CDOT Workflow - Creating a Rainfall Data File

This document describes the procedures for creating an IDF rainfall data file that is used by InRoads Storm & Sanitary. Creating the data for the IDF file requires the use of two Excel spreadsheets; the UD_Rain_v1.01.xlsm and the InRoads Rainfall Data.xlsx. The _Rain_v1.01.xlsm spreadsheet computes the actual data and the InRoads Rainfall Data.xlsx formats the data into a form usable by Storm & Sanitary.
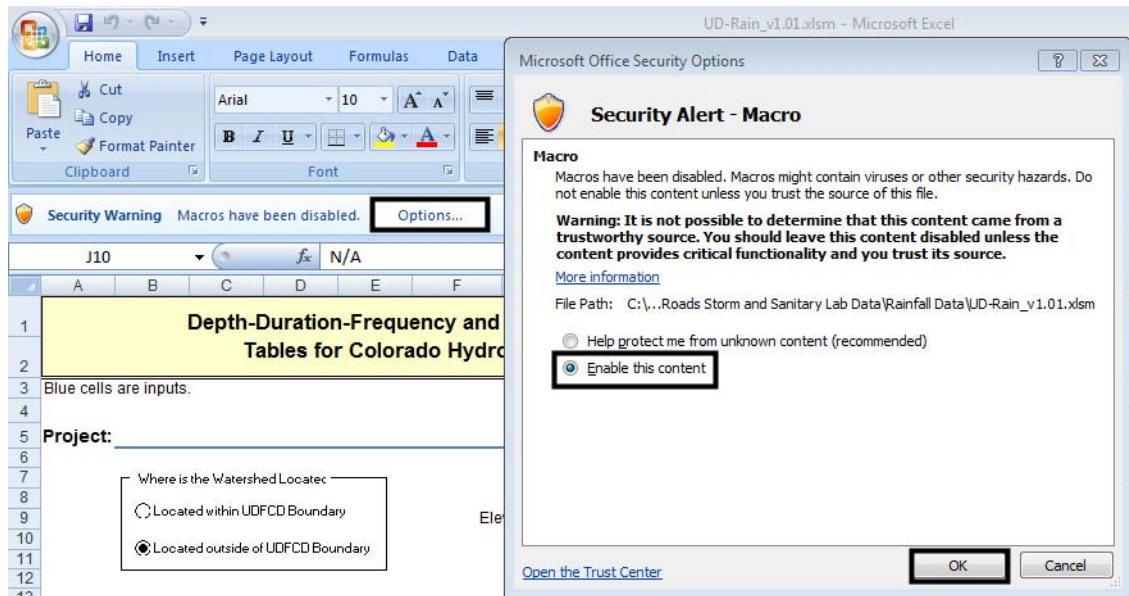
Creating Rainfall Data

The spread sheet UD_Rain_v1.01.xlsm to compute the rainfall data. This spreadsheet is provided by the Urban Drainage and Flood Control District. Precipitation frequency maps are also used to fill out the spreadsheet.

1. Open the *UD_Rain_v1.01.xlsm*, the *InRoads Rainfall Data.xlsx*, and the *#####HYDR_Rainfall_Data.idf* files.

    Note: Open the #####HYDR_Rainfall_Data.idf using Notepad. Using Word will add formatting to the file that InRoads Storm & Sanitary cannot read.

2. In the *UD_Rain_v1.01.xlsm* spreadsheet, <D> the **Options** button.
3. In the **Microsoft Office Security Options** dialog box, toggle on **Enable this content** and <D> **OK**. This allows data to be entered into the spreadsheet.


4. <D> on the **DDF & IDF Tables** worksheet.

5. Set the **Where is the Watershed Located** toggle.

Note: The UDFCD Boundary covers the Denver metro area from Boulder to Castle Rock and from Golden to the Front Range Airport. If the project in question is in this region, set the **Where is the Watershed Located** toggle **to Located within the UDFCD Boundary**. Use the map displayed in the spreadsheet to determine if the project is within the boundary.
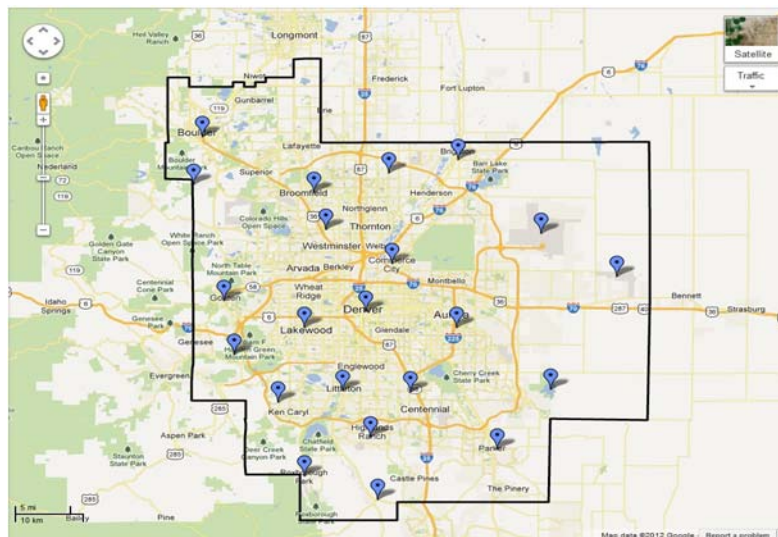
Projects Outside the UDFCD Boundary

6. If your project is outside the Denver Metro area, key in the Hydrologic Zone as indicated on the map at the right.

7. Open the Internet Explorer and navigate to the http://hdsc.nws.noaa.gov/hdsc/pfds/pfds_map_cont.html?bkmrk=co website. This site has an interactive map that provides data from collection stations across Colorado.
8. Move the cursor on to the red "+". <D> and hold then drag the "+" to the approximate location of the project.

Placement Point

9. Use the scale slider to zoom into the area. This zoom centers on the location of the "+".

10. Adjust the location of the "+" as needed.
11. Once the "+" is positioned, enter the elevation information from the map into the *UD_Rain_v1.01.xlsm* spreadsheet.

12. From the website, transcribe the precipitation frequency data to the *UD_Rain_v1.01.xlsm* spreadsheet. Use the 6-hr and 24-hr rows for the 2 , 5,10, 25, 50, and 100 columns.

Another option for getting data from the website is from the data reporting station.

13. From the website, toggle on **b) Click on station icon**. This displays the stations as green squares on the map.
14. <D> on the square closest to the project location.
15. Fill out the *UD_Rain_v1.01.xlsm* spreadsheet as described in steps 11 and 12 above.

Projects Inside the UDFCD Boundary

If the project is within the UDFCD Boundary, the NOAA website is not needed. All the information is contained within the UD_Rain_v1.01.xlsm spreadsheet.

16. In the *UD_Rain_v1.01.xlsm* spreadsheet, use the (Optional) Select a location within the UDFCD boundary drop down menu to select the reporting station nearest the project. This fills out the tables below.

Creating the Rainfall Intensity – Duration – Frequency File (*.IDF File)

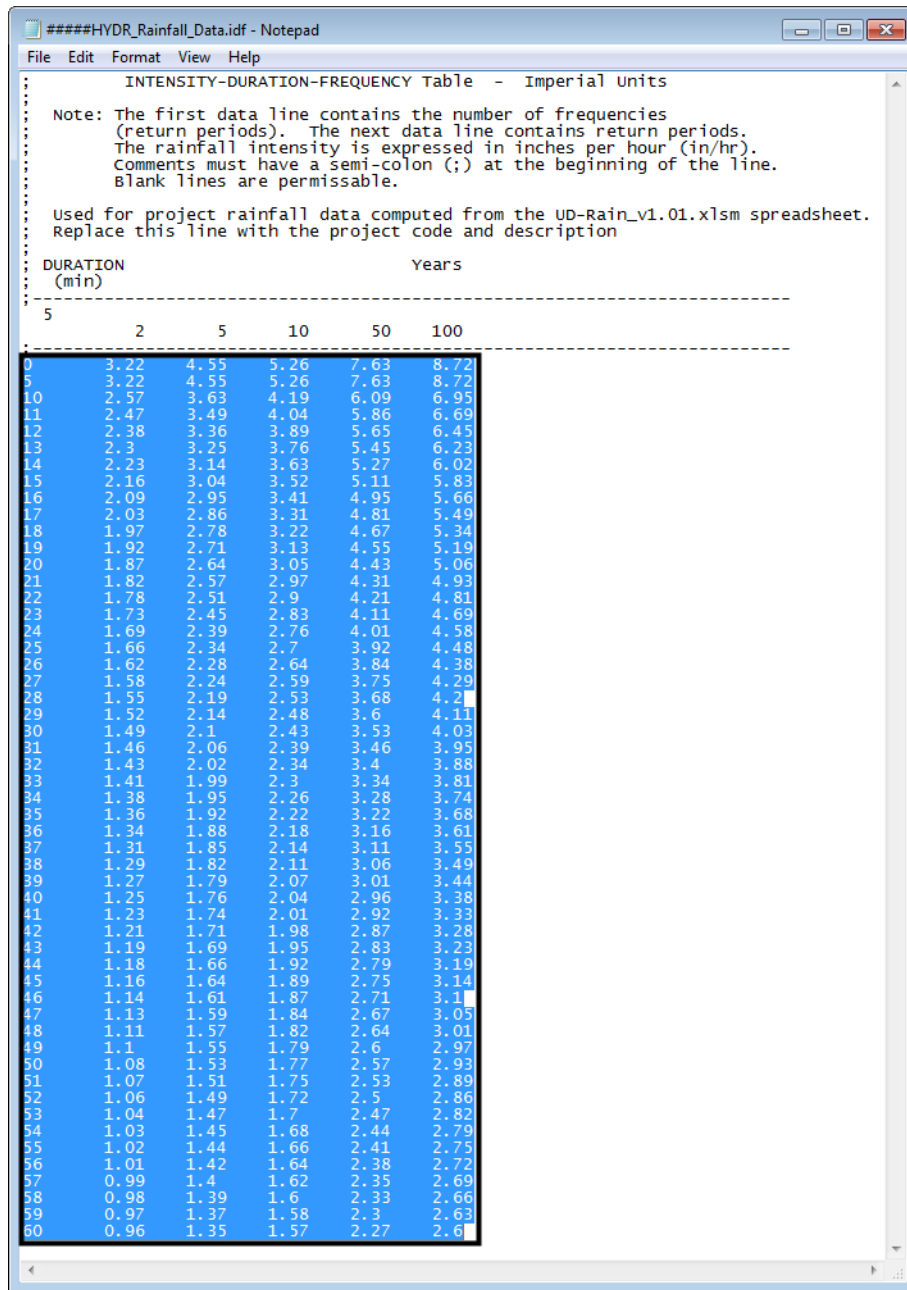With data entered into the UD_Rain_v1.01.xlsm spreadsheet, the InRoads Rainfall Data.xlsx file is automatically filled in. This data is used to create the project IDF (Intensity-Duration-Frequency) file used by the storm drain part of InRoads Storm & Sanitary.

1. In the *InRoads Rainfall Data.xlsx* file, highlight the shaded area.
2. <R> within the highlighted area and select **Copy** from the menu.

3. In the *#####HYDR_Rainfall_Data.idf* file, highlight the data as shown in the illustration below.

```
#####HYDR_Rainfall_Data.idf - Notepad
File  Edit  Format  View  Help
;           INTENSITY-DURATION-FREQUENCY Table   -   Imperial Units
;
;  Note: The first data line contains the number of frequencies
;        (return periods).   The next data line contains return periods.
;        The rainfall intensity is expressed in inches per hour (in/hr).
;        Comments must have a semi-colon (;) at the beginning of the line.
;        Blank lines are permissable.
;
;  Used for project rainfall data computed from the UD-Rain_v1.01.xlsm spreadsheet.
;  Replace this line with the project code and description
;
;  DURATION                                    Years
;   (min)
;---------------------------------------------------------------------------
   5
            2       5      10      50     100
;---------------------------------------------------------------------------
0       3.22    4.55    5.26    7.63    8.72
5       3.22    4.55    5.26    7.63    8.72
10      2.57    3.63    4.19    6.09    6.95
11      2.47    3.49    4.04    5.86    6.69
12      2.38    3.36    3.89    5.65    6.45
13      2.3     3.25    3.76    5.45    6.23
14      2.23    3.14    3.63    5.27    6.02
15      2.16    3.04    3.52    5.11    5.83
16      2.09    2.95    3.41    4.95    5.66
17      2.03    2.86    3.31    4.81    5.49
18      1.97    2.78    3.22    4.67    5.34
19      1.92    2.71    3.13    4.55    5.19
20      1.87    2.64    3.05    4.43    5.06
21      1.82    2.57    2.97    4.31    4.93
22      1.78    2.51    2.9     4.21    4.81
23      1.73    2.45    2.83    4.11    4.69
24      1.69    2.39    2.76    4.01    4.58
25      1.66    2.34    2.7     3.92    4.48
26      1.62    2.28    2.64    3.84    4.38
27      1.58    2.24    2.59    3.75    4.29
28      1.55    2.19    2.53    3.68    4.2
29      1.52    2.14    2.48    3.6     4.11
30      1.49    2.1     2.43    3.53    4.03
31      1.46    2.06    2.39    3.46    3.95
32      1.43    2.02    2.34    3.4     3.88
33      1.41    1.99    2.3     3.34    3.81
34      1.38    1.95    2.26    3.28    3.74
35      1.36    1.92    2.22    3.22    3.68
36      1.34    1.88    2.18    3.16    3.61
37      1.31    1.85    2.14    3.11    3.55
38      1.29    1.82    2.11    3.06    3.49
39      1.27    1.79    2.07    3.01    3.44
40      1.25    1.76    2.04    2.96    3.38
41      1.23    1.74    2.01    2.92    3.33
42      1.21    1.71    1.98    2.87    3.28
43      1.19    1.69    1.95    2.83    3.23
44      1.18    1.66    1.92    2.79    3.19
45      1.16    1.64    1.89    2.75    3.14
46      1.14    1.61    1.87    2.71    3.1
47      1.13    1.59    1.84    2.67    3.05
48      1.11    1.57    1.82    2.64    3.01
49      1.1     1.55    1.79    2.6     2.97
50      1.08    1.53    1.77    2.57    2.93
51      1.07    1.51    1.75    2.53    2.89
52      1.06    1.49    1.72    2.5     2.86
53      1.04    1.47    1.7     2.47    2.82
54      1.03    1.45    1.68    2.44    2.79
55      1.02    1.44    1.66    2.41    2.75
56      1.01    1.42    1.64    2.38    2.72
57      0.99    1.4     1.62    2.35    2.69
58      0.98    1.39    1.6     2.33    2.66
59      0.97    1.37    1.58    2.3     2.63
60      0.96    1.35    1.57    2.27    2.6
```

4. <R> and select **Paste** from the right click menu. This replaces the data with that copied from the *InRoads Rainfall Data.xlsx* file.

5. Select **File** > Save from the Notepad menu bar to save the changes made to the *#####HYDR_Rainfall_Data.idf* file.

Using The Project IDF File In InRoads

The completed #####HYDR_Rainfall_Data.idf file is added to the InRoads Project Defaults so that it can be accessed by Storm & Sanitary.

1. From the InRoads menu bar, select **File** > **Project Defaults**. This displays the *Project Defaults* dialog box.
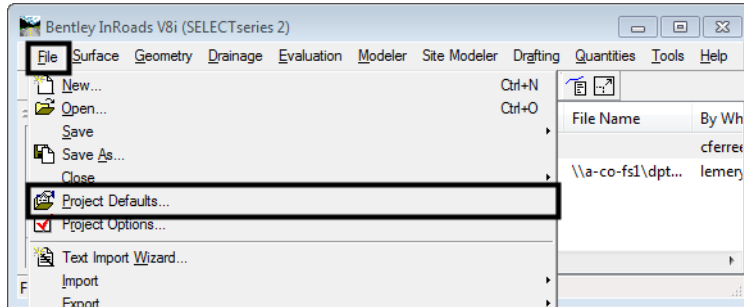
2. In displays the *Project Defaults* dialog box, <D> in the **Rainfall Data (*.idf)** field.
3. <D> the **Browse** button.
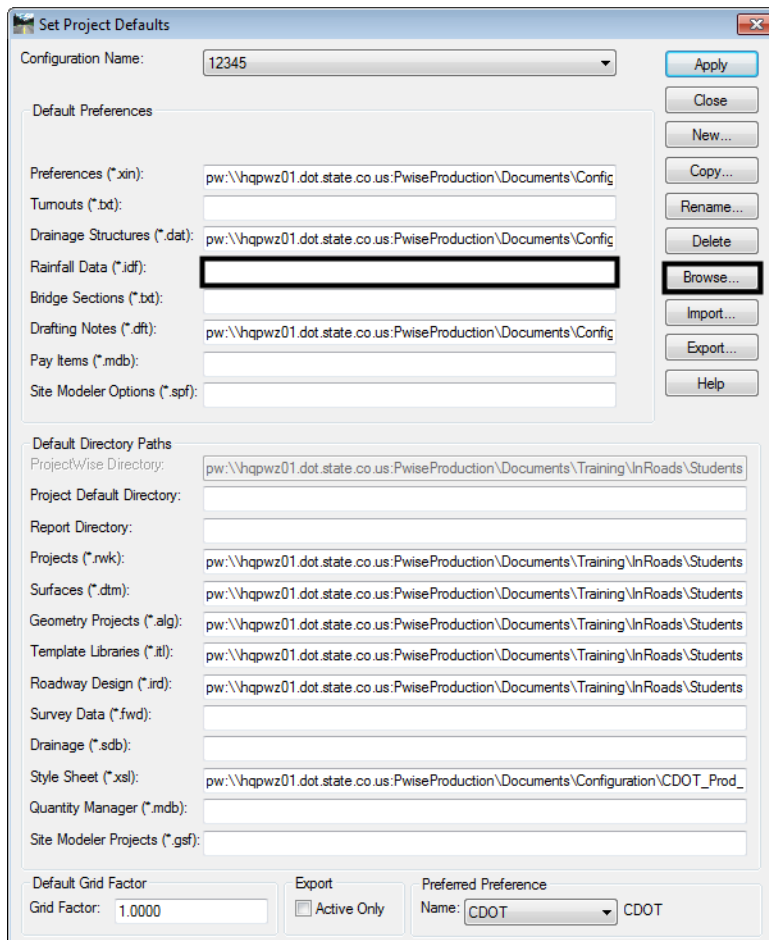
4. Navigate to the location of the *#####HYDR_Rainfall_Data.idf* file.

5. Highlight the *#####HYDR_Rainfall_Data.idf* file and <D> the **Open** button. This adds the file to the *Project Defaults* dialog box and dismisses the *Open* window.

6. In the *Project Defaults* dialog box, <D> the **Apply** button then <D> **Close**. This loads the data from the file and dismisses the *Project Defaults* dialog box.