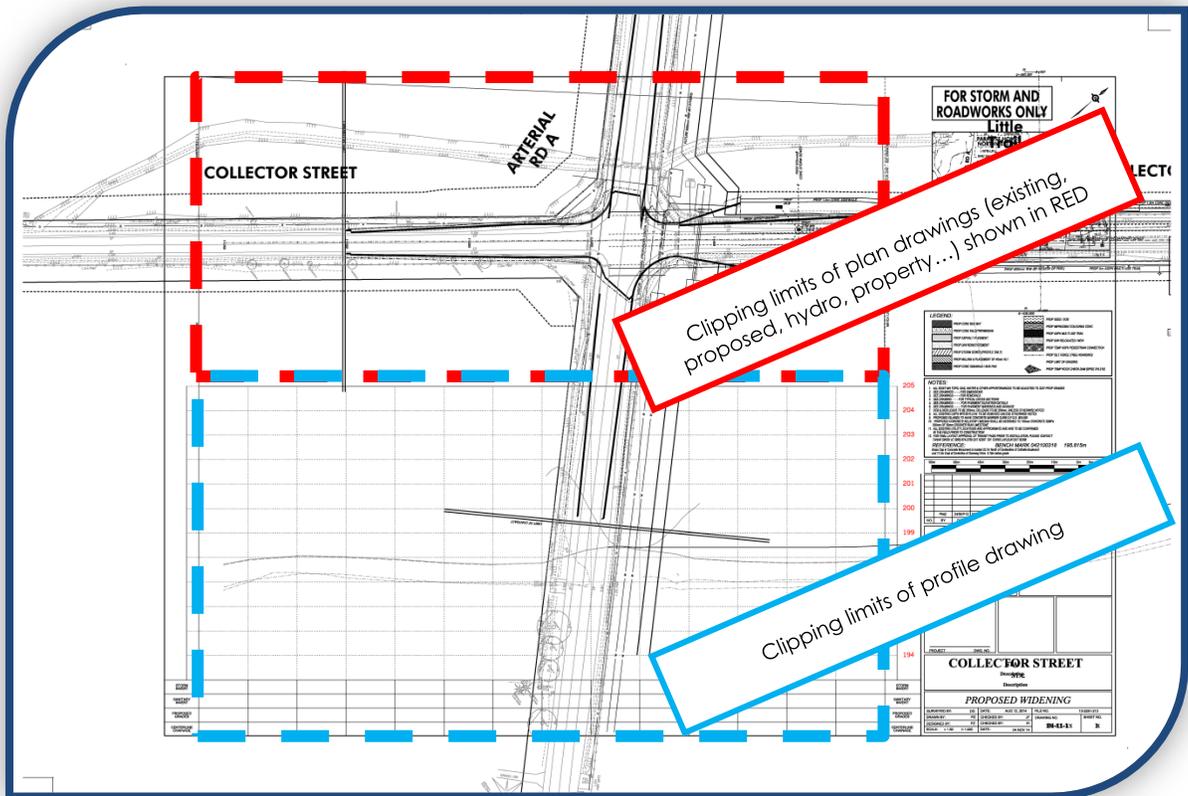

> **Do not "eyeball" these locations; it is important that the tentative / snap functions be utilized for moving and clipping reference files.**
> **Use the location of the plans i.e. "Collector-base.dgn" and "COLLECTOR-DESIGN.dgn", as the constant, move and rotate any other reference files to fit. The referenced profile will need to be moved and rotated to match the orientation of the base sheet and the stations on the plan portion. When completed on the 1st sheet, it will allow the clipping shape to be dragged along it for each new sheet.**

The profile may be attached multiple times for extreme elevation changes; it may also be attached an additional time to display the elevations/stations/storm information on the bottom.

Pat Z.

The necessary reference file(s) should now be trimmed to the rectangle or shape set by the fence/element. Work through each drawing sheet in turn…make sure the profile reference is correctly aligned with the stations on the strip plan references and the base sheet lines up with both the plan and profile portions required for each drawing. Clip the strip and profile plans using the fence/element.
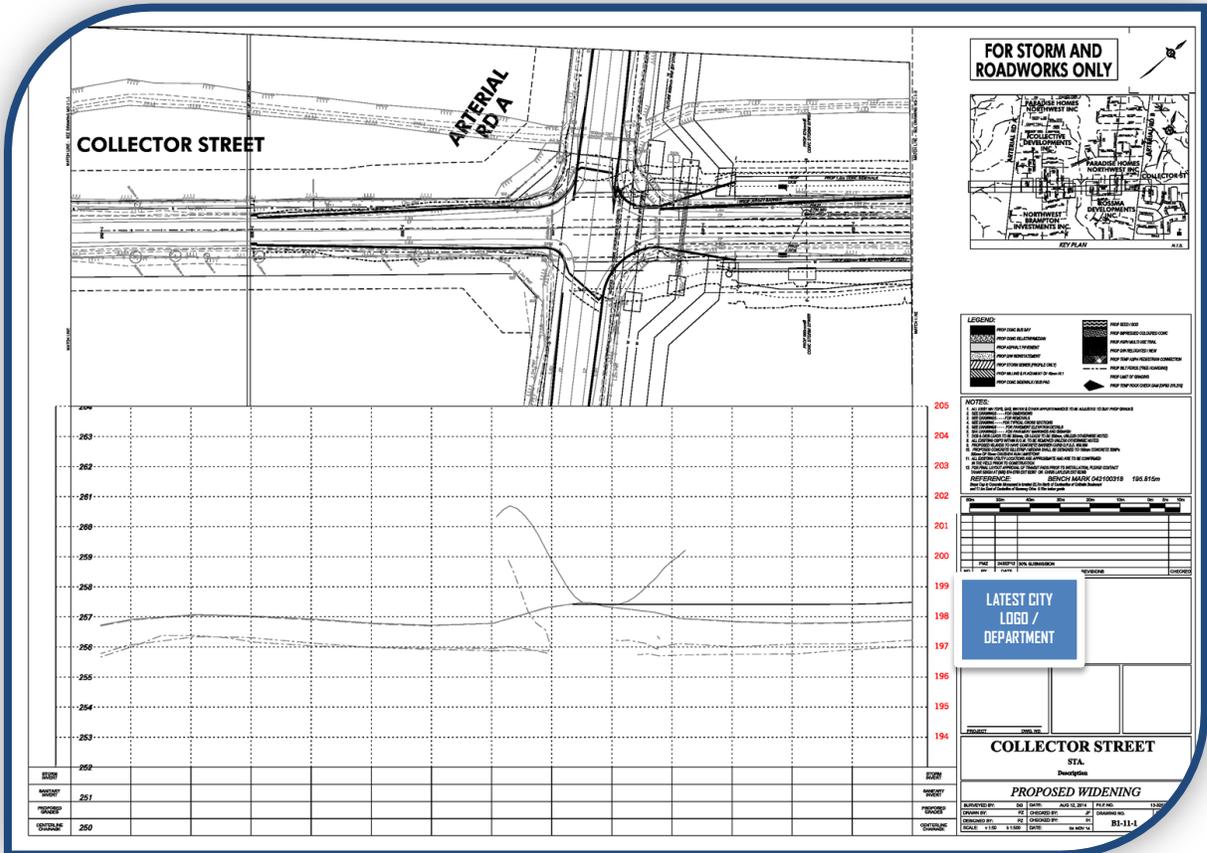
The strip plan and profile design files will remain unchanged during the reference file manipulation; only a "snapshot" of the file is manipulated and clipped using the reference file toolbar. The reference file can be un-clipped or re-clipped to enlarge or reduce the portion that is shown.

When the clipping has been completed, display the entire sheet in one view, set up the levels you want on/off for printing, then save your settings to secure the work settings completed, the view will be displayed as it is saved when you, or anyone else, next open the drawing.

Any changes made to a design file will be reflected in all the files to which it is referenced. What you see on the screen in this design file is only a snapshot of the original drawing file therefore you will need to open the original design file to modify any elements in a referenced file.

116

Pat Z.

7) ACTIVATE A REFERENCE FILE

There is also a mechanism to 'activate' a highlighted reference file. Once activated, you can modify the reference file elements without leaving your current design file. This is handy when you need to do a quick adjustment in a referenced file such as remove a stray line or add/move some text.

The reference file must then be 'deactivated' before you can continue to work in your current design file.

When you modify property lines or design elements in "COLLECTOR-*.dgn", these changes will display in any numbered drawings that reference it (in this case B1-11-1).

When the first drawing has been completed...

>> File > Compress Design

>> File > Save Settings (Ctrl + F)

>> File > Save As …"02-C1-11-5.dgn"

Adjust the base information as required for this drawing; check the position of the plan and profile sheet information on the plan portion and ensure that the position of the profile in relation to this sheet is correct.

Make sure each reference file is correctly oriented and aligned with the stations then clip the references using the match lines and profile lines as guides for a fence or shape. Placing a shape on a misc level (ENG_WK_MISC-1) to be used for clipping the references allows modifications to the area being clipped. Moving or modifying the shape will automatically display the new section of the reference file.

>> File > Compress >Design

>> File > Save Settings (Ctrl + F)

>> File > Save As … "03-C1-11-4.dgn"

Repeat these steps until there is a drawing file for each sheet required.

For the cross roads, the base will need to be rotated and moved to match Arterial Rd A for the first drawing, 07-B2-12-12.dgn, the view can be rotated to show the base in the correct orientation, then save it and follow the same method to create the remaining drawings.

117

Pat Z.

21.   NUMBERING DRAWING SHEETS

Individual sheets will still be needed for the other drawings in a project. There are bases created for 'plan only' drawings…these have the profile grid removed and contain some of the City's standard details or legends based on the use of each base. Copy to, or save as, a numbered sheet, or a generic base plate named to reflect the drawing type i.e. "COLLECTOR-DETAIL-sheet.dgn", "COLLECTOR-REMOVALS-sheet.dgn"…

As with the plan and profile drawings, you will need to modify information pertinent to each drawing in the numbered drawing and the primary information such as key plan, titleblock, common information etc can be completed in, and referenced with, the plate.

Drawing Numbers will be set up as follows…

Structures Plans   "area – 0 – page.dgn"

General Plans   "area – 1 - page.dgn"

Lot Grading   "area – 2 - page.dgn"

Storm Drainage   "area – 3 - page.dgn"

Sanitary   "area – 4 - page.dgn"

Easements   "area – 5 - page.dgn"

Watercourses   "area – 6 - page.dgn"

Watermains   "area – 7 - page.dgn"

Contract Details   "area – 8 - page.dgn"

WTC / FDC   "area – 9 - page.dgn"

Traffic "area - 10 - page.dgn"

Plan and Profile   "area - # - page.dgn…from this point the centre figure (#) would represent the street number.

These numbers are assigned by the Intermediate Engineering Technician who will also add the new drawings to EDDI so that there is no duplication

The Intermediate Engineering Technician is the point of contact for ALL drawing numbers and must be contacted for drawing number assignments.

You will prefix each drawing file name with a sheet number you will assign to it in the contract.

118

Pat Z.

1) DRAWINGS TO BE CREATED OR MODIFIED

!!READ-ME--DRAWING REQUIREMENTS.docx

This README document is found in the City Drawing Templates folder (CAPITAL WORKS DELIVERABES) and in the DESIGN DRAWING BASES folder (Engineering Standard Setups), and explains, in detail, the required information to be shown on each type of drawing sheet. This information is also within each drawing template.

As with the plan and profile drawings, add each drawing to the list you have saved in COMMUNICATIONS, as it is created. Provide a description to the Engineering Technician for each drawing to be numbered.

TITLE PAGES

(00-C1-*8-15*-TITLEPAGE.dgn, 00-C1-8-16-LISTPAGE.dgn)

The title page has been set up with the City map (TRUEBRAM) and text placement as well as all the submission stages i.e. 30%/60%/90%/100%/tender/construction. Each stage is on its own level so you will need to display only the one which applies for each submission. The drawing list page has also been set up with the text placement and the submission stages.

ENGINEERING PLAN & PROFILE DRAWINGS

(01-B1-11-1.dgn, 02-C1-11-5.dgn …)

Plan and Profile sheets will have the bulk of the design information on them; new curb lines, sidewalks and other street furniture along with shading and hatching. The stationing, vertical and horizontal alignment information and construction notes to direct contractors are to be provided on these pages.

NOTE: Pipe sizes equal to, or greater than, 900mm shall be shown (in plan view) by offsetting linework to display an accurate diameter. Center line to remain as the bylevel linestyle, outer linework will changed to be LS=0

Storm underground will be represented in the profile with linework, shading and information to identify and describe MHs and storm pipes. i.e. numbers, size, length, inverts, OPSD#.

Any CB/DCB that cannot be placed at the standard elevations i.e. minimum cover of 1.2m from obvert to finished c/l and minimum slope of 2%, will also be detailed on the drawing, as close as is reasonably possible to the CB/DCB in question. Also to be included on these drawings are charts of CBs and MHs contained on each drawing, these will include the MH, or CB, number, station, offset, OPSD and MH top, or edge of pavement, elevation

See APPENDIX 5 (SECTION 33.5.V) [Storm Information Charts for DESIGN Drawings & Quantities]

119

Pat Z.

REMOVALS

(Sheet#-C1-8-##-REMOVALS.dgn)

These drawings identify all items to be removed, relocated or adjusted and are generally the first to be created. As a general rule, there will be two or three sections of the roadway (one above the other). This will necessitate referencing the strip plans multiple times and moving some of the references for all but the top one. Give them logical names such as...TOP-EX, BOT-EX, TOP-PROP, BOT-PROP, TOP-DES, BOT-DES

> **The removals drawings, once created, can be copied to produce the Dimensions, Pavement Markings drawings, and any other plan only drawings required since the basic setup will be the same on all the plan drawings.**

- When creating the removals drawings...attach the strip plans for existing, design, property and pavement markings, then adjust the level display for each series (Removals, Dimensions, Pavement Markings) as needed.

- Removals drawings will not display the design information, but you will need the design for determining the limits of the removals.

- Dimensions drawings will display the proposed roadway and property linework, but will not usually display the existing information.

- Pavement Markings drawings will need to have the base plan for the pavement markings attached and will also display the proposed roadway and property linework.

DIMENSIONS

(Sheet#-C1-8-##-DIMENSIONS.dgn)

Show on the dimensions drawings, centerline elevation every 20m, plus vertical change points, and dimensions at all horizontal change points to centerline and/or property line. Identify the storage-taper stations and lengths.

PAVEMENT MARKINGS

(COLLECTOR-PVMNT_MKGS.dgn, *Sheet#-C1-8-##-PVMNT_MKGS.dgn*)

The main file, COLLECTOR-PVMNT_MKGS.dgn, will have no information in it, at this point, but will reference the design, property and existing files with the levels adjusted to show the pavement marking levels in the design file, and basic information on the references. This is the file that Traffic Dept will work in. Set up the pavement markings sheet drawings with all the files required, generally you can copy either the removals or dimensions drawings since the arrangement will be the same, and then adjust the references and levels as needed for the pavement markings.

These drawings will have, in addition to placement of pavment markings, signage and pavement markings removals.

Create a folder in **G:\wtengmain** and provide all the drawings required to produce the pavement markings sheet drawings i.e. Pavement Markings, Property, Plan, Design and Base sheet [***G:\wtengmain\pavement mkgs\ COLLECTOR – Arterial A to Arterial B]***

Pat Z.

Ensure that the supporting design files are updated regularly, and notify the Pavement Markings Group when updates have occurred, they may need to update their design to accommodate any changes.

In future, a process will be set up to allow Traffic Dept. to have read access to the "wtdesign" folders thus allowing them to reference our strip plans directly and eliminating the need to keep the "wtengmain" files updated.

DETAILS & TYPICAL SECTIONS
(Sheet#-C1-8-##-DETAILS.dgn or Sheet#-C1-8-##-TYPICALS.dgn)

These drawings will contain any details required for the contract including, but not limited to, typical cross sections, pavement structure and site specific details for items such as headwalls.

PAVEMENT ELEVATIONS
(*Sheet#-C1-8-##-ARTERIAL-A-ELEVATIONS.dgn,*
Sheet#-C1-8-##-LITTLE-THRU-ELEVATIONS.dgn…)

These drawings will be done for all intersections at a 1:250 scale, some drawings will contain only one large intersection, others may have more. Elevations are to be shown at the BC, EC and quarter points around the radii, High Points and Low Points. The slope and direction of flow arrows will be shown around the radii and through the intersection.

REFERENCING THE BASE SHEET VS IMPORTING THE BASE SHEET
There are advantages and disadvantages to each method…which one is chosen for use on any given project will be determined by horizontal changes, minimum / maximum elevations and intersections, among other criteria.

The preferred method is to use one plate (base sheet), referenced to each drawing sheet. The drawing sheets themselves will have little information in them as most of it will be referenced. i.e. plan drawings, profile drawing(s), plate drawing. By referencing as much as possible, changes are made once and shown everywhere without the need for duplicating the changes in each drawing. There may be multiple plates considering cross road sheets will need to be rotated.

If there is a large elevation change along the road, a valley perhaps, having the plan & profile sheet information within each drawing may be advantageous to allow the versatility of splitting the profile and changing the elevations for half of the drawing or changing the elevation numbers from drawing to drawing for steep inclines. However, you could still reference the plate to each drawing if you copied the elevations into the numbered drawings and modify them as you do the sheet numbers and description in the title block. Extreme vertical changes can be accommodated by referencing the profile twice and shifting one of them up, or down, as needed and adjusting the elevation labels.

A roadway where there is little change in vertical or horizontal alignment is an excellent candidate for the reference method where changes can be made on a single base sheet that is referenced to numerous drawing sheets without a lot of individual sheet changes required.

To use only one plan & profile base sheet, the titleblock information and north arrow would need to be done in each individual drawing to accommodate the differing

121

Pat Z.

orientations, street names, numbers and descriptions. A profile with a grade change of more than fourteen meters over the length of the project, will require multiple elevation ranges as you work your way along the street, creating drawing sheets.

In either method, changes to the legend…things like filling in a drawing number for typical sections sheet, detail sheet, dimension etc, as they are created, or adding special notes or symbology, can be done by creating a cell of the legend and replacing it at each occurrence as needed to reduce the amount of repetition of changes. In the reference method, there will be a lot fewer occurrences, as the base sheets are referenced.

2) ASSIGNING THE CONTRACT SHEET NUMBER…

These numbers are assigned by the Design Technologist, in sequence, to the contract drawings once the package has been assembled. When referring to a specific drawing, referencing the sheet number makes it easier to locate in the package as the drawing numbers may not be ordered sequentially.

This is how it would look in the Drawing List sheet; the number on the far right is the assigned sheet number. The number left of the sheet number is the drawing number assigned by the Intermediate Engineering Technician.

BID CALL No.:

FILE No: 13-3251-213

LIST OF DRAWINGS

DESCRIPTION	STATION	DRAWING	SHEET
COLLECTOR RD			
165m W to 115m E of Arterial Road A	STA. 1+270 to STA. 1+550	B1-11-1	1
115m E of Arterial Road A to 70m E of Thru Road	STA. 1+550 to STA. 1+830	C1-11-5	2
70m E of Thru Road to 50m E of Short Crescent	STA. 1+830 to STA. 2+110	C1-11-4	3
50m E of Short Crescent to 95m E of Sample Street	STA. 2+110 to STA. 2+390	C1-11-3	4
95m E of Sample Street to 125m E of Local Road	STA. 2+390 to STA. 2+670	C1-11-2	5
125m E of Local Road to 140m E of Arterial Road B	STA. 2+670 to STA. 2+950	C1-11-1	6
ARTERIAL ROAD A			
135m S to 45m S of Collector Street	STA. 3+940 to STA. 4+030	B2-12-12	7
45m S to 135m N of Collector Street	STA. 4+030 to STA. 4+210	B1-12-1	8
LITTLE TRAIL			
40m N of Collector Street to Collector Street	STA. 0+040 to STA. 0+000	C1-44-1	9
THRU ROAD			
40m N to 40m S of Collector Street	STA. 1+190 to STA. 1+270	C2-41-1	

The File Number, formerly called a Project Number, is to be obtained at the beginning of a project from either the Supervisor, or the Co-ordinator, of Engineering CADD, and consists of three parts…

- The two digit Year
- The four digit Street Designation
- The Type of project.

The Bid Call Number, formerly called a Contract Number, will be assigned by purchasing at time of tender.

122

22.   INROADS - TEMPLATES

Templates have been created for each of the City of Brampton 200 series standards, some variations, as well as components and half templates for intersection corridors.

Points in the templates are used to allow you to "stretch" the template at appropriate locations. Pre-determined lane configurations and transition lengths can be used in the creation of the roadway library.

The Points within the templates are used by InRoads to create features of the same name.

Examples of Points/Features…

- **REP**   Right Edge of Pavement
- **RGUT**   Right Gutter
- **RFC**   Right Face of Curb
- **RBC**   Right Back of Curb
- **RFSW**   Right Front of Sidewalk

Each feature is unique and has a feature style assigned to it to allow a different appearance for plan, profile and x-section instances of each feature. **"RBC"**, as an example, will display in the plan view as per the City of Brampton levels and symbology…it will be displayed as a linestring in plan view but will not be displayed in *profile. Templates do not allow duplication of names so* there is another feature created for the left back of curb **(LBC).**

> Feature styles can be modified to display in any aspect, if required for particular situations.

Each template consists of components & end conditions; each component represents part of the road structure. These components, along with the end conditions, are combined to produce the templates.

The templates will be modified to suit specific project needs, where pavement width or depth, as an example, may have been changed, or the sidewalk has been moved from the

standard location to avoid conflicts with other services. Copy the template to a similar but descriptive name with an outline of the changes in the description field. Since the template library file name has been changed to "COLLECTOR.itl" in the INROADS folder of the Contract Directory, it can be cleaned up, with any unnecessary templates removed, and the templates used for the contract will remain with the contract files.
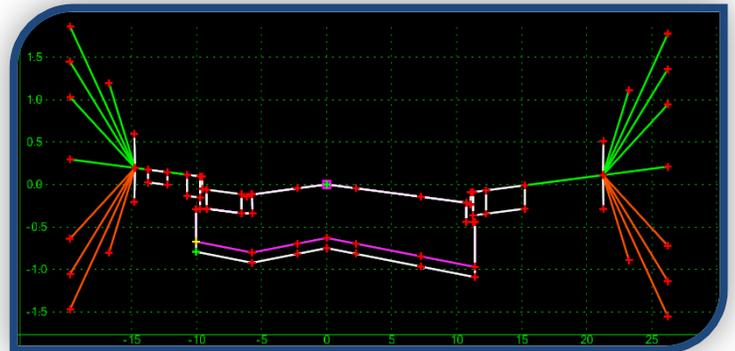
> Templates and components can be imported from another library, '.itl', if things don't go the way you planned or you have accidentally removed a needed template. Another contract's library can be utilized if it is a closer match to your needs.

123

Pat Z.

Each point in the template, and its parts, is colour coded to indicate what constraints are placed on it.

Red indicates two constraints

Yellow indicates one constraint

Green is unconstrained.
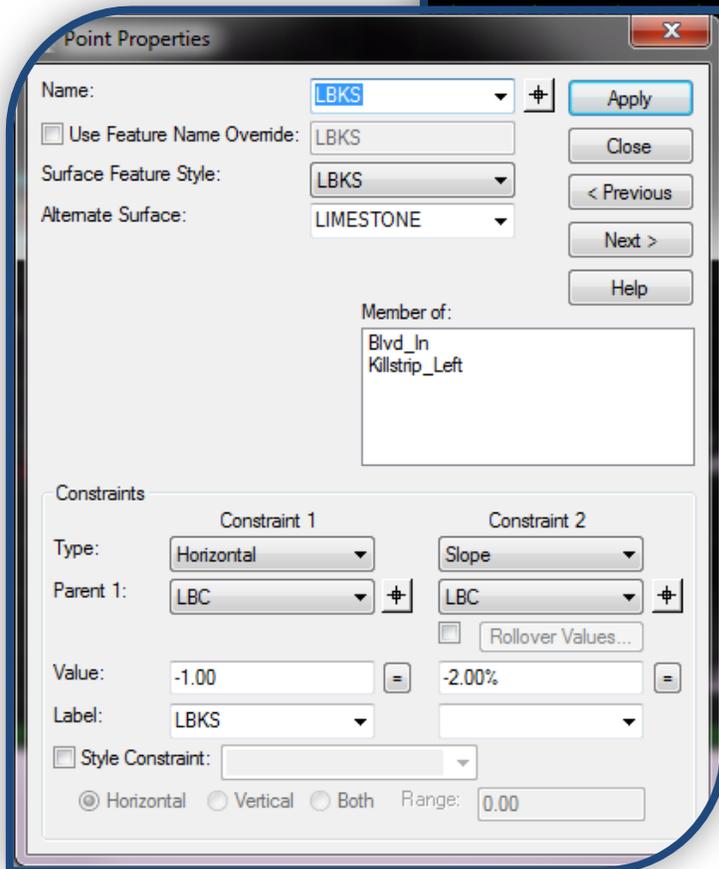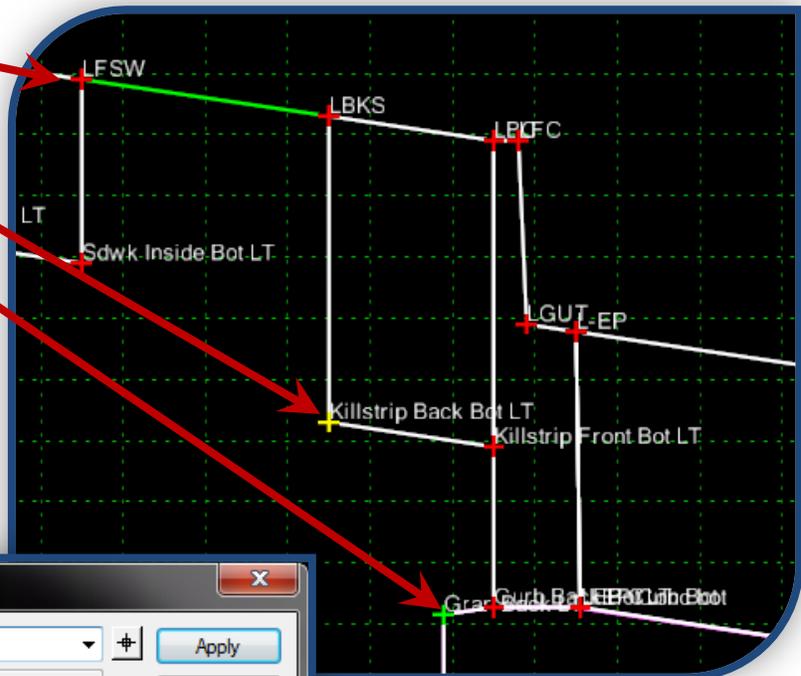
The properties for the point selected here (**L**eft **B**ack of **K**ill**S**trip) indicate two constraints, one distance and one slope, from a single point (**L**eft **B**ack of **C**urb).

These constraints allow you to modify a portion of the template and have the associated points follow the change.

It also indicates that the point is shared by two components, in the "Member of" field.

End condition components allow you to dictate a portion of the segment and have it search for a target, i.e. matching the active surface; it also sets a priority to determine which end condition will search first, second and so on.

124

23.   INTERFACE - INROADS | MODELER

1)   UNDERSTANDING THE ROADWAY MODELER INTERFACE

The Roadway Modeler working windows provide a lot of information and allow access to many avenues of change. These will be outlined in the following pages.
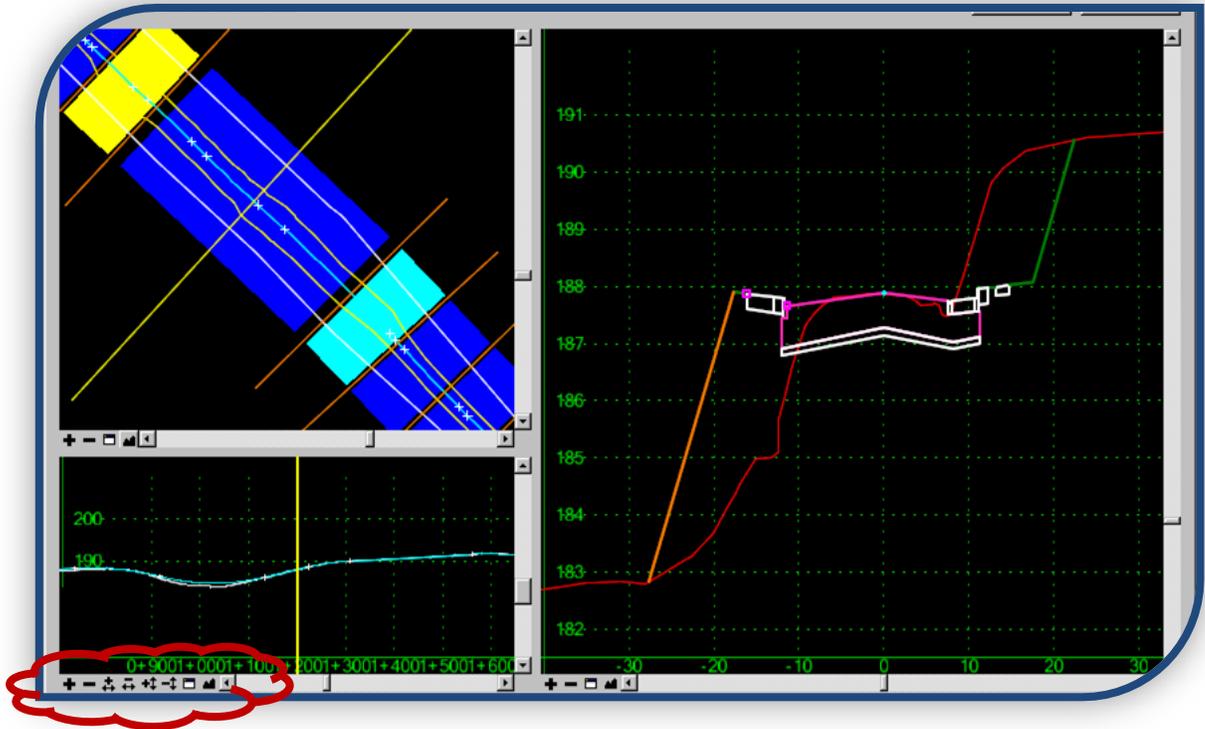
There are three main windows in the dialog, Plan, Profile and Cross Section, each has a series of view adjustments on the bottom left corner of them. As with Microstation, you can zoom in/out, fit all and window an area. In addition, you can change the vertical / horizontal exaggeration for the profile view.

These views are supported by fields in the remaining area of the dialog box where you can input information, change your location, corridor, surfaces etc.
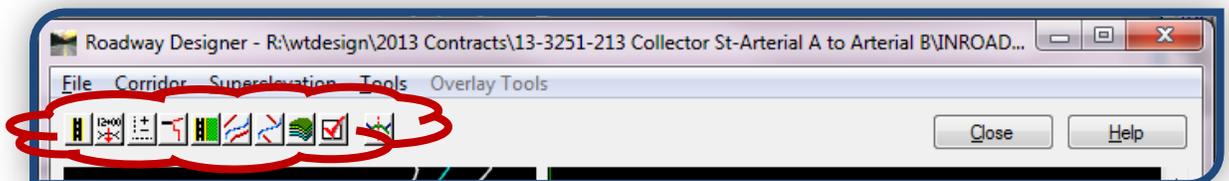
The top of the dialog box provides the sequence to follow for setting up Corridors, Template Drops and so on… these will be outlined in the following pages to guide you through the current practices for creating corridors and surfaces.

125

Pat Z.

The bottom of the dialog box is where you can specify the corridor, active surface and select stations to review in the cross section view. The interval and template name for the selected section are shown below the station.
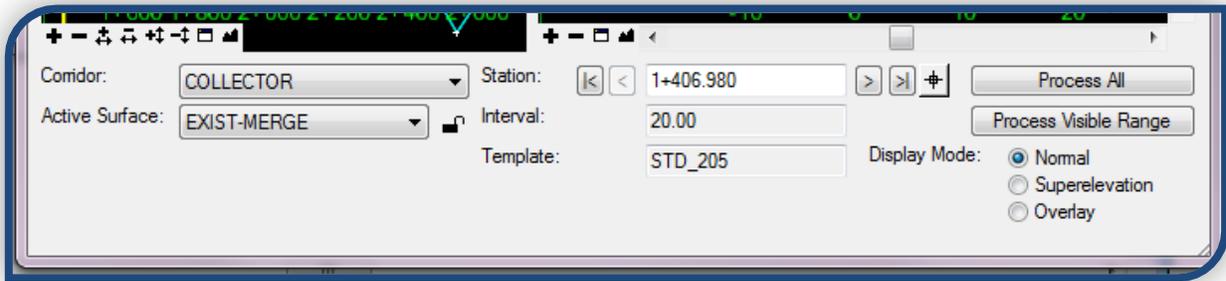
Overall the modeler provides a good overview of the project with the options to modify many aspects of the design corridors and surface.

Pat Z.
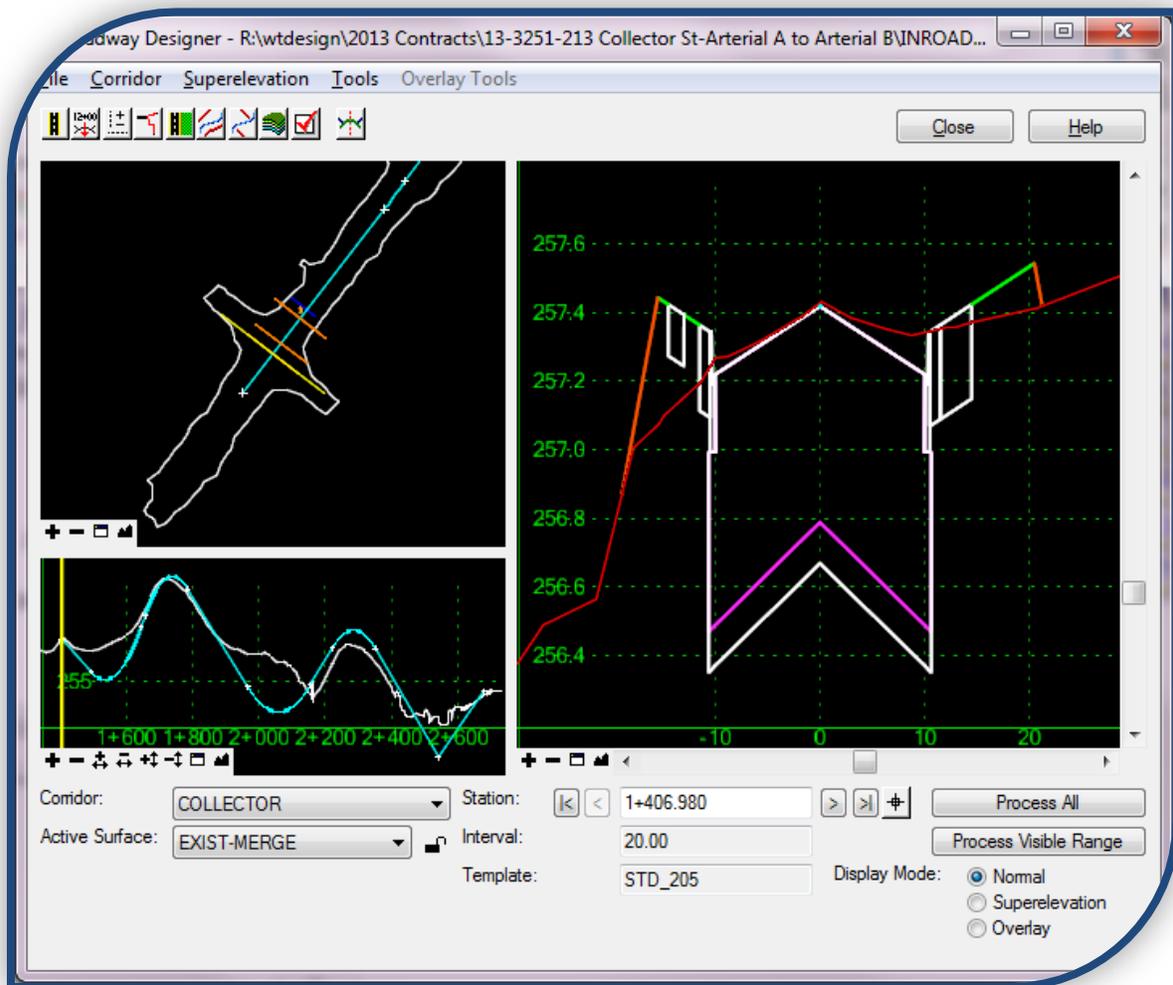
2)   ROADWAY MODELER PLAN VIEW
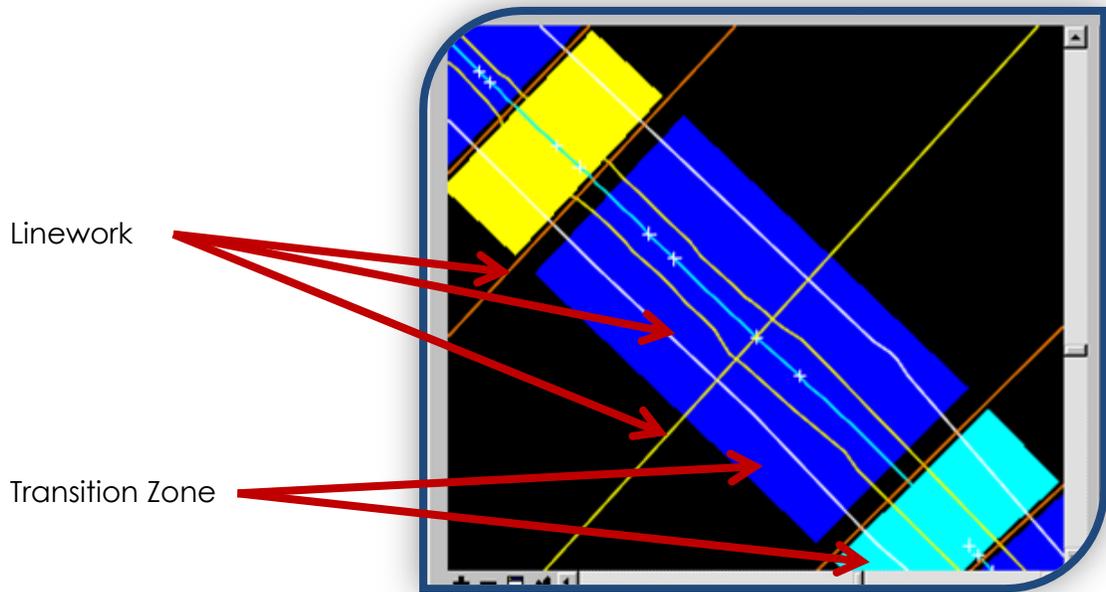
COLOUR CODING FOR LINEWORK

- The **cyan line** in the centre represents the alignment.
- The **brown lines** crossing the alignment represent template drops. Right clicking on one of these lines will bring up a menu with the choice to "edit", "delete" or "add transition" the template drop. Selecting "edit" will bring up the Template Drops window to allow you to edit the drop locations, interval, templates etc.. Selecting "delete" will remove that template drop. Selecting "add transition" will provide a transition between template drops.
- The **yellow line** crossing the alignment represents the current station as identified in and below the TEMPLATE/SECTION VIEW. This line can be dragged along the alignment to any location chosen.
- The **yellow and white lines** running the length of the alignment represent the edge of the backbone and limit of grading of the template(s) respectively.
- The **white crosses** on the alignment line represent change points on the horizontal alignment. In this example, even though it appears straight, the points represent BC & EC of a large horizontal curve. Hovering the cursor over them will display the station and identification for that point.

COLOUR CODING FOR TRANSITION ZONES

- The **dark blue areas** signify that the template backbone points match.
- The **light blue (cyan)** areas signify that the template backbone points do not all match but that it has been reviewed or edited at least once.
- The **yellow areas** signify that the not all the template backbone points match.
- If there are **red areas**, it indicates that you are way out to lunch and none of the backbone points from the template connect to any of the backbone points on the next template.

127

Pat Z.

EDIT TRANSITION

Double clicking on one of the transition zones will bring up a window with the connections between templates shown. This example has one template with a bus bay, one without, so there will be unconnected points.

The bordering stations are identified in the header.
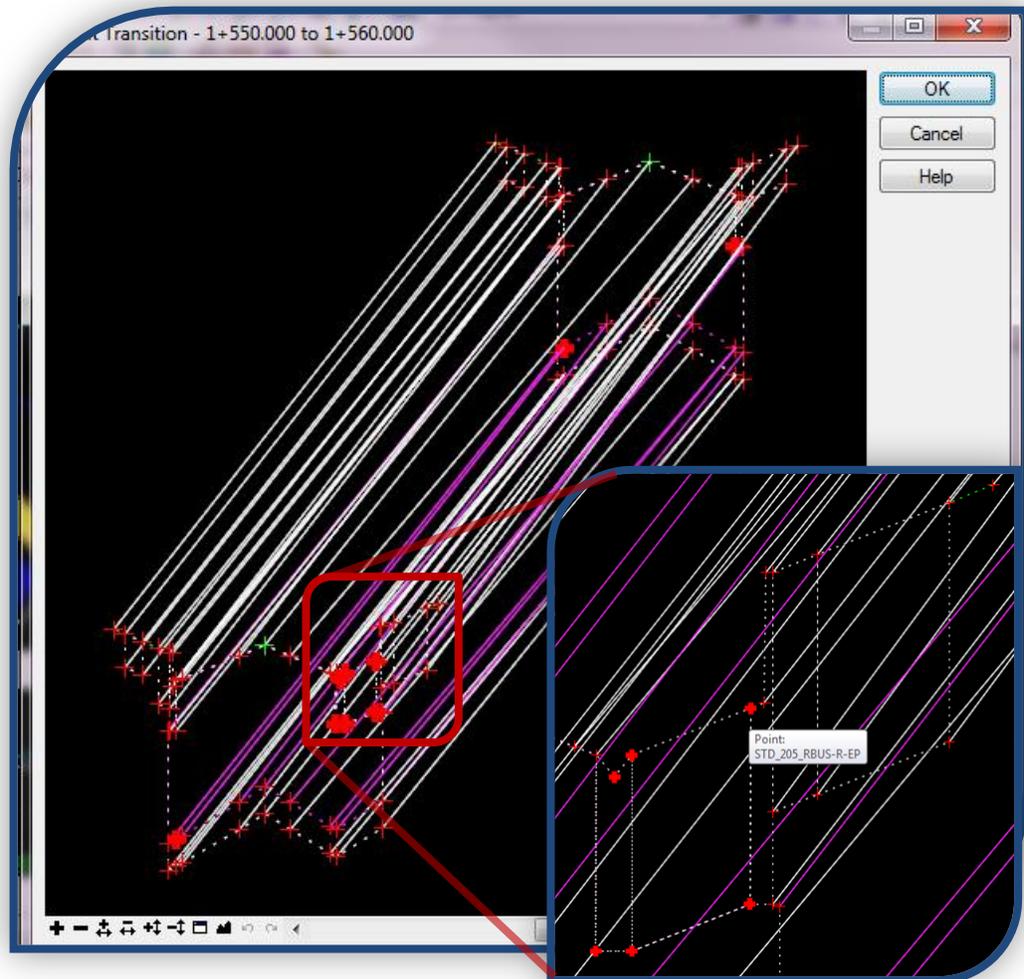
InRoads will compare the templates and match names for connection. Each connection point is represented with a cross, fine crosses are already connected, and heavy crosses are not connected. As in the template dialogs, the colour of the cross (**Green**/**Yellow**/**Red**) indicates the number of constraints on each point (0/1/2).

Hovering over a point will display the template name and point name, by selecting a heavy cross on one template it will allow a dynamic connection to follow the cursor to the other template where you can select a second cross, a new connection will be made.

Zoom in, select the first point with a left click, zoom out, with the mouse wheel, and back in to select the corresponding point on the opposite template.

128

This dialog also allows you to connect multiple points to a single point. An unconnected subgrade point on the one template can be connected to a subgrade point on the other template even though there is already a connection on the second template subgrade.

> **The first point selected must be an unconnected point (heavy cross), but once the dynamic linework starts, it can be connected to an already connected point on the opposing template. It will not allow you to select two points in the same template to connect. Right clicking on a connecting line will allow you to remove a connection.**

It may be necessary to go back to the templates to make changes after they have been assigned to a corridor.

If templates are modified, you will need to go to the Template Drops for each corridor, to syncronize the templates & update the corridors.
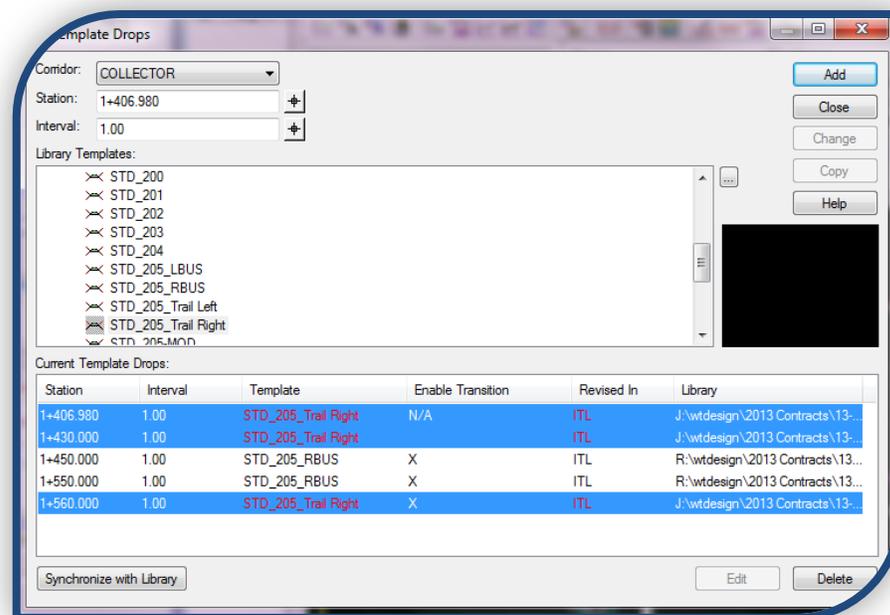
Highlight the **red** template names and select Syncronize with Libray

Pat Z.

3) ROADWAY MODELER PROFILE VIEW

As with the PLAN VIEW, the profile view displays a **yellow** **line** representing the current station location and a **cyan** **line** representing the alignment profile with **white crosses** at the change points on the vertical alignment.
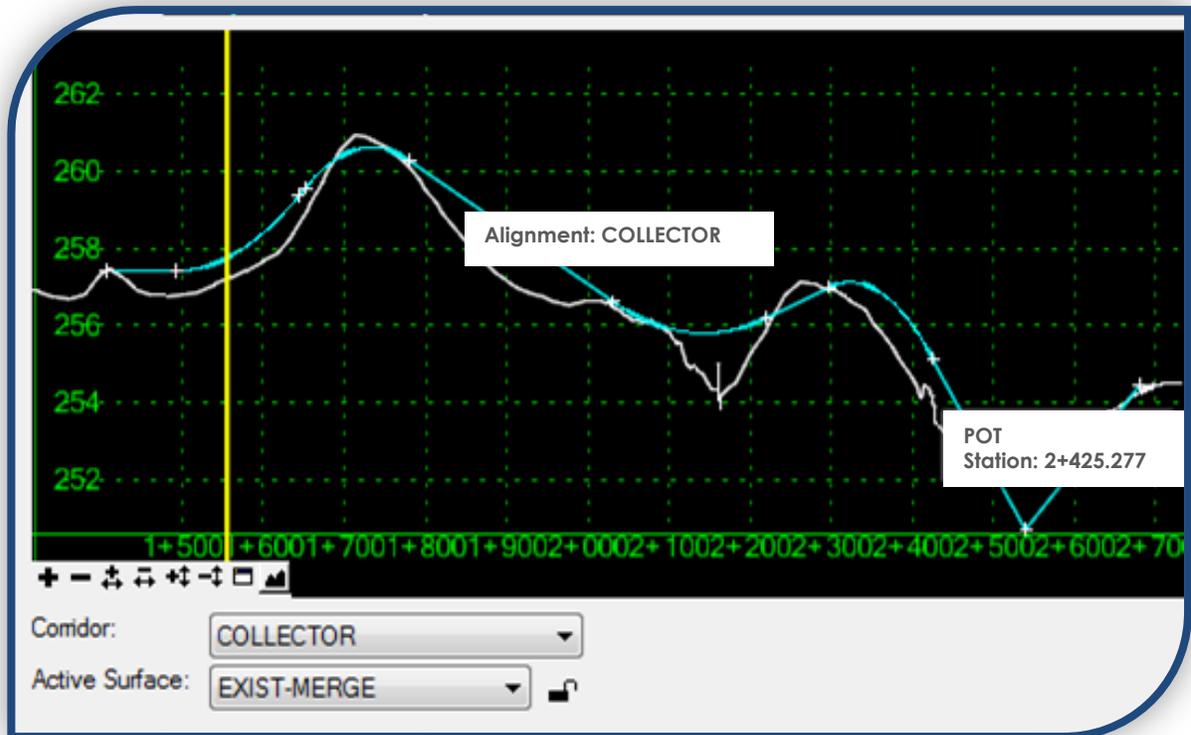
Hovering over the alignment will display the alignment name.

Hovering over the points will display the change point stations and identification.

The Active Surface is shown as a **white line**.

130

Pat Z.

4)   ROADWAY MODELER TEMPLATE / SECTION VIEW

The information below the window identifies the station, interval and template at that location. This view displays the template at the station specified and as shown in the previous two views as a **yellow** line. By dragging the **yellow** line in the PLAN VIEW or PROFILE VIEW it will dynamically change this section, including the information provided below it.

The components of the template are shown in the colours as defined by the feature styles.

The Active Surface is shown as a **red line**.

A **vertical dashed orange line** indicates a Secondary Alignment. These can be used to have a feature follow a specific vertical and horizontal alignment and any features generated outside the Secondary Alignment will be perpendicular to the Secondary Alignment rather than the Primary Alignment.

Hovering over components / points will display an information block identifying the component / point, elevation, style, offset etc..

A small **magenta square** identifies a point that is being influenced by a point control. Right clicking on it will bring up a menu that allows you to choose to "edit horizontal point control" or "edit station". The first option, when selected, will open the appropriate point controls window where you can review or adjust the parameters.

Selecting the "edit station" option will bring up a window with that section and allows you to modify that single station.
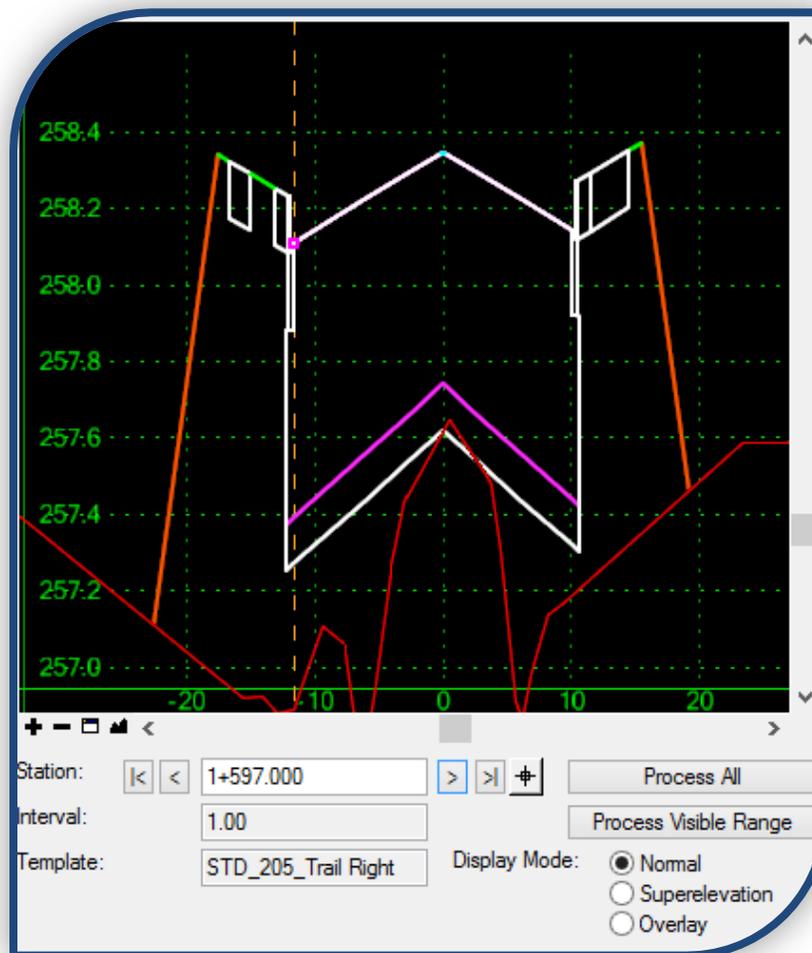
This does not modify the template, only this occurrence of the template.

Pat Z.

131

5)   USING THE ROADWAY MODELER

BEFORE STARTING YOU WILL NEED…

- ✓ Horizontal and Vertical alignment(s) or a surface feature which defines the location of the design
- ✓ Existing surface for the extents of the design
- ✓ Cross section Templates created / modified with the Create Template command

>> Modeler > Roadway Designer

>> File > New

Create a new "ird" file, "COLLECTOR.ird"
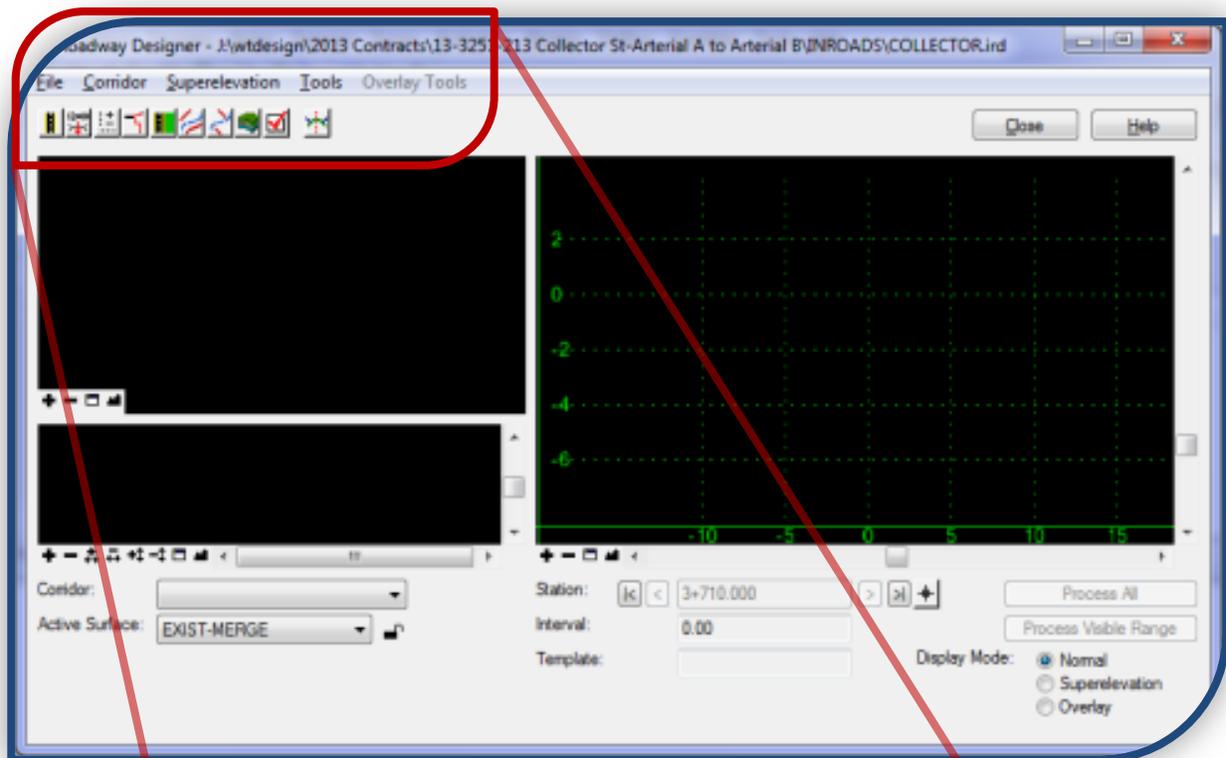
In the main working window, the basic process is to follow the icons from left to right, following the prompts to create the various files. This window displays the progress in three views, when you Process All . Reviewing the sections displayed allows you to detect problems without having to regenerate each time a modification is made.

132
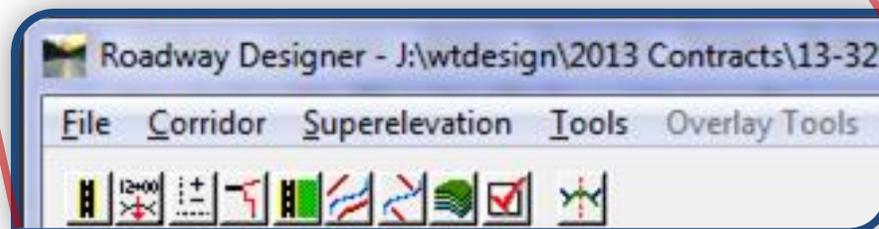
6)   MANAGE CORRIDORS…

…allows you to create corridors from the alignments you have previously created.

These alignments have already been populated for the main horizontal & vertical alignments and the cross roads horizontal and vertical alignments. See Create Horizontal Alignment & Create Vertical Alignment

Then the corner radii vertical & horizontal alignments were created using the multi centre function under the Geometry Utilities. See Create Horizontal/Vertical Alignment.
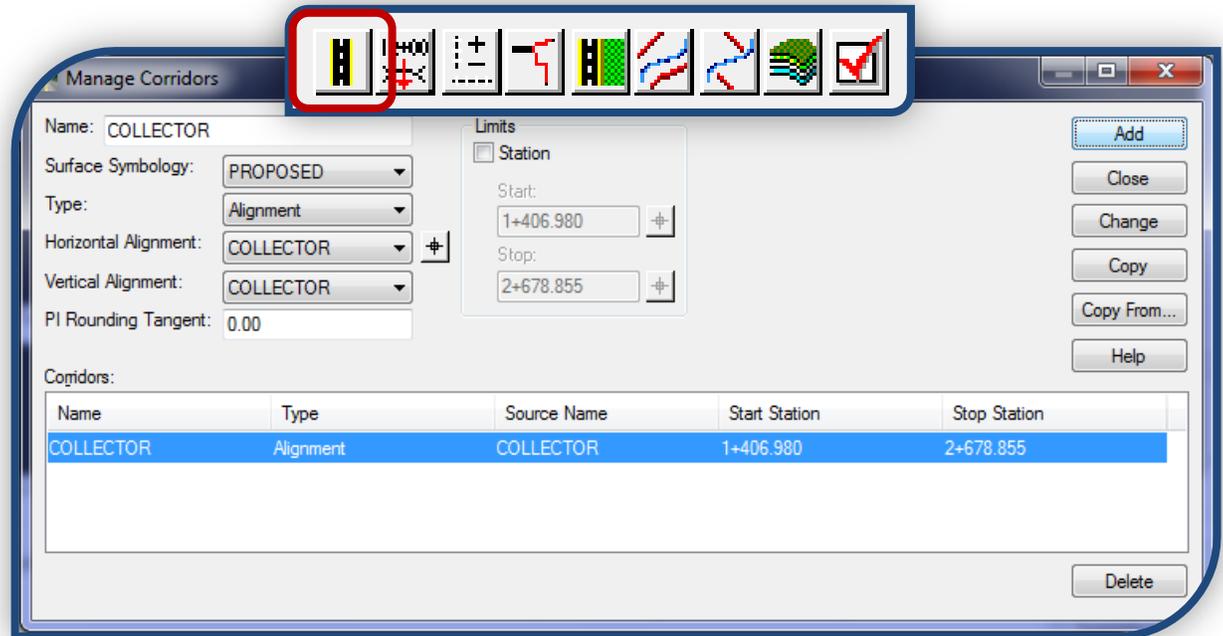
Use the main alignments (Primary Road and Cross Roads) to create a corridor for each roadway. These corridors will be used in the next step to set your template drops. Assign a descriptive name for each corridor; specify the horizontal and vertical alignments as well as stations along the alignment (usually the entire alignment). Add each corridor as it is defined; it will appear in the list on the bottom of the dialog window. When the major & minor corridors have been defined, close the Manage Corridors dialog box and select a corridor in the main dialog.

133

Pat Z.
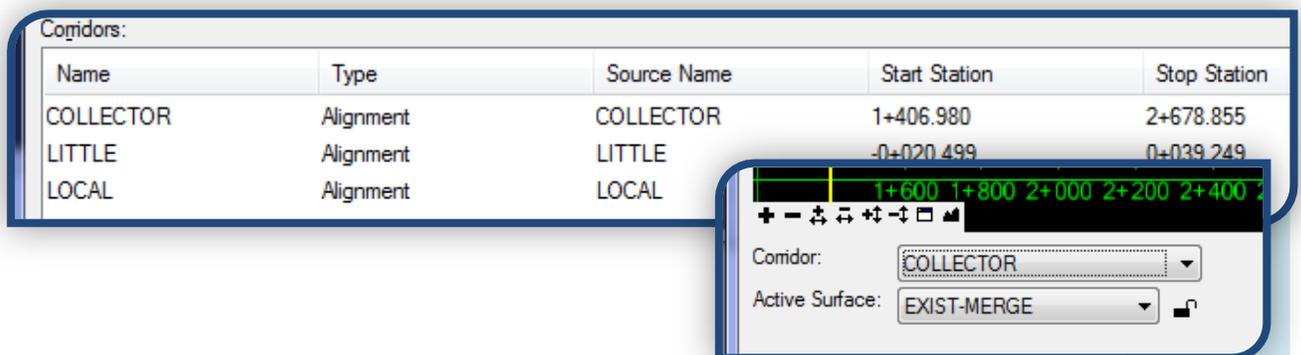
7)   TEMPLATE DROPS…

…allows you to specify which templates are dropped at what stations, and a specified interval before the next template drop, for each corridor. It also allows you to change any of these parameters while modifying the corridors.

Identify each of the corridors created in a previous step in turn, populate the station, specify an interval at which to drop subsequent templates. (The interval for a curb radius could be <1m since they will be short alignments). Select the template from the drop down list and Add, repeat as needed to complete each corridor. Close will return you to the Roadway Designer dialog.
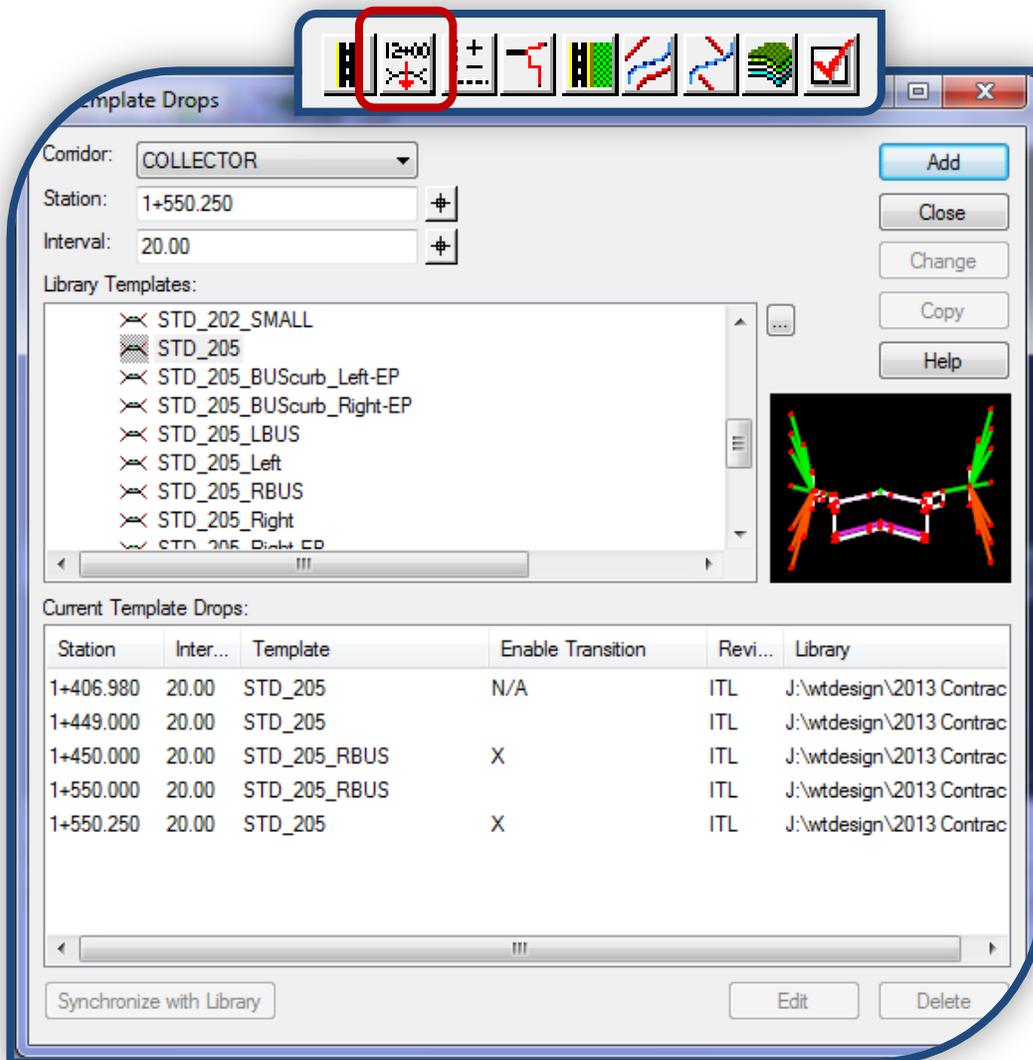
You should now have the main and crossing corridors completed.

Note: If the template is highlighted in blue, it means that no template was found and it needs to be replaced with an alternate If highlighted in red, the template has been changed and needs to be synchronized with the template library. Highlight the affected template(s) and select Synchronize with Library

134

8)   TARGET ALIASING…

To set target aliasing, select each corridor in the list; one after another, ensure that the active surface is the existing surface as it will be the "target surface".

> **Clipping Corridors, while an effective way to create a single surface from multiple alignments/corridors, will sometimes cause the subgrade to fail to display in the cross sections beyond one of the clipping sites. This has an adverse affect on the volume calculations in that you will need to manually draft and measure the missing areas.**

>> Tools > Target Aliasing

…highlight, and then add/remove the corridor(s) that you wish to clip with the active corridor. The 'aliases' column is the list of corridors that will be clipped.

The major alignment / corridor will generally be clipped by the minor corridor and all the radius corridors for cross streets or 'T' intersections. As shown here the selected cross street corridor "LITTLE" will clip the major (COLLECTOR) Click OK after the alias selections have been completed. Set active the next corridor and repeat alias selections until all corridors have been done.
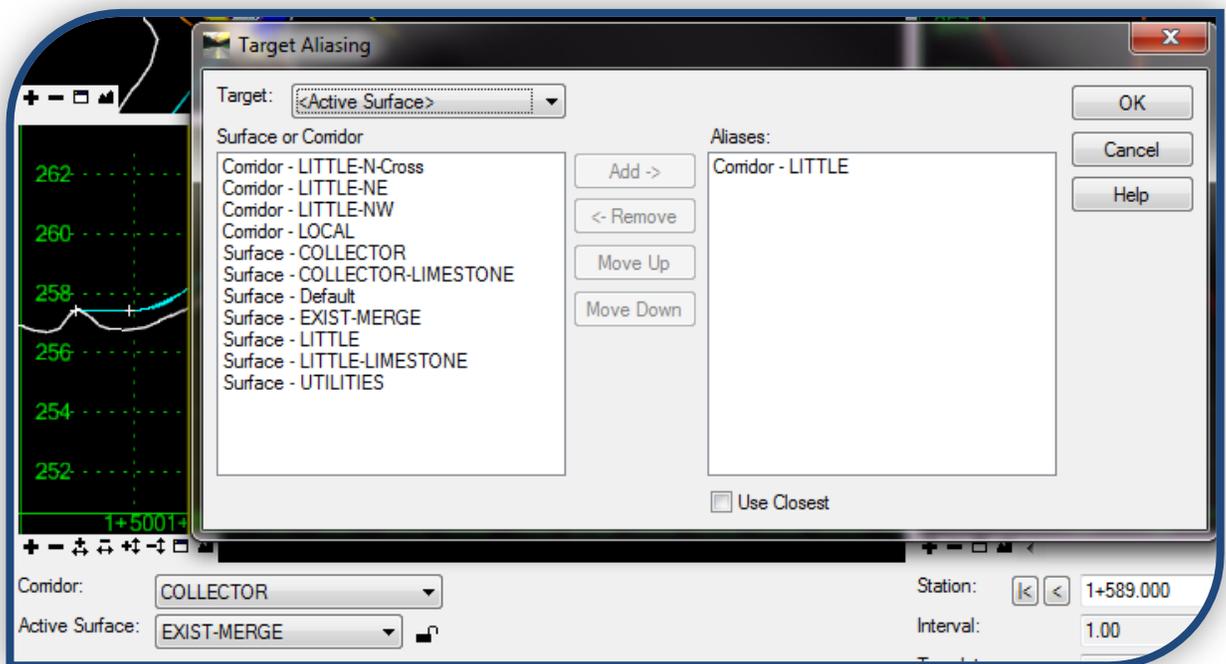
The selections made here will determine which aliases are clipped by which corridors when generating your final surface.

Pat Z.

9)   POINT CONTROLS

...allow you to stretch the templates, in the active corridor.

A feature can be directed to follow a horizontal, and/or vertical, alignment such as a curb radius.

To have the edge of pavement follow the Vertical and Horizontal alignment created for a curb radius, and make the template 'bend' at the radius alignment...

- ✓ Provide a description of what this point control is being directed to do
- ✓ Identify the point to drag (LEP)
- ✓ Select the Mode (Both)
- ✓ Select the Control Type (Alignment)
- ✓ Identify the Horizontal and Vertical alignment names
- ✓ Check 'Use as Secondary Alignment'

Station Limits (will populate automatically using the active corridor chainage, based on the limits of the secondary alignment), do not include any offsets for this type of manipulation. Add
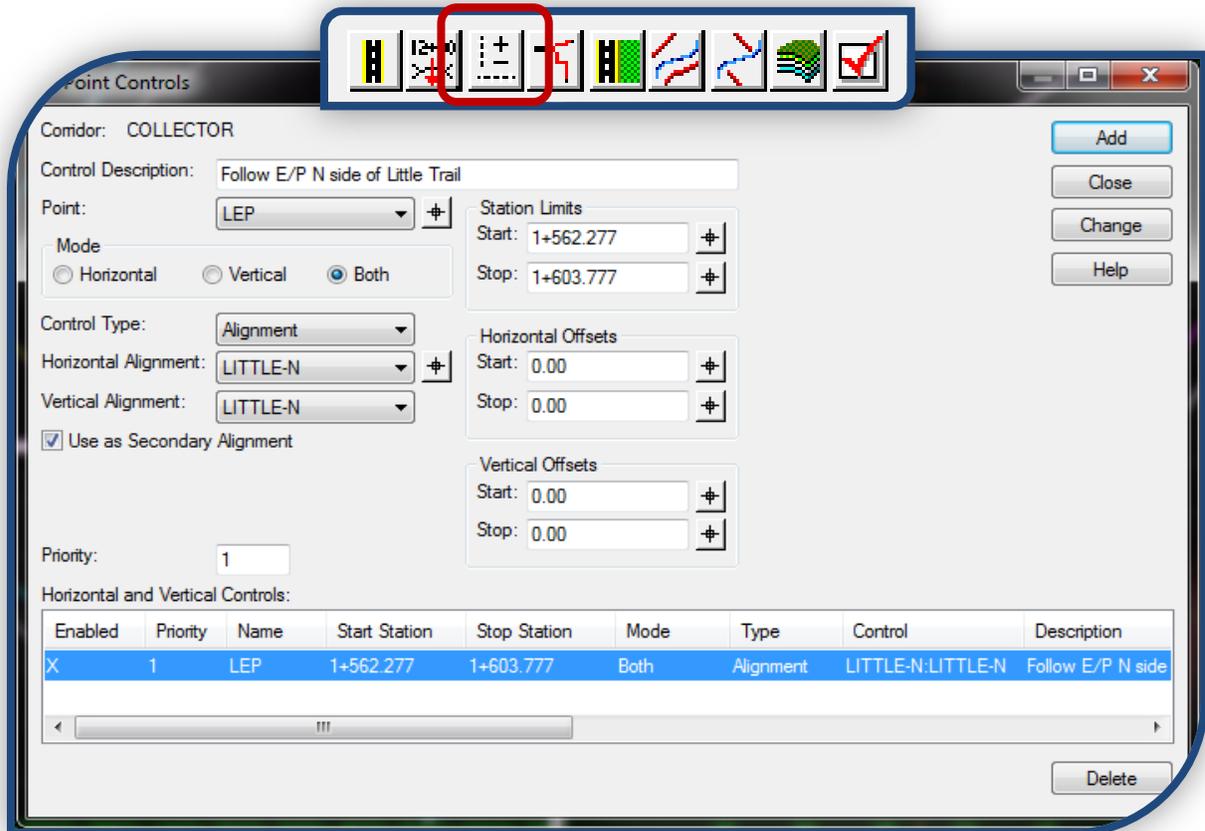
SEE "SECONDARY ALIGNMENTS" (SECTION 23.13)

Features in a template can also be offset to create a turning lane or to move a sidewalk around an obstacle for example.

136

The horizontal offsets are from centre line, in this instance there is a sidewalk connection required so the back of the sidewalk is being stretched to meet the subdivision sidewalk.

If you know you need a right turn lane, you can identify the point 'REP' at the start of the taper, by station and an offset from centre, then the end of taper/start of storage, by station and an offset, that is greater by 3.5m, then finally by the final station, usually somewhere into the intersection, and the same
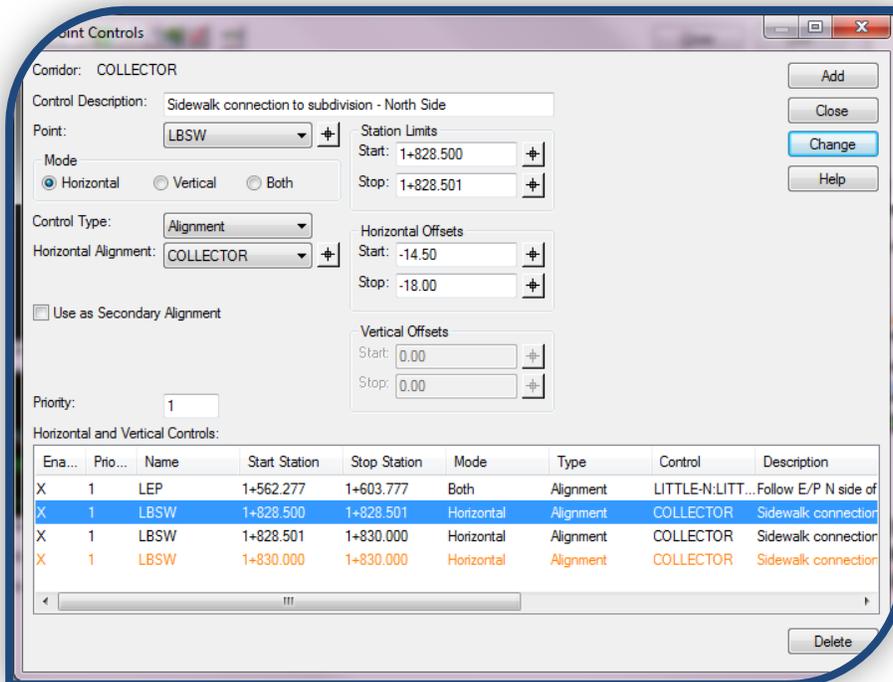
offset as the start of storage, or 'LEP', but with the storage taper sequence in the reverse order and the offsets will be negative. Add after each new set of information. This will stretch the template's right edge of pavement out to the limit of the right turn lane. This can also be utilized for bus pad locations etc.

Templates read from C/L to the outer edges. Everything from the identified feature outward will be modified relative to the designated offsets, unless it is also being controlled by some method.

If the point control is highlighted in orange, it means that you have overlapped your stationing i.e. Your LBSW stationing for example has been identified as "1+828.501 to 1+830" AND "1+830 to 1+830" ...changing one of the offsets from 1+830 to 1+830.001 will likely resolve the issue

137

Pat Z.

10) PARAMETRIC CONSTRAINTS

...allow you to stretch the templates, in the active corridor.

Similar to Point Controls, a feature can be directed to follow a series of offsets. Situations where this is used could be to adjust a killstrip around, or pull the back of the bikepath out behind, a bus pad. Unlike Point Controls the offsets are measured from the previous feature in the template, not the centerline of the template, again working from the center outward.
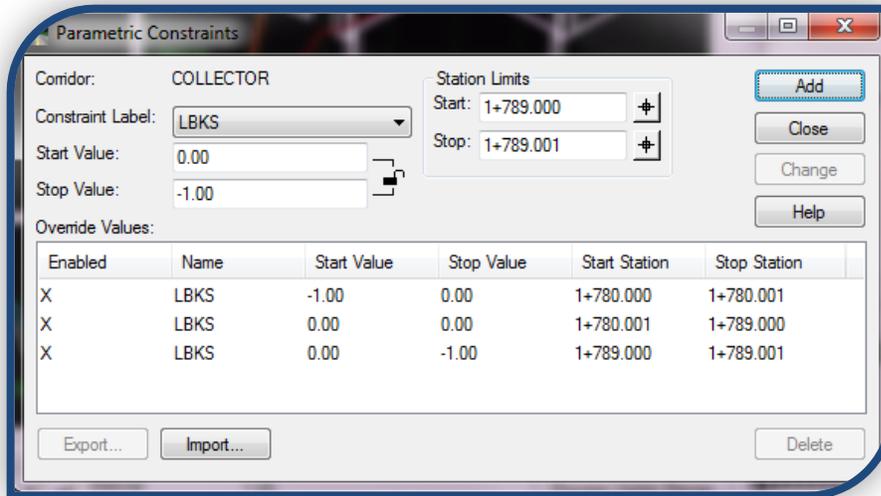
>>Tools > Paramentric Constraints...

As with Point Constraints, templates work from the center outward and overlaps in stationing will display in **orange**. Stations that do not fall within the alignment being used will display in **red**.

When determining the offsets, keep in mind what the related/previous feature is doing. The example below shows the offsets using Point Controls and Paramentric Constraints.

Using Parametric Constraints, the back of the killstrip is offset from the back of curb, the front of sidewalk is offset from the back of killstrip.

This situation would lend itself to using Point Controls for the back of the sidewalk because the front of the sidewalk is being controlled by Parametric Constraints, the changepoints do not occur at the same chainages for the back of sidewalk and front of sidewalk which would make for a more difficult transition.

138
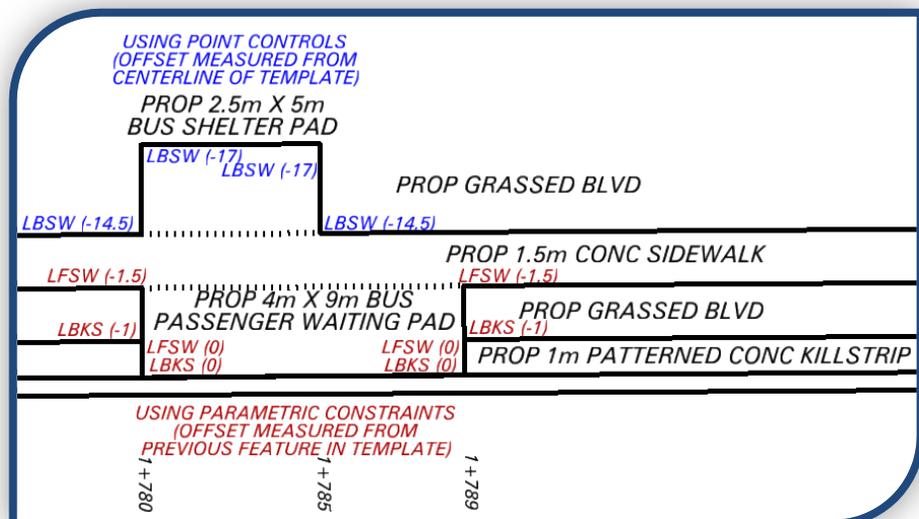
11) END CONDITION EXCEPTIONS

This tab will allow you to override the template for a specified length of the active corridor.
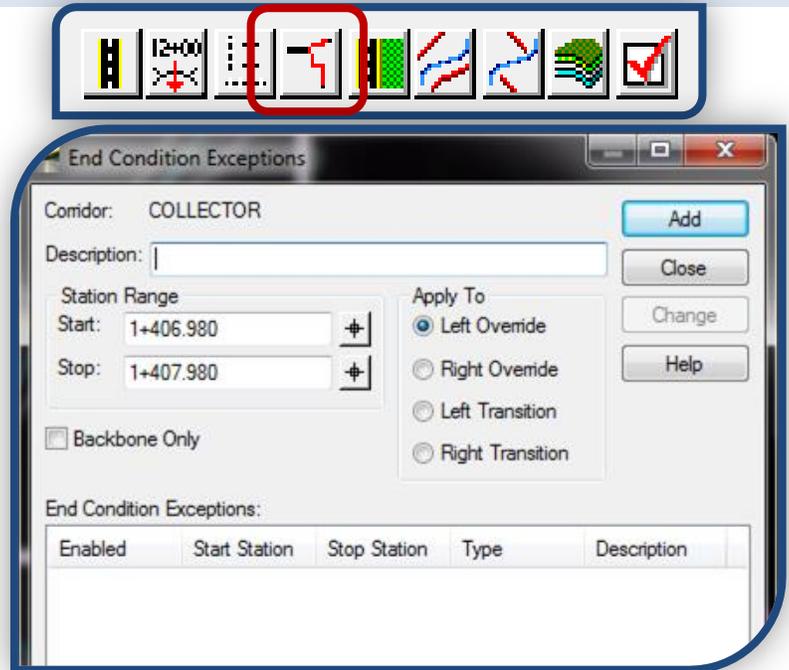
12) DISPLAY REFERENCES

This tab allows you to turn on/off the alignments and/or features displayed in the plan view of the Roadway Designer window. This can be useful for comparison of Right Of Way to disturbance limits as an example.

139

Pat Z.
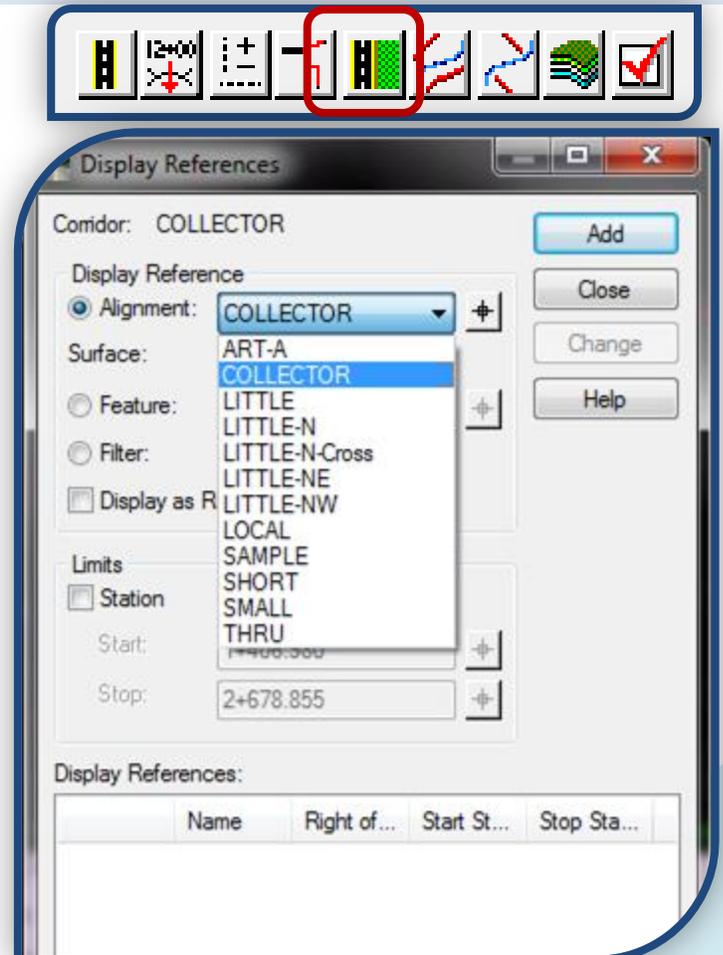
13)   SECONDARY ALIGNMENTS

Use this tab to identify the secondary alignments to be utilized for each corridor.

Secondary alignments are a good way to redirect the features in the Primary / Active Alignment. As in this example, you could create an alignment along the proposed edge of pavement to be followed through an intersection.
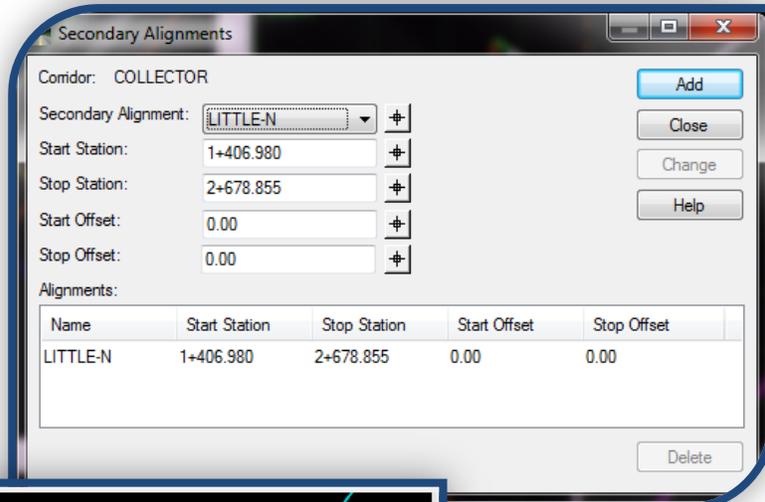
Creating a horizontal/vertical alignment around the curb radii allows the template to bend at the feature/alignment to produce linework, beyond the edge of pavement, which has a more accurate offset than if the template were to run straight through. The edge of pavement follows around the radii through the intersection.The yellow line shows bend in template drop.

However, running the secondary alignment around a curb radius can sometimes produce a situation where the alignment turns back on itself. This may cause error messages or wild points. For these intersections, you may need to modify the affected bit to mitigate the overlapping stations. If all else fails, clipping corridors may be a more effective method.

140

14)   CLIPPING CORRIDORS

There may be instances when you will need to use this method of creating a surface. In the diagram shown here…

- ✓ MAIN CORRIDOR would be COLLECTOR in our working example
- ✓ MINOR CORRIDOR would be any of the cross roads
- ✓ NW/NE/SW/SE CORRIDORs will be created using the radii alignments.

> **Remember that a "corridor" is the result of running a template, or templates, along an "alignment".**

For each alignment, corridors will be defined using stations and templates to produce a surface within their limits. These corridor surfaces will be merged and clipped, based on the Target Aliasing defined, under Tools, for each corridor.

See TARGET ALIASING (SECTION 23.8)
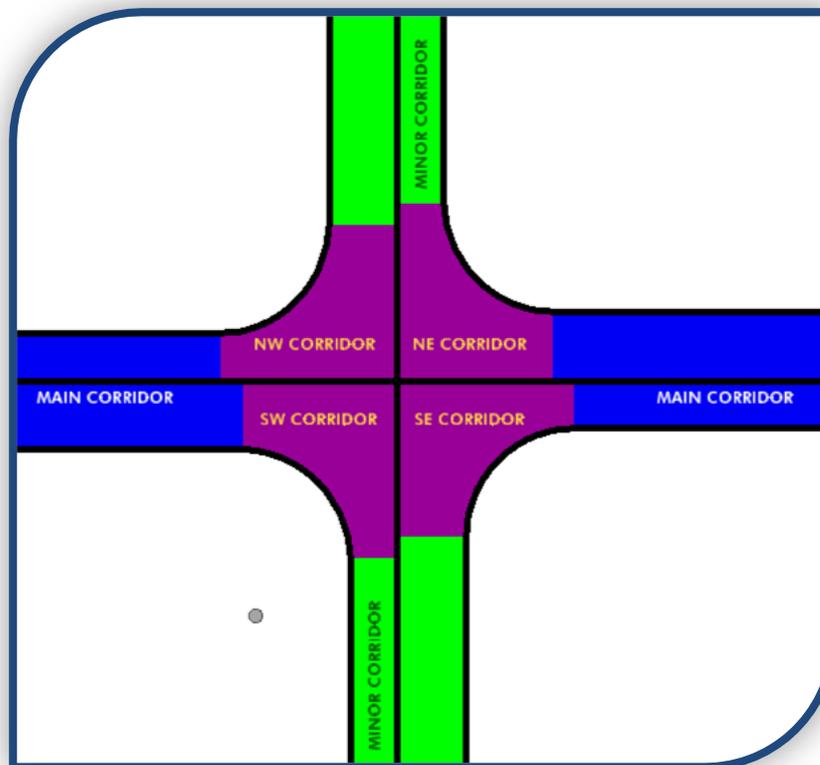
This will produce a single surface as the end result.

See CREATE SURFACE (SECTION 23.16)

The MAIN CORRIDOR and MINOR CORRIDORS will be continuous through the intersections, the corridors created at intersections using the radius alignments, will be set up to clip them. These radius alignments were created in "Create Horizontal/Vertical Alignment", using multi center curve..

>> Geometry > Utilities > Multicenter Curve

See CREATE HORIZONTAL/VERTICAL ALIGNMENT (SECTION 19.1)

Pat Z.

15) KEY STATIONS

This tab allows you to input stations where you specifically want a template to be placed above and beyond the interval placement specified in the corridors.

Places these station may be needed…

- ✓ The end of a curb radius (as shown below)
- ✓ At taper/storage change points or at any change in width of roadway
- ✓ At points of change in direction/bends in the horizontal alignment
- ✓ At points of change in direction of sidewalks or multi use paths

142
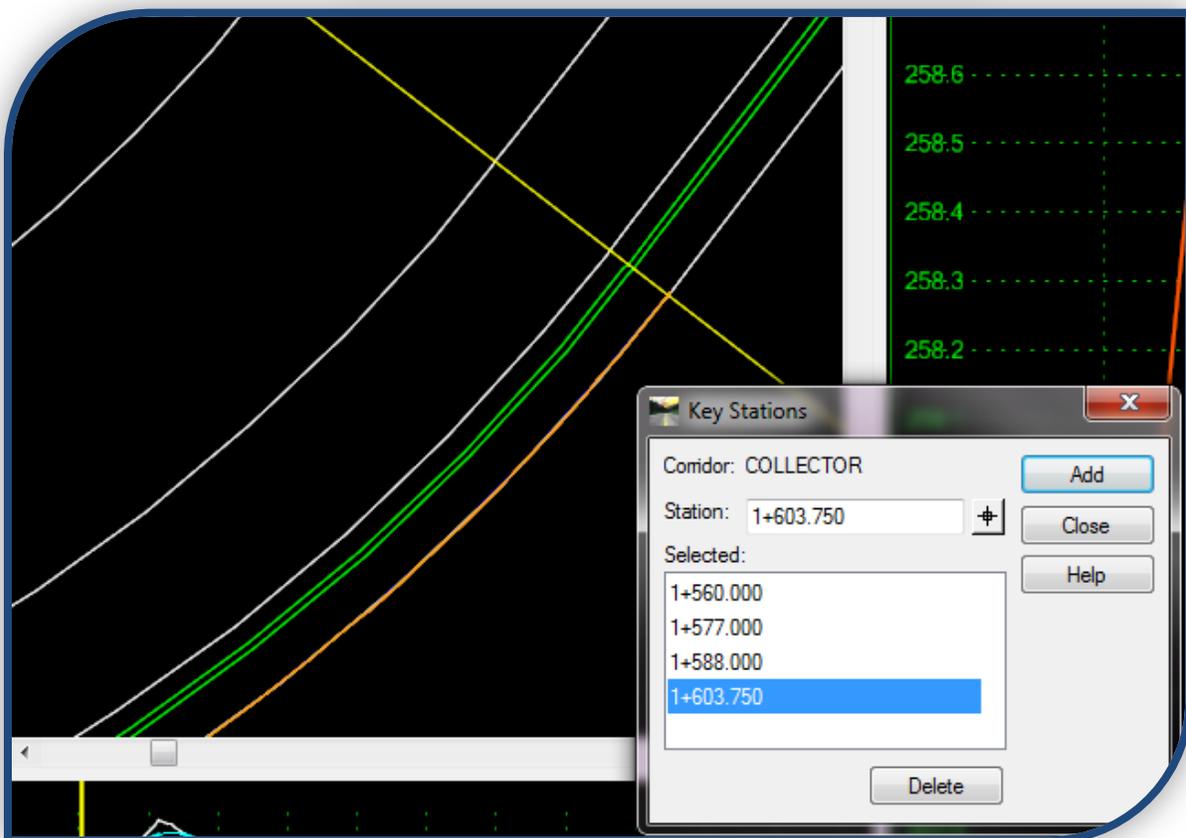
16) CREATE SURFACE

Ensure Active Surface is the Existing surface prior to selecting Create Surface. Select alignment(s) in "Create Surface(s) from" list to identify alignments to use for generating surface.
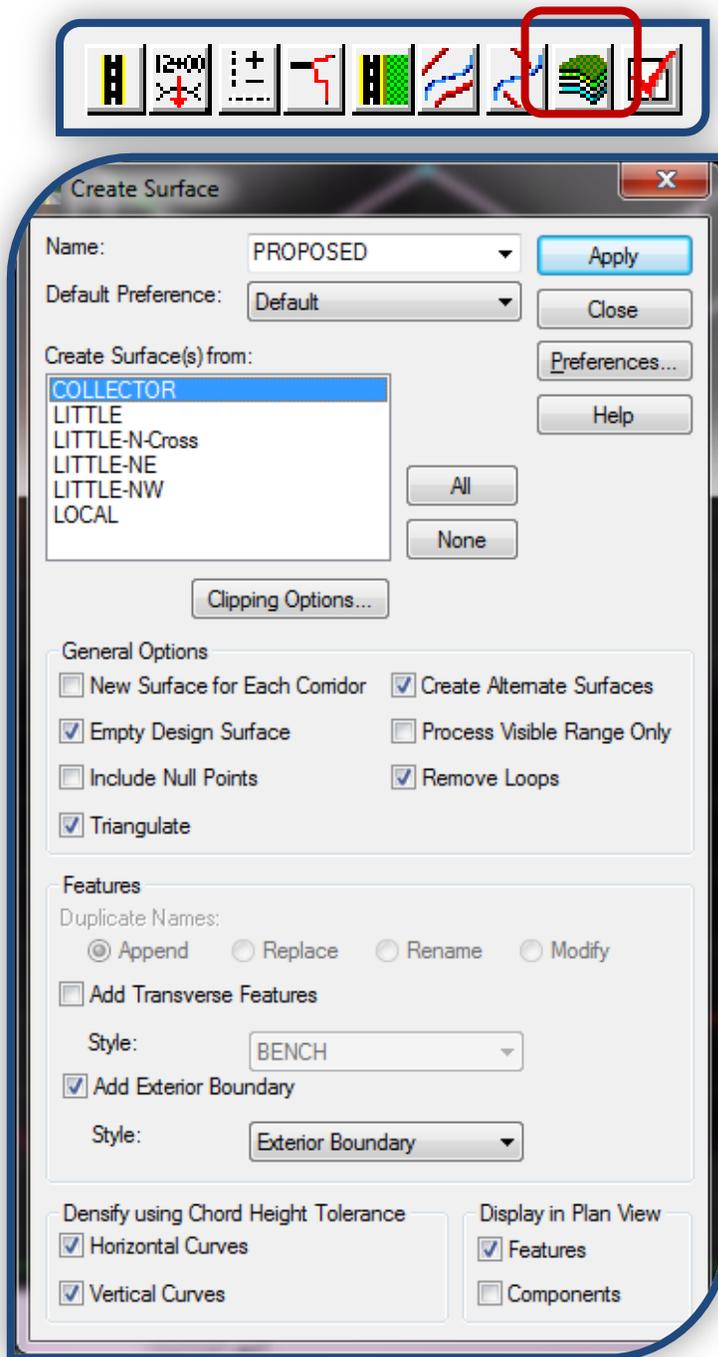
Use the Create Surface function, identify the main corridor (COLLECTOR), to be used to create the surface.

All of the corridors you have will be listed here. If you have not removed the ones used to create the secondary alignment(s) to clean up the list, they will be shown as well.

If you recall, we used the "LITTLE***" corridors to create the secondary alignment (LITTLE-N) to guide the edge of pavement through the intersection. These are listed, even though we will not be using them for the surface. They can be deleted in the roadway modeler once the secondary alignment has been created, saved and verified. Once deleted, they will not appear in this list.

If you have opted to not use a secondary alignment for this intersection, you will need to highlight all these corridors to combine them as per the clipping options set up when you assigned target aliases. You can override the clipping function by selecting Clipping Options and changing the options.

Be sure to check the Create Alternate Surfaces box as there is a limestone surface identified in the templates. This surface will be used for volume calculations allowing you to more easily provide both granular and limestone quantities.

143

Pat Z.

When your proposed surface has generated, exit the modeler and define the feature style for the new surface.

>> Surface > Surface Properties > Advanced (tab)

Select your proposed surface and set the symbology to PROPOSED for the Cross Sections and Profiles. Also check off the "Use Features Only" box, this will ensure that when you generate your sections the surface will stop at the grading limit and not continue on using the extra triangles formed at intersections. These triangles are not an accurate representation of the surface.
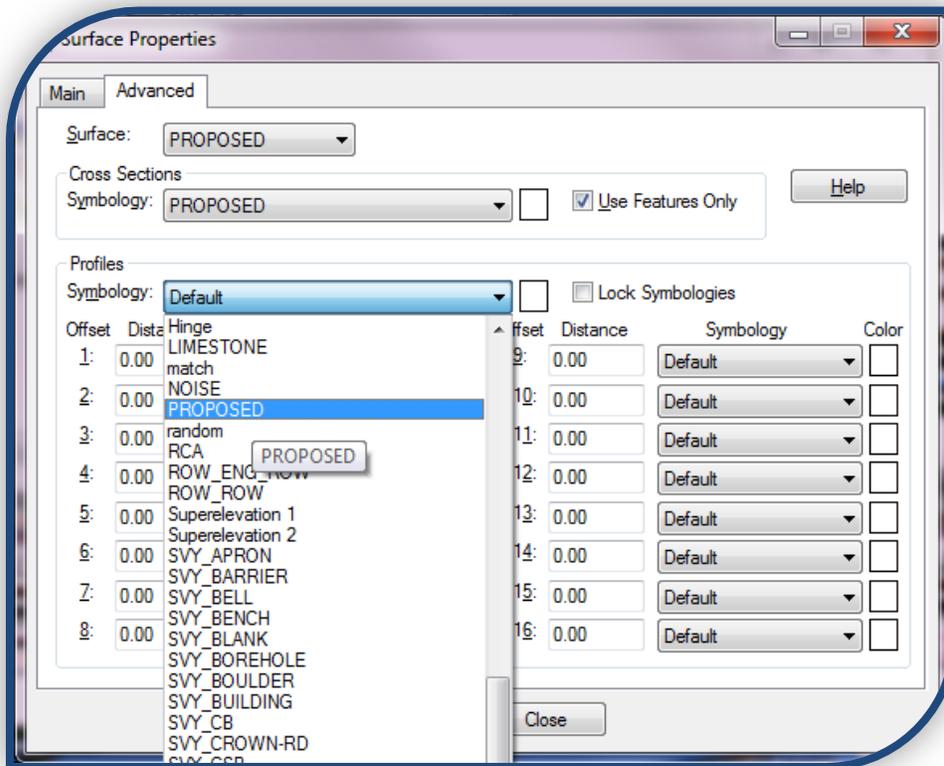
At this point save the proposed surface and re-save the geometry project file using "save as" and add the options for the newly created surface(s) if they are to be loaded each time the geometry project is opened.

Also be sure to save the preferences if they have been modified.

Any design surface generated will need to have the properties modified to reflect the PROPOSED style so when you regenerate the surface multiple times to tweak the design, you will need to change the properties of the design surface prior to generating or updating the profile or cross sections.

**Keeping an accurate roadworks file (.rwk) will ensure that anyone trying to access the latest design information will have the correct files opened in InRoads.
This is imperative as you may be unavailable, for a variety of reasons, to identify which files were used.**

144

24. FEATURE MODIFICATION - INROADS | SURFACE

1) ANNOTATING THE CENTERLINE

When the surface has been generated and finalized, annotate the C/L every 20m in the plan, and also include any High or Low points and PI's. These elevations will be displayed on the Dimensions drawings.

2) MODIFY FEATURES

EDIT FEATURE POINT

Before triangulating a surface in InRoads, lines can be joined for smooth contouring – this would include things like matching the sidewalk feature to a curb radius or adding a sidewalk connection to a subdivision (if you have not done so using Point Controls or Parametric Constraints). Anywhere there is a need to manually complete connections or make additions.

>> Surface > Edit Surface > Edit Feature Point

To correct or adjust information the information can be input directly…
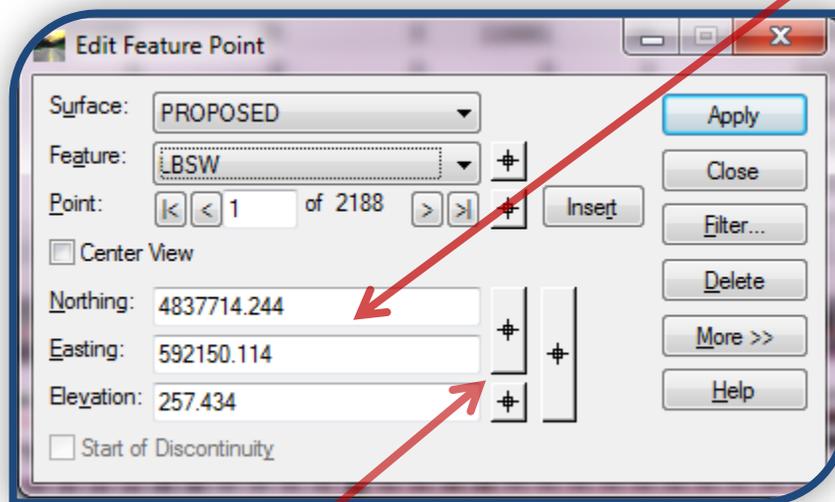
Place a tentative point on the ultimate position (the end of the line to be matched) to obtain the co-ordinates and/or elevation for direct input.

The ⊞ to the right of a field allows graphical selection in the design file of a location, elevation or the feature, reset will jump to the next feature. Each feature will highlight in the design file as it is selected and the name of the feature is displayed in the message area of the MicroStation information bar, use the data button to accept the desired feature. The feature point corresponding to the number, in the dialog box, will highlight in the design file to identify specifically which point on the feature is being modified.

Pat Z.

145

INSERT OR DELETE POINTS ON A LINEAR FEATURE.

Delete will remove the highlighted point

Insert will place a new point midway between the current point and the previous point. By definition, the midway point is the precise centre of a line drawn between the current and previous points, horizontally and vertically.
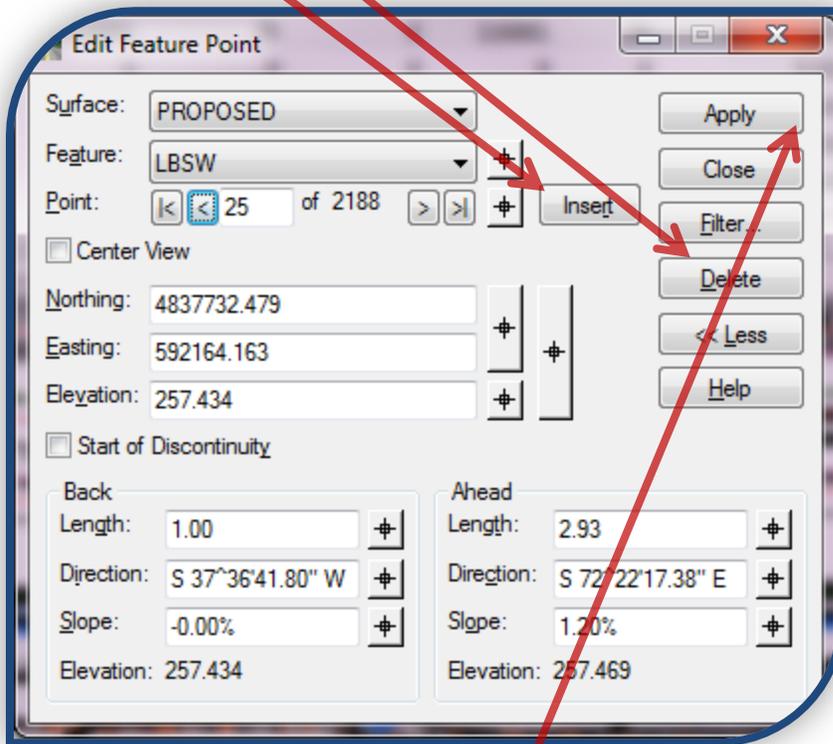
After each modification...Apply

The points ahead of and behind the currently selected point are identified at the bottom by its location relationship to the current point. i.e. (distance / direction / slope / elevation)

Occasionally, as work continues... Apply then Close

Ctrl+S [to save the surface]

146

Redisplay the features that have been worked on to verify accuracy.

Again…we are doing these trials and modifications in the "WORKING" file…

>> Surface > Update 3D/Plan Surface Display

Highlight the features to be displayed; only those features selected will display.

This is a change from the previous versions where additional features could be selected to display/refresh. Any features currently displayed, but not selected, will be removed from the drawing so all required features must be selected at one time. To help the selection process, the features can be re-ordered by name or style. Elements will display, or be removed, as each selection is made.

There is no Apply option here, it is a dynamic process.

Other surface modifications may include adding linework, which has been drawn in the correct spacial location, for the second curb radius on a bus bay as an example. This can be added the same way as **_Importing Features_** for utilities but using the element elevation instead of draping to a surface.

Create backup surface files under \contract directory\BACKUP or \contract directory\INROADS\date Redisplay features as they are modified to ensure accuracy, and then save the surface and copy a backup to a backup directory, rename it by appending the date/time to the surface name.

These files can become corrupt and any changes made since the last backup can be lost. At the end of a day of many changes, make sure the features are displaying properly and create a dated backup directory of the InRoads files. This can be done prior to making major changes or trials to save a working copy that can be used if the experiment does not work. If this step is not taken, the surface can be regenerated and changes repeated should the need arise. To minimize repeating work, save multiple copies.

147

Pat Z.

25.   PROFILE ANNOTATION - INROADS | EVALUATION

1) ANNOTATE PROFILE

The newly created PROPOSED surface elevations will need to be displayed in the profile, along with the stationing information.

>> Evaluation > Profile > Annotate Profile...

...places the road grade and station information on the profile where it can be manipulated into a position that will display on the base sheet it is referenced to, as per the City of Brampton standard drawing requirements.

This is saved in the preference file **"COLLECTOR.xin**

GENERAL
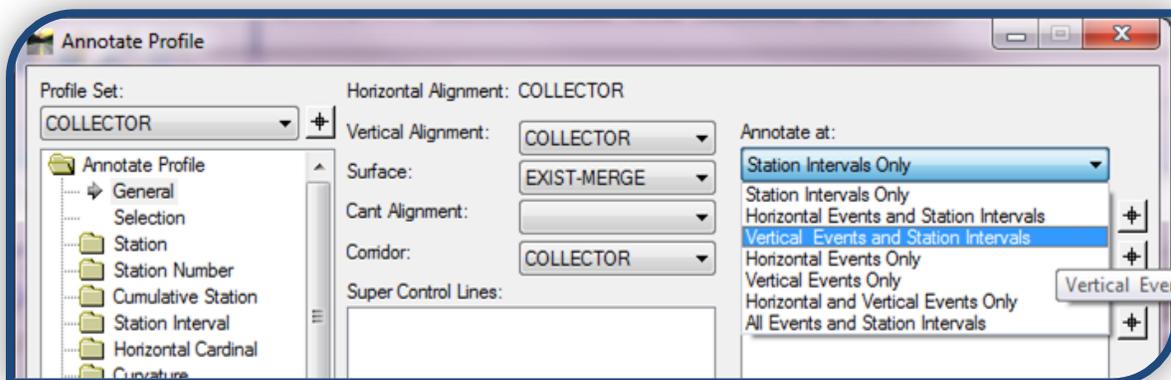
Select the vertical alignment and surface to be annotated as well as whether you need vertical events, generally vertical evens and station intervals are displayed to include BCs, ECs and High and Low points.

SELECTION
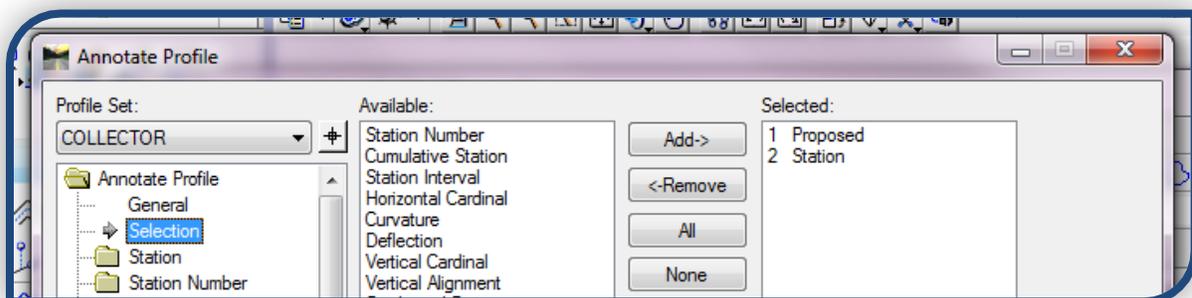
Choose what you wish to be annotated; in this case the proposed elevation and station are to be annotated.

Pat Z.

The rest of the options listed in Annotate Profile have been set up with City Standards for how the items are to be displayed. i.e. font size, levels, colours etc. (in COLLECTOR.xin)

Apply and the result will be stations and elevations of the proposed surface along the bottom of the grid.
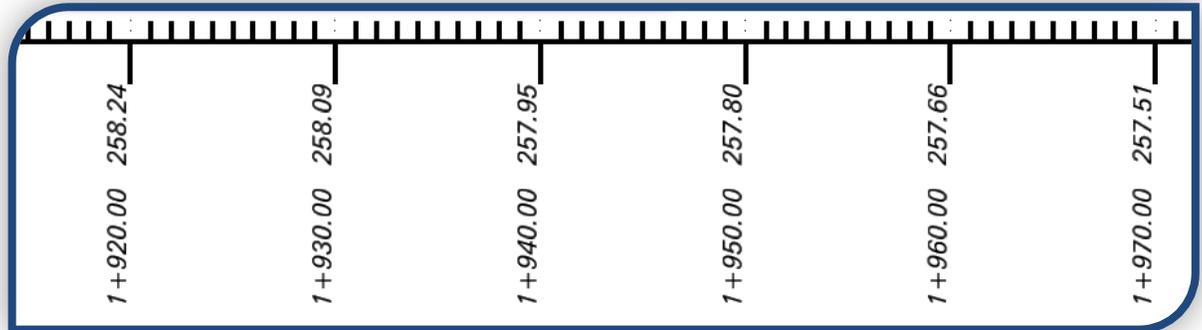
26. CROSS SECTIONS – INROADS | EVALUATION

CROSS SECTION REQUIREMENTS

This is the **minimum** amount of information required on cross sections…

- ✓ Directions, for viewer orientation (N, S, W, E)
- ✓ Existing surface
- ✓ Proposed surface
- ✓ Slopes (where typical is not used)
- ✓ Station
- ✓ Title / Date
- ✓ C/L Elevation
- ✓ E/P Elevation
- ✓ Property Lines (Proposed, Existing, Grading – as imported to the Utilities surface)
- ✓ Utility locations (as imported to the utilities surface)
- ✓ Fence location (from surveyed surface and/or proposed fence imported to the utilities surface)
- ✓ Vegetation (Woodlot, Impacted trees or trees not to be impacted – from surveyed surface)

> **Cells have been created with cross section borders to be used when generating sections. Three sizes are available to suit the width of section needed.**
>
> *See APPENDIX 5 (SECTION 33.5.VII) [Cross Section]*

Pat Z.
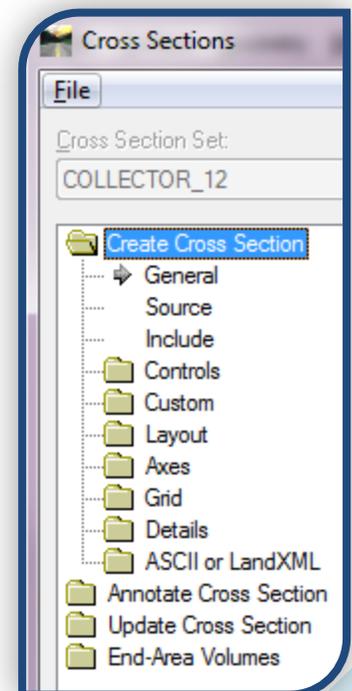
CROSS SECTION SETUP

Before getting into the setup for cross sections, make sure that your options have the scale factors set to one (1)

Cross Sections are always plotted at a 1:200 scale.
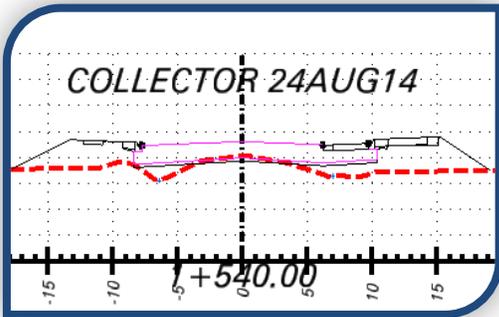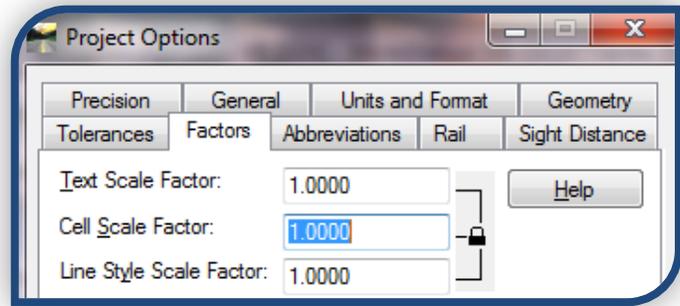
The result of not setting the scale factor to one and forgetting to change the surface symbology of the new surface that was created to "PROPOSED" is shown here. The text locations are set up based on a scale factor of one and the surface symbology (PROPOSED) is to be a heavier lineweight than is shown here.

1) CREATE CROSS SECTIONS

CREATE CROSS SECTION > GENERAL

The **Set Name:** will automatically populate with the corridor name, you may change it to provide a date and/or description. Subsequent cross section sets which are generated without removing the first set will have the corridor name with a number appended, in sequence, for each additional cross section trial. No two sets will have the same name.

In **Create:**

Window and Data is selected.

150
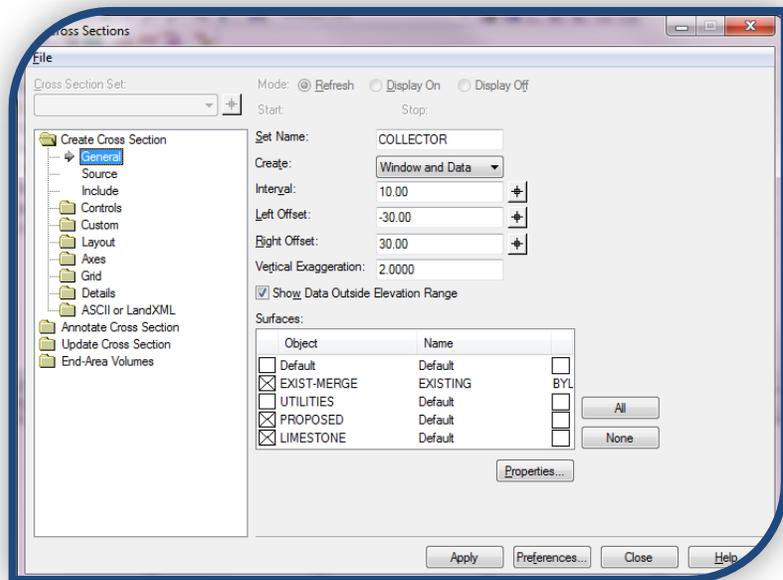
Interval: is usually ten (10). The minimum requirement is twenty (20), however, ten gives you a better idea of what is happening and a more accurate end area volume calculation. When generating the PDFs later, for tender/construction, you can generate only the twenty meter interval sections along with any special circumstances.

Left Offset: & **Right Offset:** will depend on the extent of the impact to the roadway. Obviously a ROW of 20m would not require a 60m wide cross section. There may be times when you will need only one side, the opposite side can be set at a minimal distance of maybe 5 or 10. These numbers will be adjusted to suit the conditions and requirements.

Vertical Exaggeration: is always 2 for cross sections, scale for plotting is 1:200

☑ **Show Data Outside Elevation Range** should be checked off

Surfaces: select the surfaces to be displayed in the cross sections. The Utilities surface will be utilized by updating the sections later to show fences, property lines etc. by displaying projected lines. (You don't want to display the surface line, only the utilities)

Properties… when selected, will bring up the surface properties dialog, this allows you to make sure that the surfaces have the correct style associated with them, particularly the proposed surface.

CREATE CROSS SECTION > SOURCE

Select the source, i.e. the alignment for the sections to be derived from.

Single Station can be used when information is needed at a specific location; it is also given a **set name**. Assign a name prior to generating cross sections to identify specific runs, if needed, by name and date.

These dated sets are a good way to keep a timeline of work, and changes, being done.
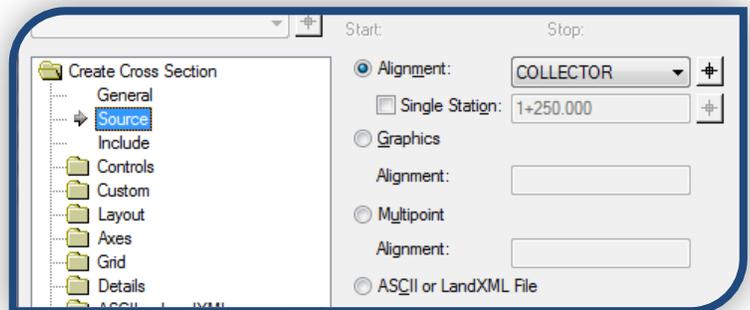
CREATE CROSS SECTION > INCLUDE

Crossing Features and **Components** are to be displayed in the cross sections.

Crossing features are features such as utilities and R.O.W

Components, such as sidewalk, subgrade, will be displayed in the cross section and the volume calculations will be made around these components.

Pat Z.

CREATE CROSS SECTIONS > CONTROLS >

> LIMITS

Elevation limits can be set here if you want all sections to be a specific range, leaving this unchecked will allow InRoads to generate only the required height to encompass the elements in each section. In the Layout, space above and below section information can be dictated to provide clearance for labeling etc.
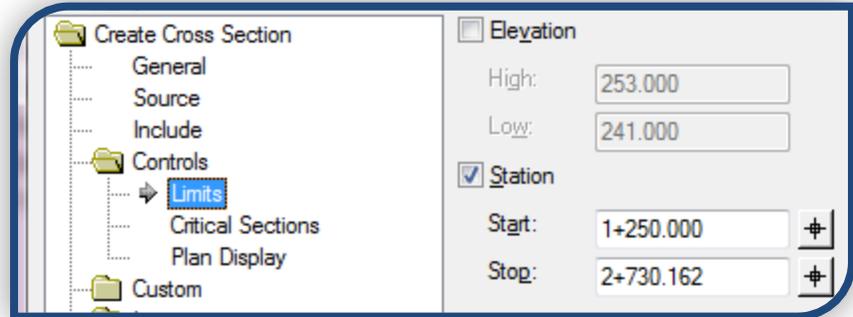
Station limits can be set since most often you will not do the entire stretch of the alignment. Generally when the alignment is set up there is room at either end, just in case there is an extension to the project limits. Set the station limits to the functional portion of the horizontal/vertical alignments.

> CRITICAL SECTIONS

Check off the points you wish to include in your section set, generally Horizontal and Vertical Event Points.

There may be instances where other Points need to be displayed as well.
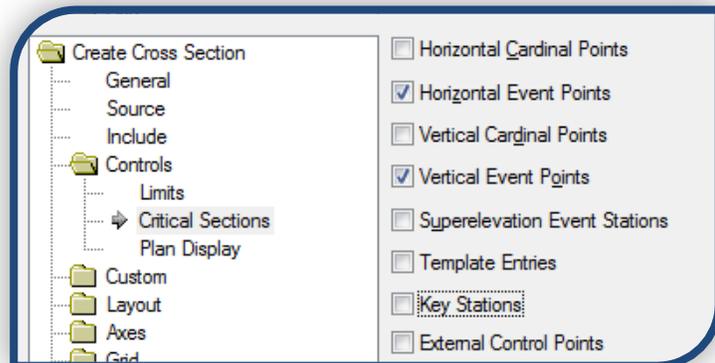
To generate a section set for HP locations that have been identified as event points on a duplicate alignment copied from the main alignment ("COLLECTOR-hydro")

Make sure "COLLECTOR-hydro" is identified as the alignment

Interval is set to zero

Horizontal event points are selected to display (under **Controls**>>**Critical Sections**).

Pat Z.

> PLAN DISPLAY

This section refers to lines that will be generated on the plan to represent the cross section locations. Normally these will be off; however, there may be instances where you need to have them displayed to be used for measuring perpendicular distances off the centerline for details in minutia. If this is the case, you can check off the Planimetric box under **Symbology.** The default is for them to be generated at zero elevation, to change this you will need to check the **Planarize** box and specify the elevation desired. These lines will be generated in this active design file, not the original plan design file.

CREATE CROSS SECTION > CUSTOM >

> GENERAL

To this point, the series of cross sections generated will have all the same parameters i.e. same interval, offsets... In this dialog, ranges can be set with different parameters; sections can also be done perpendicular to the series at specified stations. Normally one set of parameters is adequate, but if there are areas in the contract requiring considerably wider sections or more sections within a specified area, this would be the place to identify them.
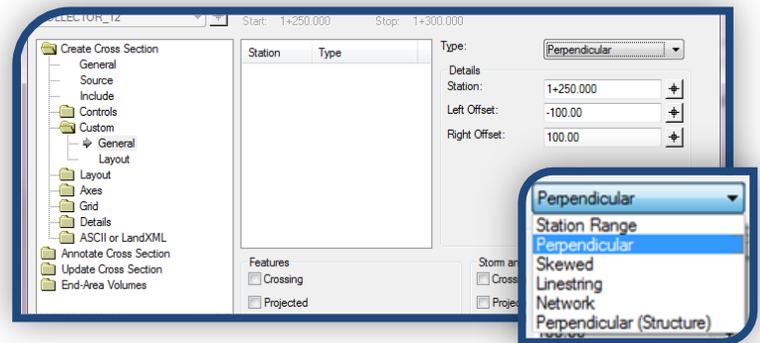
> LAYOUT

This dialog aligns the cross sections by either the left edge or at a specified offset.
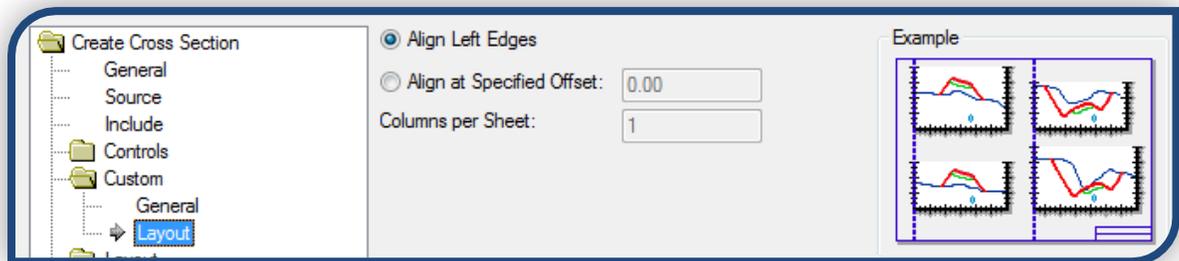
CREATE CROSS SECTION > LAYOUT >

> GENERAL

Sheet Mode will be selected

153

Pat Z.
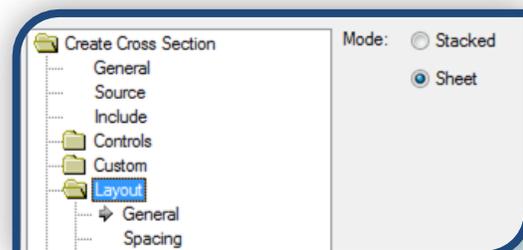
> SPACING

Sections per Column: is set up as eight (8), but can be modified to suit the individual project requirements

Horizontal distance is 20m between the right side of one section and the left side of the next column

Vertical distance is 15m between the top of one section and the bottom of the one above it

Window Clearance can be left at 3m or increased to provide room for underground work or other additional information required. Again, this is project dependant.

Direction refers to which way the sections will be generated, one above the next (Bottom to Top) or one below the next (Top to Bottom)
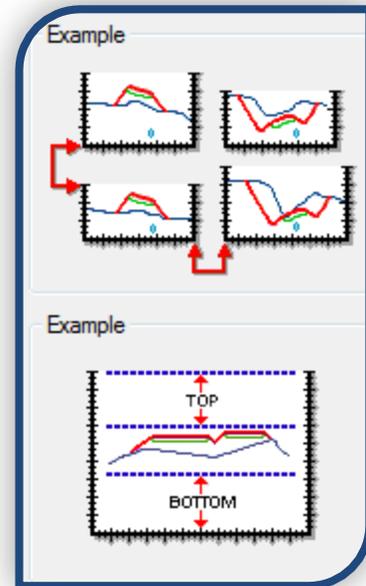
> SHEET BORDER

New practice requires a cross section sheet base on each section. To that end, there are now cells with all the pertinent information for the sections. As before, they are to be printed on letter, legal or tabloid sized paper, one per sheet.
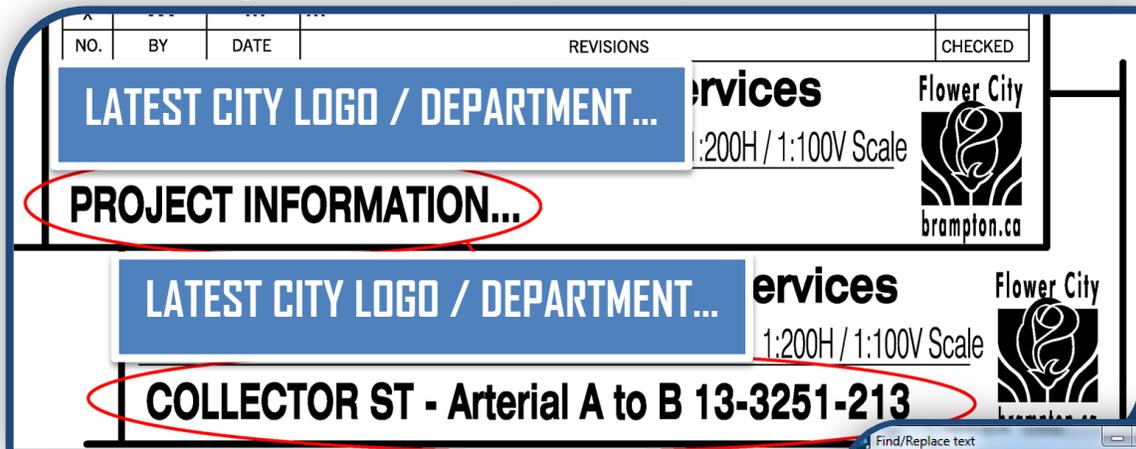
The descriptions can be changed using the Find/Replace text function under Edit in Microstation, it can also be edited individually for any revisions done.

The sections can be set up using the iPlot method to print enmasse or to create a PDF file. Set up an ips file with all of the individual sections, just as you would for the contract drawings. This allows any, or all, of them to be quickly generated into a PDF file any time there are changes without the need to fence each section again for printing.
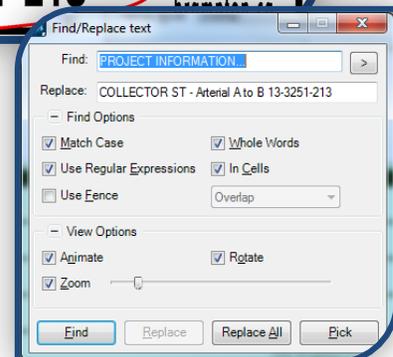
See PLOTTING CONTRACT DRAWINGS – USING IPLOT (SECTION 30.1)

Pat Z.

> SHEET LAYOUT

The main parameters for sheet setup are under **sheet layout**, getting the spacing correct between the bases and cross sections can take some tweaking. Select a small range of sections to play with to get the setup finalized for your particular needs.
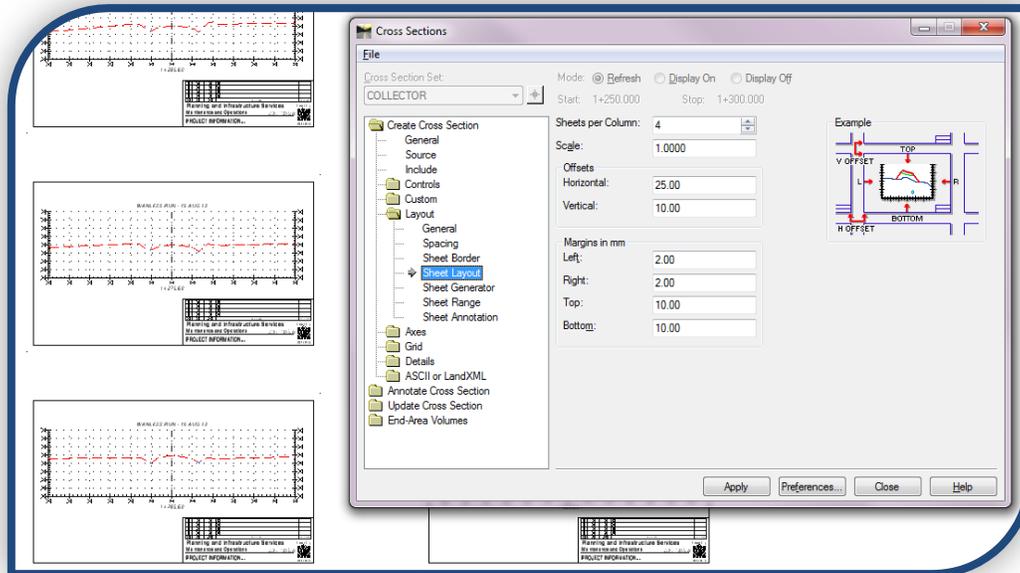
Each project is going to be different since sizes vary, as do changes in elevation and other structures and/or utilities that may need to be included on the cross sections.

The values set up in the COLLECTOR.xin (renamed from BRAMPTON.xin) will get you started. Remember to save your preferences when you have a setup that works for the project.

> SHEET GENERATOR

Not currently utilized.

> SHEET RANGE

Not currently utilized.

> SHEET ANNOTATION

Not currently utilized.

CREATE CROSS SECTION > AXES >

> LEFT / > BOTTOM / > RIGHT / > TOP / > MIDDLE

The axes parameters have been set up to City standards in BRAMPTON.xin. (Renamed COLLECTOR.xin at the beginning of the process.

155

Pat Z.

CREATE CROSS SECTION > GRID >

> GENERAL

The grid perameters have been set up to City standards in the xin file.

CREATE CROSS SECTION > DETAILS >

> TITLE

Type in a descriptive title for the cross sections, this will be displayed on the top of each cross section, generally it would include the project file name and date along with direction indicators. There are a limited number of characters available here for the title, however, if you put a place marker here it can be changed to something lengthier and more descriptive using the Find/Replace function in Microstation.

For example, type in "Collector 24AUG13" and then replace it with "< < NORTH Collector St – 13-3251-213 -- 24AUG13   SOUTH > >"

> LEGEND

We don't often use a legend, however, there may be occasions where one is required for special presentations or displays for councillors or the public sector.

> SYMBOL AND DETAILS

Not currently utilized.

GENERATE THE CROSS SECTIONS

Back under > Create Cross Section > General, make sure all the surfaces required in the cross sections have been identified and save the preferences before generating the sections.

Preferences

Save

Close   The changes will be saved to the loaded preference file i.e. **"COLLECTOR.xin"**
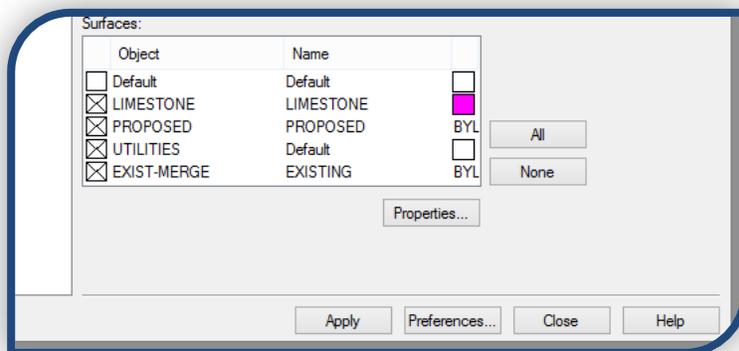
Select APPLY and identify the location for the sections to be generated. As with the profile generation, the sections will be displayed relative to the top view so ensure that there is adequate clear space for the sections to be displayed.

156

27.   CROSS SECTION ANNOTATION – INROADS | EVALUATION

ANNOTATE CROSS SECTION > GENERAL

Select the proposed surface to be annotated. Any features that have a point, or symbol, placed in the cross section can be annotated.
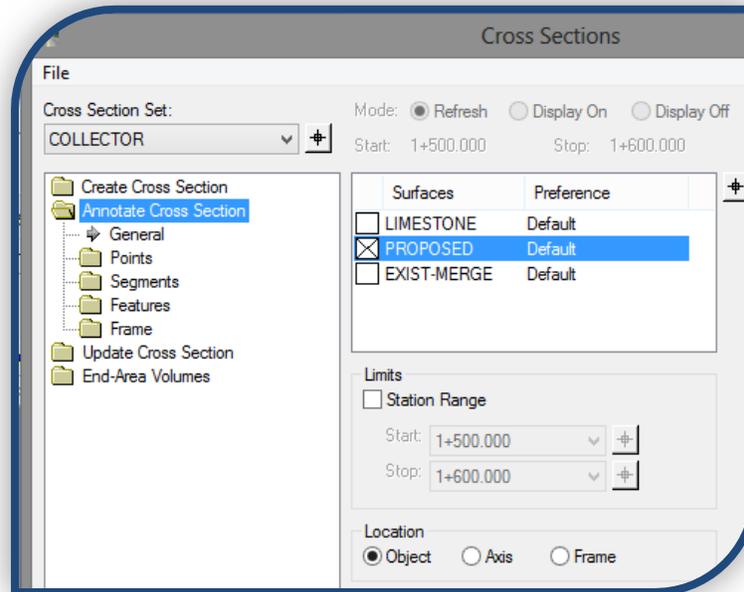
If other points are required for a particular project, this can be accomplished in a couple of ways. For random additions, i.e. only a few points or sections involved, you can copy a point from another feature in the same section. It will then be annotated along with the others.

To annotate an additional feature, or features, the feature style(s) can be modified to include annotation on the cross section.

For our purposes, the edge of pavement, lanes, centerline and ditch lines will be included in the labeling and are set up in the preference file.

Pat Z.

ANNOTATE CROSS SECTION > POINTS >

> GENERAL

Identify "Center" to be annotated, the prefix is set to display as "C/L" with a precision of three decimal places.
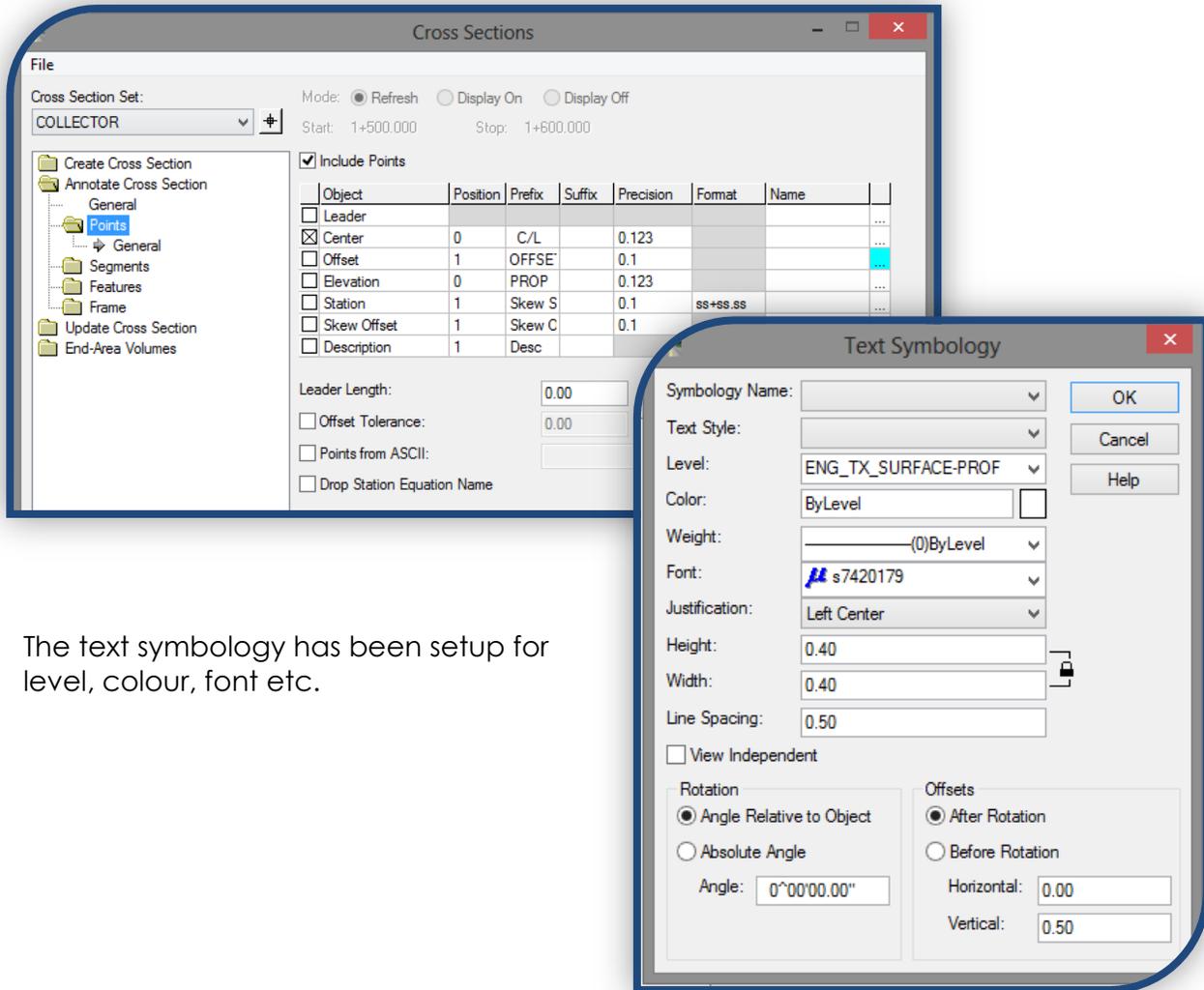
The text symbology has been setup for level, colour, font etc.

ANNOTATE CROSS SECTION > SEGMENTS >

> GENERAL / > ANNOTATE

As a general rule, segments are not annotated; labeling all segments creates a very cluttered cross section and makes reading any of the information difficult. Only those slopes that are non-standard, i.e. not 2% or 3:1, are labeled manually.

158

ANNOTATE CROSS SECTION > FEATURES >

> GENERAL

Similar to the Points annotation, the process is to identify the specific features to be annotated.

> ANNOTATE

Identify which features are to be annotated. A list of potential targets is shown, if the feature you wish to annotate is greyed out, it is not eligible for annotation.
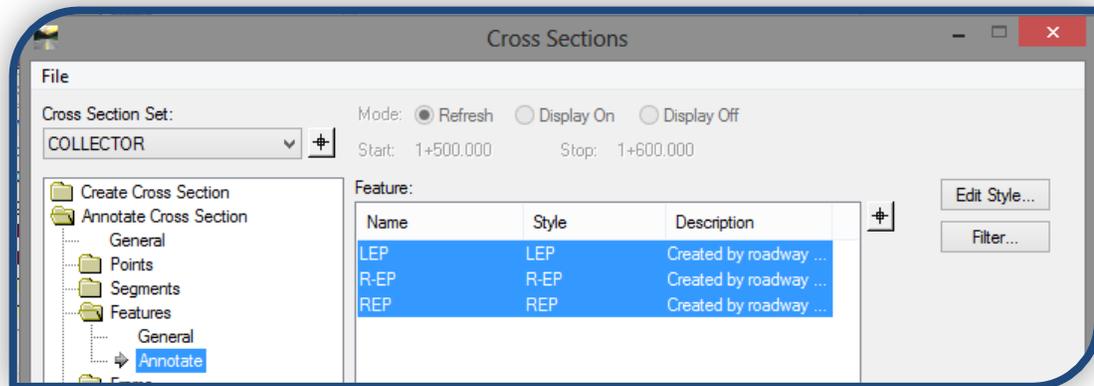
> If an ineligable feature is needed for the specific project, the feature style will need to be modified to display annotation in the cross sections and the symbology parameters must be completed for the Cross Sections.

See EDITING FEATURE STYLES (SECTION 28)

ANNOTATE CROSS SECTION > FRAME >

> GENERAL / > DETAILS / > COLLISION FREE / > POINTS / > SEGMENTS / > FEATURES / > SYMBOLOGY

Since the text will be placed on the feature, no frames are required.

The resulting annotation on the cross section will look like this...

Pat Z.

159
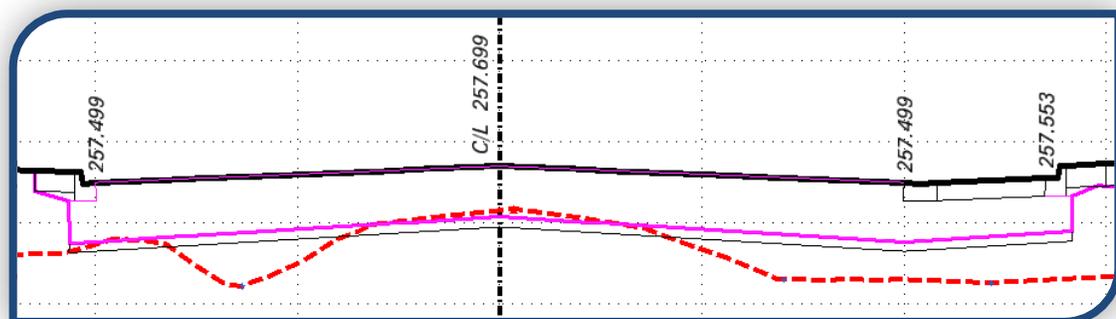
1) UPDATE CROSS SECTIONS

The dialogs that follow are dynamic; they provide options and information relative to the selections made.

> Components and features associated with the selected surface will be shown, along with any available options.

UPDATE CROSS SECTION > GENERAL
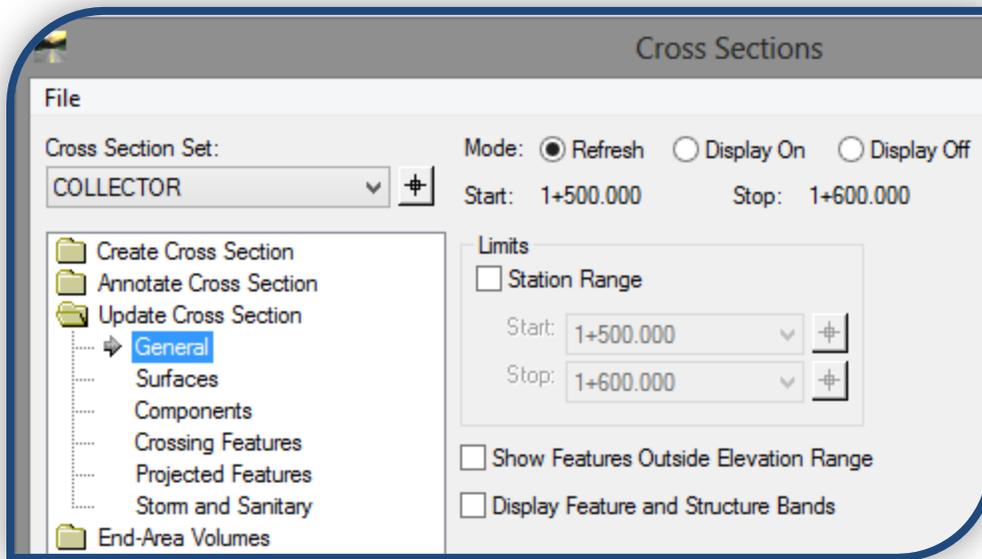
Specify a station range to update if required, the default is for the entire group to be updated. The Start and Stop Stations will be displayed in each dialog that follows.

The Mode: will be present in each dialog as well to allow you to...

⊙ Refresh -- a currently displayed surface/component/feature

⊙ Display On -- a surface/component/feature that is not currently displayed in the sections

⊙ Display Off -- a surface/component/feature that is currently displayed in the sections

UPDATE CROSS SECTION > SURFACES

A surface must be identified here prior to making component selections in the next dialog box.

The next dialog is specific to the surface chosen. i.e. components of the selected surface are listed.

160

Pat Z.
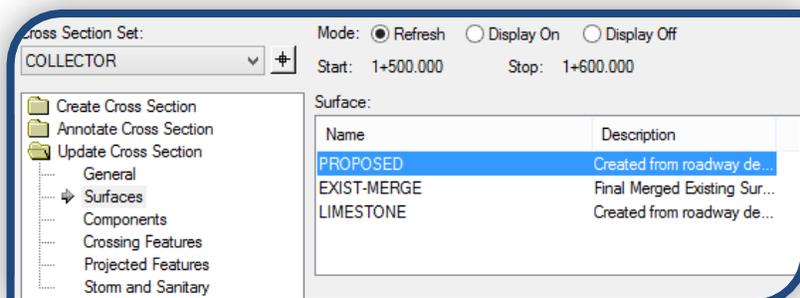
UPDATE CROSS SECTION > COMPONENTS
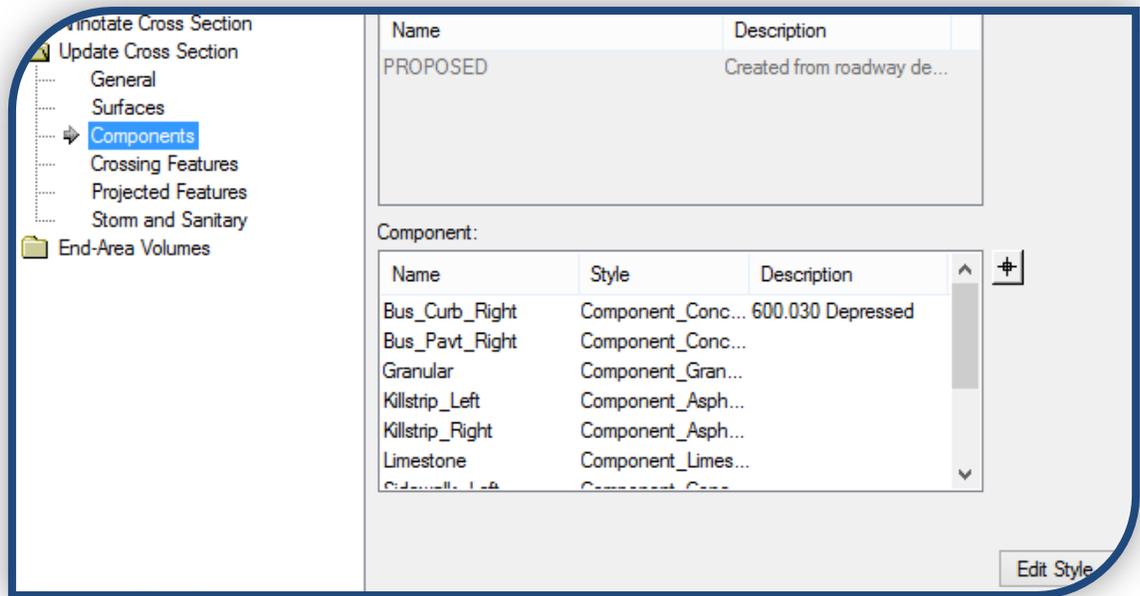
The components in the surface "PROPOSED" are shown here, as it was selected in the previous dialog. The name(s) of any surface containing components will be displayed above the component list.

By going back and selecting a different surface in the previous dialog, you can see that the components displayed will change. Since only the proposed surface has components, there are none to list for any of the other surfaces.

Pat Z.

UPDATE CROSS SECTION > CROSSING FEATURES AND > PROJECTED FEATURES

Identify the surface and then the crossing/projected features from the list displayed. Again, if it is greyed out it is not eligible for selection. By changing the Mode selected, the features listed will be modified to show eligible selections.

Refresh will only allow selection of features that are already displayed; all others will be greyed out.

Display On allows selection of features not yet displayed in the sections.

Display Off will only allow selection of features already displayed.

> If a feature is greyed out in all modes, and if it is required to be displayed, it must be modified in the feature style.

See EDITING FEATURE STYLES (SECTION 28)

UPDATE CROSS SECTION > STORM & SANITARY

Not currently utilized.

FINAL NOTES – UPDATING CROSS SECTIONS

Check each cross section for accuracy and functionality

Modify the driveway sections or any ditch lines

Add the center median as needed

Elements in the cross sections may be adjusted to more accurately reflect the actual or desired conditions.

> As with the surface feature modifications, refreshing or re-displaying the surfaces on the cross sections will remove any changes made to them on the cross section and display the updated/current dtm surface. If the surface has been modified (i.e. modifying features on the surface, triangulating and saving), refreshing it will update the cross section display of that surface.

If extra points are required for annotation, they can be copied within each cross section to locations where the elevations are required. Subsequent annotations will place the elevation at the added point(s) along with the previously existing points. As a for instance, there may be times when elevations are required along the property line for developments to match the project design, a point can be copied from the e/p to the surface line at the property limits. The annotation is all on one level so there is not conflict with levels when copying these points.

162

If a component does not generate properly, which can happen at corridor clipping zones, it can be modified by inserting vertices to complete it. If done prior to calculating volumes, the modified component will be used in the End Area calculations.
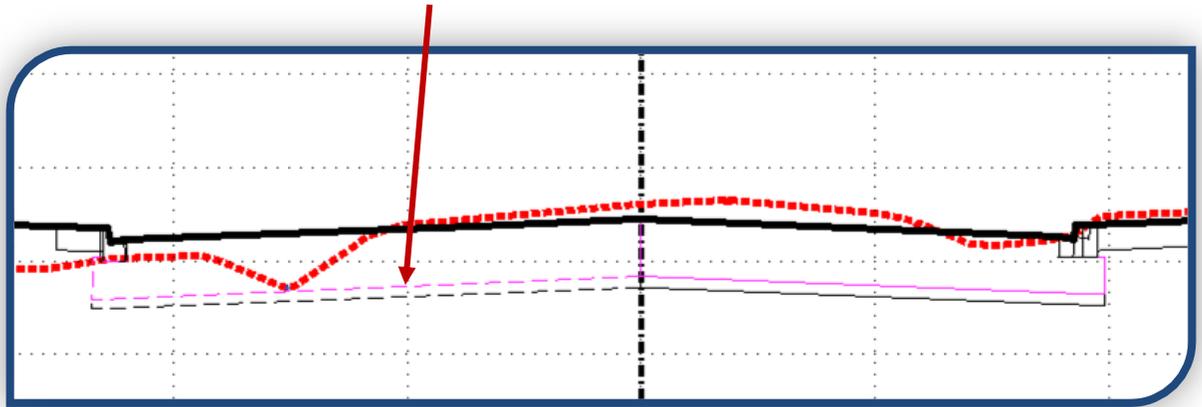
Copying this area shape, from one section to another, will cause the calculations to use areas spanning the distance between the sections to connect the areas. If subgrades have not been generated for a particular section, or a number of sections, they will need to be measured manually and input into the spreadsheet for cut/fill.

See END-AREA VOLUMES (SECTION 29)

The proposed surface shown on the sections is set up in the preferences to be displayed by **"features only"** and that eliminates all the intermediate vertices that would be placed anywhere surface triangulation occurs. If there seem to be a lot of extra points, or the surface goes beyond the grading limit, ensure the surface properties are set correctly…

See CHECK SURFACE PROPERTIES (SECTION 17.2)

The values displayed will be based on the modified location of the surface, and sub-surface, lines in each cross section and will include any additional inserted vertices placed during modification.

Modifying the cross sections does not automatically adjust the surface itself.

The modified cross section linework, however, will be utilized by Inroads to calculate the end area volumes. Adjustments made to match existing ground or correct incomplete components will be reflected in the calculated volumes and annotation.

163

Pat Z.

28.　EDITING FEATURE STYLES

Nominally, since there are components displayed in the cross sections, for sidewalks and killstrips, they are not displayed as features. If you need to annotate or display them, the feature style must be modified.

Edit Style...

Will bring up the dialog where, under > Settings,

☑ Crossing Points and/or

☑ Annotation is selected. This will allow selection of these features in the dialogs.
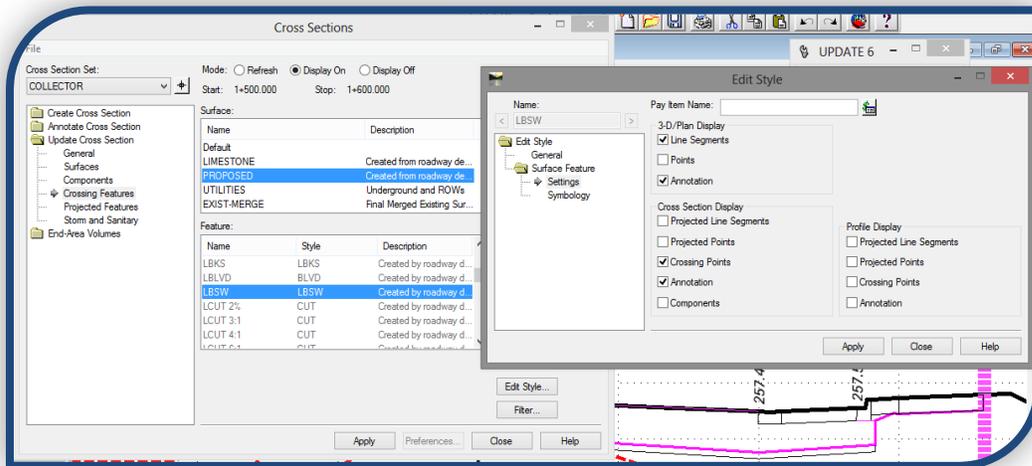
Under > Symbology, the Symbology Name is identified and can be edited. Selecting Edit... brings up the Point Symbology dialog which outlines the level/style/colour/symbol/cell and angle. These can be added, if necessary. If no symbology is named, one can be selected from the drop down, or a New... one can be added if necessary.

Pat Z.
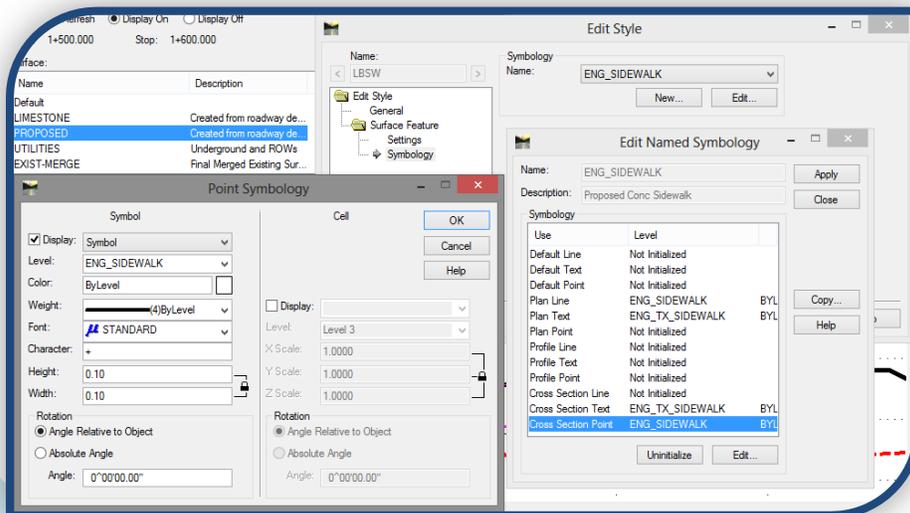
29.   END-AREA VOLUMES

Volumes can be calculated by InRoads once sections have been completed and modified as necessary. Adjustments are required in areas where surfaces do not meet, driveways where the curb needs to be depressed and driveway slopes need to be adjusted or any other specialized / problem area that requires individual manipulation. Make these adjustments prior to calculating your end area volumes and the changes will be included in the calculations.

City of Brampton End area calculations are very basic and as such we will only be dealing with two of the headers under End Are Volumes. (General & Annotation)

END-AREA VOLUMES > GENERAL

In this area, select the two surfaces to compare in the calculations. This will be done twice, once for granular volumes, using PROPOSED & EXISTING surfaces, a second time for limestone volumes, using LIMESTONE & EXISTING surfaces.

One surface must always be a design surface (one generated by InRoads), the other will be the existing surface.

Select

☑ Create XML Report

and the Method

◉ Correct for Curvature

Pat Z.
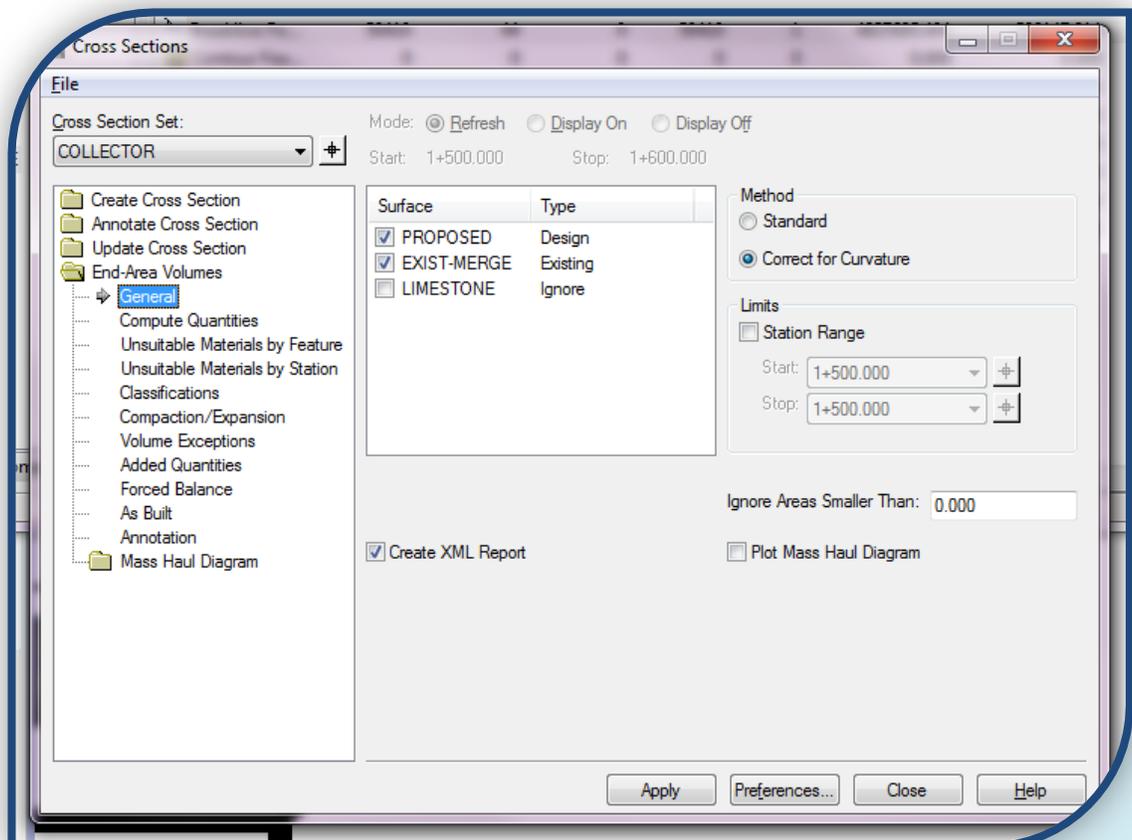
END-AREA VOLUMES > ANNOTATION

The styles have been set up in the preference file and this information will display each time the volumes are generated (by selecting Apply), replacing the previous information.

Each time Apply is selected volumes are generated and a report chart will be displayed with the information and totals.
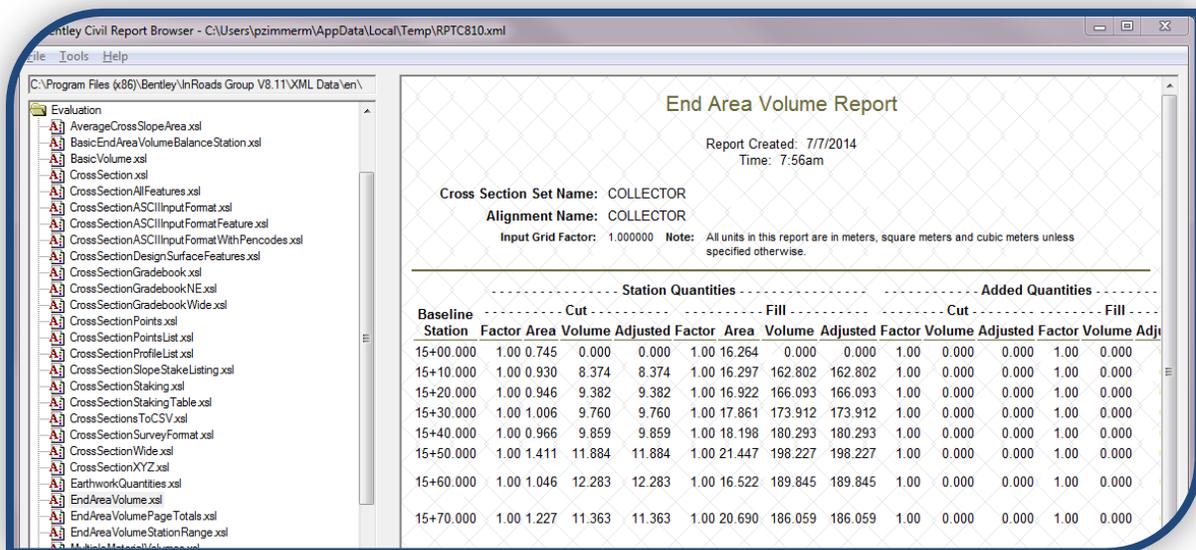
This chart provides the basic information that will be utilized for calculating the volumes, adjustments will need to be made for some areas.

Print/save the appropriate form to a PDF for later use.

With the alternate surface LIMESTONE, you can re-run the volumes to get the second calculations required, save this to a PDF for later use as well.

Remember, each time you Apply to get values, previous information is removed.

166

Pat Z.

CUT AND FILL SPREADSHEETS

When doing a totally manual measure and calculate using the cross sections, it can be done either of two ways.

Use the half scale version of the cut/fill spreadsheet, CUTFILL-HALFSCALE.xlsx, it includes two extra columns, which are to be hidden during printing. Input the measured areas from the cross sections in the hidden columns and they will be adjusted automatically for the printed portion.

Using CUTFILL.xlsx, this adjustment is not made, remember the areas you measure on the cross sections will be twice the actual area due to the vertical exaggeration and will need to be adjusted before you put them in the spreadsheet.

To make adjustments to the quantities, copy the file "**CUTFILL.xlsx**" or "**CUTFILL-HALFSCALE.xlsx**" from the directory ...*Engineering Standard Setups**DESIGN SPREADSHEETS*.

With the spreadsheet and the **EndAreaVolume** printout, populate the spreadsheet using the printout and adjust as required. The initial calculation is for earthworks based on Granular backfill. If you have not done a second calculation using the LIMESTONE surface, you will need to adjust for Limestone by increasing the fill and decreasing the cut.

Provide two earthworks spreadsheets, one Limestone, one Granular. When the adjustments/corrections to the Granular Spreadsheets have been made, copy the tabs to a Limestone version and make the necessary adjustments for the difference between Limestone and Granular quantities.

STREET:	COLLECTOR STREET					DATE:			24-Aug-14	
	EARTHWORKS FOR **GRANULAR** SUBGRADE									
FROM:	ARTERIAL RD A					CALCULATED BY:			PMZ	
TO:	ARTERIAL RD B					CONTRACT #			13-3251-213	
	END AREA		SUM - END AREAS		AVG. END AREA			AVG AREA X DIST		
STATION	CUT	FILL	CUT	FILL	CUT	FILL	DIST	CUT	FILL	
1500	0.75	16.26	1.68	32.56	0.84	16.28	10.00	8.38	162.81	
1510	0.93	16.30	1.88	33.22	0.94	16.61	10.00	9.38	166.10	
1520	0.95	16.92								

Calculations will be made to include the component areas and ignore any stripping, as demonstrated below.

Where **F** represents Fill, **C** = Cut, **AF** and **AC** represent the adjustment quantities for limestone vs. granular.

Pat Z.
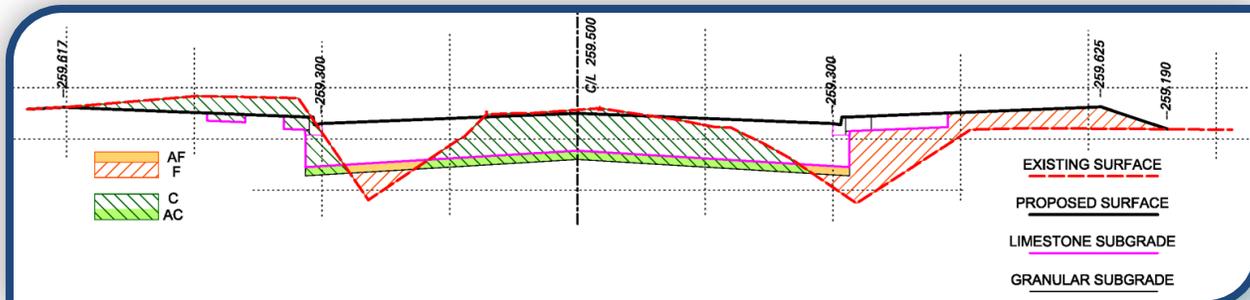
30.   PLOTTING CONTRACT DRAWINGS

1) USING IPLOT

The contract drawings you will be plotting will consist of Plan & Profiles, Removals, Dimensions, Typicals and Details, Pavement Elevations as well as the Title Page and Drawings List. Since these will need to be plotted numerous times, 30% / 60% / 90% / 100% / tender / construction, as well as for intermittent checks and reviews, it is advantageous to set up an "ips" file using ProjectWise InterPlot Organizer.

To begin, make sure you have the directory "PRINT FILES" in which to store the "i" files and the plot file (ips).

It will eventually look very similar to the list shown here.
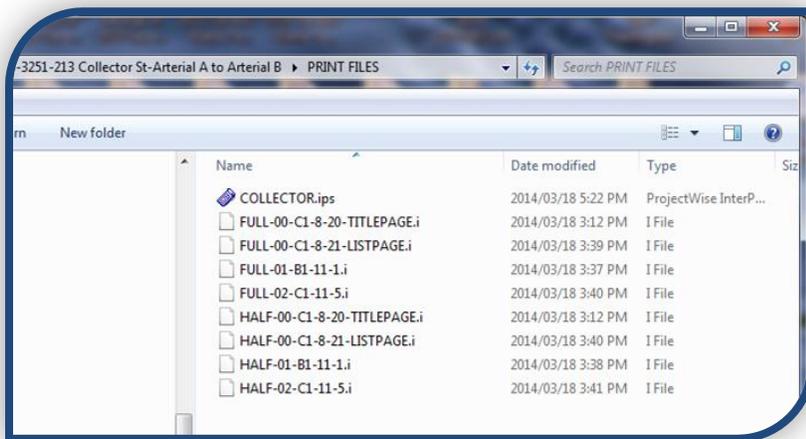
Open each Contract drawing file, in turn, set up the drawing for plotting by turning the levels on or off as needed, turn on the overrides in the plan & profile drawings.

> **Set up one view as it will be plotted and save the settings. This allows other users of the drawing, consultants perhaps, to see what is to be plotted when they open the file.**

Everything has been set up in the Seed-3D file to force the colours, for existing information, to dark grey for plotting using the level overrides.

There have been a number of filters set up to help weed out the levels needed for each drawing. Begin by turning all levels off, then filtering for the various components to turn on the needed levels for each type of drawing.

Once you have turned on/off the appropriate levels, save the settings (Ctrl S); fence the drawing by using tentative selection and picking the corner points outside the frame. The bases have been set up to allow plotting at full scale and at true half scale by using alternate corners. In View Attributes, turn on the Overrides. For the full size plots, leave the weights on and use the lower left and upper right points. For the half size plots, turn off the weights, in the View Attributes, and use the upper left and lower right points.

>> File > IPLOT…
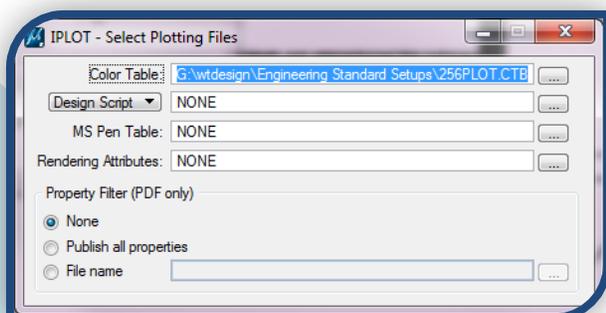
Ctrl +F will bring up the dialog with plotting file options. The colour table attached to the seed file is 256PLOT.CTB, if this has been changed; make sure you select it as the one to use. It can be found in ...*Engineering Standard Setups*

Pat Z.

No Design Script or Pen Table is required. Close ⊠ this dialog box now.

In the IPLOT main dialog window, select the

- **Printer:** "HP800 or HP1100 or HP2300"
- **Plot Area:** will be **Fence**
- **Units:** = m
- **Scale:** = 500:1
- **Rotation:** is either 90 or 270 degrees for plotting directly

> You can leave the rotation at zero (0) to create the "i" files, this way the pdf generated using the ips file will have the sheets in a landscape position.

> **In order to print using the ips file…untitled.ucf must remain in C:\ProgramData\Bentley\Microstation\Workspace\Users\ even if you are using a different ucf file on your project(s)**
> **The printer must also have an iplot driver, (CADIPLOT) even though we cannot plot directly to the plotters using iplot now.**
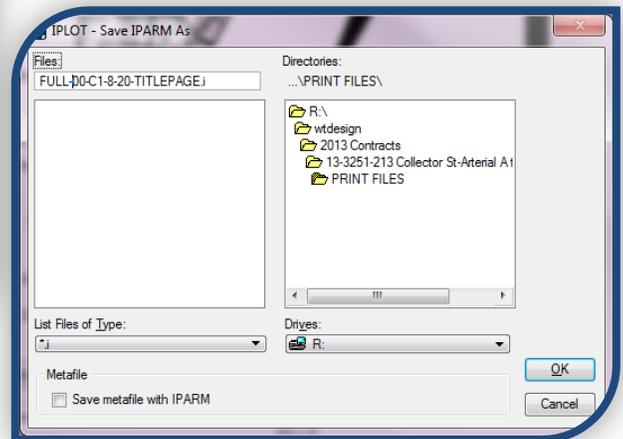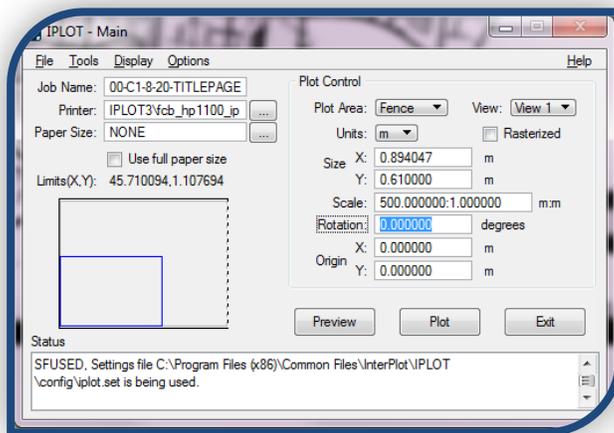
In the IPLOT dialog window…

>> File > Save As…

…to save the IPARM file in the Print Files directory. This "i" file will contain the setup provided in the IPLOT dialog and provides a means to print these drawings at any time, to paper or PDF, without opening the drawing file and setting everything up again.

When saving these 'i' files add the prefix'FULL' to the name, so this one would be called FULL-00-C1-8-20-TITLEPAGE.i

> **Your drawing files will then be set up with the Sheet # in front of the Drawing # this makes it easier to order the files in the ips file for plotting in the proper sequence.**

For half size (1:1000 scale) on 11" x 17" paper there have been alternate points made for fence placement turn level weights off for the half scale, and use the points identified by the double arrows to create your 'i' file. These would be called HALF-00-C1-8-20-TITLEPAGE.i…

> By putting the FULL / HALF designation in front of the drawing number, rather than at the end, the two groups will be sorted for you and easier to select as a group.

Pat Z.

SETTING UP THE ORGANIZER

When you have saved all the IPARM files to the PRINT FILES directory…

Go to start…

>>All Programs > Bentley > ProjectWise InterPlot Utilities > ProjectWise InterPlot Organizer

OK.

Add
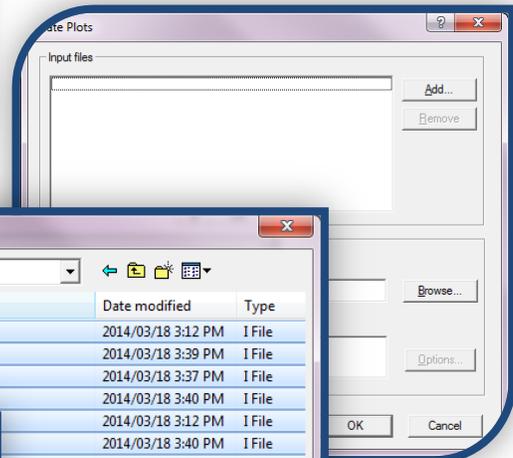
Highlight the "i" files to be plotted and select **Open**
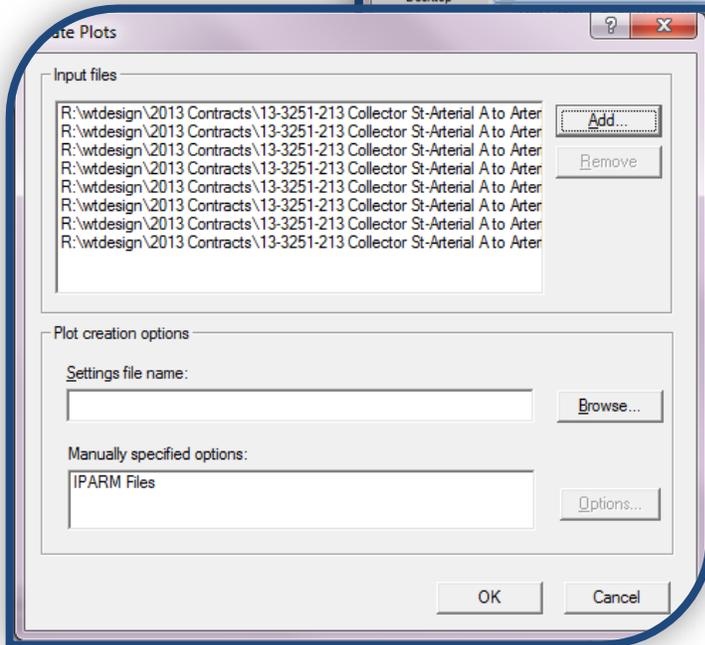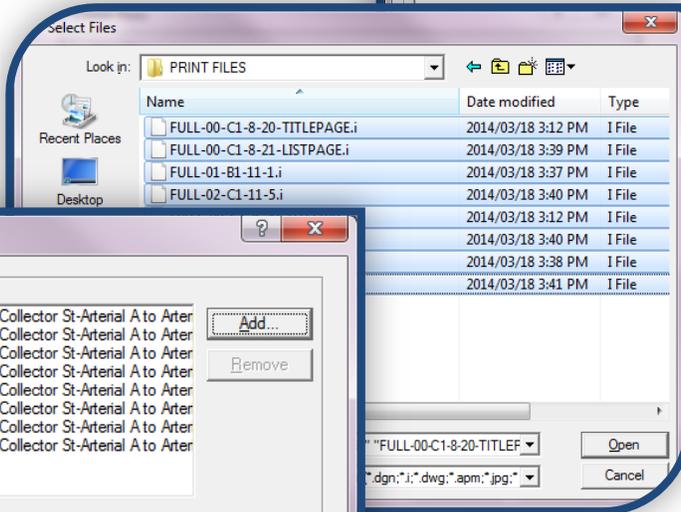
The window will revert back to the **Create Plots** window with the list included under the **Input files**.

Select **OK** and you will have the list in the Organizer, correct the sequence of drawings, if necessary.

>> File > Save …assign a name - COLLECTOR.ips, you can add HALF/FULL to the name to reflect the scale that the 'i' files were generated for.

Pat Z.

From this point you, or anyone else, can create a PDF file with any or all of the drawings and print that PDF to a large format plotter on 24" x 36" paper or to a printer/copier on 11"X17" size in just moments, or share the PDF with those who can not open Microstation files. Once the file is saved, you can activate the organizer by double clicking on the ips file.

In the early stages you may be able to use one .ips file since you will have a limited number of drawings, however, at some point you may need to separate the full and half size drawings.
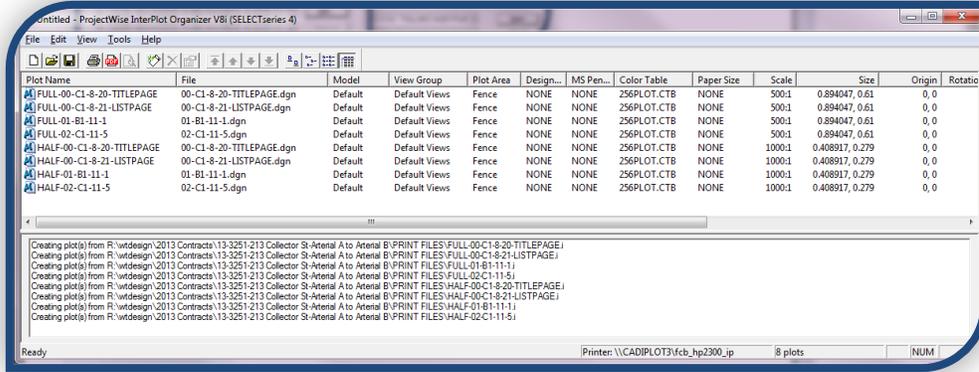
Creating two separate .ips files will reduce the size of the files and the time it takes to open one for printing. It also allows you to 'select all' to choose the set when plotting.

OOPS, SOMETHING'S WRONG WITH THE SCALE…

If you find that the lineweights seem very heavy and scales have been changed to something other than what was set up in iplot, check the print setup and make sure that the printer identified there is one of the large format plotters.
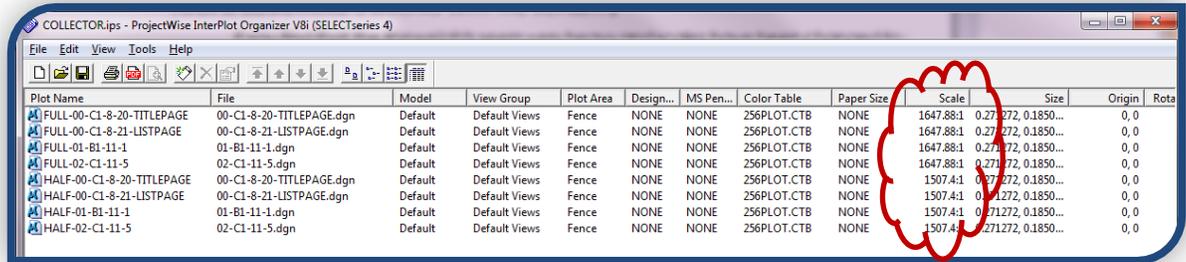
>> File > PRINT SETUP
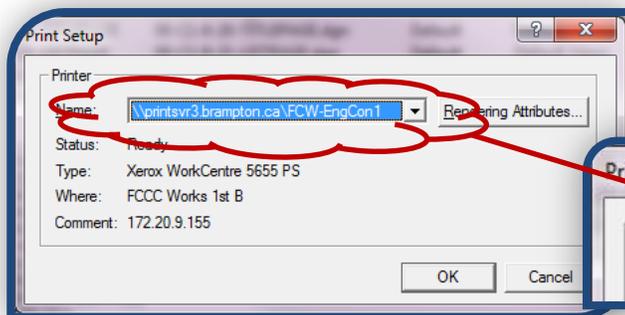
Change the Printer name to the HP800IP (or HP2300, or HP1100).

Pat Z.
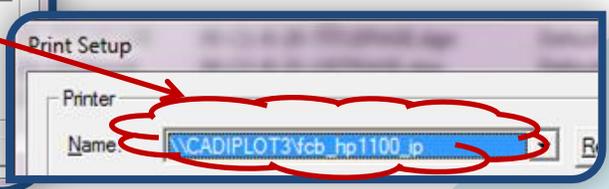
WHY DOES THIS HAPPEN?

The default page size for the previous printer used may be letter size; the scale of the plot drawing is automatically changed to fit that size paper when the "i" file is imported or if the Print Setup is changed. The plots and "pdf" files will appear to have much heavier lineweights if plotted from this plot file. After changing the printer to one of the larger format plotters, newly imported plot files will be at the scale set in iplot, previously imported files will need to be adjusted.

CORRECT THE SCALE ON PLOT FILES ALREADY IMPORTED

To change individual plot files, double click on the Plot Name to bring up the information dialog box. Change the scale in the dialog box to the correct size for the plot and select OK.
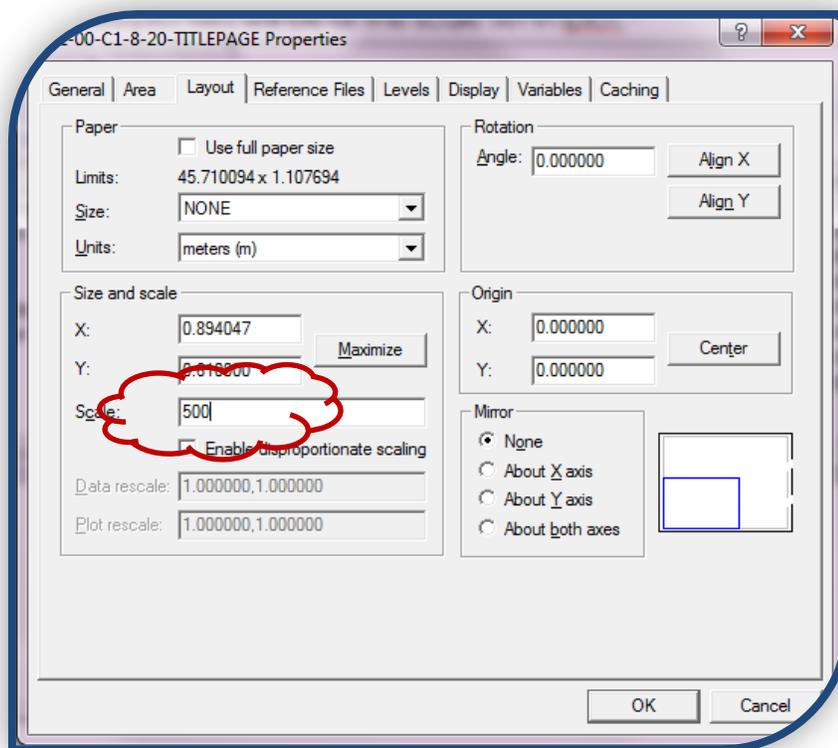
If there have been a lot of drawings imported before realizing there was a problem, you can delete the plot names and re-import the list once the print setup is corrected. This works if you have a variety of scales to be adjusted.

Select the Create Plots icon and follow the procedure, as outlined previously, to re-import your plot files.

If all the files should have the same scale...

Highlight all the plot names.

Right click and Select Properties

Change the scale in the dialog box and Select OK

172

Pat Z.
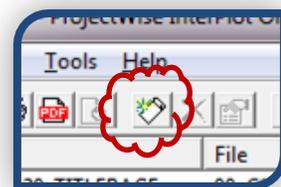
2) USING PRINT (PRINT/PLOT)

For those without iPlot, the approved "look" can be duplicated using the BRAMPTON.pltcfg file provided. This file, when used in conjunction with printplot, will produce drawings of City standard quality in both full and half sizes. Begin by setting up the drawing as you would for plotting using iPlot. i.e. levels/weights/overrides…

Remember to turn off the weights before creating the half size plans.

1- Identify Fence Area

2- Select Print

3- Select Printer / PDF program

4- Select Config File

No Pen Table or Script Required

Pat Z.

173
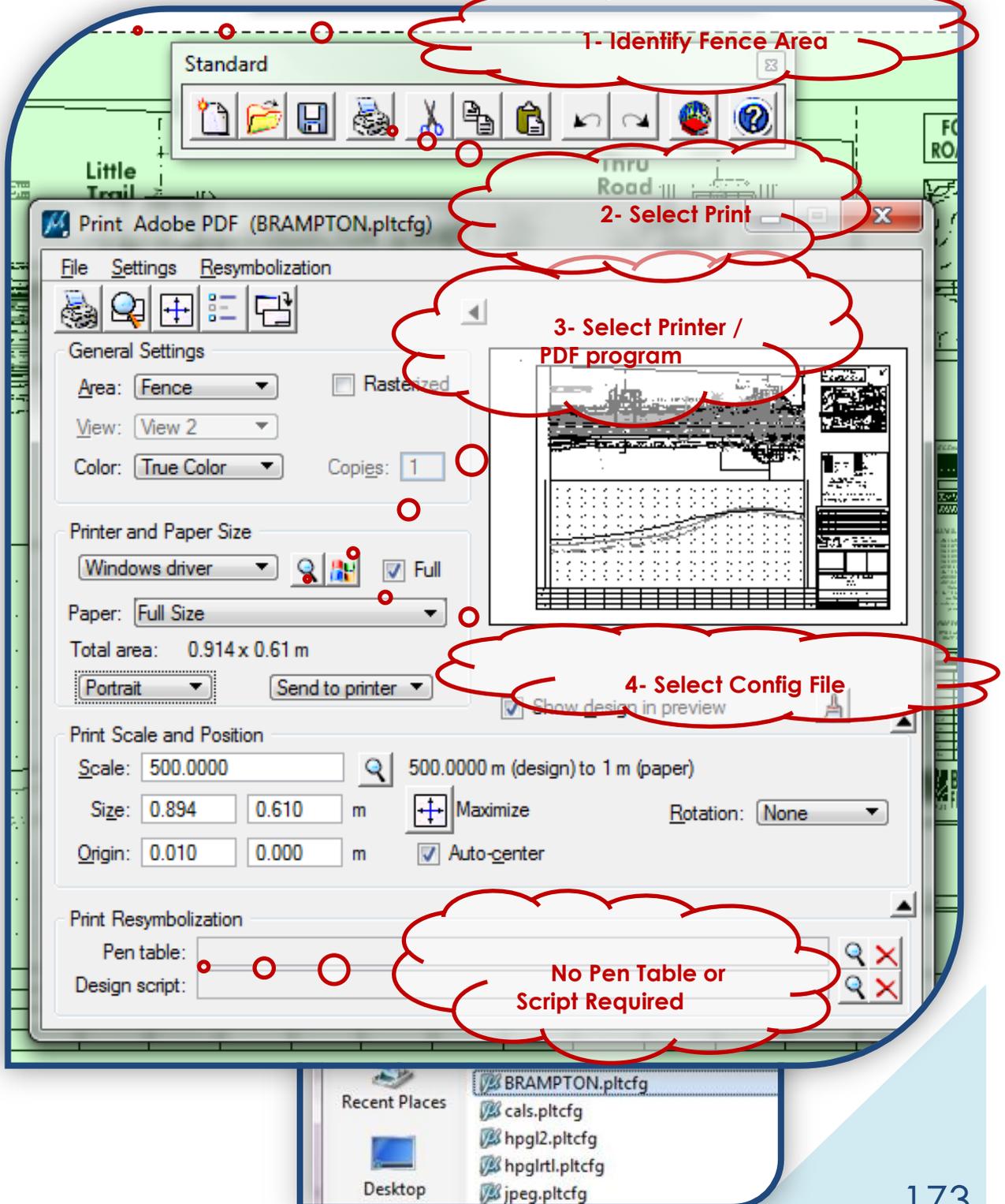
31.　FINAL CHECKLIST – COMPLETING THE PACKAGE

1) BASIC INSTRUCTIONS

- ✓ Label Dimension plans and Vertical Alignment (profile)
- ✓ Create Storm Drainage Plan(s)(area-3-page) AND Storm Drainage Calculations
- ✓ Propose Storm MH and CB locations and connections on plan as necessary and complete storm drainage calculation sheets
- ✓ Add Storm information to Profile with dimensions, OPSD reference, pipe length, size and strength.
- ✓ Tone or shade appropriate proposed works (plan & profile)
- ✓ Plot Plan and Profile drawings
- ✓ Send out 30%, 60% and 90%. Final PUCC submitted at 90% review
- ✓ Incorporate information received
- ✓ Calculate Quantities--Cut/Fill, Asphalt removal & Placement, sidewalks, storm…

2) CONTRACT DRAWINGS TO BE CREATED AS REQUIRED

- ✓ Title Pages – City Map on cover, drawings listed on second sheet (area-8-sheet)
- ✓ Application plans (Gas, Railway, Conservation…as required)
- ✓ Plan & Prof. Sheets 1:250 or 1:500 (area-street#-page)
- ✓ Removals (area-8-page)
- ✓ Dimensions (area-8-page)
- ✓ Typical X-Sections and Details (area-8-page)
- ✓ Pavement Elevation Details 1:250 scale(area-8-page)
- ✓ Pavement Markings (in house…drawings set up by primary designer (area-8-page), design to be completed by Traffic Section)
- ✓ Traffic Signals 1:250 scale (design & drawings to be done and numbered by Traffic section)
- ✓ Street Lighting (design & drawings to be done and numbered by Street Lighting section)
- ✓ Cross Sections 1:200 scale Horizontally, vertical exaggeration of 2 [individually on legal or tabloid size pages]
- ✓ Tree Inventory (to be done by landscape consultant)
- ✓ Landscape drawings (to be done by consultant)
- ✓ Structures drawings (to be done by consultant)
- ✓ Traffic Control Plan(s) (to be done by contractor)

3) APPLICATIONS / MEETINGS

- ✓ Applications to MOE, TRCA, CVCA, GAS, and RAIL Authorities--drawings as required
- ✓ Meetings to be set up with Utilities, Conservation Authorities …

4) MOE DRAWINGS

- ✓ 3 copies of each of the following…
- ✓ Drainage plan (Full Size)
- ✓ Storm Calculations
- ✓ Applicable Plan & Profile Sheets (Full Size)

174

5) RAILWAY DRAWINGS

PLAN VIEW OF CROSSING – 1:2000

- ✓ Location of tracks and R.O.W. of railway – 400m in each direction
- ✓ Location of traveled portion of roadway – 100m in each direction
- ✓ Location of R.O.W. of roadway – 100m in each direction
- ✓ Width of railway R.O.W.
- ✓ Width of roadway R.O.W.
- ✓ Width of traveled portion of roadway
- ✓ Width of roadway shoulders
- ✓ Angle of crossing
- ✓ Location of all railway crossing signs and warning devices
- ✓ Sight lines and all obstructions to view within 400m
- ✓ Drainage and utilities relating to crossing

PROFILE OF RAILWAY – 1:5000H, 1:250V – 100M IN EACH DIRECTION

- ✓ Elevation of the top of the lowest rail
- ✓ Elevation of original ground at center line of track
- ✓ PROFILE of roadway – 1:200H, 1:200V – 100m in each direction
- ✓ Elevation of roadway surface
- ✓ Gradients
- ✓ Elevation of original ground surface

TYPICAL CROSS SECTION – 1:200

- ✓ Traveled portion of roadway
- ✓ Shoulders
- ✓ Drainage
- ✓ Utilities and other information relevant to construction of crossing
- ✓ Obstacles to construction…trees, buildings, retaining walls…

6) GAS DRAWINGS

LOCATION PLAN VIEW – 1:500 OR LARGER

- ✓ Reference measurements to nearest road intersection, lot line, etc.
- ✓ Width of Easement, location of pipeline and pipeline markers within easement
- ✓ Curbs, guard rails, guy wires, poles fences
- ✓ Lot lines, Road Limits

PROFILE VIEW

- ✓ Only required where encroachment parallel to facilities for a definable distance
- ✓ Requirements the same as Section View

Pat Z.

SECTION VIEW – 1:200H, 1:100V OR LARGER

- ✓ Depth and location, diameter and material of all pipelines and casings
- ✓ Location and clearance from pipelines of roads, rail lines, rivers, ditches…
- ✓ Location of other buried appurtenances
- ✓ Proposed depth/location of new facility with details regarding material, sizing slope (if sewer), pressure voltage drainage etc. as applicable

32. TYPICAL LIST OF FILES

...that would appear in the contract directory, for the example project, would include, but not be limited to…

1) INROADS FILES…

Collector.xin [preferences]

Collector.itl [template library]

Collector.rwk [roadworks – loads all applicable files when opened]

Collector.alg [alignment geometry]

Collector.ird [roadway library]

Collector-base.dtm [surveyed surface]

UTILITIES.dtm [surface for ROW & utilities to be displayed in cross sections]

PROPOSED.dtm [surface]

2) MICROSTATION FILES…

**Collector-base.dgn	01-B1-11-1.dgn
**Collector-DESIGN.dgn	02-C1-11-5.dgn TO 06-C1-11-1.dgn
**Collector-PROPERTY.dgn	07-B2-12-12-ARTERIAL-A.dgn …
**Collector-PROFILE.dgn	15-C1-8-22_REMOVALS.dgn
**Collector-PVMNT_SIGNS.dgn	16-C1-8-23_REMOVALS.dgn
Collector-UTILITIES.dgn	17-C1-8-24_DIMENSIONS.dgn
Collector-SECTIONS.dgn	18-C1-8-25_DIMENSIONS.dgn
Collector-STORM.dgn	19-C1-8-26_PVMNT_SIGNS.dgn
Collector-STRIP.dgn	20-C1-8-27_PVMNT_SIGNS.dgn
Collector-SURFACE.dgn	21-C1-8-32_ELEV-ARTERIAL-A.dgn
Collector-QUANTITIES.dgn	22-C1-8-33_ELEV-LITTLE-THRU.dgn
Collector-WORKING.dgn	23-C1-8-33_ELEV-SAMPLE-LOCAL.dgn

**Drawings to be referenced to numbered drawings

> **Anyone required to access the contract is able to determine, with no trouble, what each file contains and where the current files are.**

176

Pat Z.

3) FINAL NOTES

**IT IS EXTREMELY IMPORTANT THAT SAVES BE DONE THROUGHOUT THE PROCESS; <u>THIS CANNOT BE REPEATED ENOUGH</u>.
EACH TIME A STEP OR PHASE IS COMPLETED WITH THE DESIRED RESULTS
<u>SAVE SAVE SAVE</u>!!!**

There will <u>not</u> be a prompt for a name each time a file is saved, only the first time.

For each process***…>>Save when satisfied***

Create a surface***…>>file >> save >>surface***…follow the prompts

Create a geometry/alignment***…>>file >>save >>geometry***…follow the prompts

Import surface features***…>>file >>save >>surface***

Triangulate a surface***…>>file >>save >>surface***

Modify an alignment***…>>file >>save >>geometry***

Keep the names consistent***…"<u>Streetname***</u>".*** In Inroads, each is a different type of file, they can all be given the same name; different extensions will be assigned by InRoads

The exceptions are surfaces and alignments, which have their own naming structure.

If you find that you are not being permitted to **-**Select a command on the MAIN MENU check to ensure THE LAST DIALOG BOX YOU HAD OPEN has been CLOSED.

For some operations, Inroads will not permit selection of an action on the Main Menu until it is the only box open.

177

Pat Z.

33. APPENDICES

1) APPENDIX 1 – LEVELS & SYMBOLOGY

I.   GENERAL LINEWORK AND TEXT LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	**DESCRIPTION**	**CO**	**STYLE**	**WT**	**CO**	**LC**	**WT**
Default	Default	0	0	0	0		0
GENERAL LINEWORK and TEXT LEVELS							
ENG_BORDER	OUTSIDE BORDER OF SHEETS	0	0	15	0		20
ENG_DETAILS	DETAIL DRAWINGS I.E. SANDBAG DAMS, CHECK DAMS, ISLAND DETAILS…	0	0	2	0		5
ENG_DIMENSIONS	DIMENSIONS TAPERS DETAILS etc	0	0	6	0		6
ENG_GRID	INTERIOR SECTIONS GRID & PROFILE GRID	0	1	0	0		1
ENG_GRIDBORDER	LEFT, RIGHT AND BOTTOM GRID LINES FOR SECTIONS AND PROFILE	0	0	3	0		5
ENG_KEY	KEY PLAN	0	0	0	0		2
ENG_LEGEND	LEGEND AND NOTES BORDER, LINEWORK - PLAN	0	0	5	0		20
ENG_LIMITS	LIMIT OF CONTRACT LINEWORK	0	0	20			
ENG_LOGO	LOGO	0	0	0	0		1
ENG_MATCH	MATCH LINE	0	5	2	0		
ENG_REMOVALS	REMOVALS X-OUT TREES ETC - PLAN	0	0	0	0		0
ENG_REMOVALS-AREA	HARD SURFACE REMOVALS-SIDEWALK, ASPHALT…	235	0	0	233		0
ENG_REMOVALS-LINEAR	REMOVALS - FENCING, CSPs ETC - PLAN	0	REMOVE	0	0		0
ENG_REMOVALS-RELOCATE	RELOCATION - ENCIRCLE ABOVE GROUND STRUCTURES - PLAN	0	2	2	0		5
ENG_REVISIONS	CLOUD FOR REVISION LOCATION	4	0	5			
ENG_TITLEBLOCK	TITLEBLOCK LINEWORK, NORTH ARROW	0	0	1	0		10
ENG_ISSUED_30 PERCENT	TEXT FOR 30 PERCENT SUBMISSION	0	0	0	0		0
ENG_ISSUED_60 PERCENT	TEXT FOR 60 PERCENT SUBMISSION	0	0	0	0		0
ENG_ISSUED_90 PERCENT	TEXT FOR 90 PERCENT SUBMISSION	0	0	0	0		0
ENG_ISSUED_100 PERCENT	TEXT FOR 100 PERCENT SUBMISSION	0	0	0	0		0
ENG_ISSUED_TENDER	TEXT FOR ISSUED FOR TENDER	0	0	0	0		0
ENG_ISSUED_CONSTRUCTION	TEXT FOR ISSUED FOR CONSTRUCTION	0	0	0	0		0
ENG_TX_BORDER	DRAWING & SHEET NO.	0	0	0	0		
ENG_TX_DETAILS	DIMENSIONS AND TEXT IN DETAIL DRAWINGS	0	0	0	0		
ENG_TX_DIMENSIONS	NOTES AND LABELS	0	0	6	0		6
ENG_TX_GRID	LABELS, ELEVATIONS, TITLE AND OFFSETS FOR SECTIONS AND PROFILE	0	0	0	0		0
ENG_TX_KEY	TEXT IN KEY PLAN - PLAN	0	0	0	0		0
ENG_TX_LEGEND	LEGEND AND NOTES TEXT	0	0	0	0		0
ENG_TX_LIMITS	LIMIT OF CONTRACT	0	0	0	0		0
ENG_TX_LOGO	LOGO TEXT	0	0	0	0		0
ENG_TX_MATCH	MATCH LINE TEXT	0	0	0	0		0
ENG_TX_REMOVALS	NOTES AND LABELS	0	0	0	0		0
ENG_TX_REMOVALS-LINEAR	NOTES AND LABELS	0	0	0	0		0
ENG_TX_REMOVALS-RELOCATE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_REVISIONS	TEXT AND SHAPE FOR REV NUMBERS	4	0	4			
ENG_TX_TITLEBLOCK	STREET NAME & DESCRIPTION, PROJECT NO., SCALE, DATES & NAMES	0	0	0	0		0
ENG_TX_TITLE-DESC	DRAWING DESCRIPTION ie "PROPOSED RECONSTRUCTION", "DETAILS"	0	0	0	0		0
ENG_TX_TITLE-REV	REVISION AND ""ISSUED FOR.."" NOTES	0	0	0	0		

178

II.   WORKING & CALCULATION LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
WORKING & CALCULATION LEVELS							
-PRINT FULLSIZE	Print border for Full Size (24x36) [NON PRINTING]	6	1	5			
-PRINT HALFSIZE	Print border for Half Size (11x17) [NON PRINTING]	4	1	5			
-SCRAP	Respository for Ghost/Residual Elements [NON PRINTING]	0	0	0	0		0
ENG_WK_BREAKLINES	BREAKLINES IMPORTED FOR SURFACE WORK	115	0	3			
ENG_WK_GROUND	GROUND SHOTS IMPORTED FOR SURFACE WORK	55	0	1			
ENG_WK_MISC-1	MISCELLANEOUS WORKING LEVEL	0	0	1			
ENG_WK_MISC-2	MISCELLANEOUS WORKING LEVEL	1	0	2			
ENG_WK_MISC-3	MISCELLANEOUS WORKING LEVEL	2	0	3			
ENG_WK_MISC-4	MISCELLANEOUS WORKING LEVEL	3	0	4			
ENG_WK_MISC-5	MISCELLANEOUS WORKING LEVEL	4	0	5			
ENG_WK_MISC-6	MISCELLANEOUS WORKING LEVEL	5	0	6			
ENG_WK_MISC-7	MISCELLANEOUS WORKING LEVEL	6	0	7			
ENG_WK_MISC-8	MISCELLANEOUS WORKING LEVEL	87	0	8			
ENG_WK_MISC-9	MISCELLANEOUS WORKING LEVEL	88	0	9			
ENG_WK_MISC-10	MISCELLANEOUS WORKING LEVEL	89	0	10			
MISC	WORKING & CALCULATION LEVEL	0	0	0			

III.   PROPERTY LINEWORK AND LABELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
PROPERTY LINEWORK and LABELS							
ROW_DEV_LOTLINES	DEVELOPER LOTLINES	80	3	5	0		
ROW_DEV_ROW	DEVELOPER ROW	80	3	15	0		
ROW_ENG_GUYING_EASEMENT	PROPOSED PERMANENT HYDRO GUYING EASEMENT	68	2	2	0		20
ROW_ENG_HYDRO_EASEMENT	PROPOSED PERMANENT EASEMENT LINEWORK ie HYDRO	68	2	10	0		20
ROW_ENG_LOTLINES	PROPOSED PROPERTY LINEWORK ie LOT LINES	80	0	5	0		10
ROW_ENG_PERM_EASEMENT	PROPOSED PERMANENT EASEMENT LINEWORK ie STRUCTURES, DRAINAGE	123	2	10	0		20
ROW_ENG_ROW	PROPOSED RIGHT OF WAY	80	2	15	0		20
ROW_ENG_TEMP_EASEMENT	PROPOSED TEMPORARY EASEMENT LINEWORK ie GRADING	230	2	10	0		20
ROW_ENG_TX_GUYING_EASEMENT	IDENTIFICATION OF TYPE OF EASEMENT ie HYDRO GUYING	68	0	0	0		
ROW_ENG_TX_HYDRO_EASEMENT	IDENTIFICATION OF TYPE OF EASEMENT ie HYDRO AERIAL	68	0	0	0		
ROW_ENG_TX_PERM_EASEMENT	IDENTIFICATION OF TYPE OF EASEMENT ie STRUCTURES, DRAINAGE	123	0	0	0		
ROW_ENG_TX_PROPERTY	NOTES AND LABELS	0	0	0	0		
ROW_ENG_TX_ROW	PROPOSED RIGHT OF WAY	0	0	0	0		
ROW_ENG_TX_TEMP_EASEMENT	IDENTIFICATION OF TYPE OF EASEMENT ie GRADING	212	0	0	0		
ROW_EXROW	EXISTING STREETLINES - RIGHT OF WAY (TERANET LEVEL 1)	80	0	20	0		
ROW_LOTLINES	EXISTING PROPERTY LOT LINES (TERANET LEVEL 1)	80	0	5	0		
ROW_REFPLANS	REFERENCE PLANS (TERANET LEVEL 7)	4	2	0	0		0
ROW_REGPLANS	REGISTERED PLANS (TERANET LEVEL5)	5	3	0	0		0
ROW_TX_OWNERS	OWNER INFORMATION	0	0	0	0		
ROW_TX_PIN	9 DIGIT P.I.N. (TERANET LEVEL 17) , TXT=1.5	6	0	0	0		
ROW_TX_REFPLANS	REFERENCE PLANS (TERANET LEVEL 8)	4	0	0	0		0
ROW_TX_REGPLANS	REGISTERED PLANS (TERANET LEVEL 6)	5	0	0	0		0
ROW_TX_STNAMES	EXISTING STREET NAME	80	0	0	0		

179

Pat Z.

IV. SURVEYED INFORMATION LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
SURVEYED INFORMATION LEVELS							
SVY_APRON	CONC APRON	2	0	0	236		0
SVY_BARRIER	BARRIER (JERSEY / ARMOURSTONE)	100	0	0	236		0
SVY_BELL	BELL	70	0	0	236		0
SVY_BENCH	BENCH (PARK / BUS)	253	0	0	236		0
SVY_BLANK	BLANK (MISC SINGLE FEATURE)	0	0	0	236		0
SVY_BOREHOLE	BOREHOLE DATA	0	0	0	236		0
SVY_BOULDER	BOULDER - LARGE DECORATIVE	140	0	0	236		0
SVY_BREAKLINES	BREAKLINES	99	2	0	236		0
SVY_BUILDING	BUILDING	253	0	0	236		0
SVY_CB	CATCHBASIN AT GUTTERLINE	112	0	0	236		0
SVY_CROSS_SEG	CROSSING SEGMENTS	3	0	0	236		0
SVY_CROWN-RD	CROWN OF ROADWAY	4	0	0	236		0
SVY_CSP	CSP, PVC OR CONC PIPE	4	3	3	236		3
SVY_CURB	FACE of CURB	4	0	0	236		0
SVY_CURBSTOP	CURBSTOP PARKING	4	2	0	236		0
SVY_DITCH	DITCH OR SWALE LINE	124	4	0	236		0
SVY_DRIVEWAY	DRIVEWAY	100	0	0	236		0
SVY_EDGE-WATER	EDGE OF WATER (POND / RIVER)	124	0	0	236		0
SVY_EPAVT	EDGE OF PAVEMENT	115	0	0	236		0
SVY_EXPANSION-JOINT	BRIDGE EXPANSION JOINT	253	0	2	236		2
SVY_FENCE	FENCE	100	CLF	0	236		0
SVY_FENCE-GATE	FENCE GATE POST	100	0	0	236		0
SVY_GABION	GABION BASKET	66	0	0	236		0
SVY_GARDEN	GARDEN	245	0	1	236		1
SVY_GAS	GAS	70	0	0	236		0
SVY_GROUND	GROUND SHOTS	220	0	0	236		0
SVY_GUIDERAIL	GUIDE RAIL	115	7	0	236		0
SVY_GUTT	CURB GUTTER	4	0	0	236		0
SVY_GUY_POLE	GUY POLE	70	0	0	236		0
SVY_GUY_WIRE	GUY WIRE	70	0	0	236		0
SVY_HEADWALL	HEADWALL	253	0	0	236		0
SVY_HYDRO	HYDRO JUNCTION BOX	70	0	0	236		0
SVY_KILLSTRIP	KILLSTRIP	116	0	0	236		0
SVY_LAYOUT-STAKE	LAYOUT STAKE	43	0	0	236		0
SVY_LEGAL	LEGAL MONUMENTS	4	0	0	236		0
SVY_LP	LIGHT POLE	70	0	0	236		0
SVY_MH	MAN HOLE - STORM, SANITARY OR FDC	112	0	0	0		0
SVY_MH_FDC	MAN HOLE - FDC	112	0	0	236		0
SVY_MH_SAN	MAN HOLE - SANITARY	112	0	0	236		0
SVY_MH_STM	MAN HOLE - STORM	112	0	0	236		0
SVY_NOISEWALL	NOISEWALL - ANY MATERIAL	100	CLF	0	236		0
SVY_OGCONT-MAJ	CONTOURS OG MAJOR	4	0	3	236		3
SVY_OGCONT-MIN	CONTOURS OG MINOR	16	0	1	236		1
SVY_OG-TIN	ORIGINAL SURFACE TRIANGLES	1	0	0	236		0
SVY_PCTRL	PROJECT CONTROL	43	0	0	236		0
SVY_PMK_LANE	LANE MARKINGS	0	2	0	236		0

Pat Z.

SURVEYED INFORMATION LEVELS						
SVY_PYCB	CATCHBASIN - PYRAMID	112	0	0	236		0
SVY_RAILROAD	RAILROAD TRACKS OR WIGWAGS	253	0	0	236		0
SVY_REFPT	REFERENCE POINT	43	0	0	236		0
SVY_RET-WALL	RETAINING WALL	253	0	0	236		0
SVY_RIPRAP	RIPRAP	66	0	0	236		0
SVY_SHELTER	SHELTER, TELEPHONE BOOTH, OR SHED	253	0	0	236		0
SVY_SHOULDER	SHOULDER	4	0	0	236		0
SVY_SIDEWALK	CONC SIDEWALK	116	0	0	236		0
SVY_SIGN	SIGN	140	0	0	236		0
SVY_SLOPE-B	BOTTOM OF SLOPE	99	2	0	236		0
SVY_SLOPE-T	TOP OF SLOPE	98	0	0	236		0
SVY_STRUCTURE-B	BOTTOM OF STRUCTURE	253	1	0	236		0
SVY_STRUCTURE-T	TOP OF STRUCTURE	253	0	0	236		0
SVY_SURFACE-PROF	EXISTING SURFACE FOR PROFILE AND SECTIONS	4	3	3	236		5
SVY_TRAFFIC	TRAFFIC	70	0	0	236		0
SVY_TV	TV	70	0	0	236		0
SVY_VEG	VEGETATION	230	0	0	236		0
SVY_WALKWAY	EDGE OF WALKWAY	116	0	0	236		0
SVY_WALL	WALL - ENTRANCE FEATURE	100	0	0	236		0
SVY_WATER	WATER	111	0	0	236		0

V.   SURVEYED POINTS LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
SURVEYED POINTS LEVELS							
SVY_PT_APRON	POINTS	2	0	0	236		0
SVY_PT_BARRIER	POINTS	100	0	0	236		0
SVY_PT_BELL	POINTS	70	0	0	236		0
SVY_PT_BENCH	POINTS	253	0	0	236		0
SVY_PT_BLANK	POINTS	0	0	0	236		0
SVY_PT_BUILDING	POINTS	253	0	0	236		0
SVY_PT_CROWN-RD	POINTS	4	0	0	236		0
SVY_PT_CURB	POINTS	4	0	0	236		0
SVY_PT_CURBSTOP	POINTS	4	2	0	236		0
SVY_PT_DITCH	POINTS	124	4	0	236		0
SVY_PT_DRIVEWAY	POINTS	100	0	0	236		0
SVY_PT_EDGE-WATER	POINTS	124	0	0	236		0
SVY_PT_EPAVT	POINTS	115	0	0	236		0
SVY_PT_EXPANSION-JOINT	POINTS	253	0	2	236		0
SVY_PT_FENCE	POINTS	100	0	0	236		0
SVY_PT_FENCE-GATE	POINTS	100	0	0	236		0
SVY_PT_GABION	POINTS	66	0	0	236		0
SVY_PT_GARDEN	POINTS	245	0	1	236		0
SVY_PT_GAS	POINTS	70	0	0	236		0
SVY_PT_GUIDERAIL	POINTS	115	7	0	236		0
SVY_PT_GUTT	POINTS	4	0	0	236		0
SVY_PT_HEADWALL	POINTS	253	0	0	236		0
SVY_PT_HYDRO	POINTS	70	0	0	236		0

181

Pat Z.

SURVEYED POINTS LEVELS							
SVY_PT_KILLSTRIP	POINTS	116	0	0	236		0
SVY_PT_NOISEWALL	POINTS	100	0	0	236		0
SVY_PT_PMK_LANE	POINTS	0	2	0	236		0
SVY_PT_RAILROAD	POINTS	253	0	0	236		0
SVY_PT_RET-WALL	POINTS	253	0	0	236		0
SVY_PT_RIPRAP	POINTS	66	0	0	236		0
SVY_PT_SHELTER	POINTS	253	0	0	236		0
SVY_PT_SHOULDER	POINTS	4	0	0	236		0
SVY_PT_SIDEWALK	POINTS	116	0	0	236		0
SVY_PT_SIGN	POINTS	140	0	0	236		0
SVY_PT_SLOPE-B	POINTS	99	2	0	236		0
SVY_PT_SLOPE-T	POINTS	98	0	0	236		0
SVY_PT_STRUCTURE-B	POINTS	253	1	0	236		0
SVY_PT_STRUCTURE-T	POINTS	253	0	0	236		0
SVY_PT_SURFACE-PROF	POINTS	0	0	0	236		0
SVY_PT_TRAFFIC	POINTS	70	0	0	236		0
SVY_PT_TV	POINTS	70	0	0	236		0
SVY_PT_VEG	POINTS	230	0	0	236		0
SVY_PT_WALKWAY	POINTS	116	0	0	236		0
SVY_PT_WALL	POINTS	100	0	0	236		0
SVY_PT_WATER	POINTS	111	0	0	236		0

VI. SURVEY TEXT LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
SURVEY TEXT LEVELS							
SVY_TX_APRON	NOTES AND LABELS	2	0	0	236		0
SVY_TX_BARRIER	NOTES AND LABELS	100	0	0	236		0
SVY_TX_BELL	NOTES AND LABELS	70	0	0	236		0
SVY_TX_BENCH	NOTES AND LABELS	253	0	0	236		0
SVY_TX_BLANK	NOTES AND LABELS	0	0	0	236		0
SVY_TX_BOREHOLE	NOTES AND LABELS	0	0	0	236		0
SVY_TX_BOULDER	NOTES AND LABELS	140	0	0	236		0
SVY_TX_BREAKLINES	NOTES AND LABELS	99	2	0	236		0
SVY_TX_BUILDING	NOTES AND LABELS	253	0	0	236		0
SVY_TX_CB	NOTES AND LABELS	112	0	0	236		0
SVY_TX_CROWN-RD	NOTES AND LABELS	4	0	0	236		0
SVY_TX_CSP	NOTES AND LABELS	4	3	3	236		0
SVY_TX_CURB	NOTES AND LABELS	4	0	0	236		0
SVY_TX_CURBSTOP	NOTES AND LABELS	4	2	0	236		0
SVY_TX_DITCH	NOTES AND LABELS	124	4	0	236		0
SVY_TX_DRIVEWAY	NOTES AND LABELS	100	0	0	236		0
SVY_TX_EDGE-WATER	NOTES AND LABELS	124	0	0	236		0
SVY_TX_EPAVT	NOTES AND LABELS	115	0	0	236		0
SVY_TX_EXPANSION-JOINT	NOTES AND LABELS	253	0	2	236		0
SVY_TX_FENCE	NOTES AND LABELS	100	0	0	236		0
SVY_TX_FENCE-GATE	NOTES AND LABELS	100	0	0	236		0
SVY_TX_GABION	NOTES AND LABELS	66	0	0	236		0

Pat Z.

SURVEY TEXT LEVELS							
SVY_TX_GARDEN	NOTES AND LABELS	245	0	1	236		0
SVY_TX_GAS	NOTES AND LABELS	70	0	0	236		0
SVY_TX_GROUND	NOTES AND LABELS	220	0	0	236		0
SVY_TX_GUIDERAIL	NOTES AND LABELS	115	7	0	236		0
SVY_TX_GUTT	NOTES AND LABELS	4	0	0	236		0
SVY_TX_GUY_POLE	NOTES AND LABELS	70	0	0	236		0
SVY_TX_GUY_WIRE	NOTES AND LABELS	70	0	0	236		0
SVY_TX_HEADWALL	NOTES AND LABELS	253	0	0	236		0
SVY_TX_HYDRO	NOTES AND LABELS	70	0	0	236		0
SVY_TX_KILLSTRIP	NOTES AND LABELS	116	0	0	236		0
SVY_TX_LAYOUT-STAKE	NOTES AND LABELS	43	0	0	236		0
SVY_TX_LEGAL	NOTES AND LABELS	4	0	0	236		0
SVY_TX_LP	NOTES AND LABELS	70	0	0	236		0
SVY_TX_MH_FDC	NOTES AND LABELS	112	0	0	236		0
SVY_TX_MH_SAN	NOTES AND LABELS	112	0	0	236		0
SVY_TX_MH_STM	NOTES AND LABELS	112	0	0	236		0
SVY_TX_NOISEWALL	NOTES AND LABELS	100	0	0	236		0
SVY_TX_OGCONT-MAJ	NOTES AND LABELS	4	0	3	236		0
SVY_TX_OGCONT-MIN	NOTES AND LABELS	16	0	1	236		0
SVY_TX_OG-TIN	NOTES AND LABELS	1	0	0	236		0
SVY_TX_PCTRL	NOTES AND LABELS	43	0	0	236		0
SVY_TX_PMK_LANE	NOTES AND LABELS	0	2	0	236		0
SVY_TX_PYCB	NOTES AND LABELS	112	0	0	236		0
SVY_TX_RAILROAD	NOTES AND LABELS	253	0	0	236		0
SVY_TX_REFPT	NOTES AND LABELS	43	0	0	236		0
SVY_TX_RET-WALL	NOTES AND LABELS	253	0	0	236		0
SVY_TX_RIPRAP	NOTES AND LABELS	66	0	0	236		0
SVY_TX_SHELTER	NOTES AND LABELS	253	0	0	236		0
SVY_TX_SHOULDER	NOTES AND LABELS	4	0	0	236		0
SVY_TX_SIDEWALK	NOTES AND LABELS	116	0	0	236		0
SVY_TX_SIGN	NOTES AND LABELS	140	0	0	236		0
SVY_TX_SLOPE-B	NOTES AND LABELS	99	2	0	236		0
SVY_TX_SLOPE-T	NOTES AND LABELS	98	0	0	236		0
SVY_TX_STRUCTURE-B	NOTES AND LABELS	253	1	0	236		0
SVY_TX_STRUCTURE-T	NOTES AND LABELS	253	0	0	236		0
SVY_TX_SURFACE-PROF	NOTES AND LABELS	4	0	0	236		0
SVY_TX_TRAFFIC	NOTES AND LABELS	70	0	0	236		0
SVY_TX_TV	NOTES AND LABELS	70	0	0	236		0
SVY_TX_VEG	NOTES AND LABELS	230	0	0	236		0
SVY_TX_WALKWAY	NOTES AND LABELS	116	0	0	236		0
SVY_TX_WALL	NOTES AND LABELS	100	0	0	236		0
SVY_TX_WATER	NOTES AND LABELS	111	0	0	236		0

Pat Z.

VII.   OTHER SOURCED INFORMATION

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
OTHER SOURCED INFORMATION							
GIS_ALIGNMENT	BASELINE ALIGNMENTcenterline	246	4	3	236		3
GIS_APRON	CONC APRON	2	0	0	236		0
GIS_BARRIER	BARRIER (JERSEY / ARMOURSTONE)	100	0	0	236		0
GIS_BELL	BELL APPURTENANCES	70	0	0	236		0
GIS_BENCH	BENCH (PARK / BUS)	246	0	0	236		0
GIS_BLANK	BLANK (MISC SINGLE FEATURE)	0	0	0	236		0
GIS_BLANKLINE	BLANK (MISC LINE FEATURE)	0	0	0	236		0
GIS_BOREHOLE	BOREHOLE DATA	0	0	0	236		0
GIS_BOULDER	BOULDER - LARGE DECORATIVE	0	0	0	236		0
GIS_BUILDING	BUILDING	246	0	0	236		0
GIS_CB	CATCHBASIN	112	0	0	236		0
GIS_CONTOG-MAJ	CONTOURS OG MAJOR	4	0	3	236		3
GIS_CONTOG-MIN	CONTOURS OG MAJOR	16	0	1	236		1
GIS_CROWN-RD	CROWN OF ROADWAY	4	0	0	236		0
GIS_CSP	CULVERT	4	3	3	236		3
GIS_CURB	CURB	4	0	0	236		0
GIS_CURBSTOP	CURBSTOP PARKING	4	2	0	236		0
GIS_DITCH	DITCH LINE	124	4	0	236		0
GIS_DRIVEWAY	DRIVEWAY	100	0	0	236		0
GIS_EDGE-WATER	EDGE OF WATER (POND / RIVER)	124	0	0	236		0
GIS_EPAVT	EDGE OF PAVEMENT	115	0	0	236		0
GIS_EXPANSION-JOINT	BRIDGE EXPANSION JOINT	5	0	2	236		2
GIS_FENCE	FENCE	100	CLF	0	236		0
GIS_FENCE-GATE	FENCE GATE POST	100	0	0	236		0
GIS_GABION	GABION BASKET	66	0	0	236		0
GIS_GARDEN	GARDEN	245	0	1	236		1
GIS_GAS	GAS APPURTENANCES	3	0	0	236		0
GIS_GROUND	GROUND SHOTS	3	0	0	236		0
GIS_GUIDERAIL	GUIDE RAIL	115	7	0	236		0
GIS_GUTT	CURB GUTTER	4	0	0	236		0
GIS_GUY POLE	GUY POLE	247	0	0	236		0
GIS_GUY WIRE	GUY WIRE	247	0	0	236		0
GIS_HEADWALL	HEADWALL	231	0	0	236		0
GIS_HYDRO	HYDRO APPURTENANCES	246	0	0	236		0
GIS_KILLSTRIP	KILLSTRIP	116	0	0	236		0
GIS_LEGAL	LEGAL MONUMENTS	43	0	0	236		0
GIS_LP	LIGHT POLE	246	0	0	236		0
GIS_MAIL	MAILBOX	20	0	0	236		0
GIS_MH_SAN	SANITARY MAINTENANCE HOLE	4	0	0	236		0
GIS_MH_STM	STORM MAINTENANCE HOLE	4	0	0	236		0
GIS_NOISEWALL	NOISEWALL - ANY MATERIAL	100	CLF	0	0		0
GIS_OG_TIN	TIN ORIGINAL GROUND (TRIANGLES)	1	0	0	236		0
GIS_PARKING_LOT	PARKING LOT LIMITS	87	0	0	236		0
GIS_PCTRL	PROJECT CONTROL	43	0	0	236		0
GIS_PMK_LANE	LANE MARKINGS	0	2	0	236		0
GIS_POND	ALL LINEWORK WITHIN TH EPERIMETER OF A POND	0	0	0	0		0

Pat Z.

OTHER SOURCED INFORMATION							
GIS_PT_BLANK	POINTS	0	0	0	236		0
GIS_PT_BREAKLINES	POINTS	35	0	1	236		1
GIS_PT_GRID	POINTS	35	0	1	236		1
GIS_PT_GROUND	POINTS	3	0	0	236		0
GIS_PYCB	CATCHBASIN - PYRAMID	112	0	0	236		0
GIS_RAILROAD	RAILROAD TRACKS	224	0	0	236		0
GIS_RASTER	RASTER ATTACHMENTS	0	0	0	236		0
GIS_REFPT	REFERENCE POINT	43	0	0	236		0
GIS_RET-WALL	RETAINING WALL	3	0	0	236		0
GIS_RIPRAP	RIPRAP	66	0	0	236		0
GIS_SHELTER	BUS SHELTER/PAD	246	0	0	236		0
GIS_SHOULDER	SHOULDER	4	0	0	236		0
GIS_SIDEWALK	SIDEWALK	116	0	0	236		0
GIS_SIGN	SIGN	208	0	0	236		0
GIS_SLOPE-B	BOTTOM OF SLOPE	99	2	0	236		0
GIS_SLOPE-T	TOP OF SLOPE	98	0	0	236		0
GIS_STRUCTURE-B	BOTTOM OF STRUCTURE	5	1	0	236		0
GIS_STRUCTURE-T	TOP OF STRUCTURE	5	0	0	236		0
GIS_TRAFFIC	TRAFFIC	3	0	0	236		0
GIS_TV	TV OR ROGERS	96	0	0	236		0
GIS_VEG	VEGETATION WOODLOT OR HEDGE	230	0	0	236		0
GIS_WALKWAY	WALKWAY	116	0	0	236		0
GIS_WALL	WALL - ENTRANCE FEATURE	100	0	0	236		0
GIS_WATER	WATER	104	0	0	236		0

VIII.   OTHER SOURCED TEXT

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
OTHER SOURCED TEXT							
GIS_TX_ALIGNMENT	NOTES AND LABELS	246	4	3	236		0
GIS_TX_APRON	NOTES AND LABELS	2	0	0	236		0
GIS_TX_BARRIER	NOTES AND LABELS	100	0	0	236		0
GIS_TX_BELL	NOTES AND LABELS	70	0	0	236		0
GIS_TX_BENCH	NOTES AND LABELS	246	0	0	236		0
GIS_TX_BLANK	NOTES AND LABELS	0	0	0	236		0
GIS_TX_BLANKLINE	NOTES AND LABELS	0	0	0	236		0
GIS_TX_BOREHOLE	NOTES AND LABELS	0	0	0	236		0
GIS_TX_BOULDER	NOTES AND LABELS	0	0	0	236		0
GIS_TX_BUILDING	NOTES AND LABELS	246	0	0	236		0
GIS_TX_BUS	NOTES AND LABELS	246	0	0	236		0
GIS_TX_CB	NOTES AND LABELS	112	0	0	236		0
GIS_TX_CONTOG-MAJ	NOTES AND LABELS	4	0	3	236		0
GIS_TX_CONTOG-MIN	NOTES AND LABELS	16	0	1	236		0
GIS_TX_CROWN-RD	NOTES AND LABELS	4	0	0	236		0
GIS_TX_CSP	NOTES AND LABELS	4	3	3	236		0
GIS_TX_CURB	NOTES AND LABELS	4	0	0	236		0
GIS_TX_CURBSTOP	NOTES AND LABELS	4	2	0	236		0
GIS_TX_DITCH	NOTES AND LABELS	124	4	0	236		0
GIS_TX_DRIVEWAY	NOTES AND LABELS	100	0	0	236		0

185

Pat Z.

OTHER SOURCED TEXT							
GIS_TX_EDGE-WATER	NOTES AND LABELS	124	0	0	236		0
GIS_TX_EPAVT	NOTES AND LABELS	115	0	0	236		0
GIS_TX_EXPANSION-JOINT	NOTES AND LABELS	5	0	2	236		0
GIS_TX_FENCE	NOTES AND LABELS	100	CLF	0	236		0
GIS_TX_FENCE-GATE	NOTES AND LABELS	100	0	0	236		0
GIS_TX_GABION	NOTES AND LABELS	66	0	0	236		0
GIS_TX_GARDEN	NOTES AND LABELS	245	0	1	236		0
GIS_TX_GAS	NOTES AND LABELS	3	0	0	236		0
GIS_TX_GROUND	NOTES AND LABELS	3	0	0	236		0
GIS_TX_GUIDERAIL	NOTES AND LABELS	115	7	0	236		0
GIS_TX_GUTT	NOTES AND LABELS	4	0	0	236		0
GIS_TX_GUY POLE	NOTES AND LABELS	247	0	0	236		0
GIS_TX_GUY WIRE	NOTES AND LABELS	247	0	0	236		0
GIS_TX_HEADWALL	NOTES AND LABELS	231	0	0	236		0
GIS_TX_HYDRO	NOTES AND LABELS	246	0	0	236		0
GIS_TX_KILLSTRIP	NOTES AND LABELS	116	0	0	236		0
GIS_TX_LEGAL	NOTES AND LABELS	43	0	0	236		0
GIS_TX_LP	NOTES AND LABELS	246	0	0	236		0
GIS_TX_MAIL	NOTES AND LABELS	20	0	0	236		0
GIS_TX_MH_SAN	NOTES AND LABELS	4	0	0	236		0
GIS_TX_MH_STM	NOTES AND LABELS	4	0	0	236		0
GIS_TX_NOISEWALL	NOTES AND LABELS	100	0	0	0		0
GIS_TX_OG_TIN	NOTES AND LABELS	1	0	0	236		0
GIS_TX_PCTRL	NOTES AND LABELS	43	0	0	236		0
GIS_TX_PMK_LANE	NOTES AND LABELS	0	2	0	236		0
GIS_TX_POND	NOTES AND LABELS	0	0	0	0		0
GIS_TX_PYCB	NOTES AND LABELS	112	0	0	236		0
GIS_TX_RAILROAD	NOTES AND LABELS	224	0	0	236		0
GIS_TX_REFPT	NOTES AND LABELS	43	0	0	236		0
GIS_TX_RET-WALL	NOTES AND LABELS	3	0	0	236		0
GIS_TX_RIPRAP	NOTES AND LABELS	66	0	0	236		0
GIS_TX_SHOULDER	NOTES AND LABELS	4	0	0	236		0
GIS_TX_SIDEWALK	NOTES AND LABELS	116	0	0	236		0
GIS_TX_SIGN	NOTES AND LABELS	208	0	0	236		0
GIS_TX_SLOPE-B	NOTES AND LABELS	99	2	0	236		0
GIS_TX_SLOPE-T	NOTES AND LABELS	98	0	0	236		0
GIS_TX_STRUCTURE-B	NOTES AND LABELS	5	1	0	236		0
GIS_TX_STRUCTURE-T	NOTES AND LABELS	5	0	0	236		0
GIS_TX_TRAFFIC	NOTES AND LABELS	3	0	0	236		0
GIS_TX_TV	NOTES AND LABELS	96	0	0	236		0
GIS_TX_VEG	NOTES AND LABELS	230	0	0	236		0
GIS_TX_WALKWAY	NOTES AND LABELS	116	0	0	236		0
GIS_TX_WALL	NOTES AND LABELS	100	0	0	236		0
GIS_TX_WATER	NOTES AND LABELS	104	0	0	236		0

Pat Z.

IX. UNDERGROUND UTILITIES LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
UNDERGROUND UTILITIES LEVELS							
POPULATED AS PART OF PRE-ENG RESEARCH (PUCC)	NOTE:- Pipe sizes equal to, or greather than, 900mm shall be shown (in plan view) by offsetting linework to display an accurate diameter. Center line to remain as the bylevel linestyle, outer linework will be changed to a linestyle of zero.						
UGS_BELL	EXISTING BELL APPURTENANCES - PLAN & PROFILE	70	0	0	236		0
UGS_BELL-UTIL	EXISTING BELL UNDERGROUND LINEWORK - PLAN & SECTIONS	70	BELL	0	236		0
UGS_CULVERT	EXISTING CULVERT - PLAN, PROFILE & SECTIONS	4	2	5	236		5
UGS_FIBRE	UNIDENTIFIED FIBRE CABLES	0	0	0	236		0
UGS_GAS	EXISTING GAS APPURTENANCES - PLAN & PROFILE	3	0	0	236		0
UGS_GAS-UTIL	EXISTING GAS UNDERGROUND LINEWORK - PLAN & SECTIONS	3	GAS	0	236		0
UGS_HYDRO	EXISTING HYDRO APPURTENANCES - PLAN & PROFILE	246	0	0	236		0
UGS_HYDRO-TELE	EXISTING HYDROONE TELECOM UNDERGROUND LINEWORK - PLAN & SECTIONS	246	HYDRO-1-T	0	236		0
UGS_HYDRO-UTIL	EXISTING HYDROONE BRAMPTON UNDERGROUND LINEWORK - PLAN & SECTIONS	246	HYDRO-1-B	0	236		0
UGS_SANI	EXISTING SANITARY APPURTENANCES - PLAN & PROFILE	4	0	3	236		3
UGS_SANI-UTIL	EXISTING SANITARY SEWER UNDERGROUND LINEWORK - PLAN & SECTIONS	4	0	5	236		5
UGS_SH_HYDRO	SHADING FOR UNDERGROUND HYDRO DUCTS - PROFILE - 'CONC_T', PA=0, PS=5, PD=0, AZ=-5	246	0	0	236		0
UGS_STORM	EXISTING STORM APPURTENANCES - PLAN & PROFILE	4	0	3	236		3
UGS_STORM-UTIL	EXISTING STORM SEWER UNDERGROUND LINEWORK - PLAN & SECTIONS	4	0	5	236		5
UGS_SUBDRAIN	SUBDRAIN	4	3	2	236		0
UGS_TCS	EXISTING TRAFFIC APPURTENANCES - PLAN & PROFILE	3	0	0	236		0
UGS_TCS-UTIL	EXISTING TRAFFIC UNDERGROUND LINEWORK - PLAN & SECTIONS	3	0	0	236		0
UGS_TV	EXISTING TV OR ROGERS APPURTENANCES - PLAN & PROFILE	96	0	0	236		0
UGS_TV-UTIL	EXISTING TV OR ROGERS UNDERGROUND LINEWORK - PLAN & SECTIONS	96	TV	0	236		0
UGS_UNKNOWN-UTIL	UNIDENTIFIED UNDERGROUND UTILITY	0	0	0	236		0
UGS_WATER	EXISTING WATER APPURTENANCES - PLAN & PROFILE	124	0	0	236		0
UGS_WATER-UTIL	EXISTING WATER UNDERGROUND LINEWORK - PLAN & SECTIONS	124	WATER	0	236		0

X. UNDERGROUND UTILITIES TEXT

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
UNDERGROUND UTILITIES TEXT							
UGS_TX_BELL	NOTES AND LABELS	70	0	0	236		0
UGS_TX_BELL-UTIL	NOTES AND LABELS	70	0	0	236		0
UGS_TX_CULVERT	NOTES AND LABELS	4	0	5	236		0
UGS_TX_FIBRE	LABEL 'UNKNOWN FIBRE'	0	0	0	236		0
UGS_TX_GAS	NOTES AND LABELS	3	0	0	236		0
UGS_TX_GAS-UTIL	NOTES AND LABELS	3	0	0	236		0
UGS_TX_HYDRO	NOTES AND LABELS	246	0	0	236		0
UGS_TX_HYDRO-TELE	NOTES AND LABELS	246	0	0	236		0
UGS_TX_HYDRO-UTIL	NOTES AND LABELS	246	0	0	236		0
UGS_TX_SANI	NOTES AND LABELS	4	0	3	236		0

187

Pat Z.

UNDERGROUND UTILITIES TEXT							
UGS_TX_SANI-UTIL	NOTES AND LABELS	4	0	5	236		0
UGS_TX_STORM	NOTES AND LABELS	4	0	3	236		0
UGS_TX_STORM-UTIL	NOTES AND LABELS	4	0	5	236		0
UGS_TX_SUBDRAIN	NOTES AND LABELS	4	0	0	236		0
UGS_TX_TCS	NOTES AND LABELS	3	0	0	236		0
UGS_TX_TCS_UTIL	NOTES AND LABELS	3	0	0	236		0
UGS_TX_TV	NOTES AND LABELS	96	0	0	236		0
UGS_TX_TV-UTIL	NOTES AND LABELS	96	0	0	236		0
UGS_TX_UNKNOWN-UTIL	LABEL ""UNKNOWN U/G""	0	0	0	236		0
UGS_TX_WATER	NOTES AND LABELS	124	0	0	236		0
UGS_TX_WATER-UTIL	NOTES AND LABELS	124	0	0	236		0

XI. LEVELS RESERVED FOR CONSERVATION AUTHORITY INFORMATION

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
LEVELS RESERVED FOR CONSERVATION AUTHORITY INFORMATION							
RCA_FILL_LINE	REGIONAL CONSERVATION AUTHORITY FILL LINE - PLAN	253	0	1	0		5
RCA_FLOOD_LINE	REGIONAL CONSERVATION AUTHORITY FLOOD LINE - PLAN	124	0	2	0		10
RCA_REGULATION_LIMITS	REGIONAL CONSERVATION AUTHORITY REGULATION LIMITS - PLAN	6	0	5	0		15
RCA_TX_FILL_LINE	NOTES AND LABELS	253	0	0	0		
RCA_TX_FLOOD_LINE	NOTES AND LABELS	124	0	0	0		
RCA_TX_REGULATION_LIMITS	NOTES AND LABELS	6	0	0	0		

Pat Z.

XII. ENGINEERING LEVELS USED FOR DESIGN ELEMENTS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
ENGINEERING LEVELS USED FOR DESIGN ELEMENTS							
NOTE:- Pipe sizes equal to, or greater than, 900mm shall be shown (in plan view) by offsetting linework to display an accurate diameter. Center line to remain as the bylevel linestyle, outer linework will be changed to a linestyle of zero.							
ENG_ALIGNMENT	BASELINE ALIGNMENTcenterline	246	4	3	0		3
ENG_APRON	PROPOSED CONC APRON - PLAN, PROFILE & SECTIONS	0	0	3	0		3
ENG_ASHCURB-FACE	PROPOSED ASPH CURB FACE - PLAN	0	0	2	0		0
ENG_BARRIER	PROPOSED BARRIER - JERSEY, ARMOURSTONE - PLAN	0	0	3	0		10
ENG_BELL	PROPOSED BELL APPURTENANCES - PLAN & PROFILE	70	0	0	0		10
ENG_BELL-UTIL	PROPOSED BELL UNDERGROUND LINEWORK - PLAN & SECTIONS	70	BELL	4	0		10
ENG_BENCH	PROPOSED BENCH -PARK, BUS - PLAN	0	0	4	0		10
ENG_BOLLARD	PROPOSED BOLLARD - PLAN	0	0	0	0		10
ENG_BOREHOLE	BOREHOLE DATA - PLAN & PROFILE	0	0	0	0		10
ENG_BOULDER	PROPOSED BOULDER - LARGE DECORATIVE - PLAN	0	0	2	0		10
ENG_BOULEVARD	PROPOSED TOP/BOTTOM OF SLOPE ON EDGE OF BOULEVARD	0	1	0	0		10
ENG_BUSH-CON	PROPOSED CONIFEROUS BUSH - PLAN	231	0	4	0		4
ENG_BUSH-DEC	PROPOSED DECIDUOUS BUSH - PLAN	230	0	4	0		4
ENG_BUS-PAD	PROPOSED BUS PAD & WAITING AREA - PLAN	0	0	4	0		10
ENG_BUS-SHELTER	PROPOSED BUS SHELTER - PLAN	0	0	4	0		4
ENG_CB	PROPOSED CATCHBASIN - PLAN	0	0	0	0		0
ENG_CBMH	PROPOSED CATCHBASIN MAINTENANCE HOLE - PLAN	0	0	0	0		0
ENG_CB-SIDEINLET	PROPOSED SIDE INLET CATCHBASIN - PLAN	0	0	0	0		0
ENG_CC	PROPOSED CUTCROSS - PLAN	0	0	0	0		0
ENG_COMP-ASPH PAVT	PROPOSED ASPHALT PAVEMENT COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-CONC PAVT	PROPOSED CONCRETE PAVEMENT (BUS BAY) COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-CURB	PROPOSED CURB COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-CUT	PROPOSED CUT COMPONENT - SECTIONS	152	0	0	0		0
ENG_COMP-DITCH	PROPOSED DITCH COMPONENT - SECTIONS	124	0	0	0		0
ENG_COMP-FILL	PROPOSED FILL COMPONENT - SECTIONS	87	0	0	0		0
ENG_COMP-GRANULAR	PROPOSED GRANULAR COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-ISLAND	PROPOSED ISLAND COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-KILLSTRIP	PROPOSED KILLSTRIP COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-LIMESTONE	PROPOSED LIMESTONE COMPONENT - SECTIONS	96	0	0	0		0
ENG_COMP-MULTI-TRAIL	PROPOSED TRAIL/BIKEPATH COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-SHOULDER	PROPOSED SHOULDER COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-SIDEWALK	PROPOSED SIDEWALK COMPONENT - SECTIONS	0	0	0	0		0
ENG_COMP-TERRACE	PROPOSED BOULEVARD COMPONENT - SECTIONS	5	0	0	0		0
ENG_CONTPRO-MAJ	PROPOSED CONTOURS - MAJOR - PLAN	0	0	3	0		10
ENG_CONTPRO-MIN	PROPOSED CONTOURS - MINOR - PLAN	3	0	1	0		5
ENG_CROWN-RD	PROPOSED CROWN OF ROADWAY - PLAN & PROFILE	0	4	2	0		2
ENG_CULVERT	PROPOSED CULVERT - PLAN, PROFILE & SECTIONS	0	2	5	0		15
ENG_CURB	PROPOSED PARKING CURBSTOP, CURB CUT - PLAN	0	0	3	0		10
ENG_CURB-BACK	PROPOSED BACK of CURB - PLAN	0	0	4	0		10
ENG_CURB-FACE	PROPOSED FACE of CURB - PLAN	5	0	0	0		0
ENG_CURB-GUT	PROPOSED CURB GUTTER - PLAN	5	0	0	0		0
ENG_DCB	PROPOSED CATCHBASIN - DOUBLE - PLAN	0	0	0	0		0

Pat Z.

189

ENGINEERING LEVELS USED FOR DESIGN ELEMENTS							
ENG_DCB-SIDEINLET	PROPOSED SIDE INLET DOUBLE CATCHBASIN - PLAN	0	0	0	0		0
ENG_DICB-ANGLED	PROPOSED ANGLED DITCH INLET CATCHBASIN - PLAN	0	0	0	0		0
ENG_DICB-FLAT	PROPOSED FLAT DITCH INLET CATCHBASIN - PLAN	0	0	0	0		0
ENG_DITCH	PROPOSED DITCH LINE - PLAN & PROFILE	124	4	3	0		10
ENG_DRIVEWAY	PROPOSED DRIVEWAY - PLAN	0	0	2	0		10
ENG_EDGE-WATER	PROPOSED EDGE OF WATER - POND, RIVER - PLAN	124	0	3	0		10
ENG_EPAVT	PROPOSED EDGE OF PAVEMENT - PLAN	0	0	4	0		10
ENG_FDC	PROPOSED STORM - FOUNDATION DRAIN COLLECTOR - PLAN	0	0	0	0		15
ENG_FENCE	PROPOSED FENCE - PLAN & SECTIONS	0	CLF	2	0		10
ENG_FENCE_SILT	PROPOSED SILT FENCE - PLAN & SECTIONS	0	6	4	0		10
ENG_FENCE-GATE	PROPOSED FENCE GATE POST - PLAN	0	0	2	0		10
ENG_GABION	PROPOSED GABION BASKET - PLAN & SECTIONS	4	0	2	0		10
ENG_GARDEN	PROPOSED GARDEN LINEWORK - PLAN & SECTIONS	146	0	1	0		5
ENG_GAS	PROPOSED GAS APPURTENANCES - PLAN & PROFILE	3	0	0	0		0
ENG_GAS-UTIL	PROPOSED GAS UNDERGROUND LINEWORK - PLAN & SECTIONS	3	GAS	4	0		10
ENG_GRADING	PROPOSED LIMIT OF GRADING - PLAN	87	GRADING	6	0		6
ENG_GUIDERAIL-BEAM	PROP STEEL BEAM GUIDE RAIL - PLAN & SECTIONS	0	GUARD	4	0		5
ENG_GUIDERAIL-CABLE	PROP CABLE GUIDE RAIL - PLAN & SECTIONS	0	GUARD	4	0		5
ENG_HEADWALL	PROP HEADWALL - PLAN & SECTIONS	0	0	3	0		10
ENG_HYDRO	PROPOSED HYDRO APPURTENANCES - PLAN & PROFILE	157	0	0	0		4
ENG_HYDRO-TELE	PROPOSED HYDROONE TELECOM UNDERGROUND LINEWORK - PLAN & SECTIONS	157	HYDRO-1-T	4	0		4
ENG_HYDRO-UTIL	PROPOSED HYDROONE BRAMPTON UNDERGROUND LINEWORK - PLAN & SECTIONS	157	HYDRO-1-B	4	0		4
ENG_HZC	HORIZONTAL CONTROL - PLAN	0	0	1	0		1
ENG_KILLSTRIP	PROPOSED KILLSTRIP - PLAN	0	0	4	0		10
ENG_LANE	PROPOSED LANE MARKINGS - PLAN	0	2	1	0		2
ENG_LANEWAY	PROPOSED LANEWAY - PLAN	0	2	1	0		10
ENG_MAIL	PROPOSED MAILBOX - PLAN	0	0	2	0		2
ENG_MULTI-TRAIL	PROPOSED MULTI USE TRAIL, BIKE TRAIL - PLAN	0	0	4	0		10
ENG_NOISEWALL	PROPOSED NOISEWALL - ALL MATERIALS - PLAN $ SECTIONS	0	CLF	5	0		
ENG_NOTES	MISC NOTES AND LABELS THAT DON'T FALL UNDER OTHER LEVELS	0	0	0			
ENG_POND	ALL LINEWORK WITHIN THE PERIMETER OF A POND	0	0	3	0		0
ENG_PT_GROUND	POINTS	0	0	0	0		0
ENG_PYCB	PROPOSED PYRAMID CB	0	0	0	0		0
ENG_RET-WALL	PROP RETAINING WALL - PLAN & SECTIONS	0	0	3	0		10
ENG_RIPRAP	PROP RIPRAP - PLAN	4	0	3	0		5
ENG_SANI	PROPOSED SANITARY APPURTENANCES - PLAN & PROFILE	0	0	0	0		0
ENG_SANI-UTIL	PROPOSED SANITARY SEWER UNDERGROUND LINEWORK - PLAN & SECTIONS	0	0	4	0		10
ENG_SHOULDER	PROPOSED EDGE OF SHOULDER - PLAN	0	0	2	0		10
ENG_SIDEWALK	PROPOSED CONC SIDEWALK - PLAN	0	0	4	0		10
ENG_SIGN	PROPOSED SIGN - PLAN	0	0	2	0		5
ENG_SIGN-COM	PROPOSED SIGN - COMMERCIAL - PLAN	0	0	2	0		5
ENG_SLOPE-B	PROPOSED BOTTOM OF SLOPE - PLAN	119	0	3	0		10
ENG_SLOPE-T	PROPOSED TOP OF SLOPE - PLAN	139	0	3	0		10
ENG_STORM	PROPOSED STORM INFORMATION - PROFILE	0	0	4	0		15
ENG_STORM-AREA	PROPOSED STORM CATCHMENT AREA - PLAN	0	7	10	0		20
ENG_STORM-MH	PROPOSED STORM APPURTENANCES - PLAN	0	0	0	0		0
ENG_STORM-UTIL	PROPOSED STORM SEWER UNDERGROUND LINEWORK - PLAN & SECTIONS	0	0	10	0		15
ENG_STRUCTURE-B	PROPOSED BOTTOM OF STRUCTURE - PLAN AND SECTIONS	0	1	3	0		5

190

ENGINEERING LEVELS USED FOR DESIGN ELEMENTS							
ENG_STRUCTURE-T	PROPOSED TOP OF STRUCTURE - PLAN & SECTIONS	0	0	3	0		5
ENG_SURFACE-PROF	PROPOSED SURFACE IN PROFILE and SECTIONS	0	0	4	0		15
ENG_SWALE	PROPOSED SWALE LINE - PLAN & PROFILE	124	4	3	0		10
ENG_TCS	PROPOSED TRAFFIC APPURTENANCES - PLAN & PROFILE	0	0	0	0		0
ENG_TCS-UTIL	PROPOSED TRAFFIC UNDERGROUND LINEWORK - PLAN & SECTIONS	0	0	0	0		0
ENG_TIN-PRO	PROPOSED SURFACE TRIANGLES - PLAN	120	0	1	0		1
ENG_TITLEBLOCK	TITLEBLOCK LINEWORK, NORTH ARROW	0	0	1	0		10
ENG_TREE-CON	PROPOSED CONIFEROUS TREE - PLAN	231	0	0	0		5
ENG_TREE-DEC	PROPOSED DECIDUOUS TREE - PLAN	230	0	0	0		5
ENG_TV	PROPOSED TV OR ROGERS APPURTENANCES - PLAN & PROFILE	96	0	4	0		0
ENG_TV-UTIL	PROPOSED TV OR ROGERS UNDERGROUND LINEWORK - PLAN & SECTIONS	96	TV	4	0		5
ENG_VCB	PROPOSED V TYPE CATCHBASIN	0	0	0	0		0
ENG_WALKWAY	PROPOSED WALKWAY - PLAN	0	0	4	0		10
ENG_WALL	PROPOSED WALL - ENTRANCE FEATURE - PLAN & SECTIONS	0	0	3	0		10
ENG_WATER	PROPOSED WATER APPURTENANCES - PLAN & PROFILE	124	0	4	0		4
ENG_WATER-UTIL	PROPOSED WATER UNDERGROUND LINEWORK - PLAN & SECTIONS	124	WATER	4	0		4
ENG_XBOUNDARY	PROPOSED EXTERIOR BOUNDARY	0	7	5	0		5

XIII.   ENGINEERING TEXT LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
ENGINEERING TEXT LEVELS							
ENG_TX_ALIGNMENT	NOTES AND LABELS - STATIONING	0	0	0	0		0
ENG_TX_APRON	NOTES AND LABELS	0	0	0	0		0
ENG_TX_ASHCURB-FACE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BARRIER	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BELL	NOTES AND LABELS	70	0	0	0		0
ENG_TX_BELL-UTIL	NOTES AND LABELS	70	0	0	0		0
ENG_TX_BENCH	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BOLLARD	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BOREHOLE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BOULDER	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BOULEVARD	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BUSH-CON	NOTES AND LABELS	231	0	0	0		0
ENG_TX_BUSH-DEC	NOTES AND LABELS	230	0	0	0		0
ENG_TX_BUS-PAD	NOTES AND LABELS	0	0	0	0		0
ENG_TX_BUS-SHELTER	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CB	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CBMH	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CB-SIDEINLET	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CC	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CONTPRO-MAJ	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CONTPRO-MIN	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CROWN-RD	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CULVERT	NOTES AND LABELS	0	0	0	0		0
ENG_TX_CURB	NOTES AND LABELS	0	0	0	0		0
ENG_TX_DCB	NOTES AND LABELS	0	0	0	0		0
ENG_TX_DCB-SIDEINLET	NOTES AND LABELS	0	0	0	0		0

191

Pat Z.

ENGINEERING TEXT LEVELS							
ENG_TX_DICB-ANGLED	NOTES AND LABELS	0	0	0	0		0
ENG_TX_DICB-FLAT	NOTES AND LABELS	0	0	0	0		0
ENG_TX_DITCH	NOTES AND LABELS	124	0	0	0		0
ENG_TX_DRIVEWAY	NOTES AND LABELS	0	0	0	0		0
ENG_TX_EDGE-WATER	NOTES AND LABELS	124	0	0	0		0
ENG_TX_EPAVT	NOTES AND LABELS	0	0	0	0		0
ENG_TX_FDC	NOTES AND LABELS	0	0	0	0		0
ENG_TX_FENCE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_FENCE-GATE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_FENCE-SILT	NOTES AND LABELS	0	0	0	0		0
ENG_TX_GABION	NOTES AND LABELS	4	0	0	0		0
ENG_TX_GARDEN	NOTES AND LABELS	146	0	0	0		0
ENG_TX_GAS	NOTES AND LABELS	3	0	0	0		0
ENG_TX_GAS-UTIL	NOTES AND LABELS	3	0	0	0		0
ENG_TX_GRADING	NOTES AND LABELS	248	0	0	0		0
ENG_TX_GROUND	NOTES AND LABELS	0	0	0	0		0
ENG_TX_GUIDERAIL-BEAM	NOTES AND LABELS	0	0	0	0		0
ENG_TX_GUIDERAIL-CABLE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_HEADWALL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_HYDRO	NOTES AND LABELS	157	0	0	0		0
ENG_TX_HYDRO-TELE	NOTES AND LABELS	157	0	0	0		0
ENG_TX_HYDRO-UTIL	NOTES AND LABELS	157	0	0	0		0
ENG_TX_HZC	NOTES AND LABELS	0	0	0	0		0
ENG_TX_KILLSTRIP	NOTES AND LABELS	0	0	0	0		0
ENG_TX_LANE	NOTES AND LABELS	0	0	0	0		0
ENG_TX_LANEWAY	NOTES AND LABELS	0	0	0	0		0
ENG_TX_MAIL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_MULTI-TRAIL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_NOISEWALL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_POND	NOTES AND LABELS	0	0	0	0		0
ENG_TX_PYCB	NOTES AND LABELS	0	0	0	0		0
ENG_TX_RET-WALL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_RIPRAP	NOTES AND LABELS	4	0	0	0		0
ENG_TX_SANI	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SANI-UTIL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SHOULDER	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SIDEWALK	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SIGN	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SIGN-COM	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SLOPE-B	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SLOPE-T	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STORM	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STORM-AREA	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STORM-MH	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STORM-UTIL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STRUCTURE-B	NOTES AND LABELS	0	0	0	0		0
ENG_TX_STRUCTURE-T	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SURFACE-PROF	NOTES AND LABELS	0	0	0	0		0
ENG_TX_SWALE	NOTES AND LABELS	124	0	0	0		0
ENG_TX_TCS	NOTES AND LABELS	0	0	0	0		0

192

Pat Z.

ENGINEERING TEXT LEVELS							
ENG_TX_TCS-UTIL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_TIN-PRO	NOTES AND LABELS	0	0	0	0		0
ENG_TX_TREE-CON	NOTES AND LABELS	231	0	0	0		0
ENG_TX_TREE-DEC	NOTES AND LABELS	230	0	0	0		0
ENG_TX_TV	NOTES AND LABELS	96	0	0	0		0
ENG_TX_TV-UTIL	NOTES AND LABELS	96	0	0	0		0
ENG_TX_VCB	NOTES AND LABELS	0	0	0	0		0
ENG_TX_WALKWAY	NOTES AND LABELS	0	0	0	0		0
ENG_TX_WALL	NOTES AND LABELS	0	0	0	0		0
ENG_TX_WATER	NOTES AND LABELS	124	0	0	0		0
ENG_TX_WATER-UTIL	NOTES AND LABELS	124	0	0	0		0

Pat Z.

XIV. SHADING AND PATTERNING LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	**DESCRIPTION**	CO	STYLE	WT	CO	LC	WT
SHADING AND PATTERNING LEVELS							
'HATCH'=Hatch, Crosshatch or Pattern name, 'OPAQUE'=Solid Shape							
PA=Pattern Angle PS=Pattern Scale PD=Pattern Delta(spacing)							
AZ=Active Z Value							
RCA_SH_REGULATION_LIMITS	REGIONAL CONSERVATION AUTHORITY LANDS, HATCH, PA=90, PS=1, PD=6.0	6	0	0	0		
ROW SHADING is set up for 1:1000 scale property drawings							
ROW_ENG_SH_GUYING_EASEMENT	PROPOSED PERMANENT HYDRO GUYING EASEMENT, OPAQUE WITH HYDRO HATCH ON PRIVATE LANDS, OPAQUE SHAPE WITHOUT HATCH ON CITY LANDS, SEE G:\wtdesign\CONSULTANTs CD burn\Appendix-A v8i\Property Closeout Report\IPRP Template.dgn FOR APPLICATION OF SHADING FOR GUYING EASEMENT	68	0	0			
ROW_ENG_SH_HYDRO_EASEMENT	PROPOSED PERMANENT EASEMENT ie HYDRO, AERIAL, ON DEVELOPER/PRIVATE LANDS, HATCH, PA=45, PS=1, PD=1	68	0	2			
ROW_ENG_SH_PERM_EASEMENT	PROPOSED PERMANENT EASEMENT ie STRUCTURES, DRAINAGE, CROSSHATCH, PA=45/-45, PS=1, PD=1/1	123	0	2			
ROW_ENG_SH_ROW	PROPOSED RIGHT OF WAY (FEE SIMPLE), HATCH, PA=45, PS=1, PD=0.65	117	0	2			
ROW_ENG_SH_TEMP_EASEMENT	PROPOSED TEMPORARY EASEMENT ie GRADING, CROSSHATCH, PA=45/-45, PS=1.O, PD=1.5/1.5	212	0	0			
ENG SHADING is set up for 1:500 scale contract drawings							
ENG_SH_ASPHALT	PROPOSED SHADING FOR ASPH SURFACE - PLAN - Opaque Shape - AZ= -15	235	0	0	233		0
ENG_SH_CONCRETE	PROPOSED CONCRETE AREA PATTERN (INCLUDES BUS BAY) - PLAN - HATCH, PA=45, PS=1, PD=0.5, AZ= -5	3	0	1	0		1
ENG_SH_DRIVEWAY	PROPOSED DRIVEWAY PATTERN - PLAN - 'ASPH', PA=0, REINSTATEMENT->PS=1.0	RELOCATION or NEW->PS=0.5, PD=0, AZ= -5	0	0	1	0		1
ENG_SH_GABION	PROPOSED GABION HATCH PATTERN - PLAN - 'GABION', PA=0, PS=0.5, PD=0, AZ= -5	4	0	1	0		1
ENG_SH_GRASS	PROPOSED GRASSED AREA PATTERN - PLAN - 'GRASS', PA=0, PS=1.0, PD=0, AZ= -5	246	0	1	0		1
ENG_SH_GRIND	PROPOSED HATCH FOR ASPHALT GRIND SURFACE - PLAN - HATCH, PA=-45, PS=1.0, PD=0.75, AZ= -5	0	0	2	0		2
ENG_SH_IMPRESSED	PROPOSED IMPRESSED CONC PATTERN - PLAN - 'CONC_T', PA=30, PS=2.0, PD=0, AZ= -5	3	0	1	0		1
ENG_SH_ISLAND	PROPOSED SHADING FOR ISLAND SURFACE - PLAN - Opaque Shape - AZ= -10 [Can also be used behind text within patterned areas - AZ=-4]	250	0	0	8		0
ENG_SH_KILLSTRIP	PROPOSED CONCRETE KILLSTRIP and MEDIAN PATTERN - PLAN - 'CONCRT', PA=0, PS=0.5, PD=0, AZ= -5	3	0	0	0		0
ENG_SH_MULTI-TRAIL	PROPOSED ASPH MULTI-USE TRAIL OR WALKWAY HATCH PATTERN - PLAN - CROSSHATCH, PA=45 / -45, PS=1, PA=0.3 / 0.3, AZ= -5	32	0	0	0		0
ENG_SH_RIPRAP	PROPOSED RIP RAP AREA PATTERN - PLAN - 'GRAVEL', PA=0, PS=1.0, PD=0, AZ= -5	4	0	1	0		1
ENG_SH_SANI	PROPOSED SANITARY PIPE HATCH - PROFILE - HATCH, PA= -60, PS=1, PD=1.0, AZ= -5	3	0	1	0		1
ENG_SH_SIDEWALK	PROPOSED SIDEWALK HATCH PATTERN (INCLUDES BUS PAD) - PLAN - HATCH, PA= -45, PS=1, PD=0.3, AZ= -5	3	0	1	0		1
ENG_SH_STORM	PROPOSED STORM PIPE HATCH - PROFILE - HATCH, PA=60, PS=1, PD=1.0, AZ= -5	3	0	1	0		1
ENG_SH_WATER	PROPOSED WATERMAIN PIPE HATCH - PROFILE - HATCH, PA= -60, PS=1, PD=0.5, AZ= -5	3	0	1	0		1

Pat Z.

XV. PAVEMENT MARKINGS LEVELS

LEVEL NAME	DESCRIPTION	BY-LEVEL			OVER-RIDE		
		CO	STYLE	WT	CO	LC	WT
PAVEMENT MARKINGS LEVELS							
PMK_CENTRELINE	LANE MARKINGS	2	0	1	0		4
PMK_LANE	LANE MARKINGS	2	0	0	0		4
PMK_LANE_1-1	LANE MARKINGS	2	1-1	0	0		4
PMK_LANE_3-3	LANE MARKINGS	2	2-2	0	0		4
PMK_LANE_3-6	LANE MARKINGS	2	3-6	0	0		4
PMK_LANE-ARROW	TURNING ARROWS	2	0	0	0		4
PMK_LANE-LABEL	LANE IDENTIFIERS	2	0	0	0		4
PMK_LANE-REMOVALS	LANE MARKINGS TO BE REMOVED	208	0	0	0		4
PMK_LANE-SYMBOL	LANE SYMBOLS	2	0	0	0		4
PMK_LEGEND	LEGEND OUTLINE	0	0	0	0		4
PMK_SIGN-LABEL	SIGN SYMBOLS	0	0	0	0		4
PMK_TRAFFIC-SIGN	TRAFFIC SIGN	2	0	0	0		4
PMK_TX_CENTRELINE	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE_1-1	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE_3-3	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE_3-6	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE-ARROW	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE-LABEL	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LANE-REMOVALS	NOTES AND LABELS	208	0	0	0		0
PMK_TX_LANE-SYMBOL	NOTES AND LABELS	2	0	0	0		0
PMK_TX_LEGEND	LEGEND TEXT	0	0	0	0		0
PMK_TX_SIGN-LABEL	NOTES AND LABELS	0	0	0	0		0
PMK_TX_TRAFFIC-SIGN	NOTES AND LABELS	2	0	0	0		0

Pat Z.

XVI.   STREET LIGHTING LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	**DESCRIPTION**	**CO**	**STYLE**	**WT**	**CO**	**LC**	**WT**
STREET LIGHTING LEVELS							
STL_ABANDON	ABANDON	4	2	2	0		2
STL_BACKGUY	BACKGUY	3	0	2	0		2
STL_CONDUCTORS_OH	NEW OVERHEAD CONDUCTORS	90	0	2	0		5
STL_CONDUIT_UG_100mm	100mm CONDUIT	90	3	4	0		5
STL_CONDUIT_UG_50mm	50mm CONDUIT	90	2	4	0		5
STL_ELECTRICAL_CHAMBER	NEW ELECTRICAL CHAMBER	3	0	2	0		2
STL_EXIST_CONDUIT_UG_100mm	EXISTING 100mm CONDUIT	236	3	2	236		0
STL_EXIST_CONDUIT_UG_50mm	EXISTING 50mm CONDUIT	236	2	2	236		0
STL_EXISTING_CONDUCTORS_OH	EXISTING OVERHEAD CONDUCTORS	236	0	1	236		0
STL_EXISTING_ELECTRICAL_CHAMBER	EXISTING ELECTRICAL CHAMBER	236	0	0	236		0
STL_EXISTING_FIXTURES	EXISTING FIXTURES	236	0	0	236		0
STL_EXISTING_POLES	EXISTING POLES	236	0	0	236		0
STL_EXISTING_POWER_SUPPLY	EXISTING STREET LIGHT POWER	236	0	0	236		0
STL_EXISTING_TRANSFORMERS	EXISTING TRANSFORMERS	236	0	0	236		0
STL_FIXTURES	NEW FIXTURES	3	2	2	0		5
STL_FUSE	IN-LINE FUSE	3	0	2	0		5
STL_GND_PLATE	GROUND PLATE	3	0	2	0		5
STL_ID	STREET LIGHT IDENTIFICATION TAG	0	0	2	0		5
STL_POLES	NEW POLES	3	0	2	0		5
STL_POWER_SUPPLY	NEW STREET LIGHT POWER SUPPLY	3	0	2	0		5
STL_REMOVE	REMOVAL	4	0	2	0		5
STL_TRANSFORMERS	NEW TRANSFORMERS	3	0	2	0		5
STL_TX_ABANDON	ABANDON	4	0	0	0		0
STL_TX_BACKGUY	BACKGUY	3	0	0	0		0
STL_TX_CONDUCTORS_OH	NEW OVERHEAD CONDUCTORS	90	0	0	0		0
STL_TX_ELECTRICAL_CHAMBER	NEW ELECTRICAL CHAMBER	3	0	0	0		0
STL_TX_EXISTING_CONDUCTORS_OH	EXISTING OVERHEAD CONDUCTORS	236	0	0	236		0
STL_TX_EXISTING_ELECTRICAL_CHAMBER	EXISTING ELECTRICAL CHAMBER	236	0	0	236		0
STL_TX_EXISTING_FIXTURES	EXISTING FIXTURES	236	0	0	236		0
STL_TX_EXISTING_POLES	EXISTING POLES	236	0	0	236		0
STL_TX_EXISTING_POWER_SUPPLY	EXISTING STREET LIGHT POWER	236	0	0	236		0
STL_TX_EXISTING_TRANSFORMERS	EXISTING TRANSFORMERS	236	0	0	236		0
STL_TX_FIXTURES	NEW FIXTURES	3	0	0	0		0
STL_TX_FUSE	IN-LINE FUSE	3	0	0	0		0
STL_TX_GND_PLATE	GROUND PLATE	3	0	0	0		0
STL_TX_ID	STREET LIGHT IDENTIFICATION TAG	0	0	0	0		0
STL_TX_POLES	NEW POLES	3	0	0	0		0
STL_TX_POWER_SUPPLY	NEW STREET LIGHT POWER SUPPLY	3	0	0	0		0
STL_TX_REMOVE	REMOVAL	4	0	0	0		0
STL_TX_TRANSFORMERS	NEW TRANSFORMERS	3	0	0	0		0
STL_WIRING	WIRING	236	0	0	0		0

196

Pat Z.

XVII. TRAFFIC SIGNAL LEVELS

CITY OF BRAMPTON - LEVEL SETUP & SYMBOLOGY		BY-LEVEL			OVER-RIDE		
LEVEL NAME	DESCRIPTION	CO	STYLE	WT	CO	LC	WT
TRAFFIC SIGNAL LEVELS							
TCS_100mm-EXIST	EXISTING TRAFFIC 100mm RIGID PVC	235	4	2	236		0
TCS_100mm-NEW	PROPOSED TRAFFIC 100mm RIGID PVC	90	3	5	0		
TCS_50mm-EXIST	EXISTING TRAFFIC 50mm RIGID PVC	235	0	2	236		0
TCS_50mm-NEW	PROPOSED TRAFFIC 50mm RIGID PVC	90	1	5	0		
TCS_75mm-EXIST	EXISTING TRAFFIC 75mm RIGID PVC	235	6	2	236		0
TCS_75mm-NEW	PROPOSED TRAFFIC 75mm RIGID PVC	90	2	5	0		
TCS_BACKGUY	PROPOSED TRAFFIC BACKGUY	3	0	2	0		
TCS_CONTROLLER	PROPOSED TRAFFIC CONTROLLER	3	0	2	0		
TCS_ELEC-CHAMBER-EXIST	EXISTING ELECTRICAL CHAMBER	235	0	2	236		0
TCS_ELEC-CHAMBER-NEW	PROPOSED ELECTRICAL CHAMBER	3	0	2	0		
TCS_FUSE	PROPOSED TRAFFIC FUSE	0	0	2	0		
TCS_HYDROSUPPLY	PROPOSED HYDRO TRANSFORMER	3	0	2	0		
TCS_LEGEND	TRAFFIC LEGEND	0	0	1	0		
TCS_LOOP	PROPOSED TRAFFIC LOOPS	3	2	1	0		
TCS_LUMINAIRE-EXIST	EXISTING TRAFFIC LUMINAIRE	235	2	0	236		0
TCS_LUMINAIRE-NEW	PROPOSED TRAFFIC LUMINAIRE	3	0	2	0		
TCS_OPTICOM	PROPOSED TRAFFIC OPTICOM DETECTOR	3	0	2	0		
TCS_PAV	PROPOSED PAVEMENT MARKING	200	0	2	0		
TCS_PLATE	PROPOSED TRAFFIC GROUND PLATE	0	0	2	0		
TCS_POLE-EXIST	EXISTING TRAFFIC POLE	235	0	0	236		0
TCS_POLE-NEW	PROPOSED TRAFFIC POLE	3	0	2	0		
TCS_POWER	PROPOSED TRAFFIC POWER SUPPLY	3	0	2	0		
TCS_PUSHBUTTON	PROPOSED TRAFFIC PEDESTRIAN PUSHBUTTON POLE	3	0	2	0		
TCS_RADAR	PROPOSED RADAR OR WAVETRONIX DETECTOR	3	0	1	0		
TCS_REMOVAL	INDICATES REMOVAL	4	0	3	0		
TCS_SCHEMATIC	PROPOSEDSCHEMATIC WIRING LINEWORK	0	0	0	0		0
TCS_SCHEMATIC-EXIST	EXISTING SCHEMATIC WIRING LINEWORK	0	2	0	0		0
TCS_SIGN	PROPOSED REGULATORY OR INFORMATION SIGNAGE	0	0	0	0		
TCS_SIGNALHEAD	PROPOSED TRAFFIC SIGNAL HEAD INCLUDING PEDESTRIAN SIGNAL HEAD & PUSH BUTTON	3	0	2	0		
TCS_SPAN-EXIST	EXISTING AERIAL SPAN CABLE	235	2	2	236		0
TCS_SPAN-NEW	PROPOSED AERIAL SPAN CABLE	3	0	1	0		
TCS_TSP-EVP	PROPOSED TSP/EVP ANTENNA	3	0	2	0		
TCS_TX_100mm-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_100mm-NEW	PROPOSED NOTES AND LABELS	90	0	0	0		
TCS_TX_50mm-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_50mm-NEW	PROPOSED NOTES AND LABELS	90	0	0	0		
TCS_TX_75mm-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_75mm-NEW	PROPOSED NOTES AND LABELS	90	0	0	0		
TCS_TX_BACKGUY	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_CONTROLLER	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_ELEC-CHAMBER-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_ELEC-CHAMBER-NEW	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_FUSE	PROPOSED NOTES AND LABELS	0	0	0	0		
TCS_TX_HYDROSUPPLY	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_LEGEND	NOTES AND LABELS	0	0	0	0		
TCS_TX_LOOP	PROPOSED NOTES AND LABELS	3	0	0	0		

Pat Z.

TRAFFIC SIGNAL LEVELS							
TCS_TX_LUMINAIRE-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_LUMINAIRE-NEW	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_PAV	PROPOSED NOTES AND LABELS	200	0	0	0		
TCS_TX_PLATE	PROPOSED NOTES AND LABELS	0	0	0	0		
TCS_TX_POLE-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_POLE-NEW	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_POWER	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_PUSHBUTTON	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_RADAR	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_REMOVAL	NOTES AND LABELS	4	0	0	0		
TCS_TX_SCHEMATIC	NOTES AND LABELS	0	0	0	0		0
TCS_TX_SCHEMATIC-EXIST	NOTES AND LABELS	0	0	0	0		0
TCS_TX_SIGN	PROPOSED NOTES AND LABELS	0	0	0	0		
TCS_TX_SIGNALHEAD	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_SPAN-EXIST	EXISTING NOTES AND LABELS	235	0	0	236		0
TCS_TX_SPAN-NEW	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_TSP-EVP	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_VIDEO	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX_WIFI	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_TX-OPTICOM	PROPOSED NOTES AND LABELS	3	0	0	0		
TCS_VIDEO	PROPOSED TRAFFIC VIDEO DETECTOR	3	0	2	0		
TCS_WIFI	PROPOSED WIRELESS HUB	3	0	2	0		

198

2) APPENDIX 2 – CELL LIBRARY

BRAMPTON CELLS V8I.CEL

This library contains both survey cells and engineering cells. It also includes cells, created in the ENG levels, based on OPSD for CBs, DCBs and DICBs in all the alternatives (these can be used in the profile to work around other utilities or to show non-standard positioning of leads.

> **For initial survey cleanup process, survey cells and level symbology, refer to the Survey Section's manual for base plan preparation.**

City of Brampton Standard Cell Library – BRAMPTON CELLS V8i.cel			
CELL NAME	**USED IN VIEW…**	**DESCRIPTION**	**CELL W/ORIGIN**
45OUT	PLAN	45 Degree Concrete Outlet	
90OUT	PLAN	90 Degree Concrete Outlet	
AREA	PLAN	Storm Drainage Identifier with area, co-efficient & area #	
CO_HA	PLAN	Storm Drainage Identifier with area & co-efficient	
ARMOUR	PLAN / PROFILE	Pattern for Armour Stone	
ARRODI	PLAN	Arrow for Existing Ditch Line	
ARROSA	PLAN	Arrow for Existing Sanitary Line	
ARROST	PLAN	Arrow for Existing Storm Line	
ARROW	PLAN	Generic Arrow	
ARROWDI	PLAN	Arrow for Proposed Ditch Line	
ARROWSA	PLAN	Arrow for Proposed Sanitary Line	
ARROWST	PLAN	Arrow for Proposed Storm Line	
ASPH	PLAN	Pattern for Driveway Reinstatement	
BIKE	PLAN	Bike Path Paint Symbol	
BORE-HOLE	PLAN	Proposed Borehole - With text	
BRHOLE	PLAN	Proposed Borehole - No Text	
BOREHOLE	PLAN	Surveyed Borehole	
BOULDER	PLAN	Existing Boulder	
BUSH-CON	PLAN	Existing Coniferous Bush	
BUSH-DEC	PLAN	Existing Deciduous Bush	
CBUSH	PLAN	Linear Pattern for group of Coniferous Trees	
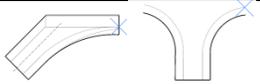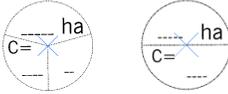
Pat Z.

City of Brampton Standard Cell Library – BRAMPTON CELLS V8i.cel			
CELL NAME	**USED IN VIEW…**	**DESCRIPTION**	**CELL W/ORIGIN**
CONC_T	PLAN / PROFILE	Area Pattern for Impressed Concrete Killstrip / Median	
CONCRT	PLAN	Area Pattern for Concrete Killstrip / Median	
CONIF	PLAN	Existing Coniferous Tree	
CUTCROSS	PLAN	Survey Cut Cross	
DBUSH	PLAN	Linear Pattern for group of Deciduous Trees	
DECID	PLAN	Existing Deciduous Tree	
END_GAS END_SAN END_STM END_WM	PROFILE	Profile Pipe Ends for Existing Underground Services	
END_P_SANI END_P_STM	PROFILE	Profile Pipe Ends for Proposed Sanitary / Storm Underground Pipes	
GABION	SECTIONS / PROFILE	Area Pattern for Existing Gabion Walls	
GRASS	PLAN	Area Pattern for Proposed Grassed Areas	
GRAVEL	PLAN	Area Pattern for Proposed Rib Rap	
GROUND	PLAN	Point for Spot Elevations	
GUY	PLAN	Hydro Anchor	
GWIRE	PLAN	Hydro Anchor & Guy Wire	
HCM	PLAN	Horizontal Control Monument	
HP_no	PLAN	Hydro Pole with Number	HP # ____
HPT	PROFILE	High Point	
LPT	PROFILE	Low Point	
HYDRANT	PLAN	Existing Water Hydrant	
INTERSECTION	PROFILE	Cross Road Identification for Profile	
LT TURN	PLAN	Left Turn Lane	
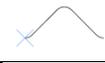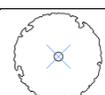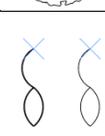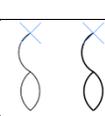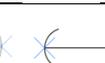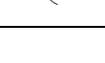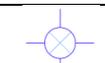
200

Pat Z.

CELL NAME	USED IN VIEW…	DESCRIPTION	CELL W/ORIGIN
THRU	PLAN	Through Lane Marking	
NARROW	PLAN	North Arrow	
NOTE	PLAN	"This Drawing to be Used for Road and Storm Sewer Works Only"	THIS DRAWING TO BE USED FOR ROAD AND STORM SEWER WORKS ONLY
P-HYD	PROFILE	Proposed Water Hydrant for Profile	
P_CB	PLAN	Proposed Catchbasin	PROP CB / PROP CB SIDE INLET
P_CB-SIDEINLET	PLAN	Proposed Side Inlet Catchbasin	
P_CBMH	PLAN	Proposed Catchbasin Maintenance Hole	PROP CBMH
P_DCB	PLAN	Proposed Double Catchbasin	PROP DCB
P_DCB-SIDEINLET	PLAN	Proposed Side Inlet Double Catchbasin	PROP DCB SIDE INLET
P_DICB-ANGLED	PLAN	Proposed Angled Ditch Inlet Catchbasin	PROP ANGLED DICB / PROP FLAT DICB
P_DICB-FLAT	PLAN	Proposed Flat Ditch Inlet Catchbasin	
P_GUY	PLAN	Proposed Guy Wire	
P_HP	PLAN	Proposed Hydro Pole with Number Data Field	PROP HP# ____
P_MH	PLAN	Proposed Maintenance Hole	PROP STM MH
P_PYD_CB	PLAN	Proposed Pyramid Catchbasin	PROP PYD CB
P_SLOPE	PLAN	Linear Pattern for Proposed Slope Identification	
PI	PROFILE	Point of Intersection	
PI_STA	PROFILE	Point of Intersection with Station Data Field	--- + ---.--
POINT	PLAN	Generic Point	
POLE	PLAN	Generic Pole	
RAIL	PLAN	Linear Pattern for Guide Rail	
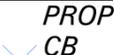
201

Pat Z.

CELL NAME	USED IN VIEW…	DESCRIPTION	CELL W/ORIGIN
City of Brampton Standard Cell Library – BRAMPTON CELLS V8i.cel			
REMOVE	PLAN	Removals Drawing Relocation Symbol	
RIP-RAP	PLAN	Area Pattern for Existing Rip Rap	
SLOPE	PLAN	Linear Pattern for Existing Slope Identification	
SOUND	PLAN	Sounding Point	
SPOT	PLAN	Ground Shots with Text Tags	
SPOT-ELEV	PLAN	Ground Shots with Text Tags	
TEST-PIT	PLAN	Proposed Test Pit with Text	
TESTPIT	PLAN	Existing Test Pit with Text	
TICK	PLAN		
TWSI	PLAN	Tactile Walking Surface Indicator	
X_BAR	SECTIONS	Barrier - No Cross Fall	
X_BARL	SECTIONS	Barrier - Left Cross Fall	
X_BARR	SECTIONS	Barrier - Right Cross Fall	OPSD 911.130
X_BELL	SECTIONS	Existing Bell Service Location	
X_BLDG	SECTIONS	Existing Building Location	
X_BRDG	SECTIONS	Existing Bridge Location	
X_BUSH	SECTIONS	Existing Edge of Woodlot	
X_CONIF	SECTIONS	Existing Coniferous Tree	
X_CSHRUB	SECTIONS	Existing Coniferous Shrub	
X_DECID	SECTIONS	Existing Deciduous Tree	
X_DSHRUB	SECTIONS	Existing Deciduous Shrub	

Pat Z.

City of Brampton Standard Cell Library – BRAMPTON CELLS V8i.cel			
CELL NAME	**USED IN VIEW…**	**DESCRIPTION**	**CELL W/ORIGIN**
X_FENC	SECTIONS	Existing Fence Location	
X_FLOOD	SECTIONS	Regional Conservation Flood Line	
X_GAB	SECTIONS	Existing Gabion Wall	
X_GAS	SECTIONS	Existing Gas Service Location	
X_GRDN	SECTIONS	Existing Garden Location	
X_GUIDERAIL	SECTIONS	Existing Guide Rail Location	
X_HEAD	SECTIONS	Existing Headwall Location	
X_HEDG	SECTIONS	Existing Hedge Location	
X_HP	SECTIONS	Existing Hydro Pole Location	
X_HYDRO	SECTIONS	Existing Hydro Underground Service Location	
X_LBARRIER	SECTIONS	Proposed Island Barrier Curb (Left Side)	OPSD 600.080
X_RBARRIER	SECTIONS	Proposed Island Barrier Curb (Right Side)	
X_LBBK	SECTIONS	Proposed 1.5m Bike Path (Left Side)	
X_RBBK	SECTIONS	Proposed 1.5m Bike Path (Right Side)	
X_LBC	SECTIONS	Proposed Curb & Gutter (Left Side)	OPSD 600.040
X_RBC	SECTIONS	Proposed Curb & Gutter (Right Side)	
X_LBKS	SECTIONS	Proposed 1m Killstrip (Left Side)	
X_RBKS	SECTIONS	Proposed 1m Killstrip (Right Side)	
X_LBKS-H	SECTIONS	Proposed 0.5m Killstrip (Left Side)	
X_RBKS-H	SECTIONS	Proposed 0.5m Killstrip (Right Side)	

203

Pat Z.

X_LBRCURB	SECTIONS	Proposed Parking Lot Barrier Curb (Left Side)	
X_RBRCURB	SECTIONS	Proposed Parking Lot Barrier Curb (Right Side)	OPSD 600.110
X_LBSW	SECTIONS	Proposed 1.5m Sidewalk (Left Sidewalk)	
X_RBSW	SECTIONS	Proposed 1.5m Sidewalk (Right Sidewalk)	
X_LCURB	SECTIONS	Proposed Bus Bay Curb (Left Side)	
X_RCURB	SECTIONS	Proposed Bus Bay Curb (Right Side)	OPSD 600.030 Depressed
X_PROW	SECTIONS	Proposed Property Line Location	
X_ROW	SECTIONS	Existing Property Line Location	
X_RBBK-MU	SECTIONS	Proposed 3.0m Bike Path (Right Side)	
X_RCA	SECTIONS	Proposed Regulation Limits	REGULATION LIMITS
X_RET	SECTIONS	Existing Retaining Wall Location	RET. WALL
X_RR	SECTIONS / PROFILE	Existing Rail Road Rail Symbol	
X_SANI	SECTIONS	Existing Sanitary Service Location	SAN LINE SAN MH
X_SANMH	SECTIONS / PROFILE	Existing Sanitary Maintenance Hole Location	
X_STM	SECTIONS	Existing Storm Service Location	STORM LINE STM MH PROP STORM LINE
X_STMMH	SECTIONS / PROFILE	Existing Storm Maintenance Hole Location	
X_STORM	SECTIONS	Proposed Storm Service Location	
X_STR-BOT	SECTIONS	Existing bottom of structure location	STR - TOP STR - BOT
X_STR-TOP	SECTIONS	Existing top of structure location	
X_TBRDG	SECTIONS	Existing Top of Bridge Location	BRIDGE
X_TV	SECTIONS	Existing TV / Rogers Service Location	TV
X_V	SECTIONS	Proposed 800mm wide V Curb	
X_WC	SECTIONS	Existing Water Chamber Location	WC WM
X_WM	SECTIONS	Existing Water Service Location	
XP_BELL	SECTIONS	Proposed Bell Service Location	PROP BELL
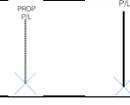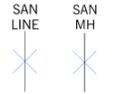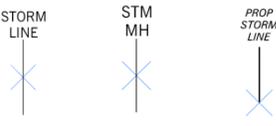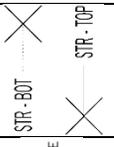
Pat Z.

XP_FENCE	SECTIONS	Proposed Fence Location	
XP_GAS	SECTIONS	Proposed Gas Service Location	
XP_HYDRO	SECTIONS	Proposed Hydro Service Location	
XP_NOISE	SECTIONS	Proposed Noise Wall	
XP_RAIL-BEAM	SECTIONS	Proposed Beam Guide Rail	
XP_RAIL-CABLE	SECTIONS	Proposed Cable Guide Rail	
XP_SAN	SECTIONS	Proposed Sanitary Service Location	
XP_STM	SECTIONS	Proposed Storm Service Location	
XP_TV	SECTIONS	Proposed TV / Rogers Service Location	
XP_WM	SECTIONS	Proposed Water Service Location	
X-SEC BASE-LTR X-SEC BASE-LGL X-SEC BASE-TAB	SECTIONS	Border setup for cross sections Created in 3 sizes Letter, Legal & Tabloid (11x17) (Insertion point on left border level with titleblock frame)	
X-SEC BASE LTR X-SEC BASE LGL X-SEC BASE TAB	SECTIONS	Border setup for cross sections Created in 3 sizes Letter, Legal & Tabloid (11x17) (Insertion point inset from left border and above titleblock frame)	
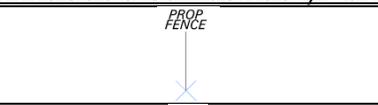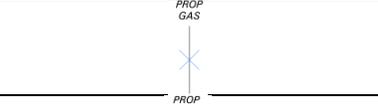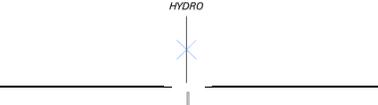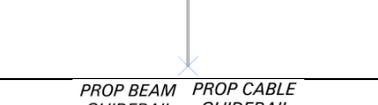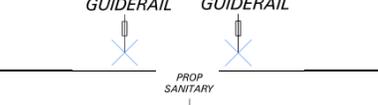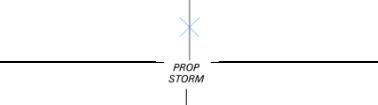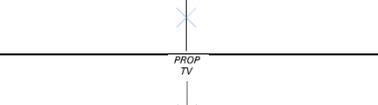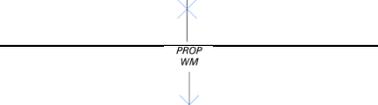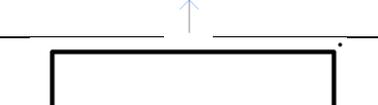
205

Pat Z.
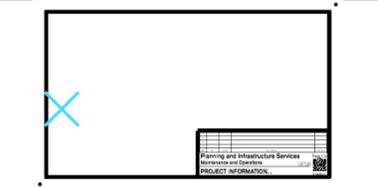
3) APPENDIX 3 - DOCUMENT TEMPLATES

ALWAYS USE THE LATEST FROM ENGINEERING STANDARD SETUPS

I. BLANK LETTERHEAD.DOCX

Generic letterhead for Capital Works group.

II. GENERAL MEMO FORM.DOCX

Generic memo form for Capital Works group.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Date: Click here to enter a date.

To: Click here to enter recipient name.
               Click here to enter company name.

From: Click here to enter your name.

Re: Click here to enter subject matter, project, etc.

_____

Click here to enter recipient name.

Click here to enter the body of the message.
Word operations work within this block. i.e. text wrap, Enter, font options etc...

Regards,

Click here to enter your name.

Design Engineering Technologist
City of Brampton, Planning & Infrastructure Services Department
Public Works Division, Capital Engineering & Construction Section
Capital Engineering, Flower City Community Campus
8850 McLaughlin Rd., Unit 2, Brampton, Ontario L6Y 5T1

(905)874-Click here to enter your extension.– work / (905)874-2505 – fax
Click here to enter your email address.

"Through spirited leadership and innovation, we take pride in providing efficient
transportation infrastructure systems enriching the quality of life in our community."
cc: Click here to enter name(s) of those copied on this memo, i.e. the project manager.

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3-1-1
Last Updated 13JUL15 - PMZ

207

Pat Z.

Generic transmittal form for Capital Works group.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

8850 McLaughlin Road, Unit # 2, Brampton, ON, L6Y 5T1
TEL: (905) 874-2500   FAX: (905) 874-2505

TRANSMITTAL

DATE: Click here to enter a date.

TO: **Click here to enter recipient name.**
COMPANY: Click here to enter company.
ADDRESS: Click here to enter address.

FROM: *Click here to enter your name.*

FILE: Click here to enter project description and number.

We are sending the following by...

☐ INTER-OFFICE   ☐ MAIL   ☐ COURIER   ☐ HAND DELIVERY   ☐ PICK UP

These documents are...

☐   FOR YOUR ACTION   ☐   FOR YOUR REVIEW   ☐   FOR YOUR APPROVAL
☐   AS YOU REQUESTED   ☐   FOR YOUR INFORMATION   ☐   OTHER

QUANTITY	**DESCRIPTION**

COMMENTS:

SIGNED:

     City of Brampton
     Planning and Infrastructure Services
     Public Works
     905-874-

CC:

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3-1-1
Last Updated 13JUL15 - PMZ

Pat Z.

IV.   GENERAL UTILITIES MARKUP REQUEST.DOCX

Standard form letter to be used to circulate plan(s) to utilities for non-capital works.

BRAMPTON
brampton.ca **Flower City**

Click here to enter a date.

LATEST CITY LOGO / DEPARTMENT...

«Title»
«Company»
«Address1»
«Address1»
«City»
«PostalCode»

Dear «Title»:

Re: **[Type Project Street & Construction type here] (ex. This St Reconstruction)**
[Type Project limits here] (ex. That Rd to Another Ave)
[Type Project File Number or Address if applicable]
Please indicate the location of your existing underground services on the enclosed **[print / prints]** and return to this office within two (2) weeks.

CAD files of existing utility works would substantially increase the accuracy of utility locations on our drawings, thereby reducing unidentified conflicts.

Your assistance with this request would be greatly appreciated.

Yours truly,

[Type Designer Name & Credential(s) here]
[Type Work Title here]
Engineering Section
Tel: (905) 874-[Type Ext # here] Fax: (905) 874-2505
Email: [Type your e-mail address here] (all lower case)

[Type your initials here in CAPITAL Letters]/la

[Choose enclosure(s)]

c.c. [Type copied individual – City of Brampton]
[Type external copied individual with full address – Hydro One Brampton, 175 Sandalwood Pkwy W., Brampton, ON, L7A 1E8]
[Continue if needed – Remove if not needed]
[Continue if needed – Remove if not needed]

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3·1·1
Last Updated 13JUL15 – PMZ

SAMPLE ONLY

Pat Z.

V.   PUCC-1 - PRE-ENG LETTER.DOCX

Standard form letter to be completed and provided digitally to the Senior Secretary (Lucia)

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Click here to enter a date.

«Title»
«Company»
«Address1»
«Address1»
«City»
«PostalCode»

Dear «Title»:

Re: [Type Project Street & Construction type here] (ex. This St Reconstruction)
[Type Project limits here] (ex. That Rd to Another Ave)
File Number: [Type Project File Number here] (ex. A1-1234-123)

Please indicate the location of your existing underground services on the enclosed **[print / prints]** and return to this office within two (2) weeks. We intend to call tenders on this project by **[select season]** of **[select year]**, and expect construction to commence in **[select season]** of **[select year]**.

Also, please forward **[this / these]** **[print / prints]** to your design department, notifying them of our intentions to construct or reconstruct in **[Select construction period]**. If any future work is planned by your organization in this area, please inform us of the extent and timing of the work as soon as possible. The final P.U.C.C. application showing our final design will be forthcoming.

CAD files of existing/future utility works would substantially increase the accuracy of utility locations on our drawings, thereby reducing unidentified conflicts.

Your assistance with this request would be greatly appreciated.

Yours truly,

[Type Designer Name & Credential(s) here]
[Type Work Title here]
Engineering Section
Tel: (905) 874-[Type Ext # here] **Fax:** (905) 874-2505
Email: [Type your e-mail address here] (all lower case)

[Type your initials here in CAPITAL Letters]/la

[Choose enclosure(s)]

c.c. [Type copied individual – City of Brampton]
[Type external copied individual with full address – Hydro One Brampton, 175 Sandalwood Pkwy W., Brampton, ON, L7A 1E8]
[Continue if needed – Remove if not needed]
[Continue if needed – Remove if not needed]

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2 **3-1-1**
Last Updated 13JUL15 – PMZ

210

Pat Z.

VI.   PUCC-2 – FINAL SUBMISSION FORM.DOCX

Form to be completed with project & contact information and provided to the PUCC Co-ordinator (Shamsul), with 13 folded copies of the project.

CITY OF BRAMPTON
NEW UTILITY PROPOSAL

APP. NO. TO BE ADDED BY PUCC COORDINATOR

Utility **TO BE COMPLETED**

Address **BY PUCC**

Attention **COORDINATOR**

APPLICATION NO. [Type your project name/file number/description here]

DATE: Click here to enter a date.

DEAR SIRS:

PLEASE BE ADVISED THAT THE CITY OF BRAMPTON

IS PROPOSING A NEW PLANT IN THE CITY OF BRAMPTON AS SHOWN ON THEIR DRAWINGS NUMBER:

[Type in all included drawing numbers or sheet range]

ANTICIPATED CONSTRUCTION DATE: [Click here to enter a date]

[Type your name here]

[Type your email/phone # here]

CONTACT PERSON / PHONE NUMBER

SAMPLE ONLY

Last Updated 29APR15 - PMZ
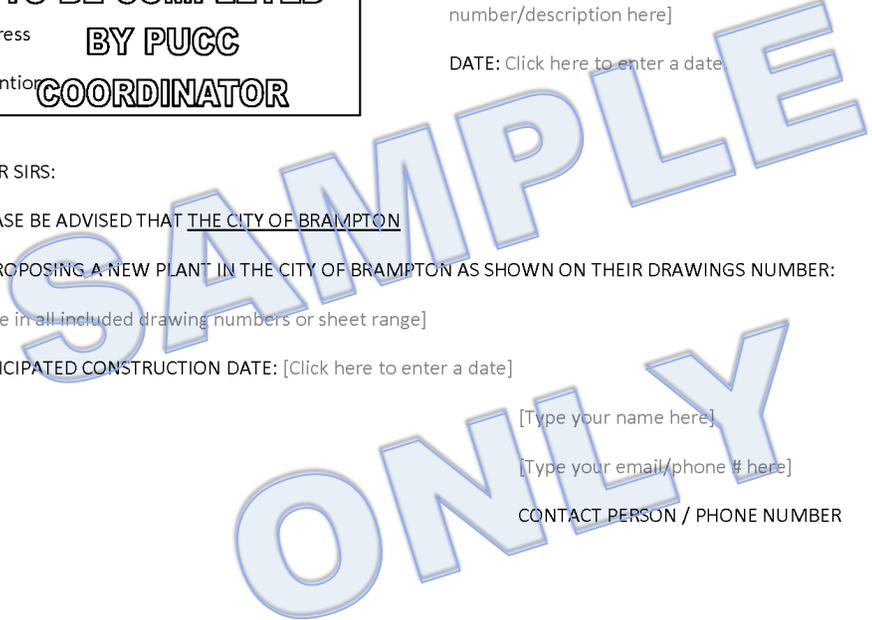
VII.   CAPITAL PROJECTS - DESIGN CIRCULATION-INTERNAL.DOCX

Circulation list to be used for 30%/60%/90% Capital Design circulations.

CITY OF BRAMPTON
DETAIL DESIGN ENGINEERING DOCUMENT REVIEW

Date Documents Issued for City's Review: **DateS**   Required Turnaround Time: Fifteen (**15**) Working days
Project Info.: **PROJECT ST.** from **ST. A** to **ST. B**, File #: **Enter file #**
For Review of... **SELECT THE STAGE** Design Submission   Clear this for 30/60...At 90% include PUCC # for ref.

INTER-OFFICE/DEPARTMENT CIRCULATION TRANSMITTAL

Circulation	Department Name Hard copy recipients are noted, all others review on portal.	Date Sent for Review	Required Date for Return	Reviewer's Initials
John Fantin (Spvr, Engineering CADD) Julia Zalecki (Design Co-Ordinator)	P. & I. S. Dept., Public Works Div. Capital Engineering & Constr. Section, Engineering FCCC Unit 2 **ONE FULL SIZE COPY**	DateS	DateR	
Mike Donnelly (Manager, Construction)	P. & I. S. Dept., Public Works Div. Capital Engineering & Constr. Section, Construction FCCC Unit 2 **ONE FULL SIZE COPY**	DateS	DateR	
Maggie Liu (Water Resources Engineer)	P. & I. S. Dept., Engineering Development Svcs. Div., Environmental Engineering, City Hall – 3rd Floor	DateS	DateR	
Kevin Minaker (Acting Spvr, Traffic Ops)	P. & I. S. Dept., Public Works Div. Roads Maint. & Operations, Traffic Svcs Williams Parkway Operations Centre, 1975 Williams Pkwy	DateS	DateR	
Michael Chan (Supervisor, Traffic Signals)	P. & I. S. Dept., Public Works Div. Traffic Engineering Services, Traffic Signals Williams Parkway Operations Centre, 1975 Williams Pkwy	DateS	DateR	
Shane Beirnes (Acting Supervisor, Traffic Streetlight)	P. & I. S. Dept., Public Works Div., Traffic Street Lighting Williams Parkway Operations Centre, 1975 Williams Pkwy	DateS	DateR	
Borendra Sanyal (Bridge Structures)	P. & I. S. Dept., Public Works Div. Bridges and Structures FCCC Unit 2	DateS	DateR	
Bill Guy Supervisor, Technical Services	P. & I. S. Dept., Public Works Div. Road Maint. & Ops. Sandalwood Yard 120 Sandalwood Parkway West	DateS	DateR	
Doug Rieger (Mgr. Service Dev WT)	Public Services Department, Service Development Brampton Transit 185 Clark Boulevard	DateS	DateR	
Chris Lafleur (Proj Leader, Brampton Transit / ZÜM)	Public Services, Brampton Transit / ZÜM 185 Clark Blvd **ONE HALF SIZE COPY**	DateS	DateR	
Rebecca Thompson (Planning Coordinator, Transit)	Public Services, Brampton Transit 185 Clark Blvd	DateS	DateR	
Frank Mazzotta (Mgr, Dev Eng Approvals)	P. & I. S. Dept., Development & Engineering Svcs. Development & Engineering Section City Hall – 3rd Floor	DateS	DateR	
Brad Hale (Mgr, Transp Planning)	P. & I. S. Dept., Development & Engineering Svcs. Development & Engineering Section City Hall – 3rd Floor	DateS	DateR	
Nelson Cadete (Proj. Mgr, Active Transport Planning)	P. & I. S. Dept., Development & Engineering Svcs. Development & Engineering Section City Hall – 3rd Floor	DateS	DateR	
Henrik Zbogar (Mgr, Long Range Planning)	P. & I. S. Dept., Development & Engineering Svcs. Development & Engineering Section City Hall – 3rd Floor	DateS	DateR	
Bernie Steiger (Mgr, Dev Srvc Subdv Appr) Allan Parsons (Mgr, Dev Svc Site Plans)	P. & I. S. Dept., Planning & Building Div., Dev. Services Section, City Hall – 3rd Floor **ONE HALF SIZE COPY TO ALLAN**	DateS	DateR	
Steve Bodrug (Interim Mgr, Const. & Community Design)- COVER ONLY Daniel Waters (Landscape Tech)	P. & I. S. Dept., Planning & Building Div., Engineering & Development Services Open Space Design & Const. Section City Hall – 3rd Floor **ONE HALF SIZE COPY TO DANIEL**	DateS	DateR	
Ann Pritchard (Mgr Realty Svcs)	Public Services, Facility Services, Realty Services City Hall, West Tower, 9th Fl	DateS	DateR	
Ed Fagan (Acting Mgr Park Assets & Infrastructure)	P. & I. S. Dept. Public Works Div. Park Assets & Infrastructure, Parks Service Centre - 129 Glidden Road	DateS	DateR	
Susan Jorgenson (Mgr, Env Planning) (OPTIONAL)	P. & I. S., Planning & Building Div., Planning Policy & Growth Management Sect., Environmental Planning City Hall – 3rd Floor	DateS	DateR	
Sharon Winski (Acting Cemetery Manager)	P. & I. S. Dept., Public Works, Cemetery Svce 10 Wilson Ave	DateS	DateR	
Michael Clark (Fire Chief)	Public Services Department, Fire Dept. Admin., Fire & Emergency Services Fire Department Headquarters, 8 Rutherford Road South	DateS	DateR	
Marc Anthony Flores (PSN) (Network Administrator – Cable Plant)	Corporate Services Dept., Information Technology IT Networks Technical Services Civic Centre, 150 Central Park Dr	DateS	DateR	

**PLEASE FILL IN YOUR COMMENTS ON THE ELECTRONIC FORM BEING SENT VIA E-MAIL AND
RETURN TO NAME – NUMBER – E-MAIL**

Template Last Updated – June 14, 2016 - PMZ

Pat Z.

Circulation list to be used for 30%/60%/90% Capital Design circulations.

CITY OF BRAMPTON
DETAIL DESIGN ENGINEERING DOCUMENT REVIEW

Date Documents Issued for City's Review: **DateS**   Required Turnaround Time: Fifteen (**15**) Working days
Project Info.: **PROJECT ST.** from **ST. A** to **ST. B, File #: Enter file #**
For Review of… **SELECT THE STAGE** Design Submission   Clear this for 30/60…At 90% include PUCC # for ref.

UTILITIES CIRCULATION TRANSMITTAL

One (1) Full Size Hard copy is provided to each Utility on this list.
For multiple names, highlight the person to receive it.

Circulation	Utility Name	Date Sent for Review	Req'd Date for Return	Reference # Provided at Pre-Eng
Robert Agostini	Hydro One Brampton 175 Sandalwood Parkway West Brampton, ON - L7A 1E8	DateS	DateR	
Justin Clarke	Hydro One Telecomm 65 Kelfield Street Toronto, ON - M9W 5A3	DateS	DateR	
Brian Elbe Maureen Grisdale Sead Delic	Bell Canada 5115 Creekbank Road Floor 3, West Tower Mississauga, ON - L4W 5R1 - ONE COPY	DateS	DateR	
Jim Washburn	Rogers Cable 3573 Wolfdale Road Mississauga, ON - L5C 3T6	DateS	DateR	
Paul Giovannetti	Enbridge Gas Distribution Inc. 500 Consumers Road North York, ON - M2J1P8	DateS	DateR	
Darrin Dodds	Region of Peel (Water) 10 Peel Centre Dr, Ste B, 4th Floor Brampton - ON – L6T 4B9	DateS	DateR	
Simon Hopton	Region of Peel (Sewer) 10 Peel Centre Dr, Ste B, 4th Floor Brampton - ON – L6T 4B9	DateS	DateR	
Bob Nieuwenhuysen	Region of Peel (Roads) 10 Peel Centre Dr, Ste B, 4th Floor Brampton - ON – L6T 4B9	DateS	DateR	
Joe Avsec	Region of Peel (Traffic) 10 Peel Centre Dr, Ste B, 4th Floor Brampton - ON – L6T 4B9	DateS	DateR	
Neha Canjar	Region of Peel (PSN) 10 Peel Centre Dr, 3rd Floor Brampton - ON – L6T 4B9	DateS	DateR	
Bernie O'Brien	MTO - Corridor Management Sec. 1201 Wilson Avenue, 7th floor Downsview, ON – M3M 1J8	DateS	DateR	
Sandy Lovisotto	Region of Peel - JOINT PROJECTS ONLY** 10 Peel Centre Dr, Ste B, 4th Floor Brampton - ON – L6T 4B9	DateS	DateR	

** See 'JOINT PROJECT Guidelines for Circulation.xlsx' for circulation requirements and times

PLEASE FILL IN YOUR COMMENTS ON THE ELECTRONIC FORM BEING SENT VIA E-MAIL
AND RETURN TO NAME – NUMBER – E-MAIL

Template Last Updated –May 17, 2016 - PMZ

IX.   JOINT PROJECT GUIDELINES FOR CIRCULATION.XLSX
This form is to be used ONLY for Joint Region of Peel Project circulations

Updated to November 16, 2010

City of Brampton - Region of Peel

Guidelines for Circulation of drawings for Joint Projects

RECEIVED 2016/05/12

			1:500 Full Size	1:1000 Half Size

For City Circulations to Region

Circulation	To Whom	# Sets	Turn around time for Comments	Coordinated Response
Environmental Assessments	Steve Ganesh	3 sets of documents	4 weeks	Yes - Transportation only*
30% Design	Sandy Lovisotto	4 Full 1 PDF	4 weeks	Yes - Transportation only*
60% Design	Sandy Lovisotto	4 Full 1 PDF	5 weeks	Yes - Transportation only*
90% Design	Sandy Lovisotto	4 Full 1 PDF	4 weeks	Yes - Transportation only*
Pre-tender submission	Sandy Lovisotto	4 Full 1 PDF	4 weeks	Yes - Transportation only*
Tender Package	Sandy Lovisotto	2 Full 1 PDF	Not circulated for comments	N/A
After award (Breakdown from PM of City/Region Costs)	Region PM	1 Excel Spreadsheet	N/A	N/A

* City will make separate circulations to water and waste water groups

For Region Circulations to City

Circulation	To Whom	# Sets	Turn around time for Comments	Coordinated Response
Environmental Assessments	Chris Duyvestyn	3 sets of documents	4 weeks	Yes - Transportation only*
30% Design	Bino Varghese	4 Full 1 half size sets, 1 PDF	4 weeks	Yes - for all city comments
60% Design	Bino Varghese	4 Full 1 half size sets, 1 PDF	5 weeks	Yes - for all city comments
90% Design	Bino Varghese	4 Full 1 half size sets, 1 PDF	4 weeks	Yes - for all city comments
Pre-tender submission	Bino Varghese	4 Full 1 half size sets, 1 PDF	4 weeks	Yes - Transportation only*
Tender Package	Bino Varghese	2 Tender sets + 1 PDF	Not circulated for comments	N/A
After award (Breakdown of City)	Bino Varghese	1 Excel Spreadsheet	N/A	N/A

214

Pat Z.

X.   PUCC – CONSULTANT CIRCULATION – MEMO.DOCX

Standard form letter to be used when providing a PUCC package for review by the consultant doing a capital project.

BRAMPTON
Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT...

PUCC PLANS CIRCULATION
(EXTERNAL CONSULTANT REVIEW)

Date: Click here to select a date.

To: Click here to enter recipient name.
              Click here to enter company name.

From: Click here to enter your name.

Re: (Choose a utility) Click here to enter the PUCC number
              Click here to enter street and extents of proposed works.
              Click here to enter related capital works project information.

Click here to enter recipient name.

Attached is the PUCC package for the above mentioned utility and location.

At your earliest convenience, please review the information, identify any conflicts with your work in the area and return comments to me by no later than Click here to enter a date which will provide them with two weeks of review time..

Regards,

Click here to enter your name.

Design Engineering Technologist
City of Brampton, Planning & Infrastructure Services Department
Public Works Division, Capital Engineering & Construction Section
Capital Engineering, Flower City Community Campus
8850 McLaughlin Rd., Unit 2, Brampton, Ontario L6Y 5T1

(905)874-Click here to enter your extension.– work / (905)874-2505 – fax
Click here to enter your email address.

"Through spirited leadership and innovation, we take pride in providing efficient
transportation infrastructure systems enriching the quality of life in our community."
cc: Click here to enter name(s) of those copied on this memo, i.e. the project manager.

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Last Updated 13JUL15 - PMZ
311

Pat Z.

XI.   SITEPLAN – CONSULTANT CIRCULATION – MEMO.DOCX

Standard form letter to be used when providing a siteplan package for review by the consultant doing a capital project.

Pat Z.

XII.   SITEPLAN – INTERNAL CIRCULATION - MEMO.DOCX

Standard form letter to be used when providing a siteplan for review by other internal departments i.e. traffic, lighting…

217

Pat Z.

Letter to be used to provide siteplan review comments to the Development group.

BRAMPTON
Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT…

Date: Click here to enter a date.

To: Olti Mertiri, Spvr, Dev Approvals, Engineering & Development Services, P. & I. Svcs.
Steve Schumacher, Technician, Engineering & Development Services, P. & I. Svcs.

From: Click here to enter reviewing technologist name(s).
Design Technologist, Public Works, Capital Construction, P. & I. Svcs.

Re: Application for Site Plan Approval
Click here to enter name and address of siteplan.

File: SP Click here to enter Site Plan #.
Assigned Planner: Click here to enter planner's name.

Planning & Infrastructure Services Department- Capital Construction, Public Works Division has reviewed the subject site plan and offers the following comments:

1.   Click here to enter comments (or 'No Comment at this time').

If you require additional information or have any questions please contact the undersigned.

Regards,

Click here to enter reviewing technologist name(s).
Planning & Infrastructure Services Department
Capital Construction, Public Works Division
Tel: 905 874-Click here to enter #., Fax: 905 874-2505

cc: Tim Kocialek
Frank Mazzotta
Brad Hale
Peter Dimitroulias

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Template Last Updated – 23FEB16 – PMZ
Page 1 of 1

3-1-1

Siteplan Review - SP XXX-XX - COMMENTS.docx

XIV. SUBDIVISION – CONSULTANT CIRCULATION – MEMO.DOCX

Standard form letter to be used when providing a development package for review by the consultant doing a capital project.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

SUBDIVISION / DEVELOPMENT PLANS CIRCULATION
(EXTERNAL CONSULTANT REVIEW)

Date: Click here to select a date.

To: Click here to enter recipient name.
             Click here to enter company name.

From: Click here to enter your name.

Re: Click here to enter subdivision name.
             21T-Click here to enter 21T number
             Click here to enter related capital works project information.

Click here to enter recipient name.

Attached is the package for the above mentioned development.

At your earliest convenience, please review the information, identify any conflicts with your work in the area and return comments to me by no later than Click here to enter a date which is one week before the date required by Development.

Regards,

Click here to enter your name.

Design Engineering Technologist
City of Brampton, Planning & Infrastructure Services Department
Public Works Division, Capital Engineering & Construction Section
Capital Engineering, Flower City Community Campus
8850 McLaughlin Rd., Unit 2, Brampton, Ontario L6Y 5T1

(905)874-Click here to enter your extension.– work / (905)874-2505 – fax
Click here to enter your email address.

"Through spirited leadership and innovation, we take pride in providing efficient transportation infrastructure systems enriching the quality of life in our community."
cc: Click here to enter name(s) of those copied on this memo, i.e. the project manager.

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   **(3-1-1**
Last Updated 13JUL15 - PMZ

Pat Z.

XV.   SUBDIVISION - INTERNAL CIRCULATION – MEMO.DOCX

Standard form letter to be used when providing a subdivision package for review by other internal departments i.e. traffic, lighting…

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

SUBDIVISION / DEVELOPMENT PLANS CIRCULATION (INTERNAL)

Date: Click here to enter a date.

To: Click here to enter recipient name.
(Choose a department)

From: Click here to enter your name.

Re: Click here to enter subdivision name.
21T-Click here to enter number
DSRClick here to enter number

Click here to enter recipient name.

Attached is the package provided for the (Choose a department) for the above mentioned development plans.

Please review them at your earliest convenience and return any comments to me by Click here to enter a date which is one week before the date required by Development..

Regards,

Click here to enter your name.

Design Engineering Technologist
City of Brampton, Planning & Infrastructure Services Department
Public Works Division, Capital Engineering & Construction Section
Capital Engineering, Flower City Community Campus
8850 McLaughlin Rd., Unit 2, Brampton, Ontario L6Y 5T1

(905)874-Click here to enter your extension.– work / (905)874-2505 – fax
Click here to enter your email address.

"Through spirited leadership and innovation, we take pride in providing efficient transportation infrastructure systems enriching the quality of life in our community."

cc: Click here to enter name(s) of those copied on this memo, i.e. the project manager.

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Last Updated 13JUL15 - PMZ
(3-1-1)

Pat Z.

BRAMPTON
brampton.ca
Flower City

LATEST CITY LOGO / DEPARTMENT...

Date: Click here to enter a date.

To: Click here to enter planner's name., Planning & Development

From: Click here to enter design tech. name., Public Works

Re: Click here to enter development name.
                 Plan No.: 21T-Click here to enter #.   City No.: Click here to enter #.
                 Choose a number. Engineering Submission

Our File: DSRxx-xx-xx

_____

The Planning & Infrastructure Services, Public Works has reviewed the Choose a number. Engineering Submission for the above noted development with respect to the following items only:

1. The configuration of any arterial and/or collector roadways within the development area
   - *Comments*
2. All above ground grading and storm design data adjoining any existing arterial/collector City roadways
   - *Comments*
3. Any proposed or reconstructed structure adjoining an existing arterial/collector City roadway
   - *Comments*
4. Compliance with any ongoing or proposed Environmental Assessment Study affecting this development.
   - *Comments*

If you require additional information or have any questions please contact the undersigned.

Regards,

Type design Technologist Name.
Design Engineering Technologist
Planning & Infrastructure Services
Tel: 905 874-Type design Technologist Name.   Fax: 905 874-2505

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Template Updated – 13JUL15 – PMZ
Page **1** of **1**

3-1-1

Subdivision Review - DSRXX-XX-XX -COMMENTS.docx

221

Pat Z.

LATEST CITY LOGO / DEPARTMENT...

BRAMPTON
Flower City
brampton.ca

Capital Projects - Drawing Revisions Log

Street Name and Location.   File Number.   Bid Call Number.

Revision Date	Revision Number	Drawing Number	Description

SAMPLE ONLY

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Template last updated 13JUL15 – PMZ   Drawing Revisions Log.docx

311

Pat Z.

4) APPENDIX 4 –PROJECT CHECKLISTS

ALWAYS USE THE LATEST FROM ENGINEERING STANDARD SETUPS

I. IN HOUSE DESIGN CRITERIA.DOCX

To be completed by Technologist and confirmed by Project Manager

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT…

Capital Projects In House Design Criteria
Type Street Name and Location Here

DATE: *Click here to enter a date.*   **Designer** *Choose Project Designer.*
File Number: *xx-xxxx-xxx.*   **Project Manager** *Choose Project Manager.*

Standard Road Cross Section
Choose a standard.
Modifications to Standard…
Click here to enter any recommendations and/o
Street Hardware Details…

Sidewalks
Click here to enter width, material and location(
Multi-Use Pathway   *Interruptions to Ex*
Click here to enter width, material and location(
Killstrip
Click here to enter width, material and location(
Major Intersections…]
Pavement Structure
Choose an asphalt top. - Choose a depth. Speci
Choose an asphalt base. - Choose a depth. Spe
Granular 'A' - Choose a depth. Specify OTHER
Granular 'B' - Choose a depth. Specify OTHER
20mm Crusher Run Limestone - Choose a dep
50mm Crusher Run Limestone - Choose a dep
Posted Speed   Choose speed.
Design Speed   Choose speed.
Alignments based on
Click here to identify EA, or other source of refe
Storm Sewer Design   Choose a design year.

Outlets -- Req'd or Not.
 Click here to identify and quantify locations – o

Culverts / bridges – Req'd or Not.
Click here to identify and quantify locations – o

Property -- Req'd or Not.
 Click here to identify and quantify locations – o

Transit Stops – Req'd or Not.
Click here to identify and quantify locations – o

Traffic Signals – Req'd or Not.
Click here to identify and quantify locations – o

Lighting – Req'd or Not.
Click here to identify and quantify locations – o

Septic Systems & Water Wells – Req'd or No
 Click here to identify and quantify locations – o

Noise Attenuation – Req'd or Not.
 Click here to identify and quantify locations – o

The Corporation of The City o
2 Wellington Street West, I
Template Upd
Pag

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT…

Capital Projects In House Design Criteria
Type Street Name and Location Here

External Involvement (To Be Co-ordinated by Project Manager)

	Yes	No	
Conservation Authorities	☐	☐	Click here to enter text.
Approving Agencies	☐	☐	Click here to enter text.
Utilities	☐	☐	Click here to enter text.
Region of Peel	☐	☐	Click here to enter text.
Landscape Design	☐	☐	Click here to enter text.
Storm Water Report	☐	☐	Click here to enter text.
Culvert / Bridge Crossings	☐	☐	Click here to enter text.
Archaeological Assessment	☐	☐	Click here to enter text.
Geotechnical	☐	☐	Click here to enter text.
Subsurface Utilities (SUE)	☐	☐	Click here to enter text.

COMMENTS: Click here to include items not covered yet – or remove.

Choose Project Manager.

Sr. Project Engineer	Date	Signature
John Fantin		
Supervisor, Engineering	Date	Signature
Tim Kocialek		
Manager, Engineering	Date	Signature

SAMPLE ONLY

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   311
Template Updated 12APR16 – PMZ
Page **2** of **2**   Capital Projects - InHouse DESIGN CRITERIA.docx

Pat Z.

BRAMPTON
Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT...

Capital Project Designs Completed In House – Kickoff / 30% Checklist

Type Street Name and Location Here

DATE: *Click here to enter a date.*_____   *Choose Project Designer.*

Choose Project Manager.

Pre-Design Meeting / Kickoff

Yes	No	N/A	
☐	☐	☐	Preliminary Design Criteria Review

_____

_____

| ☐ | ☐ | ☐ | Scope of Project Review |

_____

_____

30% Checklist

Yes	No	N/A	
☐	☐	☐	Design Criteria confirmed
☐	☐	☐	Project Scope confirmed
☐	☐	☐	Design Brief to include criteria and assumptions, typical section, turning lanes and tapers, transit features, sidewalks and multi-use path
☐	☐	☐	Base plan showing Topographic survey information complete including all existing features
☐	☐	☐	PUCC Identified existing underground services shown on plans i.e. vertical and horizontal location, size, type...
☐	☐	☐	List of other stakeholder issues i.e. utilities, transit, Region, Conservation...
☐	☐	☐	Existing property Plans, Property requirement plans, M-Plans, IPRP's
☐	☐	☑	Plan and profile drawing of preferred alternative
☐	☐	☐	MTO, Region Encroachment, Location and Description of any environmental impact and the required mitigation measures identified (where applicable)
☐	☐	☐	RFPs for Geo-Technical Report, Landscape work and Structures work completed (where applicable)
☐	☐	☐	Meeting with consultant to confirm 30% design elements (where applicable)
☐	☐	☐	30% Design circulation of letter and drawings
☐	☐	☐	Design Criteria confirmed

COMMENTS: *Click here to elaborate on selections with your comments.*

Reviewed By: *Click here to enter Name.*
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

_____   Date
Verified By – Designer [Signature]

_____   Date
Released By – Engineering Supervisor [Signature]

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   [3-1-1]
Template Updated 13JUL15 – PMZ
Page **1** of **1**   *Capital Projects - InHouse Design - Kickoff and 30 Checklist.docx*

Pat Z.

III.   IN HOUSE DESIGN – 60 CHECKLIST.DOCX

These items should be completed by the 60% circulation stage.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Capital Project Designs Completed In House – 60% Checklist

Type Street Name and Location Here

DATE: *Click here to enter a date.*   *Choose Project Designer.*

Choose Project Manager.

60% Checklist

Yes	No	N/A	
☐	☐	☐	Site walk with PM to confirm the final design alternative prior to finalizing design
☐	☐	☐	Completion of 30% review comments, as directed by PM, in response to returns from 30% circulation
☐	☐	☐	Horizontal and Vertical Alignments confirmed
☐	☐	☐	Transportation elements confirmed i.e. turning movements, turn lanes and tapers, transit locations
☐	☐	☐	**Plan and Profile drawing sheets set up
☐	☐	☐	**Removals drawing sheets set up
☐	☐	☐	**Dimensions drawing sheets set up
☐	☐	☐	**Typical Sections / Details drawing sheets set up
☐	☐	☐	**Pavement Markings drawing sheets and base plan set up for Traffic Section
☐	☐	☐	**Title page essentially complete, drawing list sheet set up
☐	☐	☐	Design (digital) provided to Traffic Section for Traffic Signals design
☐	☐	☐	Design (digital) provided to Lighting Section for Street Light design
☐	☐	☐	Design (digital) provided to selected Landscape consultant
☐	☐	☐	Design (digital) provided to selected Structures consultant (where applicable)
☐	☐	☐	Utility relocation meeting request, provide individual plans for each utility, including Region of Peel, identifying potential conflict areas
☐	☐	☐	Design (digital) provided to utility stakeholders for relocation planning and design (where applicable)
☐	☐	☐	Preliminary cross sections at 20m intervals, including critical sections at driveways and other potentially problematic areas
☐	☐	☐	Storm drainage design essentially complete and ready for approval
☐	☐	☐	Designer's form of tender quantities essentially complete
☐	☐	☐	Geo-Technical Report Completed
☐	☐	☐	MOE, MTO, CN, TRCA, CVCA, MNR etc. Applications, as required, submitted
☐	☐	☐	60% Design Circulation of letter and drawings
☐	☐	☐	Final Bridge Peer review completed (where applicable)

*** Drawing numbers are to be assigned as drawings are created. Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers.*
[SEE 'NUMBERING DRAWING SHEETS' SECTION IN OUR MANUAL PAGE 110]

COMMENTS: Click here to elaborate on selections with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   [3·1·1]
Template Updated 09NOV15 – PMZ
Page **1** of **1**   *Capital Projects · InHouse Design · 60 Checklist.docx*

Pat Z.

IV.   IN HOUSE DESIGN – 90 CHECKILIST.DOCX

These Items should be completed by the 90% circulation stage

BRAMPTON
brampton.ca
Flower City

LATEST CITY LOGO /
DEPARTMENT...

Capital Project Designs Completed In House – 90% Checklist

Type Street Name and Location Here

DATE: *Click here to enter a date.*   *Choose Project Designer.*

                                                Choose Project Manager.

90% Checklist

Yes	No	N/A	
☐	☐	☐	Completion of 60% review comments, as directed by PM, in response to returns from 60% circulation
☐	☐	☐	All outstanding requirements from the 60% stage have been completed
☐	☐	☐	Tender documents and tender quantities are essentially complete for Purchasing review
☐	☐	☐	Cost estimate and cost sharing summary essentially complete for Purchasing review
☐	☐	☐	Pre-Tender approval of design drawings, details and tender documents
☐	☐	☐	Cut and fill quantities / earthworks essentially complete
☐	☐	☐	MOE, MTO, CN, TRCA, CVCA, MNR etc. Applications, as required, submitted / received
☐	☐	☐	Design drawings shall reflect all comments from City, Region, TRCA, Utilities etc., to their satisfaction
☐	☐	☐	**Title page and Index page
☐	☐	☐	**Plan & Profile drawings
☐	☐	☐	**Details drawings
☐	☐	☐	**Removals drawings
☐	☐	☐	**Dimensions drawings
☐	☐	☐	**Pavement Markings & Signage drawings
☐	☐	☐	**Traffic Signals drawings
☐	☐	☐	**Street Lighting drawings
☐	☐	☐	**Landscape drawings
☐	☐	☐	**Structures drawings
☐	☐	☐	Utilities (Hydro)
☐	☐	☐	Region drawings
☐	☐	☐	90% design circulation of letter and drawings

*** Drawing numbers are to be assigned as drawings are created. Provide the Intermediate Engineering Technician with a small copy of each drawing to obtain the correct numbers. [SEE 'NUMBERING DRAWING SHEETS' SECTION IN OUR MANUAL PAGE 110]*

COMMENTS: *Click here to elaborate on selections with your comments.*

Reviewed By: *Click here to enter Name.*
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-*xxxx*

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   ⟨3-1-1⟩
Template Updated 09NOV15 – PMZ
Page **1** of **1**   *Capital Projects - InHouse Design - 90 Checklist.docx*

226

Pat Z.

V. DESIGN CIRCULATION-COMMENTS.XLSX

Form to be provided to circulated stakeholders, used to log comments and returned to Project Coordinator (Shamsul). One spreadsheet containing all comments is to be completed, prior to next design circulation.

Pat Z.

BRAMPTON Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT…

Capital Project Designs Completed In House – Checklist

Type Street Name and Location Here   SELECT STAGE

DATE: Click here to enter a date.   SELECT DESIGNER.

SELECT PROJECT MANAGER.

Final Submission Checklist

Yes	No	N/A	
☐	☐	☐	Completion of ALL review comments, as directed by PM, in response to SELECT PREVIOUS STAGE.
☐	☐	☐	All outstanding SELECT PREVIOUS STAGE.have been completed
☐	☐	☐	Tender documents and tender quantities are complete
☐	☐	☐	Required reports are complete and submitted i.e. Geo Tech
☐	☐	☐	External components are complete and submitted i.e. contracted works
☐	☐	☐	Required Applications submitted / received i.e. MOE, MTO, TRCA etc.
☐	☐	☐	Final Cross Sections complete
☐	☐	☐	**Title page and Index page
☐	☐	☐	**Plan & Profile drawings
☐	☐	☐	**Details drawings
☐	☐	☐	**Removals drawings
☐	☐	☐	**Dimensions drawings
☐	☐	☐	**Pavement Markings & Signage drawings
☐	☐	☐	**Traffic Signals drawings
☐	☐	☐	**Street Lighting drawings
☐	☐	☐	**Landscape drawings
☐	☐	☐	**Structures drawings
☐	☐	☐	Utilities (Hydro)
☐	☐	☐	Region drawings

*** Drawing numbers are to be assigned as*
Engineering Technician with a small copy of
[SEE 'NUMBERING DRAWING SHEETS' SECTION

Digital Files Checklist

Present	Not Present	Not Applicable	
☐	☐	☐	Design Criteria
☐	☐	☐	Title Page
☐	☐	☐	Removals
☐	☐	☐	New Construction
☐	☐	☐	Traffic Control
☐	☐	☐	Street Lighting
☐	☐	☐	Dimensions
☐	☐	☐	InRoads (Alignments – AL Surfaces – DTM)

The Corporation of The C
2 Wellington Street We
Template U
P

BRAMPTON Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT…

Capital Project Designs Completed In House - Checklist

Type Street Name and Location Here   SELECT STAGE

Hard Copy Checklist

Present	Not Applicable	Not Present	
☐	☐	☐	Storm Design Sheets [Complete, Stamped & Sealed by Consultant (S&S)]
☐	☐	☐	Removals Drawing(s) [City of Brampton visual standard, S&S]
☐	☐	☐	New Construction Plan & Profile Drawing(s) [City visual standard, S&S]
☐	☐	☐	Traffic Signals Drawings [City visual standard, S&S, Signed by Traffic Manager]
☐	☐	☐	Street Lighting Drawing(s) [City visual standard, S&S]
☐	☐	☐	Dimensions Drawing(s) [City visual standard, S&S]
☐	☐	☐	Structural / Culvert Drawing(s) [City visual standard, S&S]
☐	☐	☐	Landscaping Drawing(s) [City visual standard, S&S]
☐	☐	☐	Pavement Markings Drawing(s) [City visual standard, S&S]
☐	☐	☐	Cross Section Set [Individual sections with Borders, on 11x17" MAX, 1:200H 1:100V]
☐	☐	☐	Watermain Drawing(s) [Region of Peel visual standard, S&S]
☐	☐	☐	Sanitary Drawing(s) [Region of Peel visual standard, S&S]

Design Handover Package   [CD & Hard copy quantities to be specified by Construction Group]

☐	☐	☐	Hard copies of SELECT STAGE drawings
☐	☐	☐	Hard copy of all associated drawings, reports, approvals…
☐	☐	☐	Design Handover Checklist complete and signed (Scan & include on CDs)
☐	☐	☐	CDs created to include all items on the Handover Checklist

COMMENTS:Click here to type additional explanations and / or comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   (3·1·1)
Template Updated 09DEC15 – PMZ
Page **2** of **2**   *Capital Projects - InHouse Design - IFT-IFC Package Checklist.docx*

Pat Z.

VII.   CONSULTANT – DESIGN CRITERIA.DOCX

To be completed by Consultant and confirmed by Project Manager

---

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT…

Capital Projects By Consultant Design Criteria
Type Street Name and Location Here

DATE: *Click here to enter a date.*   **Consultant**   *Click here to enter Name.*
File Number: *xx-xxxx-xxx.*   **Project Manager**   *Click here to enter Name.*

Standard Road Cross Section
Choose a standard.

Modifications to Standard…
Click here to enter any recommendations and/or changes to the standard identified above.

Street Hardware Details…

Sidewalks
Click here to enter width, material and location(s). [ie]

Multi-Use Pathway   *Interruptions to Existing*
 Click here to enter width, material and location(s). [ie]

Killstrip
Click here to enter width, material and location(s). [ie]
Major Intersections…]

Pavement Structure
Choose an asphalt top. - Choose a depth. Specify OTH
Choose an asphalt base. - Choose a depth. Specify OT
Granular 'A' - Choose a depth. Specify OTHER depth
Granular 'B' - Choose a depth. Specify OTHER depth
20mm Crusher Run Limestone - Choose a depth. S
50mm Crusher Run Limestone - Choose a depth. S
Posted Speed   Choose speed.
Design Speed   Choose speed.
Alignments based on
Click here to identify EA, or other source of reference,
Storm Sewer Design   Choose a design year.

Outlets -- Req'd or Not.
 Click here to identify and quantify locations – or remo

Culverts / bridges – Req'd or Not.
Click here to identify and quantify locations – or remo

Property -- Req'd or Not.
 Click here to identify and quantify locations – or remo

Transit Stops – Req'd or Not.
Click here to identify and quantify locations – or remo

Traffic Signals – Req'd or Not.
Click here to identify and quantify locations – or remo

Lighting – Req'd or Not.
Click here to identify and quantify locations – or remo

Septic Systems & Water Wells – Req'd or Not.
Click here to identify and quantify locations – or remo

Noise Attenuation – Req'd or Not.
Click here to identify and quantify locations – or remo

The Corporation of The City of Brampto
2 Wellington Street West, Brampto
Template Updated 1
Page **1** of

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT…

Capital Projects By Consultant Design Criteria
Type Street Name and Location Here

External Involvement (To Be Co-ordinated by Project Manager)

	Yes	No	
Conservation Authorities	☐	☐	Click here to enter text.
Approving Agencies	☑	☐	Click here to enter text.
Utilities	☐	☐	Click here to enter text.
Region of Peel	☐	☐	Click here to enter text.
Landscape Design	☐	☐	Click here to enter text.
Storm Water Report	☐	☐	Click here to enter text.
Culvert / Bridge Crossings	☐	☐	Click here to enter text.
Archaeological Assessment	☐	☐	Click here to enter text.
Geotechnical	☐	☐	Click here to enter text.
Subsurface Utilities (SUE)	☑	☐	Click here to enter text.

COMMENTS: Click here to include items not covered yet – or remove.

Choose Project Manager.

	Date	Signature
Sr. Project Engineer		
John Fantin		
Supervisor, Engineering	Date	Signature
Tim Kocialek		
Manager, Engineering	Date	Signature

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2
Template Updated 12APR16 – PMZ
Page **2** of 2

Capital Projects - Consultant - DESIGN CRITERIA.docx

Pat Z.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Capital Project – Review of Designs Completed by Consultants

Type Street Name and Location Here

DATE: Click here to enter a date.   *30 % CADD Review*

Click here to enter Consultant details.

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant   Non Compliant   N/A

☐ ☐ ☐ File Structure Compliance **MANDATORY**
        [As per the requirements outlined in the Engineering Design Procedures Manual]
☐ ☐ ☐ Microstation Format **MANDATORY**
        [As per the requirements outlined in Appendix A V8i]
☐ ☐ ☐ GeoReferenced **MANDATORY**
        [Attach Truebram using 'Coincident', and 'Coincident-World' if necessary, to determine if the drawings are properly geo-referenced]
☐ ☐ ☐ Accurate 3D plan elements **MANDATORY**
        [Existing survey, designed roadway and stormpond elements must be Geospatially correct (XYZ)]
☐ ☐ ☐ Level compliance **MANDATORY**
        [As per the requirements outlined in the Engineering Design Procedures Manual]
☐ ☐ ☐ No Viewport usage in contract drawings. Each numbered drawing is to be its own drawing file, named using the sheet and drawing numbers.
        [Viewports of multiple numbered sheets are not permitted]

Digital Files Checklist

Present   Not Present   N/A

☐ ☐ ☐ Design Criteria
☐ ☐ ☐ Title Page
☐ ☐ ☐ Removals
☐ ☐ ☐ New Construction
☐ ☐ ☐ Property Plan

Other File Checks

Compliant   Non Compliant   N/A

☐ ☐ ☐ Hard Copy Drawings
        [Present, City of Brampton visual standard, Stamped and Sealed]

COMMENTS: Click here to elaborate on selections with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

THIS PACKAGE HAS BEEN FOUND TO BE COMPLETE AND COMPLIANT	
Verified By – Designer [Signature]	Date
Released By – Engineering Supervisor [Signature]	Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2 3-1-1
Template Updated 24NOV15 – PMZ
Page **1** of **1**   *Capital Projects - Review of Designs Completed by Consultants -30.docx*

Pat Z.

BRAMPTON
brampton.ca Flower City

LATEST CITY LOGO / DEPARTMENT...

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here

DATE: *Click here to enter a date.*   **60 % CADD Review**

Click here to enter Consultant details.

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant | Non Compliant | N/A

☐ ☐ ☐ File Structure Compliance **MANDATORY**
[As per the requirements outlined in the Engineering Design Procedures Manual]

☐ ☐ ☐ Microstation Format **MANDATORY**

☐ ☐ ☐ GeoReferenced **MANDATORY**
[Attach Truebram using 'Coincident', and 'Coincident-World' if necessary, to determine if the drawings are properly geo-referenced]

☐ ☐ ☐ Accurate 3D plan elements **MANDATORY**
[Existing survey, designed roadway and stormpond elements must be Geospatially correct (XYZ)]

☐ ☐ ☐ Level compliance **MANDATORY**
[As per the requirements outlined in Appendix A V8i]

☐ ☐ ☐ InRoads files
[As per the requ...]

☐ ☐ ☐ Landscape ar...
[Drawing numb...]

☐ ☐ ☐ **Assign dra...

☐ ☐ ☐ Traffic drawi...

☐ ☐ ☐ Contract dra...
[Base plate may...
shall be referen...]

☐ ☐ ☐ No Missing re...
[All files referenc...]

☐ ☐ ☐ No nested re...
[Nested files are...]

☐ ☐ ☐ No Viewport...
drawing file,...
[Viewports of m...]

☐ ☐ ☐ No unused re...
[No file is to be...]

*** Drawing numbers are to be...
Engineering Technician with a s...
[SEE 'NUMBERING DRAWING SHE...*

The C...
2 Wel...

BRAMPTON
brampton.ca Flower City

LATEST CITY LOGO / DEPARTMENT...

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here

Digital Files Checklist

Present | Not Present | N/A

☐ ☐ ☐ Design Criteria
☐ ☐ ☐ Title Page
☐ ☐ ☐ Removals
☐ ☐ ☐ New Construction
☐ ☐ ☐ Traffic Control
☐ ☐ ☐ Street Lighting
☐ ☐ ☐ Dimensions
☐ ☐ ☐ InRoads (Alignments – ALG, Surfaces – DTM)
☐ ☐ ☐ Cross Sections
☐ ☐ ☐ Structural
☐ ☐ ☐ Culverts
☐ ☐ ☐ Landscaping
☐ ☐ ☐ Pavement Markings
☐ ☐ ☐ Staging
☐ ☐ ☐ Watermain (Peel)
☐ ☐ ☐ Sanitary (Peel)
☐ ☐ ☐ Property Plan

Other File Checks

Compliant | Non Compliant | N/A

☐ ☐ ☐ Storm Design Sheets
[Present, Essentially Complete]

☐ ☐ ☐ Hard Copy Drawings
[Present, City of Brampton visual standard, Stamped and Sealed]

COMMENTS: Click here to elaborate with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

THIS PACKAGE HAS BEEN FOUND TO BE COMPLETE AND COMPLIANT
....
Verified By – Designer [Signature]   Date
....
Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3-1-1
Template Updated 24NOV15 – PMZ
Page **2** of 2   *Capital Projects - Review of Designs Completed by Consultants-60.docx*

SAMPLE ONLY

231

Pat Z.

BRAMPTON
brampton.ca
Flower City

LATEST CITY LOGO / DEPARTMENT…

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here   SELECT STAGE

DATE: *Click here to enter a date.*

Click here to enter Consultant details.

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant   Non   N/A
            Compliant

☐ ☐ ☐ File Structure Compliance **MANDATORY**
         [As per the requirements outlined in the Engineering Design Procedures Manual]
☐ ☐ ☐ Microstation Format **MANDATORY**
☐ ☐ ☐ GeoReferenced **MANDATORY**
         [Attach Truebram using 'Coincident' and 'Coincident World' if necessary, to determine if the drawing
         are properly geo-referenced]
☐ ☐ ☐ Accurate 3D plan ele
         [Existing survey, designe
☐ ☐ ☐ Level compliance **M**
         [As per the requirements
☐ ☐ ☐ InRoads files compa
         [As per the requirements
☐ ☐ ☐ Landscape and stru
         [Titleblock base to be ut
         numbers to be assigned
☐ ☐ ☐ **Assign drawing n
☐ ☐ ☐ Traffic drawing num
☐ ☐ ☐ Contract drawings
         [Base plate may be refe
         shall be referenced]
☐ ☐ ☐ No Missing referenc
         [All files referenced to th
☐ ☐ ☐ No nested reference
         [Nested files are not perr
☐ ☐ ☐ No Viewport usage
         drawing file, named
         [Viewports of multiple nu
☐ ☐ ☐ No unused referenc
         [No file is to be reference

*** Drawing numbers are to be assigne
Engineering Technician with a small cc
[SEE 'NUMBERING DRAWING SHEETS' SE*

The Corporation
2 Wellington S
Temp

SAMPLE ONLY

BRAMPTON
brampton.ca
Flower City

LATEST CITY LOGO / DEPARTMENT…

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here   SELECT STAGE

Digital Files Checklist

Present	Not Present	Not Applicable		Present	Not Present	Not Applicable	
☐	☐	☐	Design Criteria	☐	☐	☐	Cross Sections
☐	☐	☐	Title Page	☐	☐	☐	Structural / Culverts
☐	☐	☐	Removals	☐	☐	☐	Landscaping
☐	☐	☐	New Construction	☐	☐	☐	Pavement Markings
☐	☐	☐	Traffic Control	☐	☐	☐	Staging
☐	☐	☐	Street Lighting	☐	☐	☐	Watermain (Peel)
☐	☐	☐	Dimensions	☐	☐	☐	Sanitary (Peel)
☐	☐	☐	InRoads (Alignments – ALG, Surfaces – DTM)	☐	☐	☐	Property Plan

Hard Copy Checklist

Present	Not Applicable	Not Present	
☐	☐	☐	Storm Design Sheets [Complete, Stamped & Sealed by Consultant (S&S)]
☐	☐	☐	Removals Drawing(s) [City of Brampton visual standard, S&S]
☐	☐	☐	New Construction Plan & Profile Drawing(s) [City visual standard, S&S]
☐	☐	☐	Traffic Signals Drawings [City visual standard, S&S, Signed by Traffic Manager]
☐	☐	☐	Street Lighting Drawing(s) [City visual standard, S&S]
☐	☐	☐	Dimensions Drawing(s) [City visual standard, S&S]
☐	☐	☐	Structural / Culvert Drawing(s) [City visual standard, S&S]
☐	☐	☐	Landscaping Drawing(s) [City visual standard, S&S]
☐	☐	☐	Pavement Markings Drawing(s) [City visual standard, S&S]
☐	☐	☐	Cross Section Set [Individual sections with Borders, on 11x17" MAX, 1:200H 1:100V]
☐	☐	☐	Watermain Drawing(s) [Region of Peel visual standard, S&S]
☐	☐	☐	Sanitary Drawing(s) [Region of Peel visual standard, S&S]

COMMENTS: Click here to elaborate on selections with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

THIS PACKAGE HAS BEEN FOUND TO BE COMPLETE AND COMPLIANT
....
Verified By – Designer [Signature]   Date
....
Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   C3-1-1
Template Updated 09DEC15 – PMZ
Page **2** of **2**   *Capital Projects - Review of Designs Completed by Consultants-90-100.docx*

Pat Z.

BRAMPTON Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT...

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here   SELECT STAGE

DATE: *Click here to enter a date.*

Click here to enter Consultant details.

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant | Non Compliant | N/A

☐ ☐ ☐ File Structure Compliance **MANDATORY**
[As per the requirements outlined in the Engineering Design Procedures Manual]
☐ ☐ ☐ Microstation Format **MANDATORY**
☐ ☐ ☐ GeoReferenced **MANDATORY**
[Attach Truebram using 'Coincident', and 'Coincident-World' if necessary, to determine if the drawings are properly geo-referenced]
☐ ☐ ☐ Accurate 3D plan elements **MANDATORY**
[Existing survey, designed roadway and stormpond elements must be Geospatially correct (XYZ)]
☐ ☐ ☐ Level compliance **MANDATORY**
[As per the requirements outlined in Appendix A V8i]
☐ ☐ ☐ InRoads files co...
[As per the requirem...
☐ ☐ ☐ Landscape and...
[Titleblock base to... numbers to be ass...
☐ ☐ ☐ **Assign drawi...
☐ ☐ ☐ Traffic drawing...
☐ ☐ ☐ Contract drawi...
[Base plate may b... shall be reference...
☐ ☐ ☐ No Missing ref...
[All files referenced...
☐ ☐ ☐ No nested refe...
[Nested files are no...
☐ ☐ ☐ No Viewport us...
drawing file, na...
[Viewports of multi...
☐ ☐ ☐ No unused ref...
[No file is to be ref...

***Drawing numbers are to be as...
Engineering Technician with a sm...
[SEE 'NUMBERING DRAWING SHEET...

The Corp...
2 Welling...

BRAMPTON Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT...

Review of Capital Project Designs Completed by Consultants

Type Street Name and Location Here   SELECT STAGE

Digital Files Checklist

Present | Not Present | Not Applicable

☐ ☐ ☐ Design Criteria
☐ ☐ ☐ Title Page
☐ ☐ ☐ Removals
☐ ☐ ☐ New Construction
☐ ☐ ☐ Traffic Control
☐ ☐ ☐ Street Lighting
☐ ☐ ☐ Dimensions
☐ ☐ ☐ InRoads (Alignments – ALG, Surfaces – DTM)

☐ ☐ ☐ Cross Sections
☐ ☐ ☐ Structural / Culverts
☐ ☐ ☐ Landscaping
☐ ☐ ☐ Pavement Markings
☐ ☐ ☐ Staging
☐ ☐ ☐ Watermain (Peel)
☐ ☐ ☐ Sanitary (Peel)
☐ ☐ ☐ Property Plan

Hard Copy Checklist

Present | Not Applicable | Not Present

☐ ☐ ☐ Storm Design Sheets [Complete, Stamped & Sealed by Consultant (S&S)]
☐ ☐ ☐ Removals Drawing(s) [City of Brampton visual standard, S&S]
☐ ☐ ☐ New Construction Plan & Profile Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Traffic Signals Drawings [City visual standard, S&S, Signed by Traffic Manager]
☐ ☐ ☐ Street Lighting Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Dimensions Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Structural / Culvert Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Landscaping Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Pavement Markings Drawing(s) [City visual standard, S&S]
☐ ☐ ☐ Cross Section Set [Individual sections with Borders, on 11x17" MAX, 1:200H 1:100V]
☐ ☐ ☐ Watermain Drawing(s) [Region of Peel visual standard, S&S]
☐ ☐ ☐ Sanitary Drawing(s) [Region of Peel visual standard, S&S]

COMMENTS: Click here to elaborate on selections with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

---
THIS PACKAGE HAS BEEN FOUND TO BE COMPLETE AND COMPLIANT

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   311
Template Updated 09DEC15 – PMZ
Page **2** of **2**   *Capital Projects - Review of Designs Completed by Consultants-IFT-IFC.docx*

233

Pat Z.

XII. DESIGN HANDOVER CD CHECKLIST.DOCX

Checklist for CD provided at 'Issued for Construction' stage and 'Issued for As Construction' stage.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

CITY OF BRAMPTON
DIGITAL DRAWINGS CHECKLIST

☐ **ISSUED FOR CONSTRUCTION HANDOVER**

☐ **PRE AS-CONSTRUCTED HANDOVER**

FILE # Design #.   BID CALL # Purchasing #.

LOCATION Street / Project Name and Description.

○ Appendix 'A' package
○ Title Page dgn file*
○ Drawing List Page dgn file
○ Removals dgn file(s)*
○ New Construction dgn files*
○ Traffic Control dgn files* (City and Peel Region**)
○ Street Lighting dgn files*
○ Dimensions dgn file(s)*
○ Inroads (Alignments, DTM)
○ Cross Sections dgn file
○ Structural** dgn file(s)*

○ Culverts dgn file(s)*
○ Landscaping dgn file(s)*
○ Pavement Markings dgn file(s)*
○ Staging Plan**
○ Watermain / Sanitary dgn file(s)** (Peel Region)
○ Survey Surface (dgn with OG triangles/contours)
○ PDF set of Issued for Construction drawings
○ Approved Property Plan dgn file and layout text file provided by Surveys – Surveys to initial here _____

SAMPLE ONLY

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

* All reference files must be present

** As applicable

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3-1-1
Template Updated 16MAR16 – PMZ
Page **1** of **1**   Capital Projects - Design Handover CD Checklist.docx

---

234

Pat Z.

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Capital Project - Review of As Constructed work

Type Street Name and Location Here

DATE: *Click here to enter a date.*   *As Constructed Review*

Click here to enter Consultant details.

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant Non Compliant N/A

- ☐ ☐ ☐ Compliance to *Drafting Requirements for "As Constructed" Drawings.*
  [As per the requirements outlined in the Engineering Design Procedures Manual]
- ☐ ☐ ☐ Drawings reflect redline drawing marked up changes.
- ☐ ☐ ☐ GeoReferenced **MANDATORY**
  [Attach Truebram using 'Coincident', and 'Coincident-World' if necessary, to determine if the drawings are properly geo-referenced]
- ☐ ☐ ☐ Accurate 3D plan elements **MANDATORY**
  [Existing survey, designed roadway and stormpond elements must be Geospatially correct (XYZ)]
- ☐ ☐ ☐ Level compliance **MANDATORY**
  [As per the requirements outlined in Appendix A V8i]
- ☐ ☐ ☐ Microstation v8i CADD format **MANDATORY**
- ☐ ☐ ☐ Provide Traffic section with their digital and hard copy traffic drawings for review.
  [Traffic requires that the cells for proposed information be replaced with cells for existing information]
- ☐ ☐ ☐ Provide Lighting section with their digital & hard copy lighting drawings for review.
  [Lighting does an onsite verification of the installation]
- ☐ ☐ ☐ Provide Pavement section with their digital & hard copy pavement marking & signage drawings for review.   [If Applicable]
- ☐ ☐ ☐ Provide Structures section with their digital & hard copy structural drawings for review. [If Applicable]
- ☐ ☐ ☐ Contract drawings reference the strip plans & strip profile, not merged.
  [Base plate may be referenced or merged to the contract drawings, but, plan & profile information shall be referenced]
- ☐ ☐ ☐ No Missing reference files in contract drawings.
  [All files referenced to the contract drawing shall be present. i.e. No references are to appear red.]
- ☐ ☐ ☐ No nested reference files in contract drawings.
  [Nested files are not permitted, i.e. with 'live nesting'; the reference of a reference is displayed]
- ☐ ☐ ☐ No Viewport usage in contract drawings. Each numbered drawing is to be its own drawing file, named using the sheet & drawing numbers provided for the sheet.
  [Viewports of multiple numbered sheets are not permitted]
- ☐ ☐ ☐ No unused reference files in contract drawings.
  [No file is to be referenced to a sheet drawing that is not required for, & displayed in, the drawing]

Other File Checks

Compliant Non Compliant N/A

- ☐ ☐ ☐ Storm Design Sheets
  [Present, Stamped and Sealed]
- ☐ ☐ ☐ Hard Copy Drawings
  [Present, City of Brampton visual standard, Stamped and Sealed]

COMMENTS: Click here to elaborate with your comments.
Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

---

THIS PACKAGE HAS BEEN FOUND TO BE COMPLETE AND COMPLIANT

Verified By – Designer [Signature]   Date

Released By – Engineering Supervisor [Signature]   Date

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   [3-1-1]
Template Updated 24NOV15 – PMZ
Page **1** of **1**   *Capital Projects - Review of As Constructed Completed by Consultants.docx*

235

Pat Z.

BRAMPTON
Flower City
brampton.ca

LATEST CITY LOGO /
DEPARTMENT...

Development Project - Review of As Constructed work

Development Name and Location Here

DATE: Click here to enter a date.   **As Constructed Review**

MANDATORY – Indicates an absolute requirement for compliance – NO Discussion

Digital Files Compliance

Compliant	Non Compliant	N/A	
☐	☐	☐	Compliance to *Drafting Requirements for "As Constructed" Drawings.*
			[As per the requirements outlined in the Development Digital Submissions Requirements Manual]
☐	☐	☐	Drawings reflect redline drawing marked up changes.
☐	☐	☐	** GeoReferenced **MANDATORY**
			[Attach Truebram using 'Coincident', & 'Coincident-World' if necessary, to determine if the drawings are properly geo-referenced]
☐	☐	☐	**Peel Group Level compliance **MANDATORY**
			[As per the requirements outlined in the Development Digital Submissions Requirements Manual]
☐	☐	☐	CAD platform compatible with Microstation v8i CADD format **MANDATORY**
			[As long as you can open it with Microstation, it is CAD compliant]
☐	☐	☐	Storm Pond has 3D elements.
			[If present, the pond limits and contoured levels must be Geospatially correct]
☐	☐	☐	Drawings file names as per assigned City drawing numbers.
			[Titleblocks, CAD file names and PDF file names are all to reflect the drawing number]
☐	☐	☐	No Missing reference files in the sheet drawings.
			[All files referenced to the contract drawing shall be present. i.e. No references are to appear red.]
☐	☐	☐	No unused reference files in the sheet drawings.
			[No file is to be referenced to a sheet drawing that is not required for, & displayed in, the drawing]

Other File Checks

☐	☐	☐	Storm Design Sheets
			[Present, Stamped and Sealed]
☐	☐	☐	Hard Copy Drawings
			[Present, City of Brampton visual standard, Stamped and Sealed]

COMMENTS: Click here to elaborate with your comments.

Reviewed By: Click here to enter Name.
City of Brampton, Planning & Infrastructure Services, Public Works, 905-874-xxxx

_____
Verified By – Designer [Signature]   Date

_____
Released By – Engineering Supervisor [Signature]   Date

** GeoReferencing and Level Compliance are MANDATORY only on the base plan.
Sheet drawings need not comply with either of these as long as there is a separate base plan which is georeferenced
with the correct Peel Group levels, within the submitted development limits, as per the requirements outlined in the
Development Digital Submissions Requirements Manual.

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   311
Template Updated 17SEP15 – PMZ
Page **1** of **1**
Development CADD review .docx

Pat Z.

5) APPENDIX 5 - EXAMPLES

I.   REALTY PLANS

IPRP - PORTRAIT

Pat Z.

238

Pat Z.

Pat Z.

II.   DESIGN CRITERIA CHECKLIST

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Capital Projects In House Design Criteria

Collector Street – Arterial Rd A to Arterial Rd B

DATE:	25 February 2013	**Designer**	D. Designer
File Number: 13-3251-213		**Project Manager**	R. Engineer

Standard Road Cross Section

205 - Arterial Road 15.0m Pavement on 36.0m R.O.W.

Modifications to Standard...

5m Centre Lane / Raised Median

Street Hardware Details...

Sidewalks
1.5m Concrete - North Side Only

Multi-Use Pathway
3.0m Asphalt - South Side Only

Killstrip
1.0m Concrete – Both Sides

Pavement Structure
HL3 Asphalt - 50mm
HL 8 Asphalt - OTHER >> 100mm
Granular 'A' - 150mm
Granular 'B' - 450mm

Posted Speed	60 kph
Design Speed	80 kph
Alignments based on...EA11-3251-213 Collect
Storm Sewer Design	10 Year

Outlets
Multiple Required Outlets required at two

Culverts / bridges
One Required Bridge required, between
(Intermittent flow, seasonal warn
27m E of exist location, Existing in
REGULATED HABITAT AREA FOR R

Property Required?
Multiple Required 11 Properties impacted
review / approval

Transit Stops Required?
Multiple Required Twelve locations noted

Traffic Signals?
Multiple Required Signals required at Loc

Lighting Required?
Multiple Required No existing illumination

Septic Systems & Water Wells
None Required

Noise Attenuation
None Required Not Warranted or to be p

The Corporation of The Cit
2 Wellington Street Wes
Pa

BRAMPTON
brampton.ca **Flower City**

LATEST CITY LOGO / DEPARTMENT...

Capital Projects In House Design Criteria

Collector Street – Arterial Rd A to Arterial Rd B

External Involvement (To Be Co-ordinated by Project Manager)

	Yes	No	
Conservation Authorities	☑	☐	Ministry of Natural Resources Work Permit
			Ministry of Environment
			Endangered Species Act Permit
Approving Agencies	☐	☑	Click here to enter text.
Utilities	☑	☐	Hydro One Brampton
			Bell Canada
			Enbridge Gas (East side of Local Rd)
Region of Peel	☑	☐	2014 – 375mm sanitary along Thru Rd (Collector St to Caledon Rd 14-2113)
			A 400mm watermain is planned along the south of Thru Rd connecting to the future Collector St watermain
Landscape Design	☑	☐	RFP Required
Storm Water Report	☐	☑	Provided as part of EA
Culvert / Bridge Crossings	☑	☐	RFP Required
Archaeological Assessment	☑	☐	Outside of existing R.O.W
Geotechnical	☑	☐	RFP Required
Hydrovac	☑	☐	RFP Required (Sensitive areas around Enbridge plant)

COMMENTS: Two species at risk identified (Butternut and Harts Tongue Fern)
As per Geotech Report pg 9 section 5.2 'site specific investigation is recommended for detailed design of significant cut or fill works.'

R. Engineer		
Sr. Project Engineer	Date	Signature
John Fantin		
Supervisor, Engineering	Date	Signature
Tim Kocialek		
Manager, Engineering	Date	Signature

The Corporation of The City of Brampton
2 Wellington Street West, Brampton, ON L6Y 4R2   3-1-1
Page 2 of 2   13-3251-213 COLLECTOR - DESIGN CRITERIA.docx

Pat Z.

III.   DRAWING NUMBERS LIST / SPREADSHEET

COLLECTOR STREET - Arterial Rd A to Arterial Rd B
13-3251-213

Drawing Number	Station From	To				08-Jun-13	SHEET
COLLECTOR STREET							
B1-11-1	1+270	1+550	165m W of Arterial Rd A	to	115m E of Arterial Rd A		1
C1-11-5	1+550	1+830	115m E of Arterial Rd A	to	70m E of Thru Rd		2
C1-11-4	1+830	2+110	70m E of Thru Rd	to	50m E of Short Cres		3
C1-11-3	2+110	2+390	50m E of Short Cres	to	95m E of Sample St		4
C1-11-2	2+390	2+670	95m E of Sample St	to	125m E of Local Rd		5
C1-11-1	2+670	2+950	125m E of Local Rd	to	140m E of Arterial Rd B		6
C1-8-15			Titlepage				
C1-8-16			Drawing List Page				
ARTERIAL ROAD A							
B2-12-12	3+940	4+030	135m S of Collector St	to	45m S of Collector St		7
B1-12-1	4+030	4+210	45m S of Collector St	to	135m N of Collector St		8
LITTLE TRAIL							
C1-44-1	0+040	0+000	40m N of Collector St	to	Collector St		9
THRU ROAD							
C2-41-1	1+190	1+270	40m N of Collector St	to	40m S of Collector St		10
SMALL STREET							
C1-45-1	0+000	0+040	40m N of Collector St	to	Collector St		11
SHORT CRESCENT							
C2-67-1	0+370	0+423	Collector St	to	50m S of Collector St		12
SAMPLE STREET							
C2-92-1	0+190	0+120	Collector St	to	50m S of Collector St		13
LOCAL ROAD							
C2-51-1	0+210	0+355	85m N of Collector St	to	65m S of Collector St		14

Drawing Number	Station From	To				30-Sep-13	SHEET
REMOVALS							
C1-8-22	1+270	2+110	165m West of Arterial Rd A	to	70m East of Thru Road		15
C1-8-23	2+110	2+950	70m East of Thru Rd	to	125m East of Local Road		16
DIMENSIONS							
C1-8-24	1+270	2+110	165m West of Arterial Rd A	to	70m East of Thru Road		17
C1-8-25	2+110	2+950	70m East of Thru Rd	to	125m East of Local Road		18
PAVEMENT MARKINGS & SIGNAGE							
C1-8-26	1+270	2+110	165m West of Arterial Rd A	to	70m East of Thru Road		19
C1-8-27	2+110	2+950	70m East of Thru Rd	to	125m East of Local Road		20

Drawing Number	Station From	To				05-Nov-13	SHEET
PAVEMENT ELEVATIONS							
C1-8-32			@ Arterial Road A				21
C1-8-33			@ Little Trail	&	@ Thru Road		22
C1-8-34			@ Small Street	&	@ Short Crescent		
C1-8-35			@ Sample Street	&	@ Local Road		

Pat Z.

IV. 3D LINEWORK – ISO VIEWS

ISO VIEW of Poor 3D work
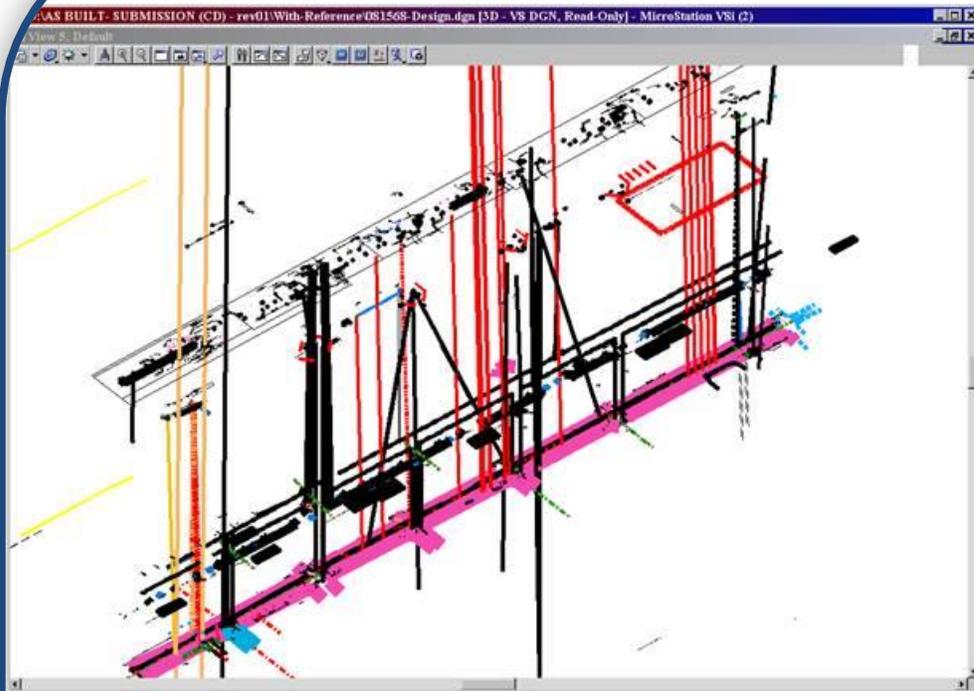
ISO VIEW of Proper Strata for drawing information

Survey &
Inroads
Information

Storm

Utilities

Property

Shading

242

V.   STORM INFORMATION CHARTS FOR DESIGN DRAWINGS & QUANTITIES

STORM MAINTENANCE HOLES CHART

COLLECTOR ST - Arterial Rd A to Arterial Rd B - 13-3251-213

MH #	STATION	OFFSET	ELEVATION		STANDARD
MH 201	1+684.52	L-4.36	255.712	TOP	701.010, 401.010
MH 202	1+739.53	L-4.22	255.891	TOP	701.010, 401.010
MH 16E	1+794.55	L-4.33	255.204	TOP	EXISTING
DICBMH 203	1+823.23	L-18.50	253.217	INLET	701.010, 403.010
DICB 4845	1+844.78	L-16.18	253.885	INLET	705.030, 403.010
CBMH 204	1+842.95	L-9.58	254.15	GUTTER	701.010, 400.020
CBMH 205	1+925.54	L-30.88	254.18	TOP	701.010,400.020
MH 42E	2+004.90	L-3.16	253.359	TOP	EIXSTING
MH 41	2+090.00	L-4.38	254.19	TOP	701.010, 401.010

STORM CATCHBASINS CHART

COLLECTOR ST - Arterial Rd A to Arterial Rd B - 13-3251-213

CB #	STATION	OFFSET FROM C/L	ELEVATION AT E/P	STANDARDS
CB 1	1+663.41	R-10	255.397	705.030, 400.020
CB 2	1+681.49	L-10	255.569	705.030, 400.020
CB 3	1+704.10	L-10	255.759	705.030, 400.020
CB 4	1+704.79	R-10	255.764	705.030, 400.020
CB 5	1+733.99	L-10	255.447	705.030, 400.020
CB 6	1+774.20	R-10	255.444	705.030, 400.020
CB 7	1+843.34	R-10	254.173	705.030, 400.020
CB 8	1+904.24	R-10	253.406	705.030, 400.020
CB 9	1+905.01	L-10	253.399	705.030, 400.020
CB 10	2+021.48	R-10	253.321	705.030, 400.020
CB 11	2+021.80	L-10	253.323	705.030, 400.020
CB 12	2+094.36	L-10	254.122	705.030, 400.020
CB 13	2+095.17	R-12.2	254.086	705.030, 400.020
DCB #	**STATION**	**OFFSET**	**ELEVATION**	**STANDARDS**
DCB 1	2+968.79	R-10	253.132	705.040, 400.020
DCB 2	2+969.70	L-10	253.132	705.040, 400.020

Pat Z.

G	H	I	J
GRANULAR (m2)...	CONC BUS PADS (m2)...	KILLSTRIP/MEDIAN CONC (m2)...	REMOVE CONC CURB(m)...
-------------------	12.5	18.1707	22.21
29,901.27	12.5	17.677	22.63
ASPH PLACEMENT (m2)...	12.5	88.3083	151.56
28,238.98	12.5	161.8218	150.03
-44.4907	12.5	29.2773	24.98
-900.6729	22.5	10.1898	32.39
-670.7962	22.5	761.7552	-------------------
-89.3321	22.5	20.84	403.80
-89.334	22.5	161.8469	SAW CUTTING (m)...
-89.4517	22.5	210.9336	22.37
----------------	36	11.5156	46.64
26354.90	36	159.6442	95.14
ASPH PLACEMENT (m2)...	36	11.0365	57.66
250mm Depth	36	167.9502	-------------------
W of Collector	36	565.2726	221.81
-------------------	-------------	89.0545	MILLING (m2)...
308.71	355.00	14.2238	133.37
ASPH MULTI USE TRAIL (m2)...	GRASS/SOD (m2)...	21.7251	81.0383
845.5341	219.0174	21.9565	33.4456
911.6421	197.4619	96.7109	16.6812
748.855	43.8171	59.2643	28.5034
291.5579	62.5316	186.5251	-------------------
806.4219	605.4577	79.5242	293.04
488.2334	29.6677	59.2758	
-------------------	2422.1077	13.0877	
4092.24	791.8568	13.4079	
D/W / PARKING LOT REINSTATEMENT (m2)	22.4067	59.2603	REMOVE FENCE (INCL GATES)(m)...
34.811	132.4629	131.3712	47.7...

Pat Z.

VII.   CROSS SECTION

Pat Z.

Pat Z.

IX.   REVISIONS INFORMATION IN TITLEBLOCK

and 17.5m East of Centerline of Goreway Drive 0.10m below grade

60m	50m	40m	30m	20m	10m	0m	5m	10m
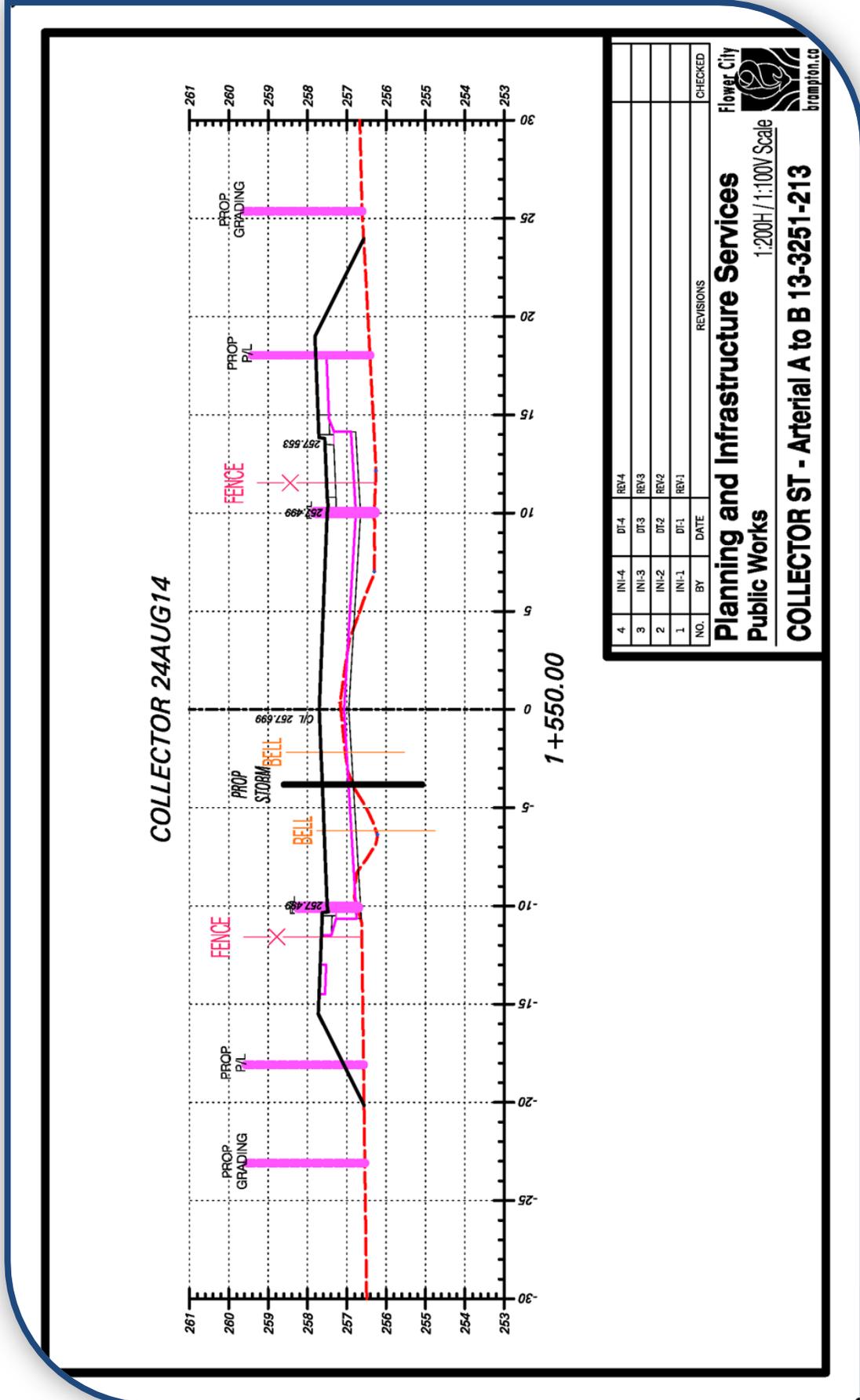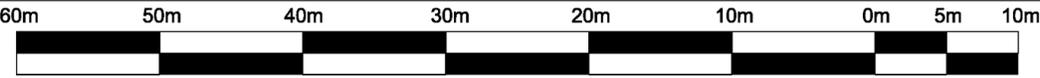
NO.	BY	DATE	REVISIONS	CHECKED
⚠2	XYZ	06AUG14	REV. 2 - East Island reduced 4m	
⚠1	XYZ	15JUL14	REV. 1 - EB Bus Pad moved 5m West / WB Bus Pad Moved 4m East	
	INI	27MAR14	ISSUED FOR CONSTRUCTION	
1	INI	27MAR14	ADDENDUM 1 - Driveway to #5471 Collector St Re-Aligned	
	INI	14MAR14	ISSUED FOR TENDER	

BRAMPTON
Flower City
brampton.ca

LATEST CITY LOGO / DEPARTMENT...

247

Pat Z.

SAMPLE - ENGINEERING AS CONSTUCTED

248

Pat Z.

XI.   TRAFFIC – CONSTRUCTION DRAWING

Pat Z.

XII.   TRAFFIC – AS-CONSTRUCTED DRAWING

Pat Z.

251

Pat Z.

XIV. LIGHTING – AS-CONSTRUCTED DRAWING

Pat Z.
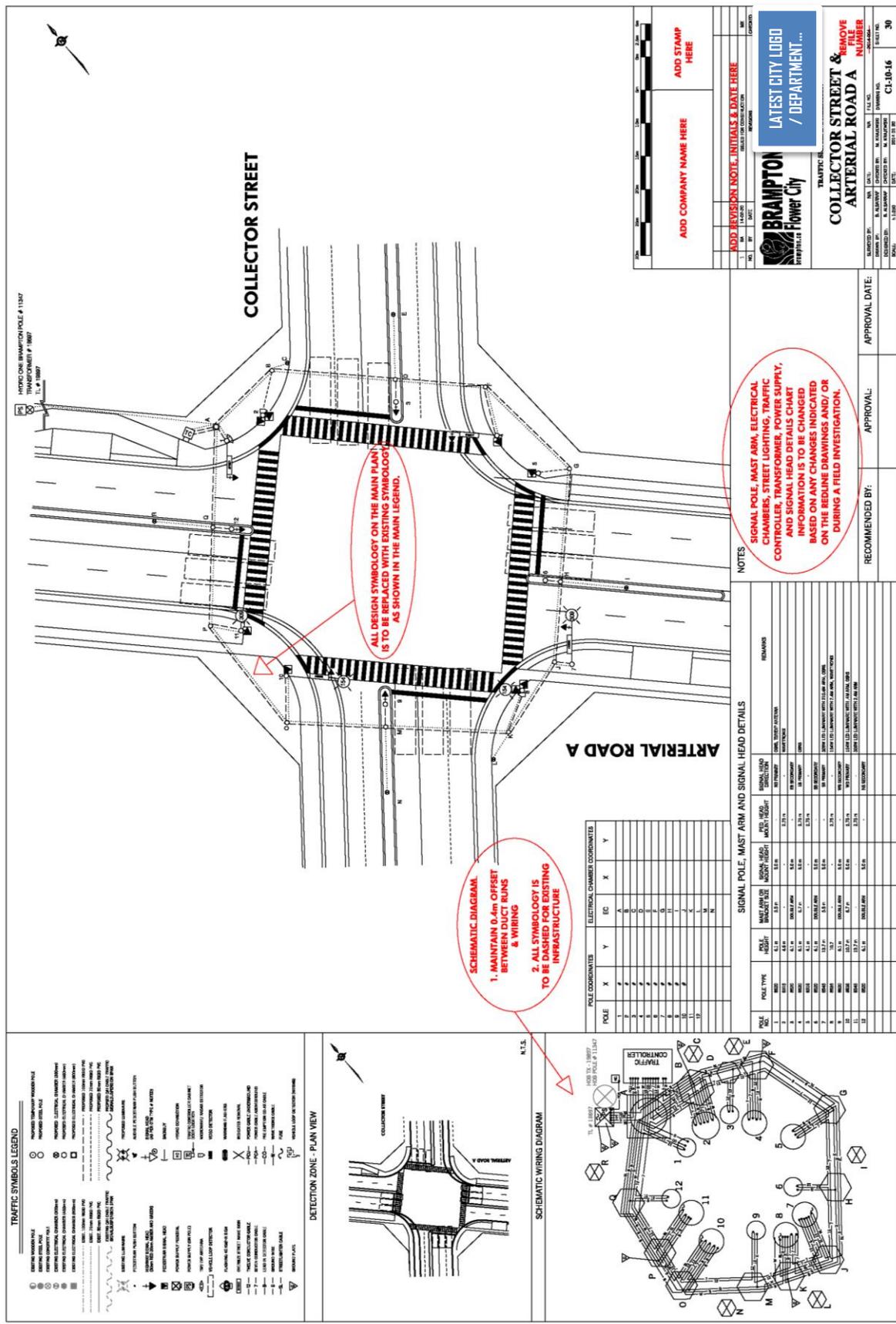
6) APPENDIX 6 – COMMON OPSD

MOST COMMONLY USED OPSD FOR DESIGN AND CONSTRUCTION

200 - GRADING SECTIONS

219.180_____Straw Bale Flow **Check Dam**

219.210_____Rock Flow **Check Dam** V-Ditch

219.211_____Rock Flow **Check Dam** Flat Bottom Ditch

300 - SIDE ENTRANCES

310.010_____Concrete **Sidewalk**

310.020_____Concrete **Sidewalk** Adjacent to Curb and Gutter

310.030_____Concrete **Sidewalk** Ramps at Intersections

400 - FRAMES AND GRATES

400.010_____Cast Iron, Square Frame with Square Overflow Type Dished **Grate for Catch Basins**, Herring Bone Openings

400.020_____Cast Iron, Square Frame with Square Flat **Grate for Catch Basins**, Herring Bone Openings

400.030_____Cast Iron, Square Frame with Square V **Grate for Catch Basins**, Herring Bone Openings

400.081_____Cast Iron, Curb Inlet Frame with Two-Piece Raised **Cover for Catch Basins** Out of Roadway

400.110_____Cast Iron, Square Frame with Square Overflow Type Flat **Grate for Catch Basins**, Perforated Openings

400.120_____Cast Iron, Square Frame with Birdcage **Grate for Catch Basins**

401.010_____Cast Iron, Square Frame with Circular Closed or Open **Cover for Maintenance Holes**

403.010_____Galvanized Steel, Honey Comb **Grating for Ditch Inlets**

404.020_____Aluminum Safety **Platform** for Circular **Maintenance Holes**

405.020_____Maintenance Hole **Steps**, Solid

500 - PAVING

512.011_____**Concrete Steps**, Slab on Grade

561.010_____**Interlocking Concrete Pavers** on Granular Base

600 - CURBS AND GUTTERS

600.030_____Concrete Mountable **Curb** with Wide Gutter [depressed at Zum bus bays]

600.040_____Concrete Barrier **Curb** with Standard Gutter [roadways]

253

Pat Z.

600.060_____Concrete Semi-Mountable **Curb** with Standard Gutter [depressed at bus bays]

600.080_____Concrete Barrier **Curb** with Narrow Gutter [median curbs]

600.090_____Concrete Semi-Mountable **Curb** with Narrow Gutter

600.110_____Concrete Barrier **Curb** [parking lots]

601.010_____Asphalt **Curb** and Asphalt **Gutter**

603.020_____Precast Concrete **Curb**

604.010_____90º Concrete **Outlet** for Concrete Curb with Gutter

604.020_____90º Asphalt **Outlet** for Asphalt Gutter

605.010_____45º Concrete **Outlet** for Concrete Curb with Gutter

605.020_____30º and 45º Asphalt **Outlets** for Asphalt Gutter

605.040_____Asphalt **Spillways**

700 - C. BASINS AND M. HOLES

701.010_____Precast Concrete **Maintenance Hole**, 1200mm Diameter

701.011_____Precast Concrete **Maintenance Hole**, 1500mm Diameter

701.012_____Precast Concrete **Maintenance Hole**, 1800mm Diameter

701.013_____Precast Concrete **Maintenance Hole**, 2400mm Diameter

701.014_____Precast Concrete **Maintenance Hole**, 3000mm Diameter

701.015_____Precast Concrete **Maintenance Hole**, 3600mm Diameter

701.021_____Maintenance Hole **Benching** and Pipe Opening Alternatives

705.010_____Precast Concrete **Catch Basin**, 600 x 600 mm

705.020_____Precast Concrete **Twin Inlet Catch Basin**, 600 x 1200 mm

705.030_____Precast Concrete **Ditch Inlet**, 600 x 600 mm

706.010_____Precast Concrete **Ditch Inlet**, 600 x 1200 mm with 1500mm Diameter Flat Cap

706.020_____Precast Concrete **Ditch Inlet**, 600 x 1200 mm with 1800mm Diameter Flat Cap

708.010_____Catch Basin **Connection** for Rigid Main Pipe Sewer

708.020_____**Support** for Pipe at Catch Basin or Maintenance Hole

800 - CULVERTS AND DRAINS

801.020_____**End Section** Details, Corrugated Steel Pipe

802.010_____Flexible **Pipe Embedment** and Backfill, Earth Excavation

802.020_____Flexible **Pipe** Arch **Embedment** and Backfill, Earth Excavation

802.030_____Rigid Pipe **Bedding**, Cover, and Backfill, Type 1 or 2 Soil – Earth Excavation

804.030_____Concrete **Headwall** for Pipe Less Than 900mm

804.040_____Concrete **Headwall** for Sewer or Culvert Pipe Outlet

254

Pat Z.

804.050_____Grating for Concrete **Headwall**

810.010_____**Rip-Rap** Treatment for Sewer and Culvert Outlets

810.020_____**Rip-Rap** Treatment for Ditch Inlets

900 - FENCING, GUIDE RAILS

911.140_____**Guide Rail** System, Concrete Barrier, Precast I-Lock Connection Installation, Temporary and Permanent

911.233_____**Guide Rail** System, Concrete Barrier, Precast Temporary End Section Installation

912.101_____**Guide Rail** System, Steel Beam, Rail, Component

912.102_____**Guide Rail** System, Steel Beam, Channel, Component

912.401_____**Guide Rail** System, Steel Beam, Structure Connection, Component – Rail and Channel

922.401_____Energy **Attenuator**, End Treatment, Eccentric Loader Terminal System, Component – Loader Assembly

922.402_____Energy **Attenuator**, End Treatment, Eccentric Loader Terminal System, Component – Rail and Cable Attachment

922.410 _____Energy **Attenuator**, End Treatment, Eccentric Loader Terminal System, Assembly – Loader Detail

922.430_____Energy **Attenuator**, End Treatment, Eccentric Loader Terminal System, Installation – Layout and Post

922.530_____Energy **Attenuator**, End Treatment, Steel Beam Energy Attenuating Terminal, Extruder Terminal System with Wooden Posts, Installation

971.101_____**Fence**, Highway, In Earth, Shale, Loose Rock or Friable Rock, Installation

972.102_____**Fence**, Chain-Link, Component – Gate

972.130_____**Fence**, Chain-Link, Installation – Roadway

1000 - SANITARY SEWERS, MANHOLES & CATCH BASINS

1003.010_____Cast-in-Place Maintenance Hole **Drop Structure Tee**

1003.020_____Cast-in-Place Maintenance Hole **Drop Structure Wye**

3000 - STRUCTURES

3120.100_____Walls, **Retaining**, Concrete Toe Wall

3121.150_____Walls, **Retaining**, Backfill, Minimum Granular Requirement

3190.100_____Walls, **Retaining** and Abutment, Wall Drain

3940.150_____Figures in Concrete, **Warning Message, Layout**

3940.151_____Figures in Concrete, **Warning Message, Letters**

Pat Z.

7) APPENDIX 7 – RECORD OF CHANGES, UPDATES & CORRECTIONS

2011

JUNE 2011

Level 10 description corrected

JULY 2011

Level Structure replaced

AUGUST 2011

Note added RE orange error colour under *Roadway library, corridors and modeler / Point Controls*

Cells updated throughout including cell library name

OCTOBER 2011

Cells updated to include new Regional Conservation Limit and spot elevation cells

NOVEMBER 2011

Section added at end for As Constructed drawing preparation. PDF version contains examples of a pre- and a post-as constructed drawing

Levels modified to accommodate engineering foundation drain collector MHs text and linework

DECEMBER 2011

Level symbology modified for some ROW levels

2012

JANUARY 2012

ENG_SH_KILLSTRIP description changed to include pattern for asphalt surfaces

Missing SVY Levels added

Note added regarding alignments under a Geometry Project in section "Multiple Alignments within a Geometry Project"

MAY 2012

Section added for Property Plans outlining requirements and file names

JUNE 2012

Levels added for Developer ROW and Lot Lines

Target Aliasing sections moved to more logical order

JULY 2012

Pat Z.

Borehole and test pit cells added to list of cells

Typical City streetscape components section added

Hydro One Brampton procedures modified

AUGUST 2012

Patterning elevations synchronized between explanation of patterning method and chart of patterning parameters.

Communications folder contents modified.

Five new levels added for stages of submissions i.e. 30/60/90/tender/construction

Note added about title page and drawing list page and the levels to be turned on/off for each submission.

SEPTEMBER 2012

Updates to file structure descriptions and example provided of typical contract directory.

Hyperlink corrections

Note correction in 3D patterning section.

Changed file structure to move "CD FOR HANDOVER" to main directory

OCTOBER 2012

Expanded >>COMMUNICATIONS folder description

Expanded Manage Corridors

Expanded >>CD FOR HANDOVER folder description

Expanded >>>E-MAIL "project number" folder description

Expanded In Microstation…Final Drawing Cleanup

Added Annotating the Centerline

Added Quick List of Process

Added Other Drawings to be Created or Modified

DECEMBER 2012

Roadway Modeller Interface section added

30, 60 & 90 Percent Submissions clarified

Page references updated

Sample As Constructed drawings added

Procedures added for CADD review of capital projects being completed by Consultants

Procedures added for CADD review of as constructed drawings being completed by Consultants

Pat Z.

2013

JANUARY 2013

Explanation of requirements for "as constructed" traffic drawings added to "Drafting Requirements for as Constructed drawings"

Additional explanation of traffic requirements for "as constructed" drawings

MARCH 2013

"NOTES" page added at the front of the manual for jotting down reminders.

"Drafting requirements for 'As Constructed' Drawings" expanded to include requirements for lighting and traffic sections.

Added note to "Drafting requirement for 'As Constructed' Drawings" general requirements RE the Engineer's Stamp.

Added note outlining stages where an engineer's stamp is required. (Engineering Submissions)

Added Most Commonly used OPSD standards.

Added alternate method for clipping references. (Clipping Information for Drawing Sheets / Creating Drawing Sheets)

Added standardized verbiage for contract circulation / distribution e-mail. (Digital Submissions)

Added notes to identify that only plan and profile drawings are required for final PUCC submission. (Engineering Submissions)

Added reference to CD Handover Checklist for digital drawings. (Standard File Structure / CD for HANDOVER)

Added an example of a cross section after "Cross Sections-Display".

Expanded "Patterning in 3D" to include tips on working in 3D, renamed "Working and Patterning in 3D".

"Property Plans" expanded to better explain process of creating property strip plan and IPRPs.

Prologue updated.

Removed Levels from Street Lighting List and adjusted colours and weights.

Added note referencing spreadsheets available for Reviewing the CADD component of As Constructed drawings and outsourced Capital projects. (CADD Review of...)

Added note identifying implementation of various standard requirements... georeferencing, 3D elements, leveling systems. (CADD Review of As Constructed Development Drawings)

Added samples of –

IPRP drawings

Design Criteria Sheet

Milestones Checklists

258

Iso Views demonstrating Poor and Proper 3D work

Digital Drawings Checklist for Handover at Issued for Construction and Pre As Constructed stages

As Constructed requirements drawing for Engineering drawings

As Constructed Engineering drawing

As Constructed requirements drawing for Traffic drawings

As Constructed Traffic drawings

As Constructed requirements drawing for Lighting drawings

As Constructed Lighting drawings

Removed references to G:\drive information and provided generic directions to accommodate external projects and updated Standard File Structure to match CD Burn directory.

Updated names for cell library, template library and preference file (BRAMPTON CELLS V8i.cel, BRAMPTON.itl, and BRAMPTON.xin)

In Seed-3DUTM.dgn

Override colours for existing survey information changed to 236

Override colour for ENG_SH_ASPHALT changed to 233

Added level in Survey section for crossing segments

In BRAMPTON CELLS V8i.cel

"SLOPE" re-oriented by 180 degrees

"DBUSH", "CBUSH" and "GPOST" modified

"ARRODI", "ARROSA", "ARROST" modified to display hollow

"ARROW" and "Point" level changed to MISC

Added cells for proposed flow arrows, solid shapes

2013 – 2014

APRIL 2013 – JULY 2014   16 JULY 2014 CIRCULATED

∗ Manual re-organized, re-structured and expanded to more clearly identify process and requirements for In House Capital projects, Consultant Capital projects, Consultant "As-Constructed" Capital projects and Consultant "As-Constructed" Development projects
∗ Reworded the Prologue to include all drawings received by the Planning and Infrastructure Services i.e. Capital, Development, As Constructed
∗ Changes throughout to reflect new City organization…Works & Trans replaced with Planning & Infrastructure Services
∗ Samples modified to show new departmental logo information
∗ Cell library changes…
∗ Cell library updated (BRAMPTON CELLS V8i.cel)
∗ New cell library added (COB-BORDER.cel) – contains City border cells
∗ Cells created in BRAMPTON CELLS V8i for bases to be used in cross section production, explanation added to Cross Sections for use of the new cross section borders

259

Pat Z.

* Level changes…
* Removal and addition of some ROW levels
* Removal and addition of levels in the Traffic and Lighting sections
* Removal and addition of levels in Engineering section
* Added notes to define PA, PD etc. in shading levels section
* Example Project (13-3251-213 - Collector St – Arterial Rd A to Arterial Rd B) created and utilized throughout "In House Process for Capital Works Design" section to demonstrate required practices
* OPSDs added to list of commonly used standards for New Jersey type barriers
* Note added in "As-Constructed" sections for quality assurance checks of mylars received by the City, prior to acceptance of package
* Note added in Engineering Submissions to describe use of distribution list, sample added to Sample Forms and Drawings
* Common verbiage for email notification of impending XX% circulation of design drawings expanded
* PUCC circulation requirements modified to include the possibility of circulating pdf format on CD instead of, or as well as, 13 folded hard copies
* PUCC circulation process change noted
* InRoads changes…
   o Updates to InRoads working sections to reflect upgraded software
   o Alternate surface creation (LIMESTONE) instructions added to Roadway Modeller section
   o Parametric Constraints sections added to Roadway Modeller section
   o Secondary Alignments expanded
* Property drawing instructions expanded

2014 – 2015

OCTOBER 2014 – JULY 2015   20 JULY 2015 CIRCULATED

REORGANIZTION

* Changes to As Built section including note to direct users to the new Development As-Built Requirements Manual
* Improved heading labels
* Revised direction of manual to apply to Captial works only
* Revised terminology…'As Built' replaced by 'As Constructed' throughout document
* Project identifiers - Project No. / Contract No. changed to File No. / Bid Call No. throughout document
* Identified the new sub-folders in Engineering Standard Setups folder. These were created to make it easier to find the correct templates/drawings etc.
* Reordered sections to put them in a more logical order
* Reorganized manual to group reference materials in Appendices
* References to the appropriate appendix or section added throughout to allow user to locate information more efficiently
* Clarified at what stage the drawing numbers need to be assigned
* Clarified general requirements for Capital 'as constructed' drawings
* Added note to define proper display of pipe utilities over 900mm

Pat Z.

∗ 'Maintenance & Operations' throughout document updated to 'Public Works'
∗ 'Captures' updated throughout document as required for departmental name changes

LEVELS

∗ Hilighted levels to be used for 'as constructed' work
∗ Added new levels for Unidentified Fibre cables, including text
∗ Added new patterning for Tactile Walking Surface Indicator – to be placed on level ENG_SH_IMPRESSED
∗ Added new cell for Tactile Walking Surface Indicator to BRAMPTON CELLS v8i.cel – 'TWSI'

NEW SECTIONS

∗ Added section [CIRCULATION FORMS] outlining standard templates to be used for circulation of PUCCs, Site Plans and Subdivision Plans received for review
∗ Added section [CHECKLISTS] outlining checklists to be used by design group for reviews
∗ Expanded on review procedures for PUCC, Site Plan and Development Plan submissions
∗ Added instructions with respect to Appendix A and the preparation of CDs for consultants working on Capital projects

SAMPLES EXAMPLES

∗ Document Templates (Appendix 3) added showing all circulation letters to be utilized by design group
∗ Checklists (Appendix 4) added showing all checklists to be utilized by design group
∗ Sample drawings replaced, as needed, to reflect new project identifiers
∗ Updated cross section capture in volume calculations section to better illustrate the basis for volume calculations

2015 – 2017

AUGUST 2015 TO JANUARY 2017   16 JAN 2017 CIRCULATED

∗ New simplified file structure for Consultant Submissions [Section 4-1]
∗ Additional clarification of file structure for handover CD [Section 4-2]
∗ Greater emphasis placed on the final property plan requirements [Section 9]
∗ Expansion of descriptions defining property strip plan, roll plans & IPRPs [Section 9]
∗ Circulation process better defined with expanded explanations [Sections 2&3]
∗ Section Numbers added to make it easier to define the location of information
∗ Expanded & clarified CAD requirements & deliverables for each stage [Section 6]
∗ New product name CAPITAL WORK DELIVERABLES used throughout, to replace Appendix A package to reduce confusion between the Appendix A document and the complete package
∗ City departmental designations updated throughout
∗ Added Levels for InRoads template works and scrap
∗ Added levels for print areas
∗ Levels re-organized to allow links to each group [Section 33-1-I to xvii]

Pat Z.

* Searchable PDF Manual, links maintained for table of contents
* Document containing additional descriptions with respect to information required to be shown on each type of drawing sheet, is referenced in Section 21-1

Pat Z.