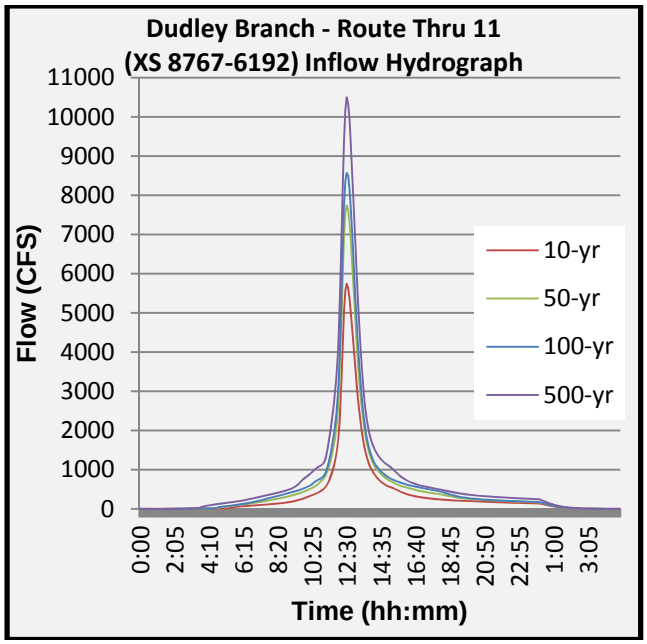
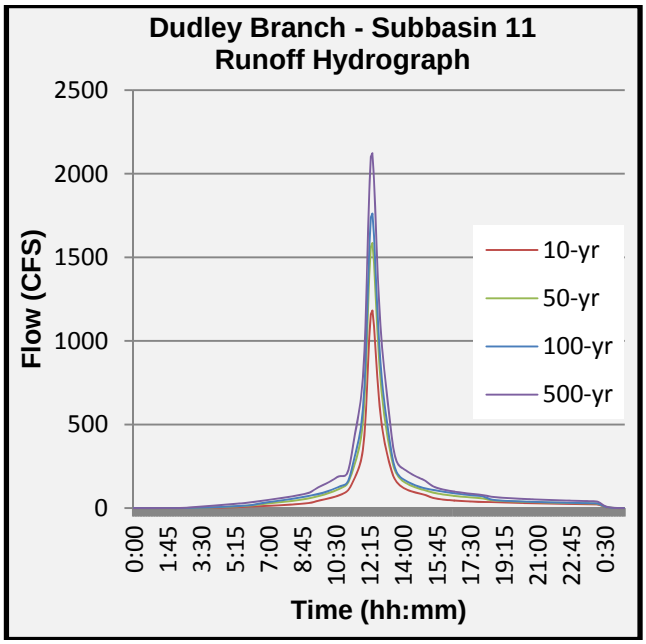
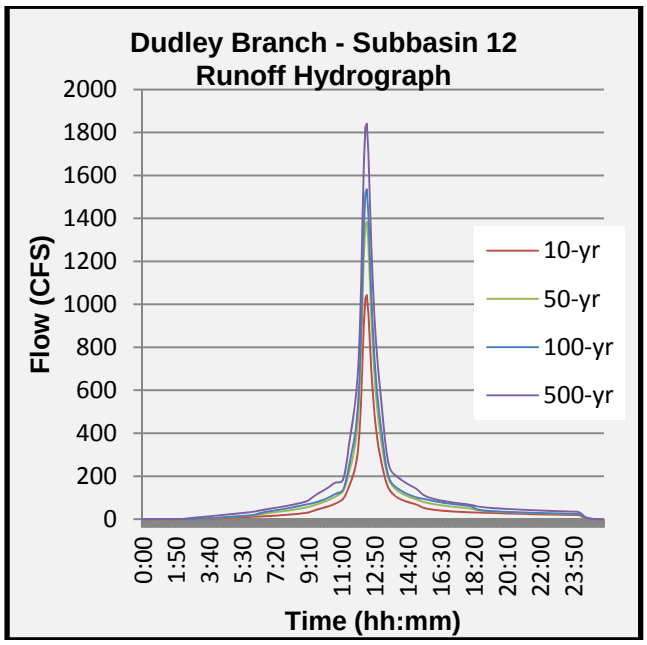
Appendix C: 10-, 50-, 100-, & 500-Year Hydrographs

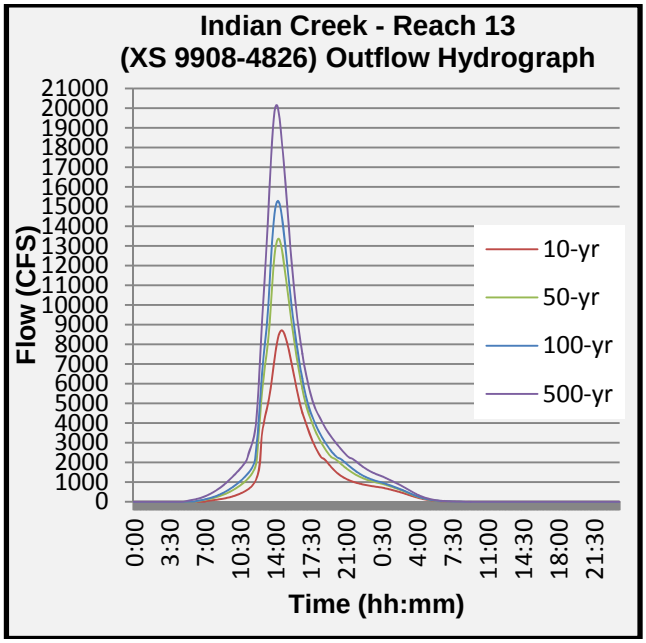
Dudley Branch

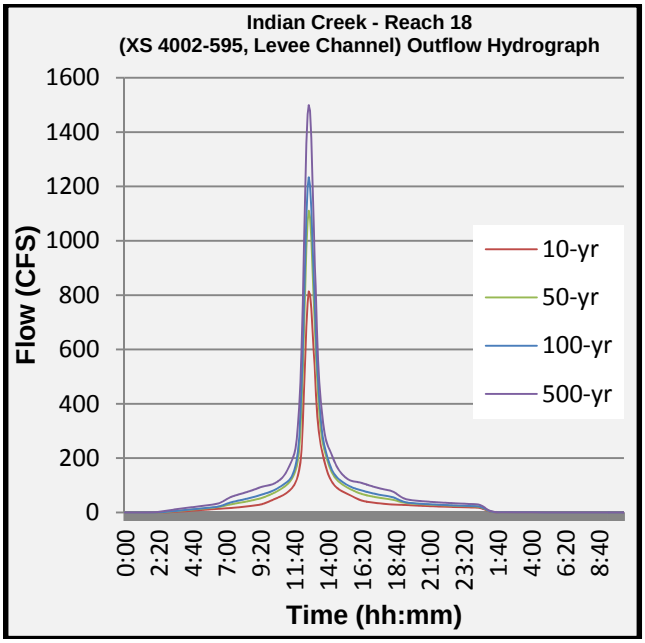


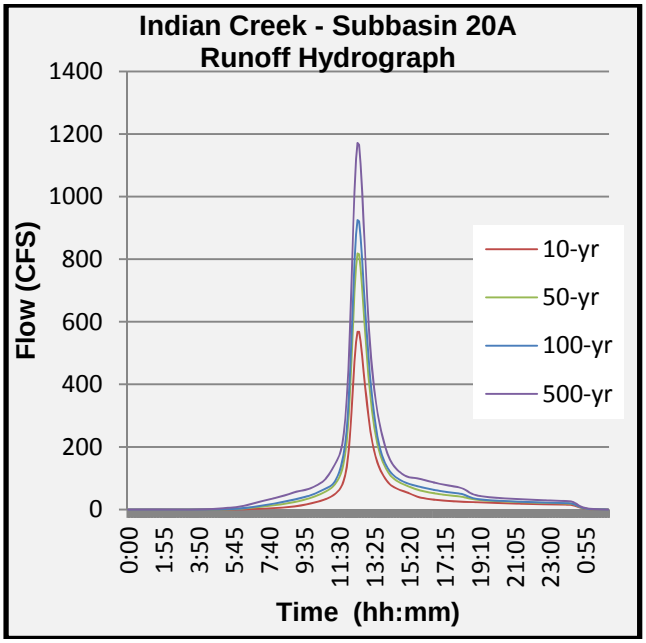


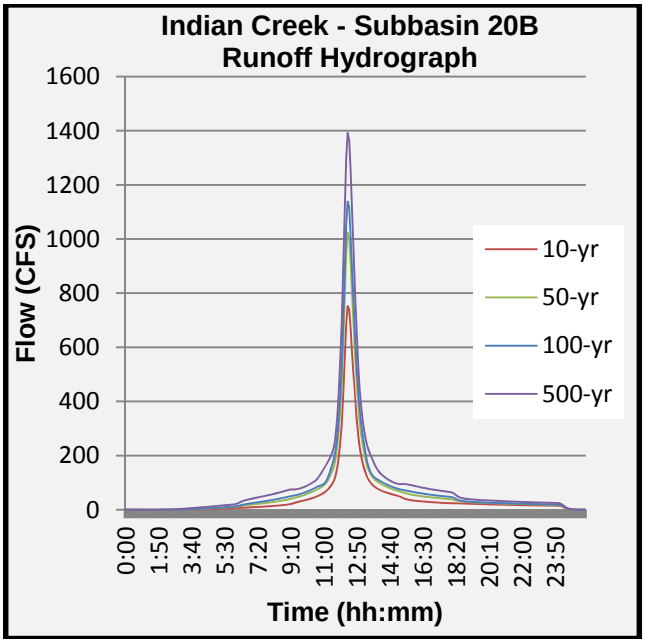


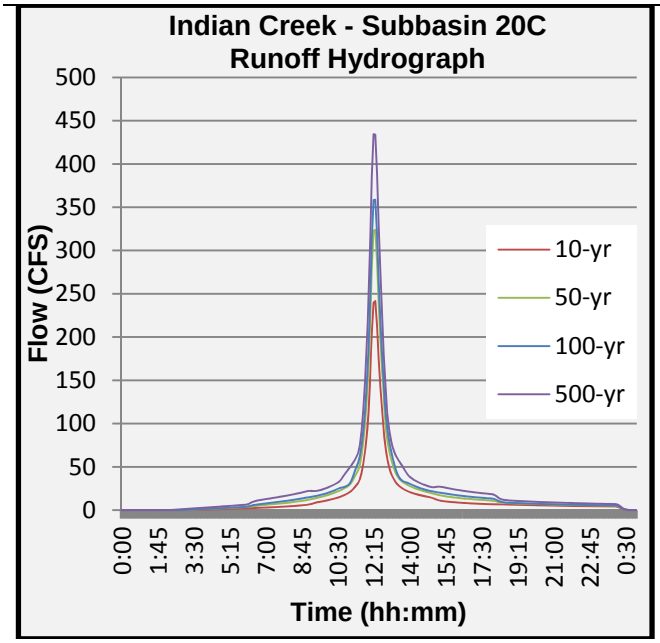
Indian Creek



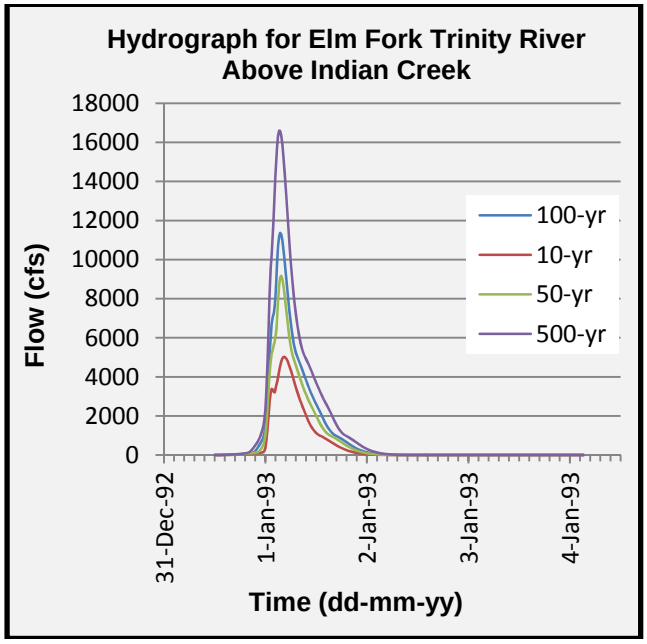


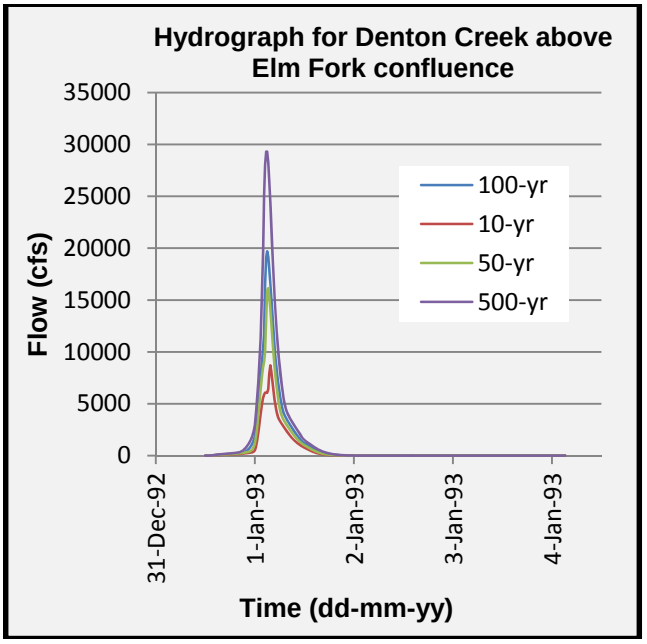


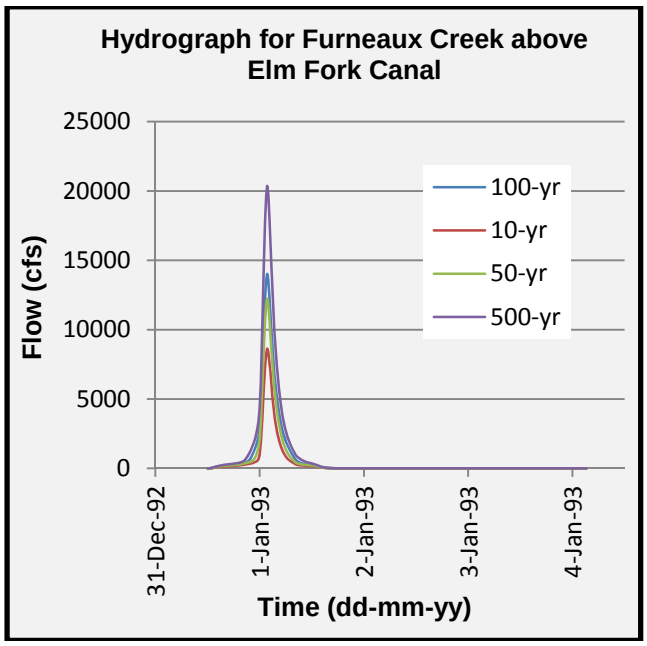


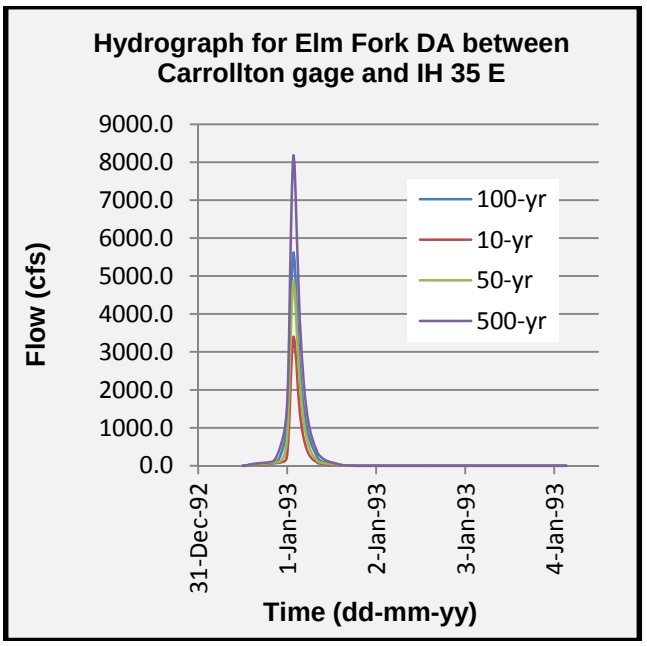

Indian Creek - Subbasin 20C
Runoff Hydrograph
Flow (CFS)
500
450
400
350
300
250
200
150
100
50
0
0:00
1:45
3:30
5:15
7:00
8:45
10:30
12:15
14:00
15:45
17:30
19:15
21:00
22:45
0:30
Time (hh:mm)
10-yr
50-yr
100-yr
500-yr

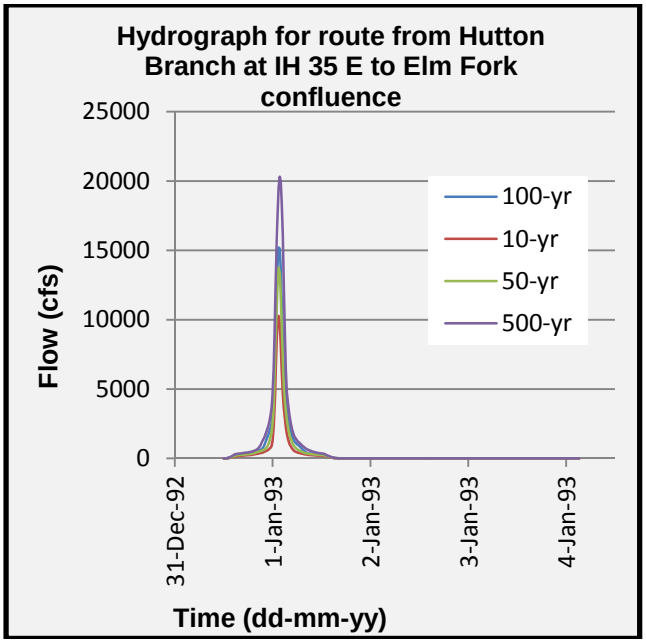
Elm Fork Trinity River

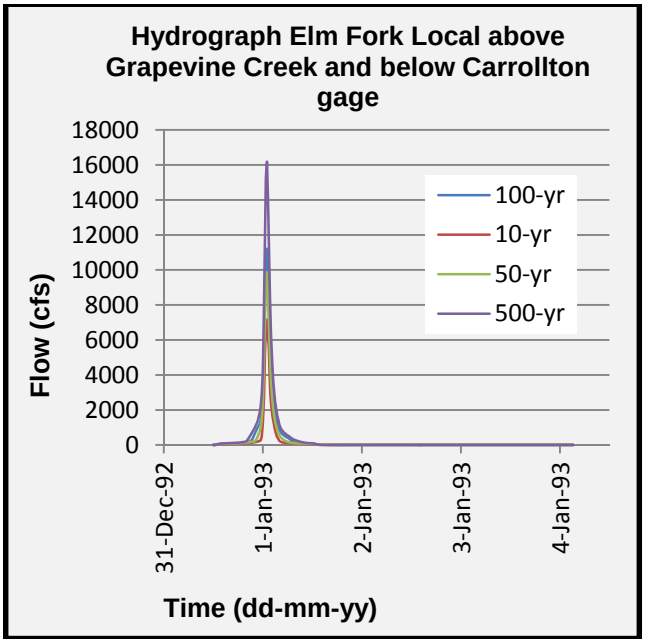


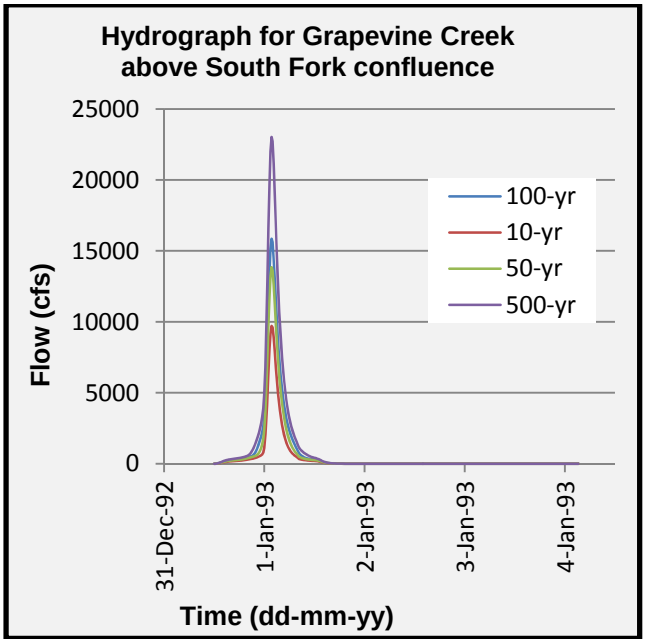




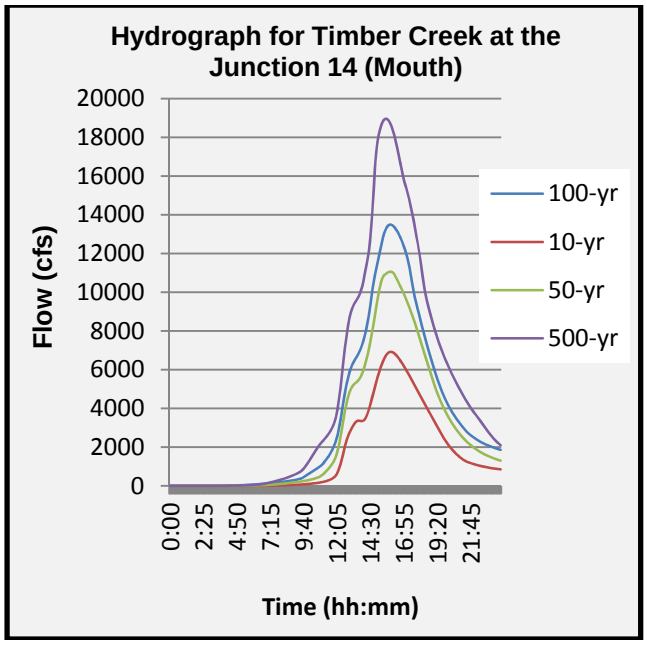



Hydrograph for route from Hutton Branch at IH 35 E to Elm Fork confluence
25000
20000
15000
10000
5000
0
Flow (cfs)
100-yr
10-yr
50-yr
500-yr
31-Dec-92
1-Jan-93
2-Jan-93
3-Jan-93
4-Jan-93
Time (dd-mm-yy)


Hydrograph Elm Fork Local above Grapevine Creek and below Carrollton gage
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Flow (cfs)
100-yr
10-yr
50-yr
500-yr
31-Dec-92
1-Jan-93
2-Jan-93
3-Jan-93
4-Jan-93
Time (dd-mm-yy)


Hydrograph for Grapevine Creek above South Fork confluence
25000
20000
15000
10000
5000
0
Flow (cfs)
100-yr
10-yr
50-yr
500-yr
31-Dec-92
1-Jan-93
2-Jan-93
3-Jan-93
4-Jan-93
Time (dd-mm-yy)

Timber Creek



Finalized Checklists

Checklist for Hydrologic Analysis

Stream Name: Dudley Branch

Number	Sub Step		Sub Step Description	Reviewer Comments	Issues (Y/N)
1	Determine if Method is Appropriate	a	Read hydrology report and effective FIS hydrology section (if available) to determine methodology used in both studies	Do not have Hydrology TSDN for this data, although the peak flows from this model match those in the Hydraulics TSDN	N
		b	Check with scoped method and verify	Matches with the scope.	N
2	Review Drainage Areas	a	Check boundaries, areas, discharge points, and streamline delineations.	This data was not provided	N
3	Review Rainfall-runoff Modeling	a	Run Model	Had to modify model to run. - Table "Reservoir1" storage-discharge units from 1000m3 to AC-FT. Units of AC-FT are consistent with units of all other parired data. Model ran fine after that.	N
		b	Verify that input and output cross check	Verified	N
		c	Sub-watersheds are sufficient	Not provided	N
		d	CNs/infiltration	SCS Curve Number method was used. Missing TSDN, therefore sources not listed for CN determination. CN's seem high but within reasonable range, Future Developed Land Use was used for this hydrology.	N
		e	Reach routing	Watersheds use lag times, reaches use Modified Puls with storage-discharge tables. No TSDN, therefore uncertain on how these parameters were developed	N
		f	Reservoir routing	No Reservoirs	N
		g	Calibration and hypothetical rainfall	No data was available for model calibration	N
		h	Rainfall distribution	A "frequency storm" was used for rainfall. They are all 24-hour (1 day) storms. Since there is no TSDN, it is uncertain where the 24 Hour rainfall depths (in) came from.	N
		i	Initial conditions assumptions	Reasonable	N
		j	Review hydrographs to ensure that simulation was run long enough to capture peak	Yes. The simulation was done at a 5 minute intervel, and the peak was captured.	N
		k	For large watersheds where the lag is generally greater than 12 hours, evaluate whether a 24 storm is suitable	The watersheds are not significantly large. 24 hour storm is suitable.	N
4	Review Calibration	a	Check that observed and simulated hydrographs have same shape, peak, volume and timing (If applicable)	Not Applicable	N
5	Review Discharges	a	Check with FIS for consistency	HMS discharges match RAS flow data.	N
6	Results	a	Provide comments	The model looks reasonable and no significant issues or problems are found in the data and approach	N
7	Present Results to Senior Engineer	a	Extract time-series data and present it to senior engineer	Time Series data extracted	N

Additional Comments

1. 3 separate hydrographs were extracted, one for each branch (1) and one for each additional subbasin (2) along our stretch of river.

	Jeff Whanger, PE	12/27/2011
Reviewer Signature	Reviewer Name	Date

	James Keith	1/6/2012
Approver Signature	Approver Name	Date

Checklist for Hydrologic Analysis

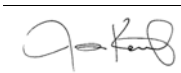
Stream Name: Indian Creek

Number	Sub Step		Sub Step Description	Reviewer Comments	Issues (Y/N)
1	Determine if Method is Appropriate	a	Read hydrology report and effective FIS hydrology section (if available) to determine methodology used in both studies	Do not have Hydrology TSDN for this data, although the peak flows from this model match those in the Hydraulics TSDN	N
		b	Check with scoped method and verify	Matches with the scope.	N
2	Review Drainage Areas	a	Check boundaries, areas, discharge points, and streamline delineations.	This data was not provided	N
3	Review Rainfall-runoff Modeling	a	Run Model	Had to modify model to run. - Table "Reach-11(PROPCN12.IH1)" had two consecutive rows of double zeros. Deleting the second row fixed the issue and the model ran.	N
		b	Verify that input and output cross check	Verified	N
		c	Sub-watersheds are sufficient	Not provided	N
		d	CNs/infiltration	SCS Curve Number method was used. Missing TSDN, therefore sources not listed for CN determination. CN's seem high but within reasonable range.	N
		e	Reach routing	Watersheds use lag times, reaches us storage-discharge tables. No TSDN, therefore uncertain on how these parameters were developed	N
		f	Reservoir routing	No Reservoirs	N
		g	Calibration and hypothetical rainfall	No data was available for model calibration	N
		h	Rainfall distribution	A "frequency storm" was used for rainfall. They are all 24-hour (1 day) storms. Since there is no TSDN, it is uncertain where their 24 Hour rainfall depths (in) came from.	N
		i	Initial conditions assumptions	Reasonable	N
		j	Review hydrographs to ensure that simulation was run long enough to capture peak	Yes. The simulation was done at a 5 minute intervel, and the peak was captured	N
		k	For large watersheds where the lag is generally greater than 12 hours, evaluate whether a 24 storm is suitable	The watersheds are not significantly large. 24 hour storm is suitable.	N
4	Review Calibration	a	Check that observed and simulated hydrographs have same shape, peak, volume and timing (If applicable)	Not Applicable	N
5	Review Discharges	a	Check with FIS for consistency	HMS discharges match RAS flow data.	N
6	Results	a	Provide comments	The model looks reasonable and no significant issues or problems are found in the data and approach	N
7	Present Results to Senior Engineer	a	Extract time-series data and present it to senior engineer	Time Series data extracted	N

Additional Comments

1. 5 separate hydrographs were extracted, one for each branch (2) and one for each additional subbasin (3) along our stretch of river.

	Jeff Whanger, PE	12/27/2011
Reviewer Signature	Reviewer Name	Date

	James Keith	1/6/2012
Approver Signature	Approver Name	Date

Checklist for Hydrologic Analysis

Stream Name: Elm Fork Trinity River

Number	Sub Step		Sub Step Description	Reviewer Comments	Issues (Y/N)
1	Determine if Method is Appropriate	a	Read hydrology report and effective FIS hydrology section (if available) to determine methodology used in both studies	Description in the FIS matches with input. TSDN report was not available.	N
		b	Check with scoped method and verify	Matches with the scope.	N
2	Review Drainage Areas	a	Check boundaries, areas, discharge points, and streamline delineations.	GIS files were not available for verification	N
3	Review Rainfall-runoff Modeling	a	Run Model	The model ran successfully without any errors.	N
		b	Verify that input and output cross check	Output files were created and verified	N
		c	Sub-watersheds are sufficient	Delineations were not available to verify	N
		d	CNs/infiltration	Uniform Loss Rate method and Snyder Unit Graphs were used.	N
		e	Reach routing	Reach Routing was done using a hydraulic model. Storage routing option was used with reservoir volume and discharge. The results apper to be reasonable.	N
		f	Reservoir routing	No reservoirs	N
		g	Calibration and hypothetical rainfall	Hypothetical Storm Data was used. Calibration information is not available.	N
		h	Rainfall distribution	SCS Type II distribution was used.	N
		i	Initial conditions assumptions	Reasonable	N
		j	Review hydrographs to ensure that simulation was run long enough to capture peak	Yes. The simulation was done at a 15 minute intervel, and the peak was captured.	N
		k	For large watersheds where the lag is generally greater than 12 hours, evaluate whether a 24 storm is suitable	The storm used is suitable and captures the peak.	N
4	Review Calibration	a	Check that observed and simulated hydrographs have same shape, peak, volume and timing (If applicable)	Not Applicable	N
5	Review Discharges	a	Check with FIS for consistency	Analysis is consistent with FIS	N
6	Results	a	Provide comments	The model looks reasonable and no significant issues or problems are found in the data and approach	N
7	Present Results to Senior Engineer	a	Extract time-series data and present it to senior engineer	Time Series data extracted at 50 sqmi location.	N

Additional Comments

K. N. Vamshi	Vamshi Konduru-Narsimha	2/9/2012
Reviewer Signature	Reviewer Name	Date

	James Keith	2/24/2012
Approver Signature	Approver Name	Date

Checklist for Hydrologic Analysis

Stream Name: Timber Creek

Number	Sub Step		Sub Step Description	Reviewer Comments	Issues (Y/N)
1	Determine if Method is Appropriate	a	Read hydrology report and effective FIS hydrology section (if available) to determine methodology used in both studies	Description in the FIS matches with the hydrology TSDN report	N
		b	Check with scoped method and verify	Matches with the scope.	N
2	Review Drainage Areas	a	Check boundaries, areas, discharge points, and streamline delineations.	Sub Basin boundaries, discharge points and stream line delineations appear to be reasonable	N
3	Review Rainfall-runoff Modeling	a	Run Model	The model ran successfully without any errors.	N
		b	Verify that input and output cross check	Verified	N
		c	Sub-watersheds are sufficient	Yes	N
		d	CNs/infiltration	SCS Curve Number method was used. SSURGO was used for Soils data, and NCTCOG was used for landuse data. Curve numbers look reasonable.	N
		e	Reach routing	As per the report, storage discharge data was developed using HEC-RAS models. Lag times are calculated using TR-55	N
		f	Reservoir routing	NA	N
		g	Calibration and hypothetical rainfall	No data was available for model calibration	N
		h	Rainfall distribution	SCS Type III distribution was used for the flows. Storm depth was calculated from NCTCOG Integrated Stormwater Management Manual (iSWM)	N
		i	Initial conditions assumptions	Reasonable	N
		j	Review hydrographs to ensure that simulation was run long enough to capture peak	Yes. The simulation was done at a 5 minute intervel, and the peak was captured	N
		k	For large watersheds where the lag is generally greater than 12 hours, evaluate whether a 24 storm is suitable	The watersheds are not significantly large. 24 hour storm is suitable.	N
4	Review Calibration	a	Check that observed and simulated hydrographs have same shape, peak, volume and timing (If applicable)	Not Applicable	N
5	Review Discharges	a	Check with FIS for consistency	Analysis is consistent with FIS	N
6	Results	a	Provide comments	The model looks reasonable and no significant issues or problems are found in the data and approach	N
7	Present Results to Senior Engineer	a	Extract time-series data and present it to senior engineer	Time Series data extracted	N

Additional Comments

K. N. Vamshi	Vamshi Konduru-Narsimha	12/2/2011
Reviewer Signature	Reviewer Name	Date

	James Keith	12/14/2011
Approver Signature	Approver Name	Date

CARROLLTON

City of Carrollton
Denton County, Texas
Floodplain Update Study

Key to Features

Study Streams

Drainage Areas

Indian 6
0.73 Sq. Mi.

Indian 2
0.48 Sq. Mi.

Indian 3
0.28 Sq. Mi.

Indian 1
0.57 Sq. Mi.

Indian 5
0.1 Sq. Mi.

Indian 4
1.2 Sq. Mi.

Indian 11
0.71 Sq. Mi.

Indian 7
0.74 Sq. Mi.

Indian 13
0.66 Sq. Mi.

Indian 12
1.2 Sq. Mi.

Indian 18
0.78 Sq. Mi.

City of The Colony

Indian 8
1.1 Sq. Mi.

Indian 10
0.52 Sq. Mi.

Indian 14
0.12 Sq. Mi.

Indian 16
0.79 Sq. Mi.

City of Plano

City of Lewisville

Furneaux 1
0.44 Sq. Mi.

Indian 9
1.7 Sq. Mi.

Indian 17
0.34 Sq. Mi.

Indian 15
1 Sq. Mi.

Indian 19
1.2 Sq. Mi.

Furneaux 2
0.36 Sq. Mi.

Dudley 1
0.39 Sq. Mi.

Furneaux 3
0.39 Sq. Mi.

Dudley 2
0.36 Sq. Mi.

Furneaux 6_FD1
0.054 Sq. Mi.

Furneaux 6_FE3
0.086 Sq. Mi.

Furneaux 5_FE1
0.25 Sq. Mi.

Indian 20D
0.58 Sq. Mi.

Furneaux 4
0.14 Sq. Mi.

Furneaux 7_HL4
0.19 Sq. Mi.

Dudley 4
0.32 Sq. Mi.

Dudley 3
0.37 Sq. Mi.

Furneaux 6_FE4
0.087 Sq. Mi.

Furneaux 8_HL3
0.22 Sq. Mi.

Indian 20C
0.1 Sq. Mi.

Furneaux 10B
0.31 Sq. Mi.

Indian 20B
0.36 Sq. Mi.

Furneaux 9_HL2
0.17 Sq. Mi.

Furneaux 10A
0.51 Sq. Mi.

Furneaux 12
0.6 Sq. Mi.

Dudley 6
0.38 Sq. Mi.

Dudley 5
0.15 Sq. Mi.

Dudley 8
0.33 Sq. Mi.

Furneaux 13
0.36 Sq. Mi.

Furneaux 10C
0.26 Sq. Mi.

Furneaux 10D
0.25 Sq. Mi.

Indian 20A
0.39 Sq. Mi.

Furneaux 15
0.31 Sq. Mi.

Dudley 10
0.75 Sq. Mi.

Furneaux 14
0.34 Sq. Mi.

Dudley 11
0.56 Sq. Mi.

Dudley 9
0.21 Sq. Mi.

Furneaux 11
0.63 Sq. Mi.

Furneaux 18
0.59 Sq. Mi.

City of Dallas

City of Carrollton

Furneaux 17
0.2 Sq. Mi.

Furneaux 16
0.15 Sq. Mi.

Dudley 12
0.48 Sq. Mi.

Furneaux 22
0.091 Sq. Mi.

Furneaux 21
0.31 Sq. Mi.

Furneaux 19
0.51 Sq. Mi.

Furneaux 24
0.76 Sq. Mi.

Furneaux 20
0.39 Sq. Mi.

Furneaux 26
1 Sq. Mi.

Furneaux 23
0.29 Sq. Mi.

Furneaux 25
0.44 Sq. Mi.

Furneaux 27
0.18 Sq. Mi.

City of Addison

City of Coppell

Figure 3.
City of Carrollton
Drainage Area Map

N
W E
S

0 4,000 8,000
Feet

Halff Associates
ENGINEERS • ARCHITECTS • SCIENTISTS • PLANNERS • SURVEYORS