Project	0
Reviewer	0
Date	01-00-1900
Model File	0
	0
References	0
	0
	0
	0
	0
Glossary	0
	0
	0
	0
	0

Reviewer's "Require Action" Choices
Yes
Follow up during re/calibration review.
Follow up during final model review.
Follow up in next round of review
Note

"Follow-Up Action" Choices
Yes

Part 1 - General

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
1	The performance requirements of the model are clearly defined through the project performance requirements and the modeling plan. What the model needs to be capable of is clearly defined for the modeler (e.g. analyze green infrastructure alternatives, or quantify impacts of improvements within City system on King County conveyance system).												
2	Model is built/revised to run in SWMM5 v22 engine or newer with SPU-LTCRDI method for groundwater infiltration modeling												
3	Overall, the design and level of detail of the model meet the performance requirements												
4	If this is a new model, data used to build model are based upon SPU GIS data, survey, and/or as-built information and the model is built using the right approach and model elements (e.g. each of the hydraulic structures are modeled correctly according to as-built, survey data or field knowledge, the right set of rain gauges is used to cover the entire modeled area, the right ET time series, boundary condition time series, and/or inflow time series are used, etc.). These information might be submitted, but they might or might not be the most appropriate for the modeled area and should be reviewed for their appropriateness.												
5	If this is a model revision review, the revision is implemented properly into the model by using the right approach and model elements and is based upon SPU GIS, survey, and/or as-built information. To expedite a model revision review, (1) sort all of the model elements in the original model and revised model alphabetically. EPA SWMM has a button that will sort all of the elements within each of the model element groups alphabetically. (2) After all of the model elements are sorted, use WinDiff to do a file comparison between the two .inp files. WinDiff will generate a comparison output results which can be printed to a printer (physical printer, xps file, or pdf files, etc.). One can also review the comparison within WinDiff environment.												
6	If this is a review of scenario model, the scenario is implemented properly into the model by using the right approach and model elements and in agreement with the objective of the scenario.												
7	All new survey and As-built information used to build and update the model, if any, have been saved into the model's "2_NetworkSourceDataNCalc" subfolder												
8	Model contains the following minimum data groups with each containing relevant data:												
	Title - Model Run properly documented in Title. First line of Title contains CSO Basin Name. The subsequent lines of Title contains short 1-line description of the purposes of model construction or revision project. The description should be in the following format: Company (mm/dd/yyyy): 1-line description of the purposes of model construction or revision project. (modeler initial). These description must be sorted in descending order by revision dates as information shown on the first 3 lines of Title also appear in the .rpt file. Having them in descending order helps to track the .inp files and their associated .rpt files, especially when the modeling project involves multiple scenarios with multiple .inp files and .rpt files. Subsequent lines beyond the 3rd line in the Title block can contain any relevant information that modelers want to save with the model.												
	Options:												
	General - Rainfall/Runoff, Groundwater, Flow Routing, Green-Ampt, Allow Ponding, Report Control Actions, Report Input Summary, Dynamic Wave must be selected; other options may be selected as needed.												
	Dates - Start Analysis on, Start Reporting on, End Analysis on dates and times are as expected. Model's simulation start and end times are within the bound of the minimum start and end times of all of its referenced external time series. A list of the model's referenced external time series and their start and end dates and times are listed in the model's README file.												
	Time Steps - Reporting, Runoff: Dry Weather, Runoff: Wet Weather, Routing time steps are optimized. See spreadsheet used by consultant for time step optimization saved in "TimeStepAnalysis" subfolder of model for details. Request this spreadsheet from consultant if it is not included in the subfolder.												
	Dynamic Wave - Dampen, Both, Use Variable Time Step are selected; Adjustment Factor and Conduit Lengthening Time Step are optimized. See spreadsheet used by consultant for time step optimization saved in "TimeStepAnalysis" subfolder of model for details. Square Feet = 0 to use default (4 ft) maintenance hole diameter.												
	Interface Files - If model is split, verify that the referenced interface file exists and has the right file path. Note: When one uses multiple Interface files as inflow files to another model, one has to combine them into 1 Inflow interface file before using the data as inflow to the other model. Otherwise even though one can add multiple inflow interface files into the software user interface and the model will run, but only one of the inflow files will be read internally and used in calculation and the others will not. Do not be tricked by the software interface. This is the case for both SWMM5 v18 and v22. The COMBINE utility in SWMM can be used to combine interface files together. In terms of setting up the COMBINE utility, the interface files to be combined must have the same start and end date and time. Otherwise, the utility will go into an infinite loop.												
	Reporting - check that the model is reporting the appropriate Node, Link, and/or Subcatchment simulated time series												
	Climatology > Evaporation - Time Series is selected and it points to the right "Time Series" in the model's list of time series.												
	Hydrology - contains all of the intended components												
	Hydraulics - contains all of the intended components												
	Curves - contains all of the intended components												
	Time Series - the list of time series is as expected												
	Time Patterns - the list of time patterns are expected												
9	Engineering Audit and Connectivity												
	All attributes of model elements are within their respective ranges												

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	No orphan node is identified												
	No orphan link is identified												
	No orphan subcatchment is identified												
	No orphan rain gauge time series are identified												
	No orphan boundary depth and/or flow time series are identified												
	No orphan diurnal time patterns are identified												
	System connectivity - intended continuity of network is established - no sections of network and/or subcatchments are routed incorrectly, SWMM Interface file is used as the flow transfer mechanism among split-up models.												
	Nodes to which interface files referenced exist in both upstream and downstream models.												
	Notes in the description field of each of the added/revised model elements are in the following format: Company (yyyymmdd): comment describing what the update/revision to the element is and the source of information used. (modeler initial)												
10	Each element's attribute in the model has either a default flag or a user-defined flag. User defined flags are described in Appendix B of the DS&G Chapter 7. Elements and attributes that are assumed, calculated, or otherwise modified based upon new SPU GIS info, drawings, or survey data should include additional description in the Description field to indicate how the value was determined. The description should be in the following format: Company(mm/dd/yyyy): comment about revision and source of data used in revision. (modeler initial)												
11	NAVD88 datum used for all elevations. Was a conversion factor used to adjust any elevations (e.g., from City datum)? If so, is the conversion factor correct? The correct conversion factor can be obtained from the City of Seattle Survey field book.												
12	If there are multiple scenarios, a final set of PCSWMM GIS shapefiles and SWMM5 model files is submitted for each of the scenarios in their respective model folders.												
Other general items that warrant QA/QC review given the project goals, objectives and performance requirements - to be identified and added by the technical team													

Part 2 - Hydrology Block Development

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
Rain Gages													
1	Rain gage(s) reference the right time-series data. Simulation start and end dates entered in the model match or within the limit of the start and end time of the rainfall time series.												
2	Rain gage assignments to subcatchments verified (Thiessen Polygon)												
3	Selected Rain Format is consistent with the format of the referenced rainfall time series (e.g. Rain Format = VOLUME for rainfall time series tabulated in depth of rain over time interval)												
4	Time Interval is consistent with time interval of the referenced rainfall time series (0:05 is selected if the referenced rainfall time series is tabulated in 5-min increment)												
5	Data Source (TIMESERIES or FILE) is selected correctly. SWMM supports two types of Rainfall time series data format - Rainfall Files (FILE), and Time Series Files (TIMESERIES). See SWMM user manual for their difference.												
6	If "TIME SERIES" is selected in Data Source, verify that the "Series Name" is selected correctly												
7	If "FILE" is selected in Data Source, verify that the "-File Name, -Station ID, -Rain Units" are entered correctly												
Subcatchments													
8	The total extent of all of the model subcatchments covers the entire area of interest												
9	Resolution of subcatchments is sufficient for the needs of the project												
10	Satisfactory delineation of all areas tributary to model outfall(s) and/or calibration flow monitors												
11	Subcatchment boundaries contained within study area boundary												
12	Information about system type is added to the "Tag" field of each Subcatchment: (C)ombined, (D)rainage, (S)anitary.												
13	Subcatchment delineated according to system type												
14	Name of tributary flow monitor is added to the "Tag" field of the Subcatchment. The name should be separated by a colon from the system type. For example: DS:FM_123-456 for an area with both Drainage and Sanitary sewer tributary to flow monitor FM_123-456.												
15	Subcatchments delineated according to flow monitoring locations												
16	Subcatchments delineated according to subarea type (building, parcel, row)												
17	Sum of subcatchments area within a flow monitoring catchment equal to total area of the flow monitoring catchment												
18	Sum of subcatchment impervious and pervious area equals flow monitoring catchments impervious and pervious area respectively												
19	Sum of subcatchment area equal to basin area												
20	Sum of subcatchment impervious and pervious area equals to the basin's impervious and pervious area respectively												
21	Subcatchment physical parameters calculation and their assignment												
22	Rain Gage Assignment is verified												
23	For separated and partially separated area, % of impervious area going to combined sewer and % of impervious going to separated sewers. Verify not only by proximity to sewers but also by topography.												
24	Outlet ID verified for each of the subcathcments												
25	Contributing Total Area verified												
26	Hydraulic Width is reasonable (would not make subcatchment's Flow length too short)												
27	Flow Length (Flow Length * Hydraulic Width = Total Contributing Area)												
28	Slope (reasonable when compared with topography data)												
29	Percent Imperviousness (reasonable given landuse consideration)												
30	Manning's n of impervious and pervious area - reasonable for the type of surface according to literature												

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31	Depth of depression storage on impervious area - within reasonable range according to literature/experience												
32	Depth of depression storage on pervious area - within reasonable range according to literature/experience												
33	% of impervious area with no depression storage - within reasonable range according to literature/experience												
34	Subarea routing type verified as intended												
35	Percent Routed verified as intended												
36	Infiltration = Green Ampt												
37	Suction Head - reasonable according to literature												
38	Conductivity - reasonable according to literature												
39	Initial Deficit = Porosity - Initial moisture content. This is to account for the effect of evapotranspiration on soil moisture after a prolonged dry period and prevent too much moisture from being retained in the soil at the end of soil moisture deficit recovery and affect infiltration rate.												
40	Groundwater = Yes												
41	Aquifer Name verified												
42	Receiving node verified												
43	Surface Elevation = Invert El. + Max. Depth of the Receiving Node to which the subcatchment drains.												
44	Groundwater flow coefficient (A1) is reasonable according to calibration result and experience												
45	Groundwater flow exponent is (B1) is reasonable according to calibration result and experience												
46	Surface water flow coefficient (A2) is reasonable according to calibration result and experience, if used												
47	Surface water flow exponent (B2) is reasonable according to calibration result and experience, if used												
48	Surface-GW interaction coefficient (A3) is reasonable according to calibration result and experience, if used												
49	Fixed Surface Water Depth = 0												
50	Threshold Groundwater Elevation is synchronized with associated aquifer												
51	LID Control parameters are reasonable according to literature, calibration results, and experience, if used												
Aquifers													
53	Unique aquifer name in the following format: A_TributaryFlowMonitorID_AssociatedSubcatchmentName. This order of naming convention helps to group the subcatchments tributary to the same flow monitor together together when the subcatchments are sorted alphabetically by Aquifer Name.												
54	Aquifers parameters are within reasonable range according to soil type, literature, and/or experience												
55	Water Table Elevation = Bottom Elevation												
56	Unsaturated zone moisture (theta-initial) = Field Capacity so that the aquifer will begin to discharge groundwater once infiltration occurs at the beginning of simulation.												
Other items related to subcatchment development that warrant QA/QC review - to be identified and added by the technical team													

Part 3 - Hydraulics Block Development

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
1	Boundary conditions defined by project team are applied correctly in the model. Downstream boundary condition modeled as described in design documentation. Any deviations from design documentation are described. Downstream boundary condition designed so as to achieve the performance requirements described in the boundary condition performance requirements.												
2	Extents of modeled network defined (e.g., minimum pipe diameter) and deviations explained												
Nodes													
3	Standard maintenance holes are modeled as Junctions.												
4	Implemented new survey and/or as-built information into model, if any. Electronic copy of the new survey and/or as-built information is saved in the "2_NetworkSourceDataNCalc" subfolder of the model												
5	Added note to the Description field of the new or updated node regarding to the update. The note should be in the following format: Company (mm/dd/yyyy): comment describing what the update is and the source of information used. (modeler initial)												
6	Node names follow SPU naming conventions. See Appendix C of DS&G Chapter 7												
7	Junction names and attribute data (i.e., rim elevation, system type) matches best available information (SPU GIS system, or as-built, or survey data) and differences are explained in Description fields												
8	Information about system type is added to the "Tag" field of the Junction node: (C)ombined, (D)rainage, (S)anitary.												
9	Name of tributary flow monitor is added to the "Tag" field of the Junction node. The name should be separated by a colon from the system type. For example: DS:FM_123-456 for an area with both Drainage and Sanitary sewer tributary to flow monitor FM 123-456.												
10	Inflows = Yes or No as intended. For split-up models, remove inflow at the upstream or downstream models as necessary to not duplicate inflow between upstream and downstream models.												
10.1	Sources of Inflow identified (Baseline, and/or Dry Weather), if any												
10.2	Average flow value (Baseline and/or Dry Weather) verified, if any												
10.3	Time pattern assignment (Meter ID, weekday, weekend) verified, if any												
10.4	Inflow hydrograph time series assignment verified, if any												
11	Either a Surcharge Depth of 999 ft or a Ponded Area of 5,000 sq.ft, but not both, is specified for each of the **non-storage** nodes. If Surcharge Depth is set at 999 ft, Ponded Area must be set to 0. Both Surcharge Depth and Ponded Area should not be equal to zero at the same time.												

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
12	Outfall nodes verified, names and attributes (Invert Elev., Tide Gate - Yes/No) matches best available information (SPU GIS system, as-built, or survey data) and differences are explained in Description fields												
12.1	Please include "system type" info in the Tag field of Outfall: (C)ombined, (D)rainage, (S)anitary.												
12.2	If Inflow = "Yes", verify its types and components as described in item 8												
12.3	If Outfall Type = "TIME SERIES", the correct "Series Name" is selected at the "Time Series Outfall" field												
13	Storage Units nodes are used for modeling offline storage structures (e.g. offline vertical tanks, offline inclined large diameter pipes). This prevents SWMM's pipe lengthening function from affecting the storage volumes of offline storage pipes during a simulation. This also makes the model run faster. When creating a depth-area curve for a storage tank, please account for the effect of the slope of the tank on its storage capacity at different depth levels (do not simplify the stage-area curve of a sloped tank to a horizontal tank). This is especially important for simulating the timing and rate of discharge from the tanks. Storage Units nodes are verified, names and attributes match best available information (SPU GIS system, As-built, or survey data) and difference explained in Description fields.												
13.1	Storage nodes are also used to model non-standard maintenance holes, different chambers in control structures in which their depths determine the volume and frequency of flow across hydraulic structures (e.g. various chambers within a structure that are upstream of weirs, orifices, and/or sluice gates, etc.) so that the Villemonte Equation for submerged weirs and the transition between weir and orifice equations can be fully utilized internally by SWMM during a dynamic wave simulation. If a hydraulic structure does not perform as expected and cannot simulate results consistent with flow monitoring data despite the hydraulic structure itself is modeled correctly (e.g. right weir length, orifice coefficient, etc.), please review whether the upstream and downstream nodes' cross-sectional areas are correct. If the individual cross-sectional area of the chamber upstream and downstream of a hydraulic structure is not equal to a 4-ft diameter maintenance hole, then the upstream and downstream nodes of the hydraulic structure should be modeled by using storage nodes.												
13.2	Please include "system type" info in the Tag field of Storage node: (C)ombined, (D)rainage, (S)anitary.												
13.3	If Inflows = "Yes", verify its types and components as described in item 8.												
13.4	For split-up models, remove inflow at the upstream or downstream models as necessary to not duplicate inflow between upstream and downstream models.												
13.5	Ponded Area = 5000 for non-pressurized tank; for pressurized tank, Ponded Area = 0.01; Ponded Area is applicable to Storage Node.												
13.6	Evap. Factor value is as expected if used												
13.7	If Infiltration= "YES", all of its Green-Ampt parameters are as expected												
13.8	If Storage Curve = "FUNCTIONAL", the correct "Coefficient", "Exponent", and "Constant" are used												
13.9	If Storage Curve = "TABULAR", the correct "Curve Name" is selected at the "Tabular Curve" field												
Links													
14	Implemented new survey and/or as-built information into model, if any. Electronic copy of the new survey and/or as-built information is saved in the "2_NetworkSourceDataNCalc" subfolder of the model.												
15	Added notes to the Description field of the new or updated link regarding to the update. The note should be in the following format: Company (mm/dd/yyyy): comment describing what the update is and the source of information used. (modeler initial)												
16	Link names follow SPU naming conventions. See Appendix C of DS&G Chapter 7												
17	Conduit attribute data (i.e., length, shape, diameter, invert elevations, system type) matches best available information (SPU GIS system, as-built, survey data) and any differences are explained in Description fields												
17.1	Please include "system type" info in the Tag fields of Links: (C)ombined, (D)rainage, (S)anitary.												
17.2	Default Manning's n of 0.013 is applied, other n values are explained in Description fields												
17.3	Head loss coefficients that aren't default are explained in Description fields												
17.4	Flap Gate is verified if used												
17.5	Pipe profiles reviewed and no anomalies are noted												
17.6	Unintended negative slope - information of %Slope can be found in the .rpt file if "Report input summary" was checked before simulation was run.												
17.7	Unintended decreasing flow capacity in a downstream direction (information on flow capacity can be obtained from the .rpt file when "Report Input Summary" was selected on the "General" tab at the start of a simulation run).												
17.8	Unintended zero flow links												
17.9	Unintended large vertical drop (> 10 ft). Use VerticalDropNRiseReview.xlsx												
17.10	Unintended large vertical rise (> 1ft). Use VerticalDropNRiseReview.xlsx												
17.11	Negative offset is reviewed. See EPA SWMM5 warning message.												
17.12	Crown of pipe above ground elevation. Use VerticalDropNRiseReview.xlsx												
17.13	Sediment levels included where information is available (e.g., measurements from flow monitoring) and explained in Description fields												
17.14	If a model is split into submodels, the pipes immediately downstream of inflow nodes in downstream models must be in supercritical flow and not drowned by backwater effect from downstream controls. If the .rpt file of a long term simulation (e.g. 32-year simulation) is available, the inflow pipes must have the following "Fraction of Time in Flow Class" attributes: SupCrit = 0.99, SubCrit, Upcrit, and Downcrit = 0.00, and Avg. Froude Number > 1.00. Otherwise, the pipes are not in unrestricted supercritical flow and cannot be used as inflow pipes. Information about "Fraction of Time in Flow Class" can be found in the "Flow Classification Summary" section of the .rpt file.												
18	Pump Station inlet and outlet node locations are verified												
18.1	Pump station wet well is appropriately represented in the model.												
18.2	Pump Station startup Depth, Shutoff Depth matches best available information (SSDB, as-built, survey data) and any differences are explained in Description fields.												
18.3	Pump operation logic is appropriately modeled.												
18.4	Startup Depth > Shutoff Depth.												
18.5	"Pump Curve" field references the right Pump Curve name.												
19	Orifice inlet and outlet node locations are verified												

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19.1	Orifice attribute data (i.e., Type, shape, dimensions, invert elevations) matches best available information (SPU GIS system, as-built, survey data) and any differences are explained in Description fields												
19.2	Discharge Coeff. value used are as expected and in agreement with overall unit used by model. Set discharge coefficients of all unoperational flap gates to zero and their inlet offset elevations as per As-built drawings/survey data. Add a note in the Description fields of unoperational structures as to what their discharge coefficients should be when they are in operation.												
19.3	Flap Gate is verified if used												
20	Weir inlet and outlet locations are verified												
20.1	Weir attribute data (i.e., Type, dimensions, invert elevations, number of End Contractions) matches best available information (SPU GIS system, as-built, survey data) and any differences are explained in Description fields												
20.2	Discharge Coeff. values used are as expected and in agreement with overall unit used by model												
20.3	Flap Gates are verified if used												
20.4	End Contraction is verified if used												
20.5	End coeff. are verified if used												
21	Outlet's inlet and outlet locations are verified												
21.1	Outlet attribute data (e.g. invert elevations) matches best available information (SPU GIS system, as-built, or survey data) and any differences are explained in Description fields												
21.2	Flap Gates are verified if used												
21.3	Rating Curve selection is correct (e.g. TABULAR/HEAD) for the type of hydraulic structure being modeled.												
21.4	If FUNCTIONAL/DEPTH or FUNCTIONAL/HEAD is selected as the Rating Curve used, the Functional Curve "coefficient" and "Exponent" values entered are correct												
21.5	If TABULAR/DEPTH or TABULAR/HEAD is selected as the Rating Curve used, "Curve Name" selected at the Tabular Curve field is correct.												
21.6	Review that "Outlets" is correctly applied for the hydraulic structures being modeled.												
Controls													
22	Control rules are referencing the right hydraulic structures. The resulting operation of the hydraulic structures as instructed by the rules match operational procedures or measured data. The most appropriate incremental or PID controllers are utilized to match real world performance. Operation of the Control rules can be verified by selecting "Report Control Action" at the "General" tab of the "Option" item on the "Data" tab at the start of a simulation. Once selected, SWMM will print the Control rule action to the .rpt file at the end of a simulation for review.												
22.1	Are all Control Rule source sited in the Control Rules Editor by using Comment lines that are started by single semi-colons?												
Curves													
23	Sources of data used to develop the curves (e.g. SCADA, flow monitor data) are described in the Description field												
24	Spreadsheets, as-built, and survey data used to develop the curves are saved to the"2_NetworkSourceDataNCalc" subfolder of the model												
25	Curves data make sense given the types of curves (e.g. Total depth of a Storage Curve does not exceed the Max. Depth of the Storage Node that references the curve, etc.). Please note that Depths of storage tank curves need to extend all the way to match the max. depth of the associated storage nodes. Also, Area of a tank cannot be zero at the top of the tank.												
26	No unnecessary orphan curves are left in the model. If it is necessary to leave an unreferenced orphan curve in the model, please state the reason in the Description field of the curve (e.g. curve used to model operation of pump station under Dec 2007 storm scenario, etc.).												
Other items related to network development that warrant QA/QC review - to be identified and added by the technical team													

Part 4 - Time Pattern Data Block

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
1	Key monitoring locations used for dry weather flow derivation are identified, reasons for not selecting locations for dry weather flow derivation are documented												
2	Latest available information from Puget Sound Regional Council are utilized for determining subcatchment population. Adjustments for commercial and industrial area employment reviewed, documented, and applied. Methodology for dissolving population values from TAZ zones reviewed and final population values totals reviewed.												
3	Documentation for derivation of wastewater profiles and per capita flow rates reviewed (included separately from model). Spreadsheets used in derivation are saved to "2_NetworkSourceDataNCalc" subfolder of the model.												
4	Weekday and weekend HOURLY wastewater profiles are defined												
5	Flow monitor ID's and the period of time series used to develop profiles are recorded in the Description fields of the time pattern												
6	Correct wastewater profiles are assigned to each subcatchment												
7	Significant inflow from unmodeled and modeled areas (e.g. large users) are applied												
8	Sanitary & dry weather flow balances using a flow meter schematic - dry weather flows used in the model should hold continuity prior to being allocated												
9	Added note to the Description box of the new or updated time pattern. The note should be in the following format: Company(mm/dd/yyyy): comment describing what the update is and the source of information used. (modeler initial)												
10	No unnecessary orphan time patterns are left in the model. If it is necessary to leave an unreferenced time pattern in the model, please state reason in the Description field of the pattern.												
Other items related to dry weather flow components that warrant QA/QC review - to be identified and added by the technical team													

Part 5 - Timeseries Data Block

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
1	level time series are created, populated with field measured data or King County provided level data, and are assigned to outfalls in network. Time versus stage information for Lake Washington and Puget Sound are based on historical level information collected by the U.S. Army Corps of Engineers and NOAA. Salt water density differential, if applicable, are accounted for through adjustment of time versus stage relationship. Time Series Name should be indicative of the source and nature of the time series (e.g. Puget Sound Tidal data, King County Simulated level). Description field should contain a description of the nature, unit, datum, and source of data of the time series. Gage ID used to derive level time series, and any other post processing done to the data are also stated (e.g. Puget Sound Tidal data - Elevation (ft) - NAVD88 Datum. Obtained from NOAA -Station ID: 9447130, corrected for salt/ fresh water density differential)												
1.1	"Use external data file named below" box is checked and the right level time series is selected. The level time series should be saved in the same location of where the inp file is saved.												

Item	Description	Reviewer	Date of Review	Review Comments	Require Action	Reviewer & Team Recommended Action	Modeler Response	Follow-up Submittal Date	Follow-up Reviewer	Follow-up Reviewer Comment	Follow-up Action	Follow-up Consultant Response and Comments	Final Resolution
1.2	Two Header lines beginning with a semi-colon should be included in a Level time series .dat file. First comment line should include the Nature of the time series, ID of Gage used, Datum of data, span of data used to generate time series, and any post processing done to the data (e.g. ;Puget Sound Tidal Level. Station ID: 9447130. Datum: NAVD88. Span of data used to generate time series: 1999 - present, corrected for salt-fresh water density differential). The Second header line should contain header description of each of the columns of the time series (e.g. ;Date(mm/dd/yyyy) Time(hh:mm) Elevation (ftNAVD88))												
2	Rainfall time series are created from data collected by appropriate gages for the modeled area. All rainfall data from Sept 1977 to present including calibration period are included in the rainfall time series. Time Series Name should contain name of the rain gage ID and Scaling Factor applied if any (e.g. RG03_1_0167). Description field should contain ID of rain gages used to develop the time series, unit of the time series, and description of any post-processing of the data (e.g. RG03. Rainfall Depth (in). Corrected data to remove false tips in fall 2009. Scaling factor: 1.0167).												
2.1	"Use external data file named below" box is checked and the right rainfall time series is selected. The rainfall time series should be saved in the same location as where the inp file is saved.												
2.2	Two Header lines beginning with a semi-colon should be included in a rainfall series .dat file. First comment line should include the Nature of the time series, ID of Gage used, span of data used to generate time series, and scaling factor used if any (e.g. ;Rainfall Depth, Gage ID: RG03, Span of data used to generate time series: 1977 - present, Scaling factor: 1.0167). The Second header line should contain header description of each of the columns of the time series (e.g. ;Date(mm/dd/yyyy) Time(hh:mm) Rainfall Depth (in))												
3	EvapoTranspiration time series created and contains evapotranspiration data from 1931 to present including calibration period. Description field contains the source and unit of data (e.g. Daily evaporation data (in/day) from Puyallup Station)												
3.1	"Use external data file named below" box is checked and the right evapotranspiration time series is selected. The evapotranspiration time series should be saved in the same location of where the inp file is saved.												
3.2	Two Header lines beginning with a semi-colon should be included in an evapotranspiration series .dat file. First comment line should include the Nature of the time series, ID/source of Gage used, span of data used, and any post-processing done to data (e.g. ;Daily Evapotranspiration Depth. Gage ID: Puyallup Station. Span of data used to generate time series: 1988 - present. Time series is repeated to fill in data before 1988). The Second header line should contain header description of each of the columns of the time series (e.g. ;Date(mm/dd/yyyy) Time(hh:mm) ETo Depth (in/day))												
4	External inflow time series not generated by an upstream SWMM model (e.g. Simulated inflow from King County). Time series name contains the inflow node ID and the source of the time series (e.g. 044-087_fromKC). The Description field contains a description of the background of the time series (e.g. Inflow Time series was generated by the King County sewer model. Provided by King County on 02/08/2012. Unit of time series: CFS but converted to MGD by SPU).												
4.1	"Use external data file named below" box is checked and the right time series is selected. The time series should be saved in the same location of where the inp file is saved.												
4.2	Two Header lines beginning with a semi-colon should be included in an inflow time series .dat file. First comment line should include the Nature of the time series, where the inflow is applied in the model, ID of Gage used or source of data, and any post processing done to the data (e.g. ;Inflow Time Series generated by King County sewer model. Inflow Node: 044-087. Provided by King County on 02/08/2012. Original unit of the time series was cfs and it was subsequently converted to mgd by SPU). The Second header line should contain header description of each of the columns of the time series (e.g. ;Date(mm/dd/yyyy) Time(hh:mm) Flow (mgd))												
Other items related to data groups that warrant QA/QC review - to be identified and added by the technical team													