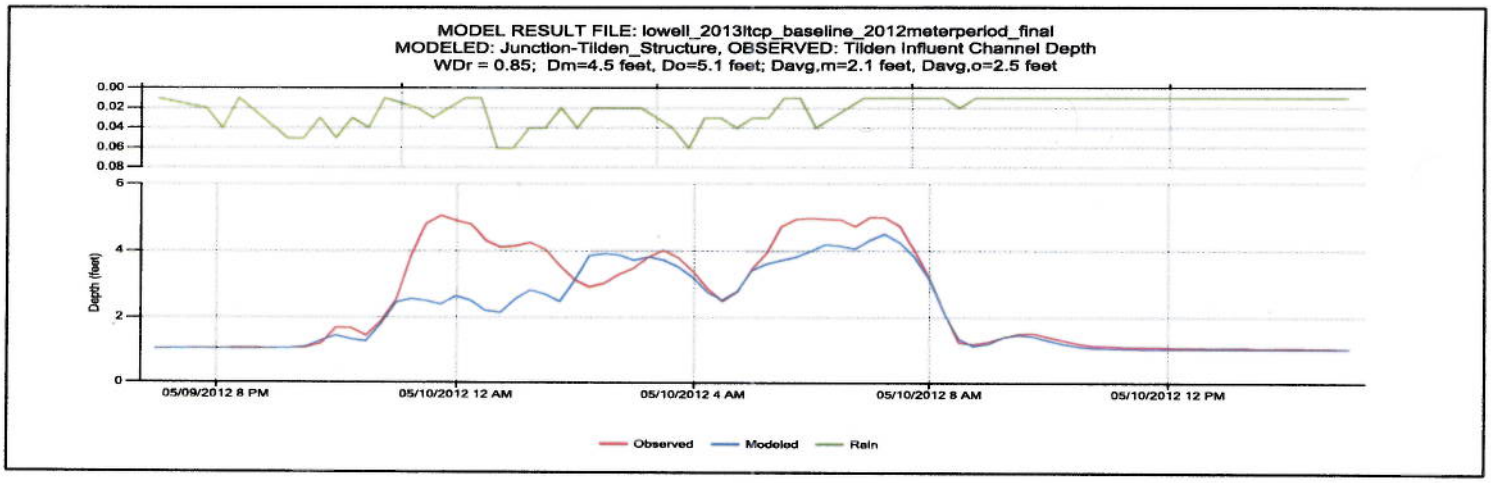
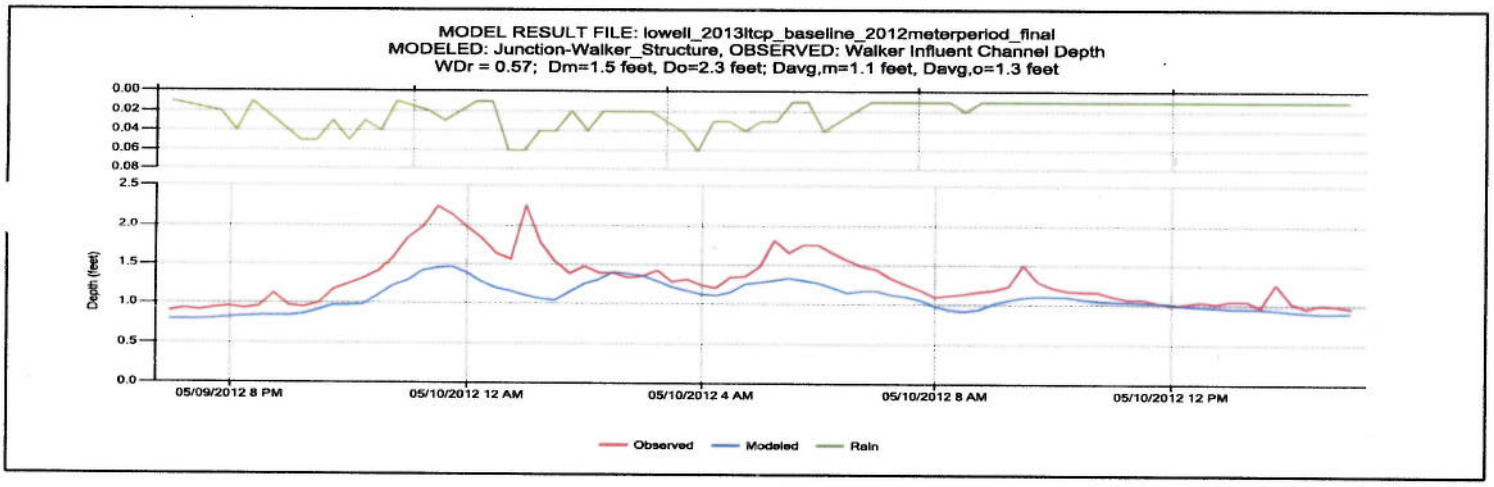
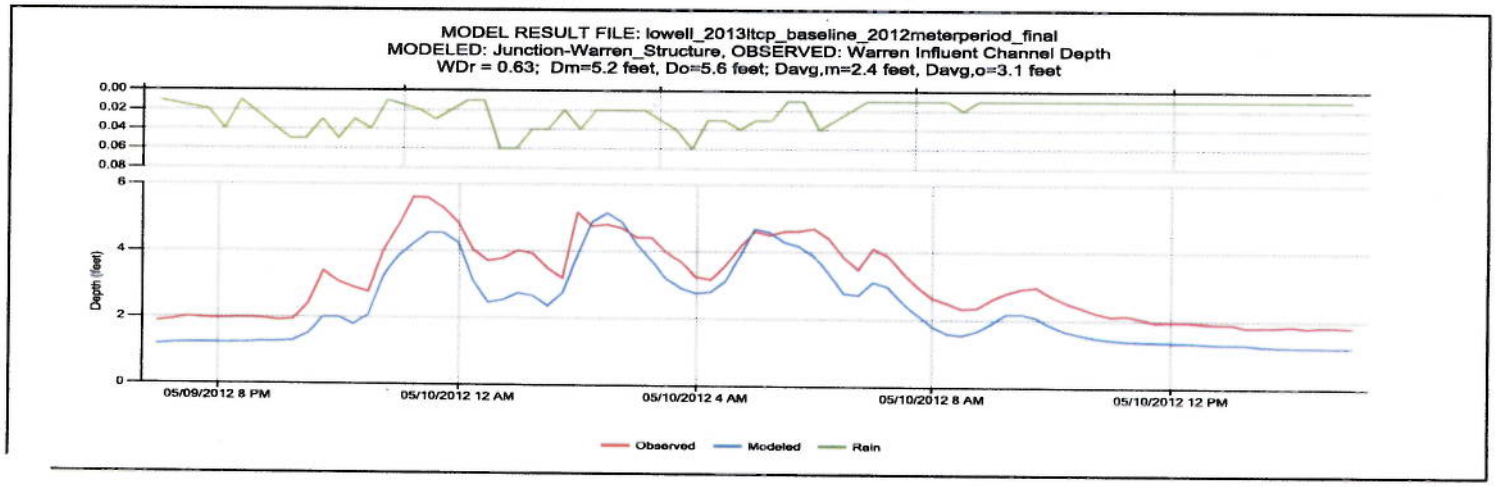
Tilden Influent Channel Depth



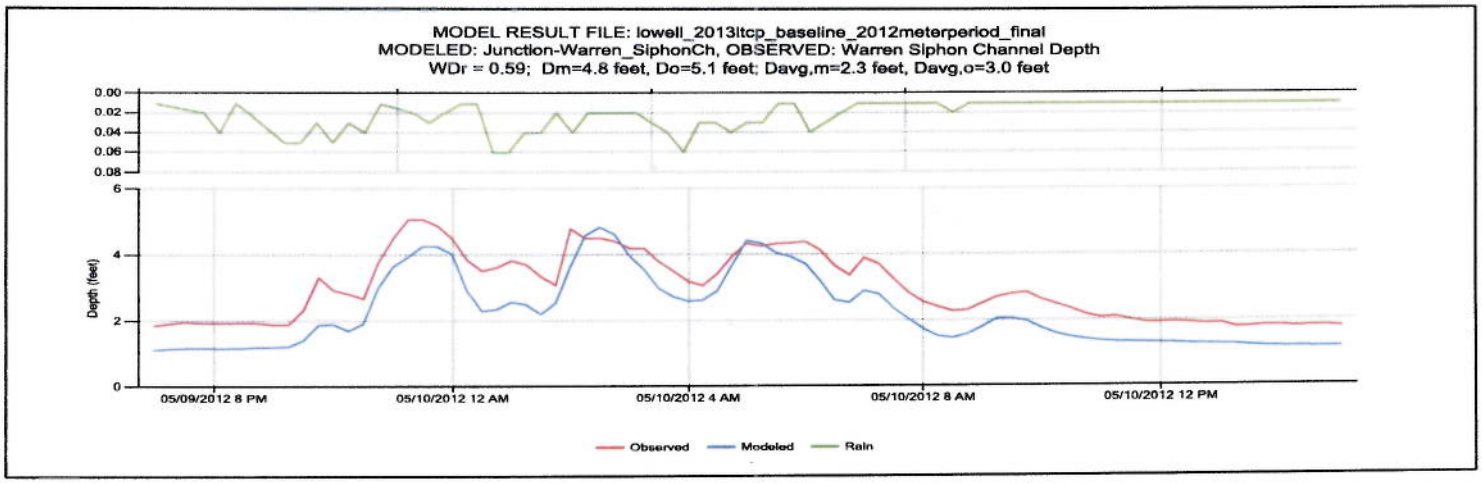
Walker Influent Channel Depth



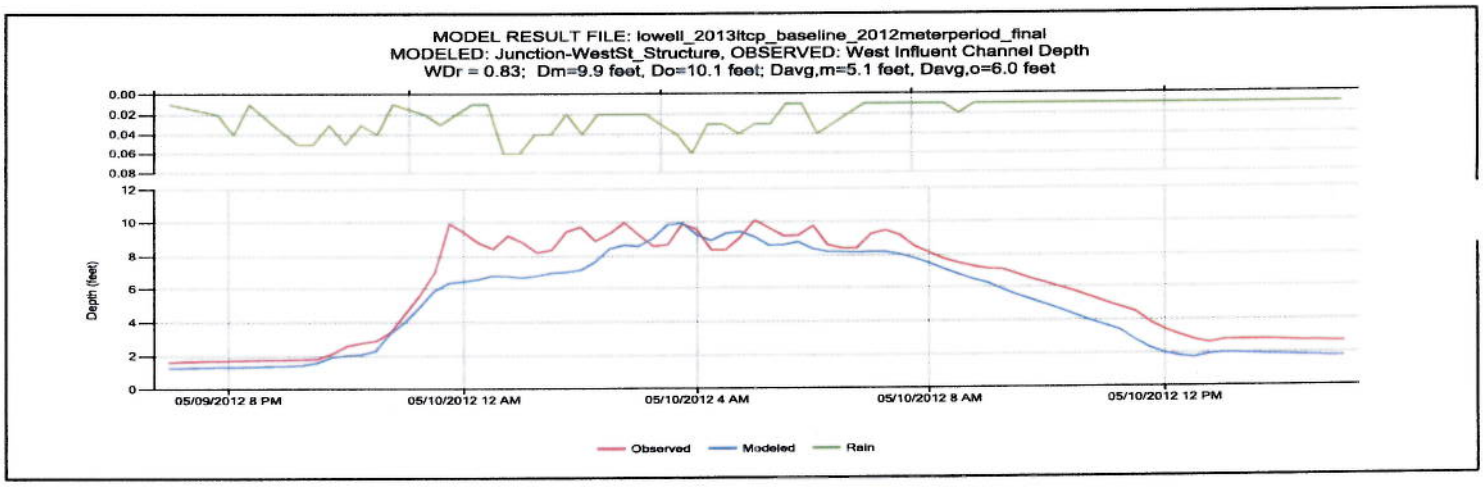
Warren Influent Channel Depth



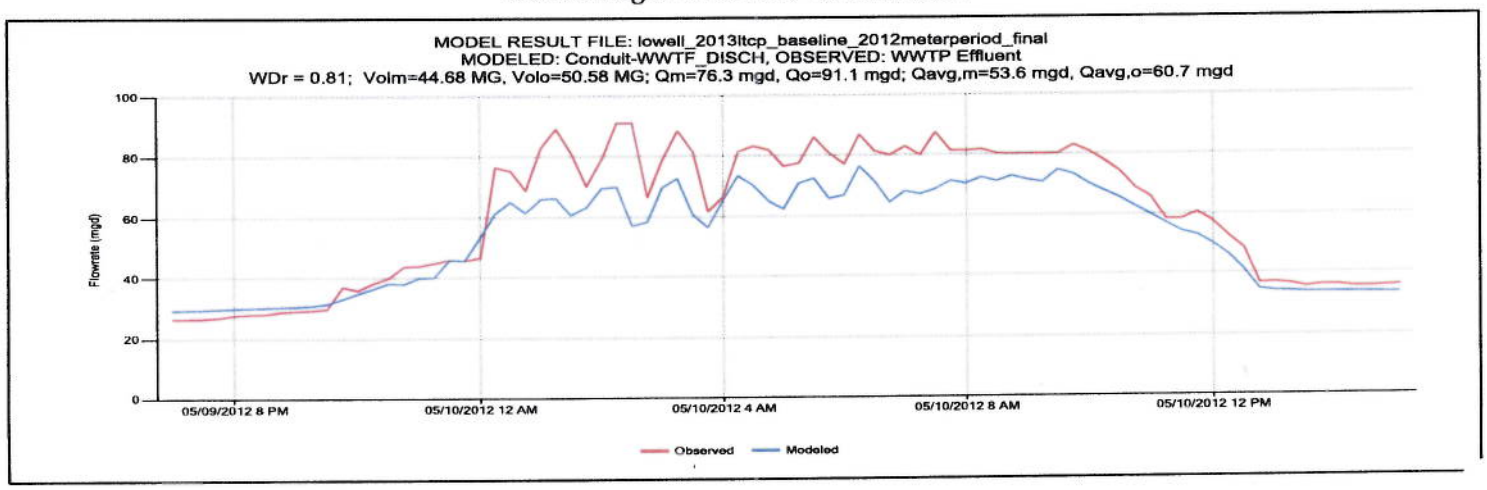
Warren Siphon Channel Depth



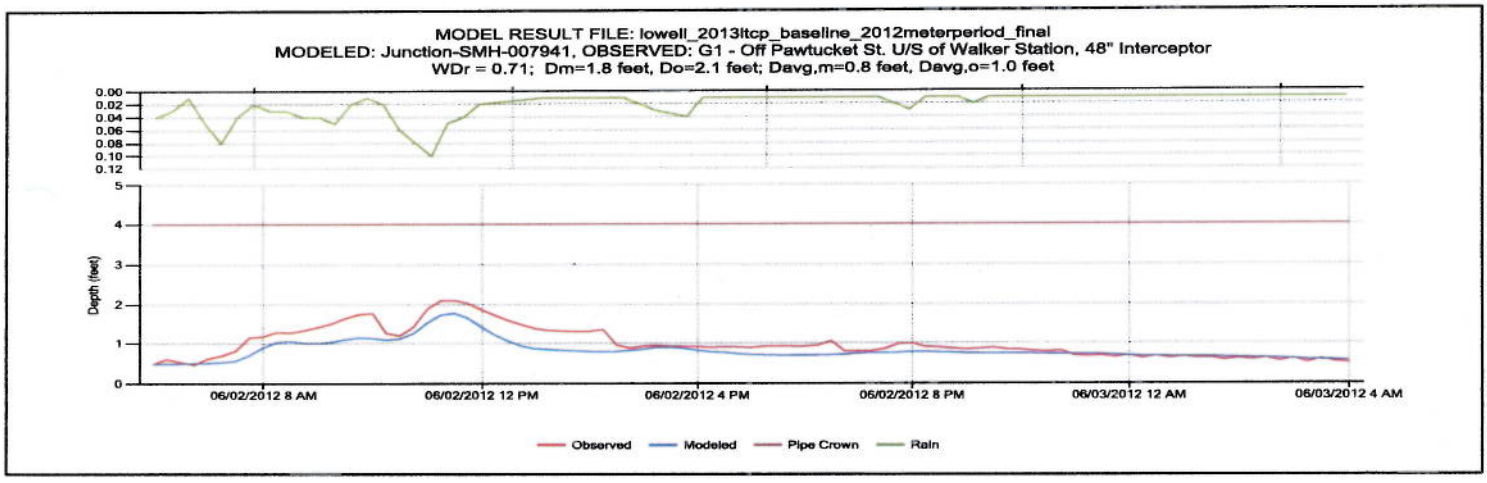
West Influent Channel Depth

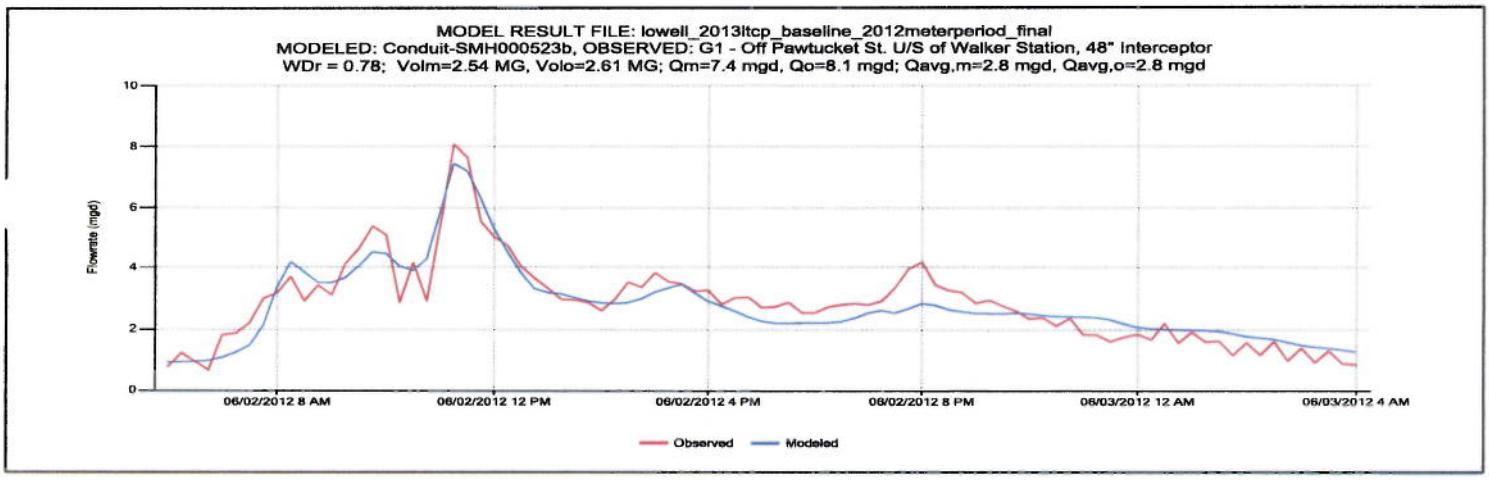


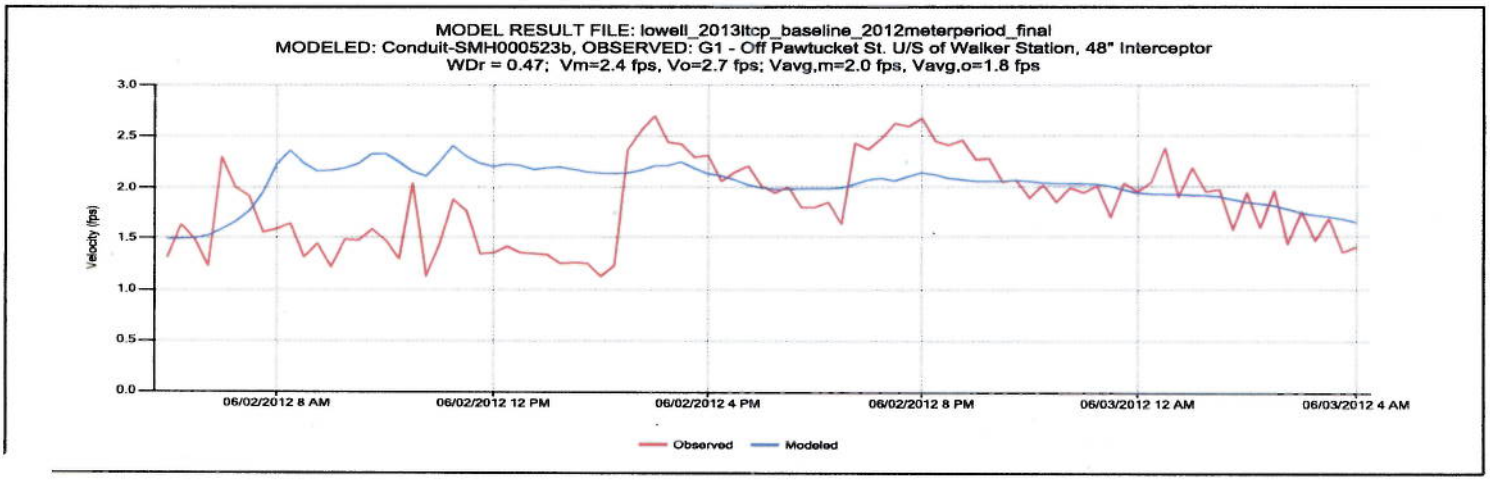
Lowell Regional WWTF Effluent Flow



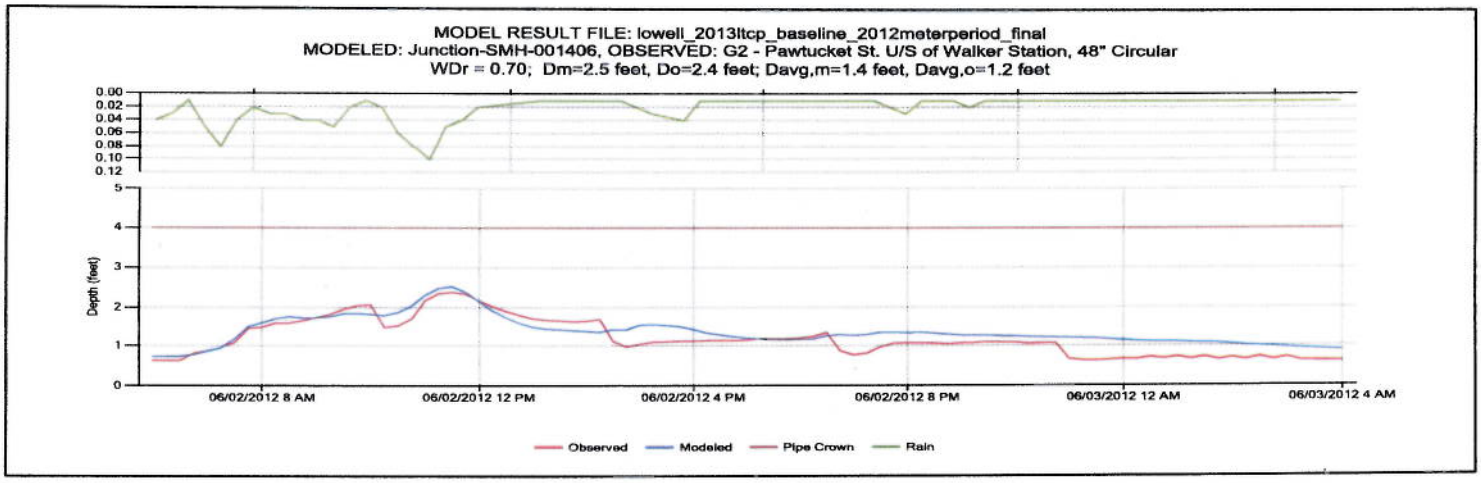
G1-Storm 3

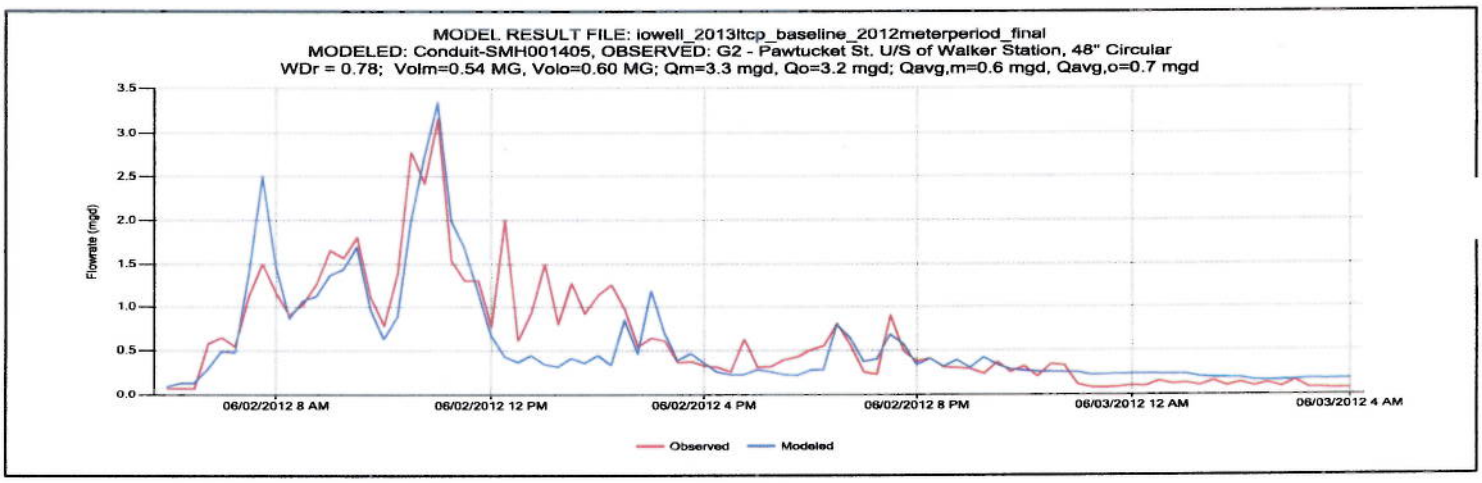

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-007941, OBSERVED: G1 - Off Pawtucket St. U/S of Walker Station, 48" Interceptor
WDr = 0.71; Dm=1.8 feet, Do=2.1 feet; Davg,m=0.8 feet, Davg,o=1.0 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

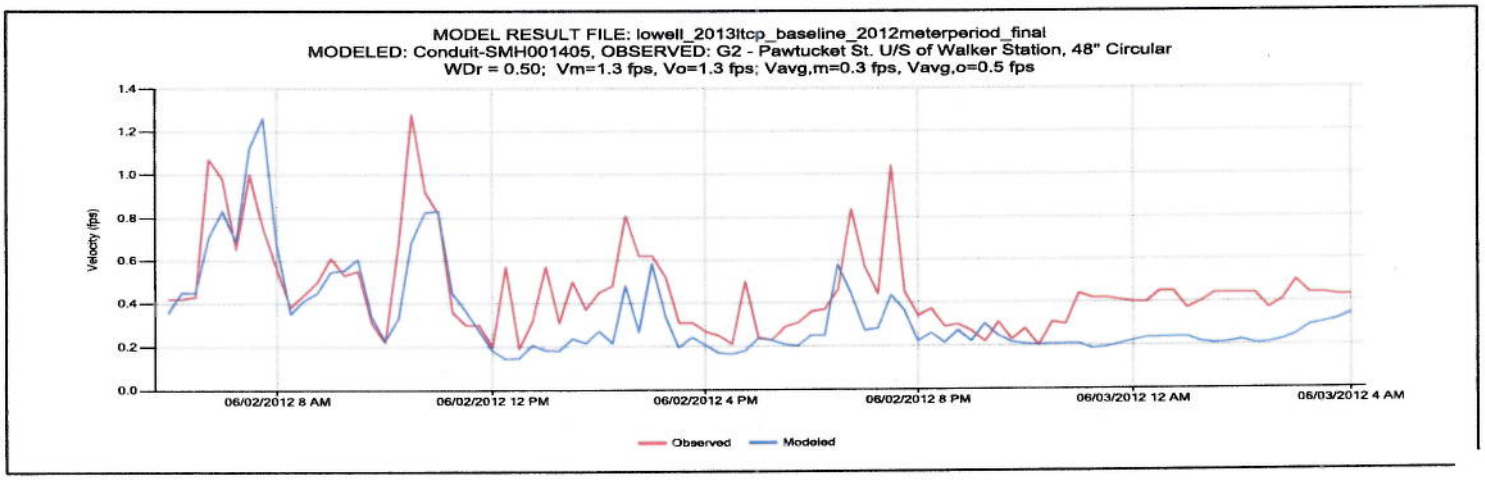

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH000523b, OBSERVED: G1 - Off Pawtucket St. U/S of Walker Station, 48" Interceptor
WDr = 0.78; Volm=2.54 MG, Volo=2.61 MG; Qm=7.4 mgd, Qo=8.1 mgd; Qavg,m=2.8 mgd, Qavg,o=2.8 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH000523b, OBSERVED: G1 - Off Pawtucket St. U/S of Walker Station, 48" Interceptor
WDr = 0.47; Vm=2.4 fps, Vo=2.7 fps; Vavg,m=2.0 fps, Vavg,o=1.8 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

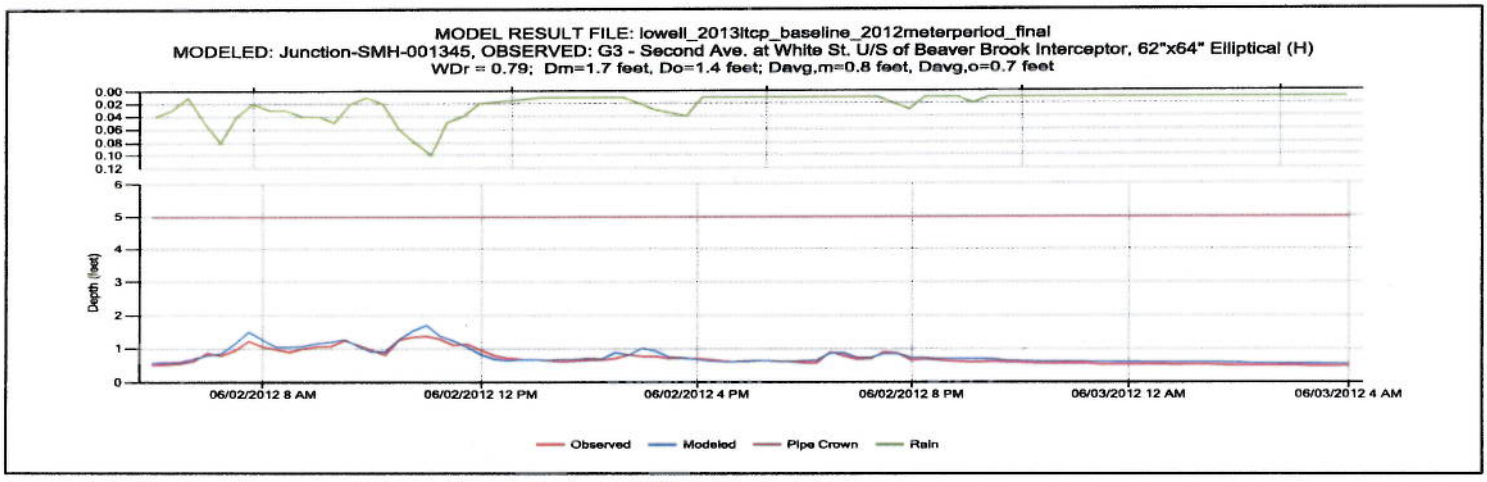
G2-Storm 3

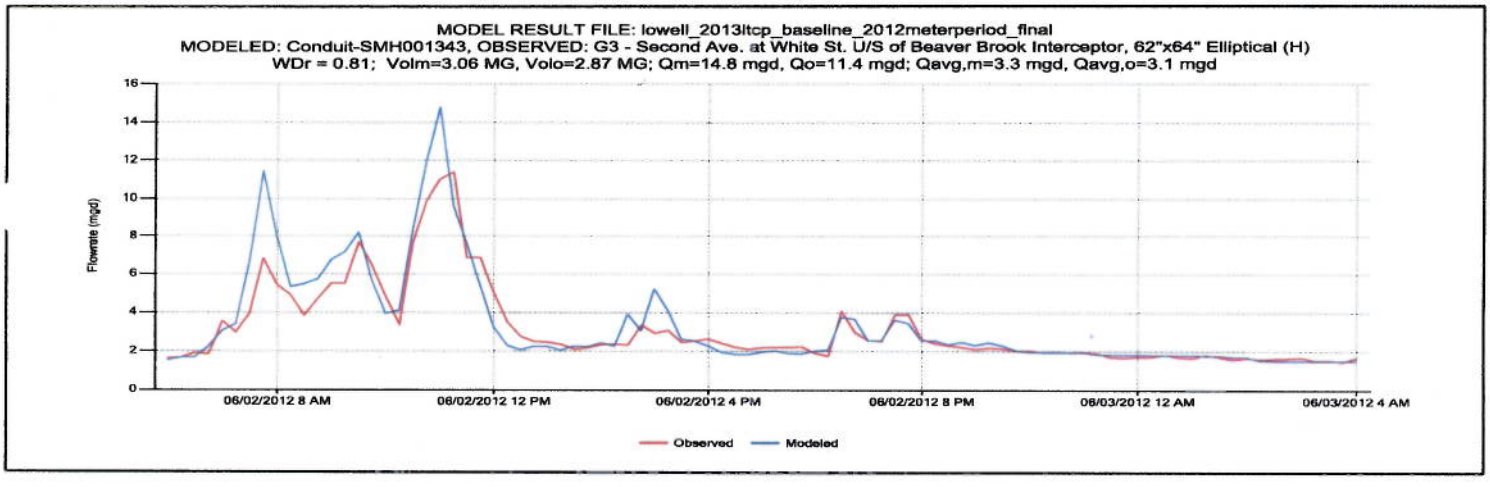

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-001406, OBSERVED: G2 - Pawtucket St. U/S of Walker Station, 48" Circular
WDr = 0.70; Dm=2.5 feet, Do=2.4 feet; Davg,m=1.4 feet, Davg,o=1.2 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

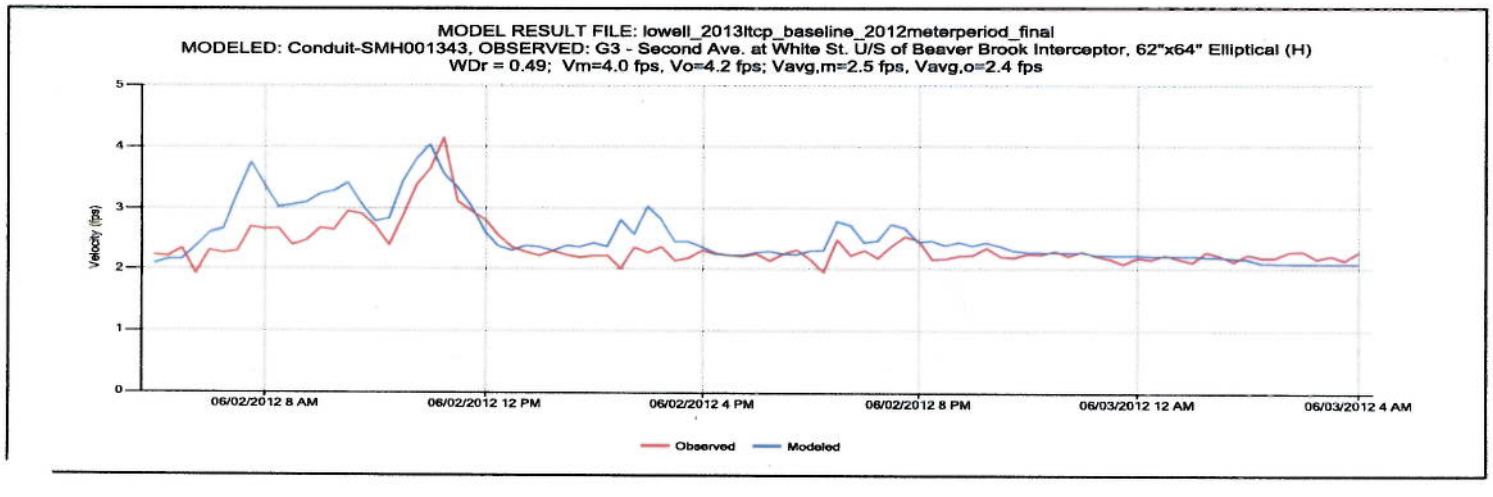

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH001405, OBSERVED: G2 - Pawtucket St. U/S of Walker Station, 48" Circular
WDr = 0.78; Volm=0.54 MG, Volo=0.60 MG; Qm=3.3 mgd, Qo=3.2 mgd; Qavg,m=0.6 mgd, Qavg,o=0.7 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH001405, OBSERVED: G2 - Pawtucket St. U/S of Walker Station, 48" Circular
WDr = 0.50; Vm=1.3 fps, Vo=1.3 fps; Vavg,m=0.3 fps, Vavg,o=0.5 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

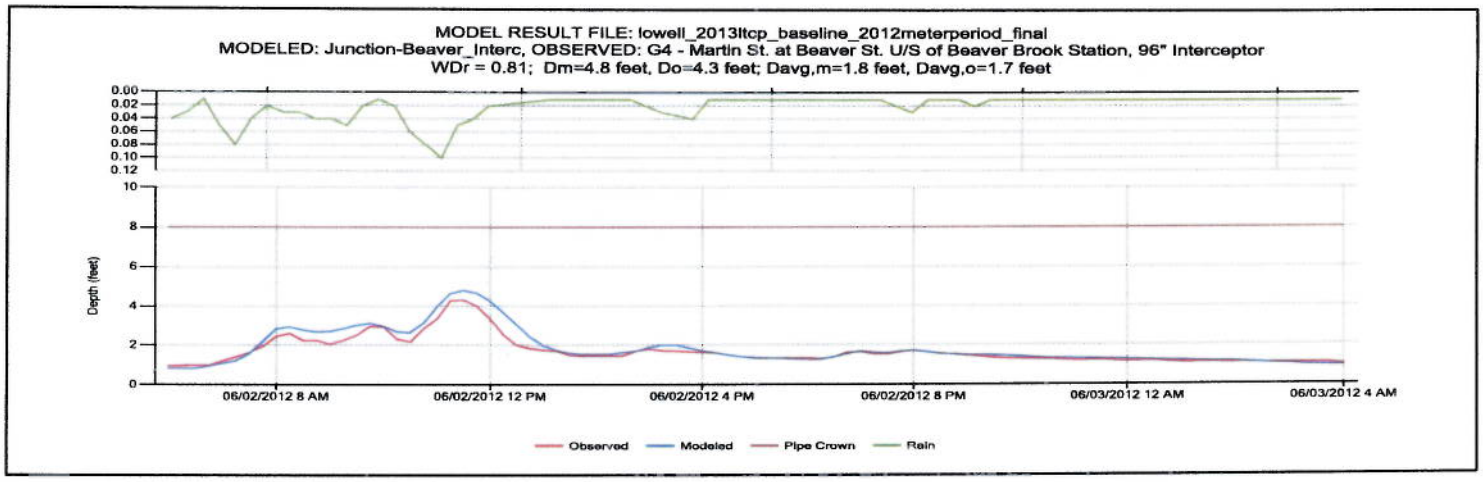
G3-Storm 3

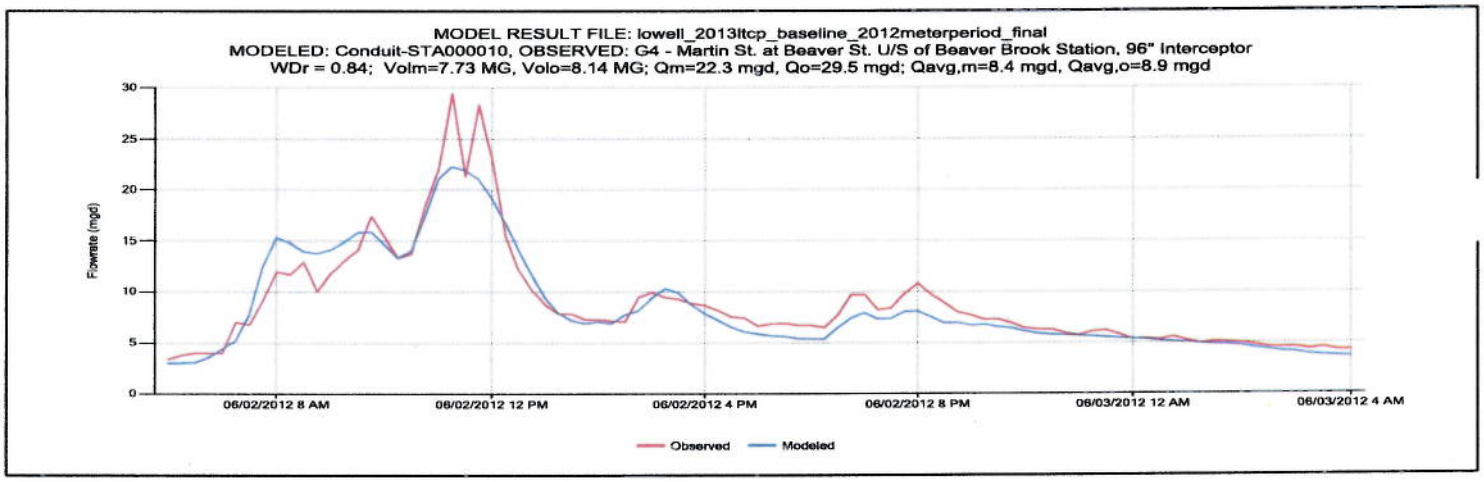

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-001345, OBSERVED: G3 - Second Ave. at White St. U/S of Beaver Brook Interceptor, 62"x64" Elliptical (H)
WDr = 0.79; Dm=1.7 feet, Do=1.4 feet; Davg,m=0.8 feet, Davg,o=0.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

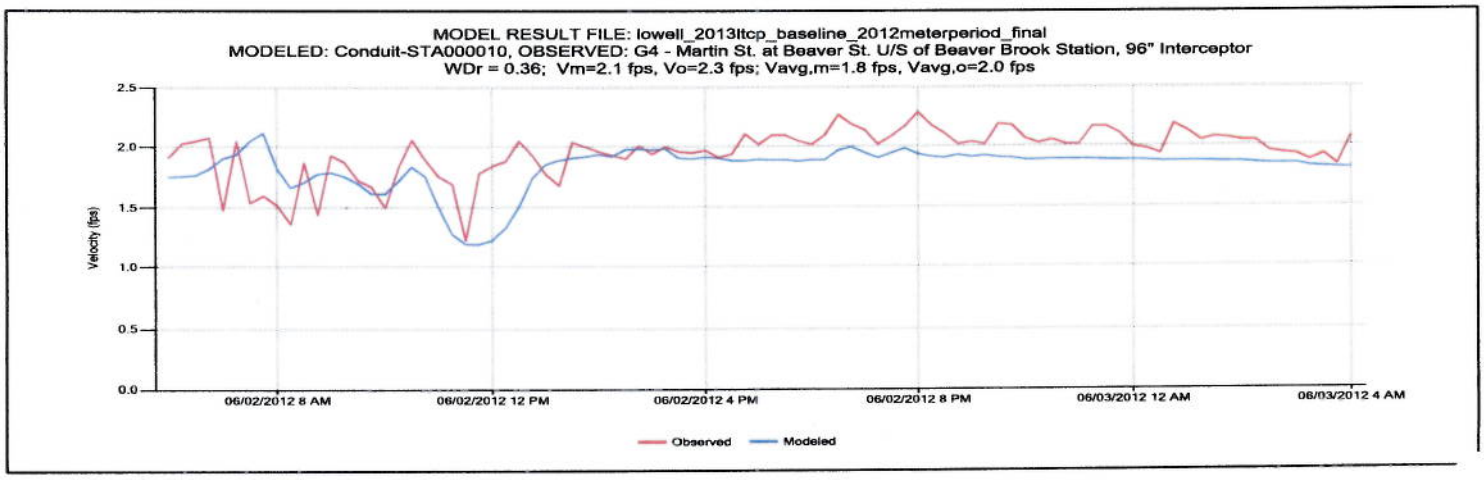

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH001343, OBSERVED: G3 - Second Ave. at White St. U/S of Beaver Brook Interceptor, 62"x64" Elliptical (H)
WDr = 0.81; Volm=3.06 MG, Volo=2.87 MG; Qm=14.8 mgd, Qo=11.4 mgd; Qavg,m=3.3 mgd, Qavg,o=3.1 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH001343, OBSERVED: G3 - Second Ave. at White St. U/S of Beaver Brook Interceptor, 62"x64" Elliptical (H)
WDr = 0.49; Vm=4.0 fps, Vo=4.2 fps; Vavg,m=2.5 fps, Vavg,o=2.4 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

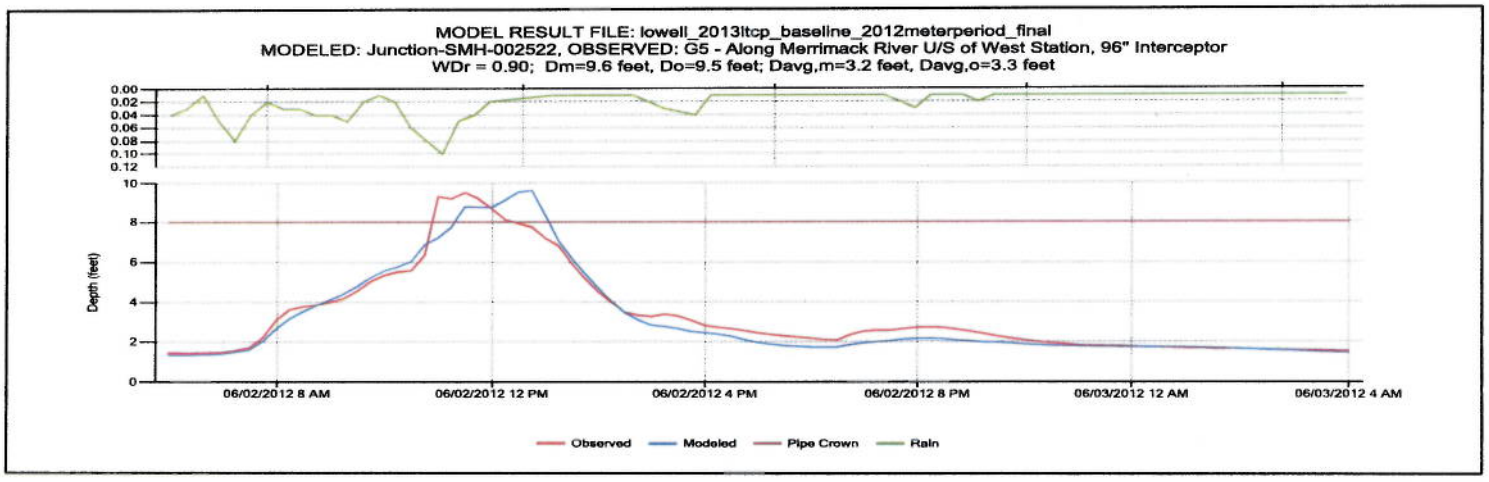
G4-Storm 3

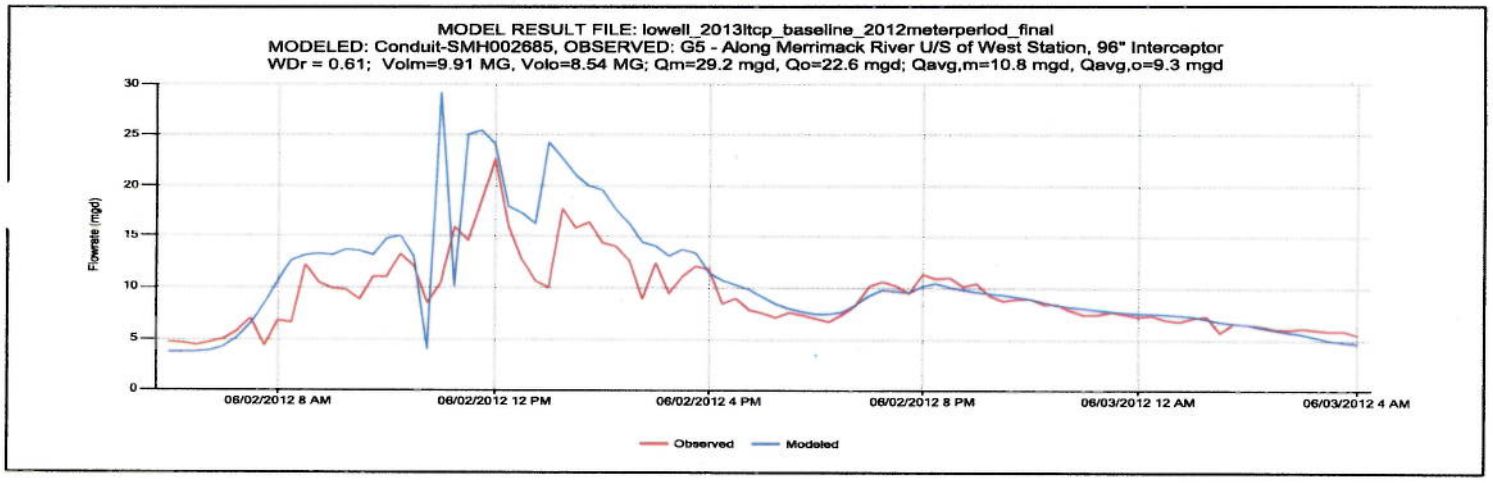

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-Beaver_Interc, OBSERVED: G4 - Martin St. at Beaver St. U/S of Beaver Brook Station, 96" Interceptor
WDr = 0.81; Dm=4.8 feet, Do=4.3 feet; Davg,m=1.8 feet, Davg,o=1.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

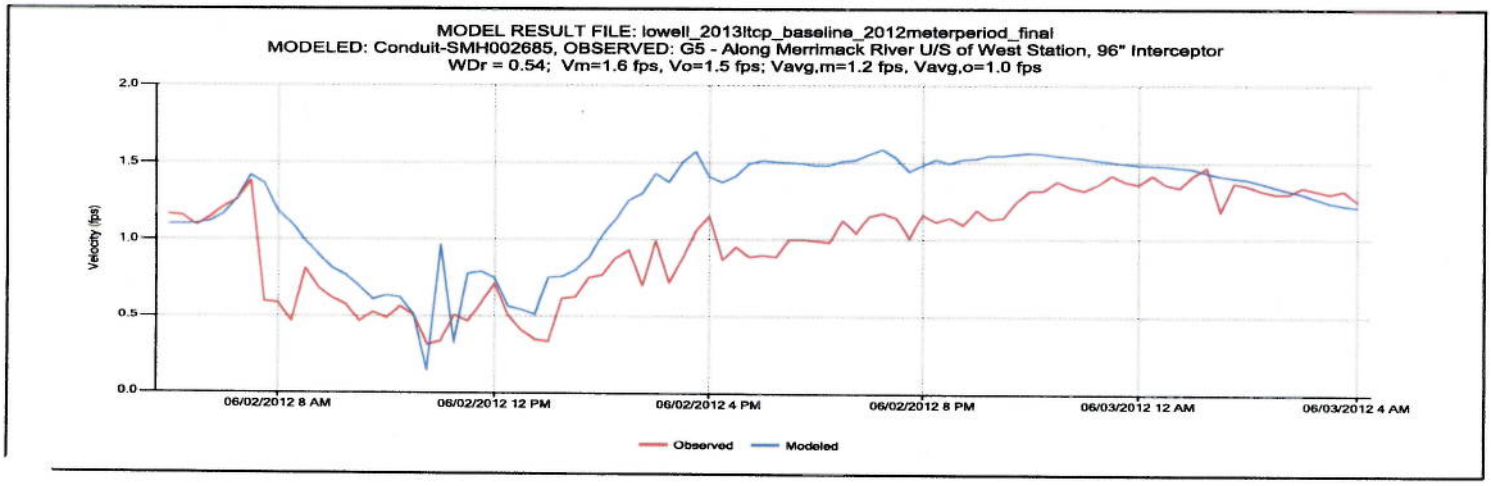

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-STA000010, OBSERVED: G4 - Martin St. at Beaver St. U/S of Beaver Brook Station, 96" Interceptor
WDr = 0.84; Volm=7.73 MG, Volo=8.14 MG; Qm=22.3 mgd, Qo=29.5 mgd; Qavg,m=8.4 mgd, Qavg,o=8.9 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-STA000010, OBSERVED: G4 - Martin St. at Beaver St. U/S of Beaver Brook Station, 96" Interceptor
WDr = 0.36; Vm=2.1 fps, Vo=2.3 fps; Vavg,m=1.8 fps, Vavg,o=2.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

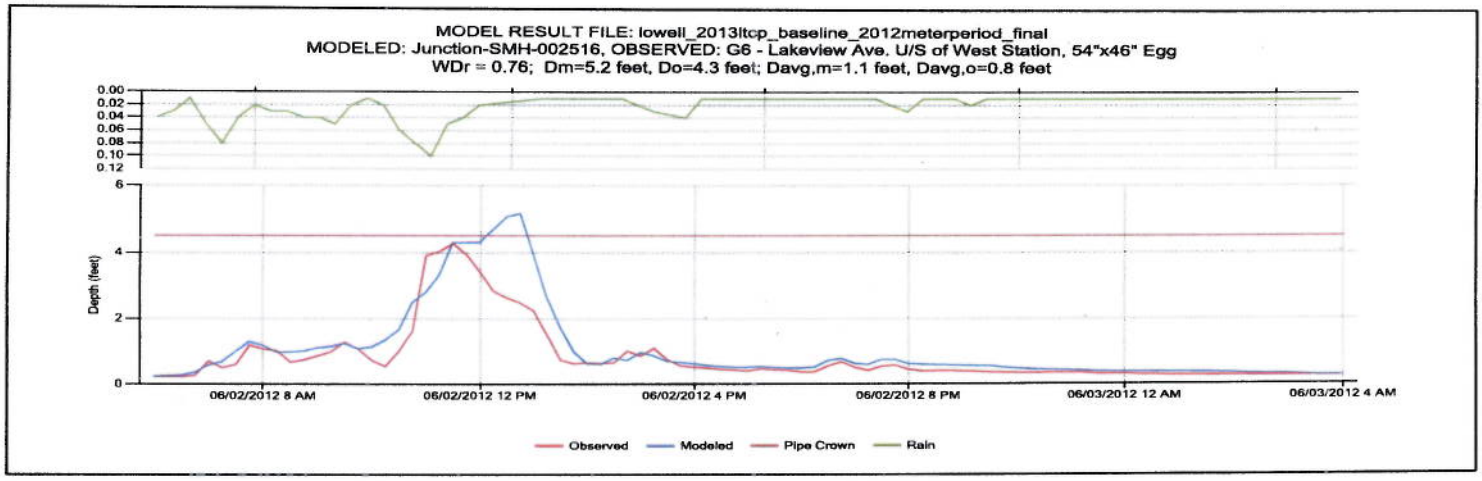
G5-Storm 3

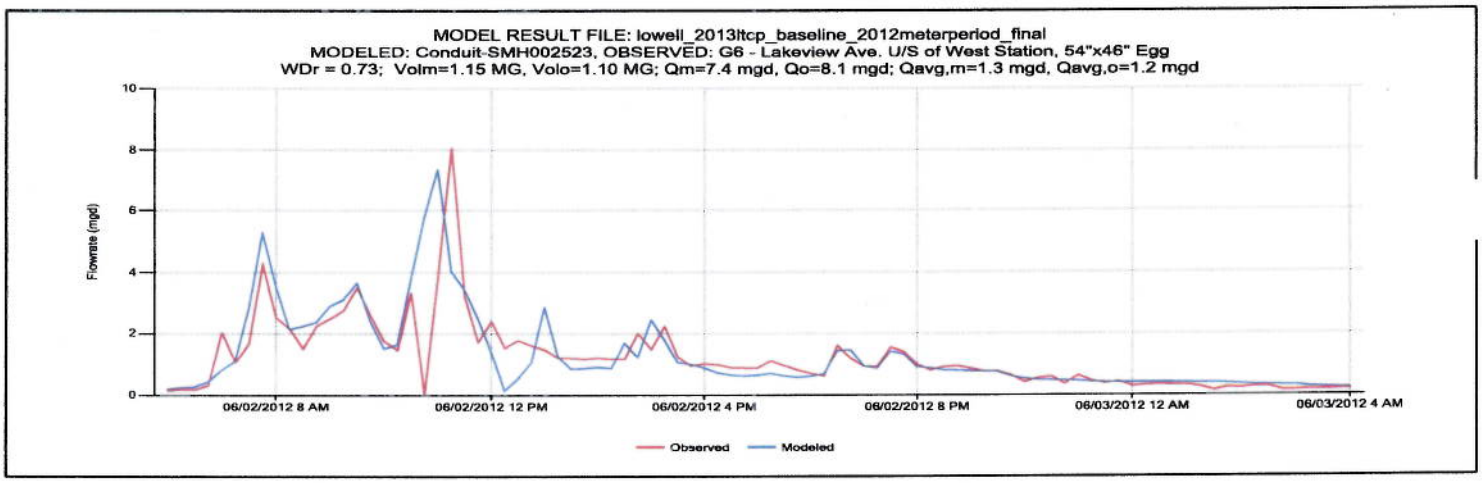

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002522, OBSERVED: G5 - Along Merrimack River U/S of West Station, 96" Interceptor
WDr = 0.90; Dm=9.6 feet, Do=9.5 feet; Davg,m=3.2 feet, Davg,o=3.3 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

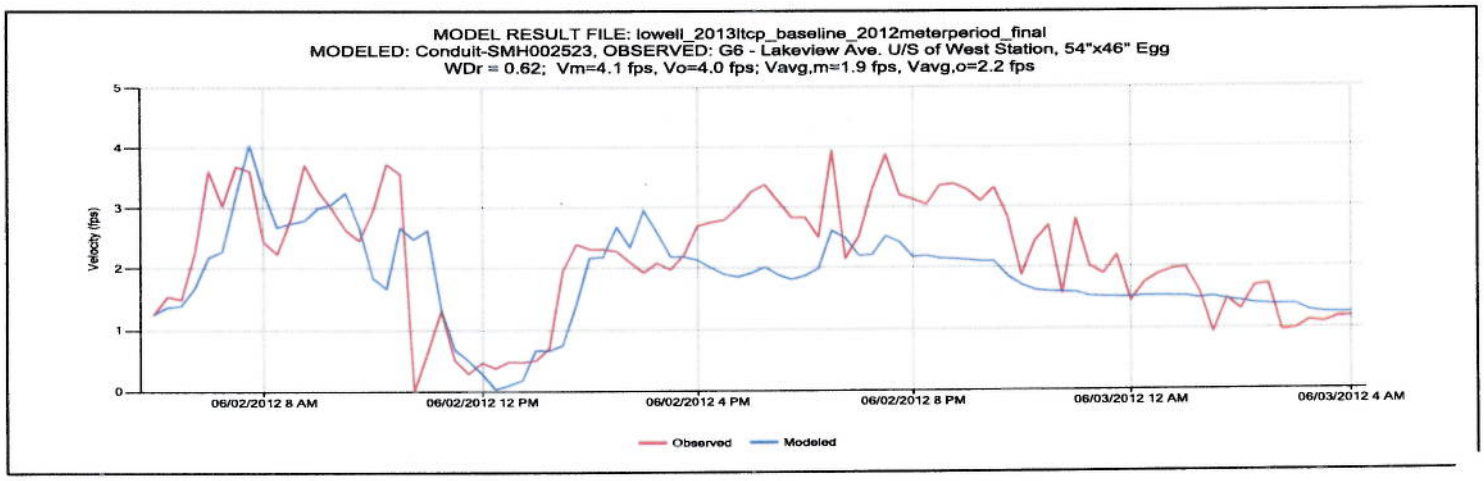

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002685, OBSERVED: G5 - Along Merrimack River U/S of West Station, 96" Interceptor
WDr = 0.61; Volm=9.91 MG, Volo=8.54 MG; Qm=29.2 mgd, Qo=22.6 mgd; Qavg,m=10.8 mgd, Qavg,o=9.3 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002685, OBSERVED: G5 - Along Merrimack River U/S of West Station, 96" Interceptor
WDr = 0.54; Vm=1.6 fps, Vo=1.5 fps; Vavg,m=1.2 fps, Vavg,o=1.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

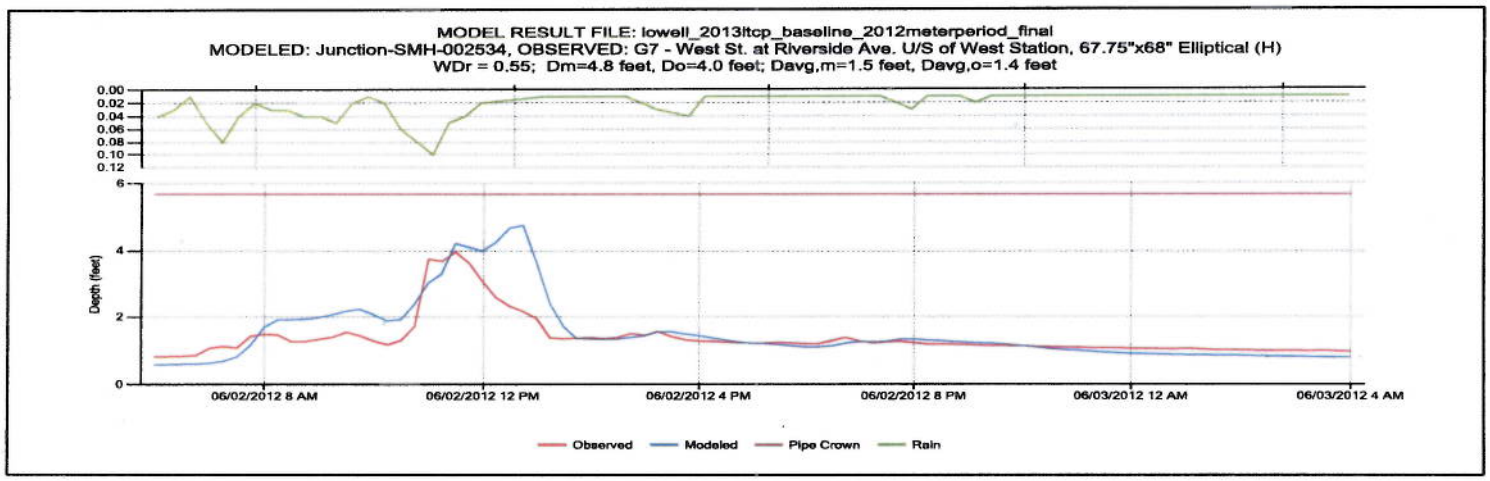
G6-Storm 3

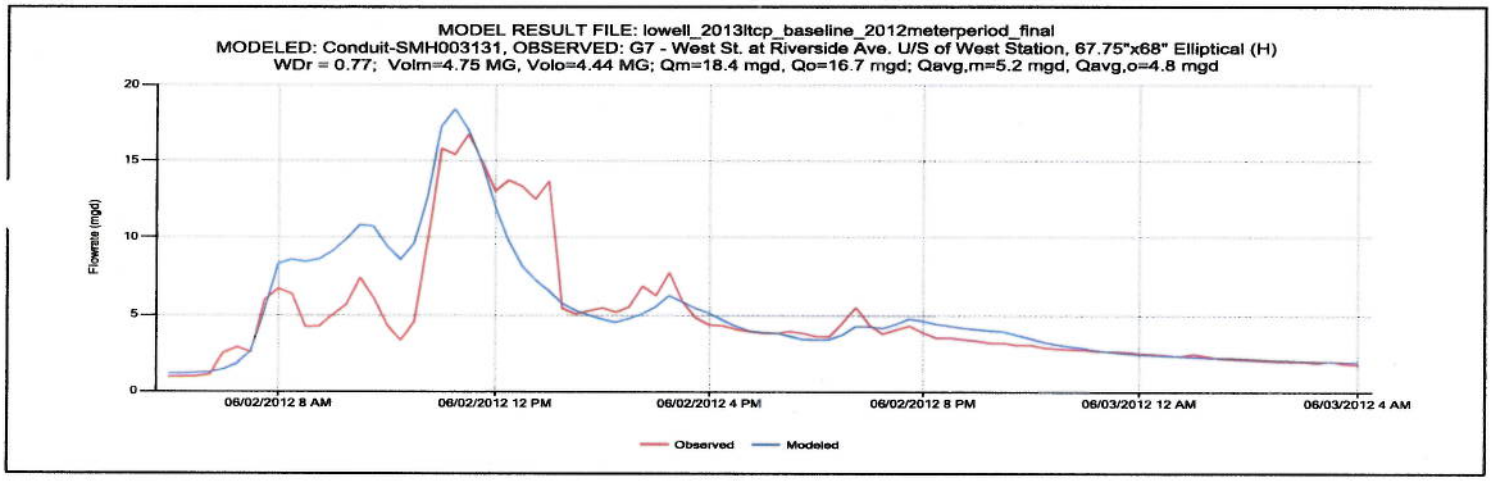

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002516, OBSERVED: G6 - Lakeview Ave. U/S of West Station, 54"x46" Egg
WDr = 0.76; Dm=5.2 feet, Do=4.3 feet; Davg,m=1.1 feet, Davg,o=0.8 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

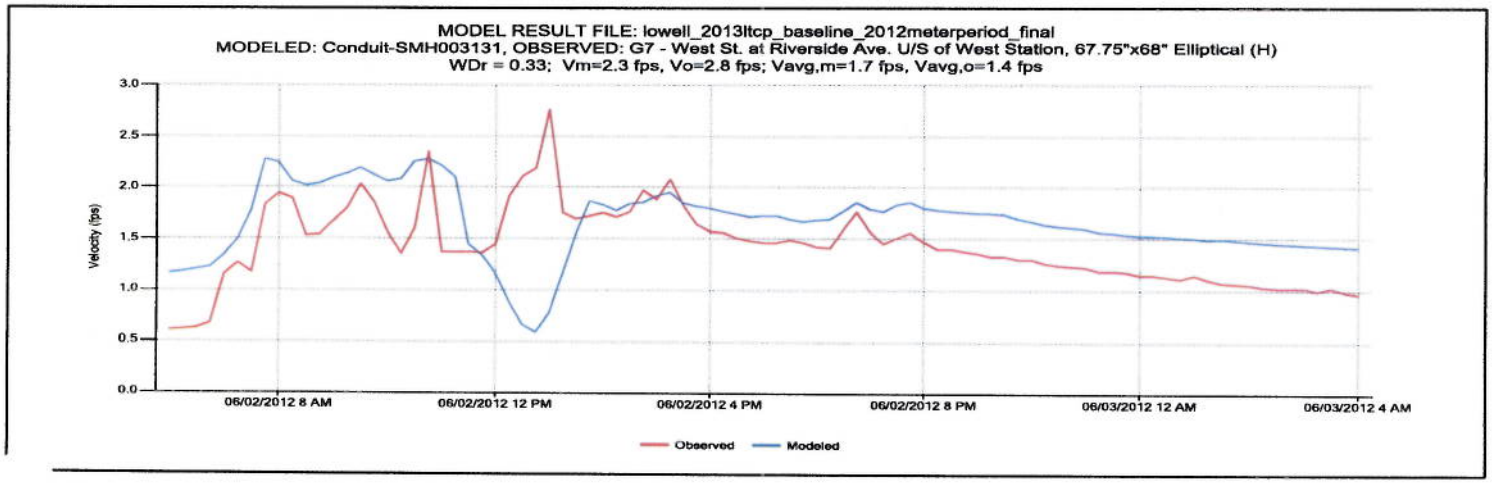

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002523, OBSERVED: G6 - Lakeview Ave. U/S of West Station, 54"x46" Egg
WDr = 0.73; Volm=1.15 MG, Volo=1.10 MG; Qm=7.4 mgd, Qo=8.1 mgd; Qavg,m=1.3 mgd, Qavg,o=1.2 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002523, OBSERVED: G6 - Lakeview Ave. U/S of West Station, 54"x46" Egg
WDr = 0.62; Vm=4.1 fps, Vo=4.0 fps; Vavg,m=1.9 fps, Vavg,o=2.2 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

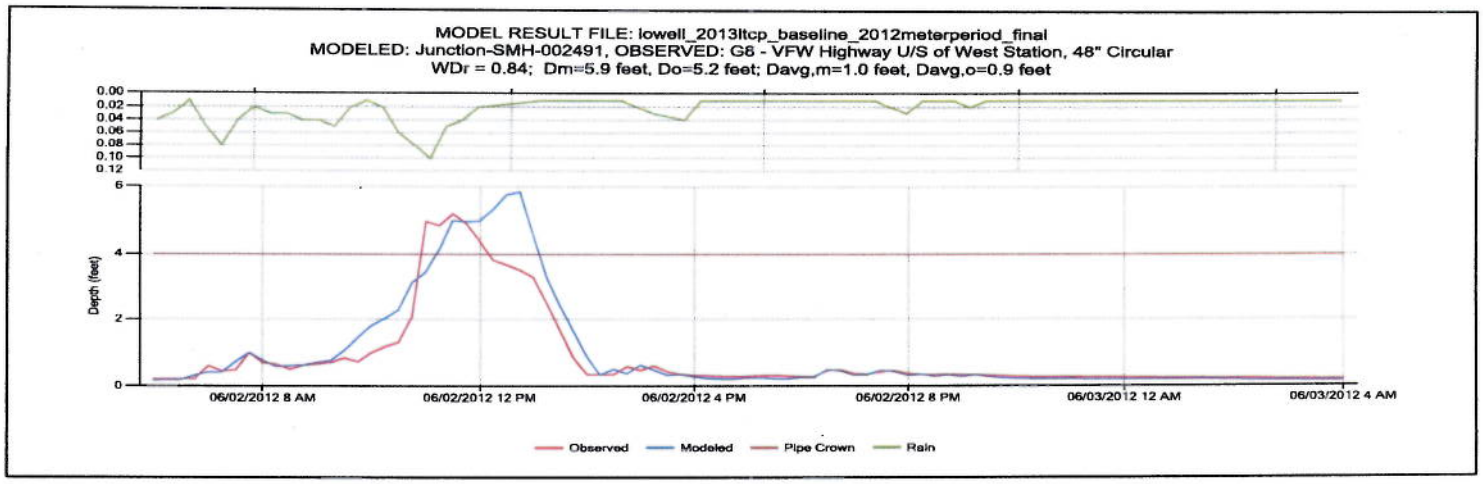
G7-Storm 3

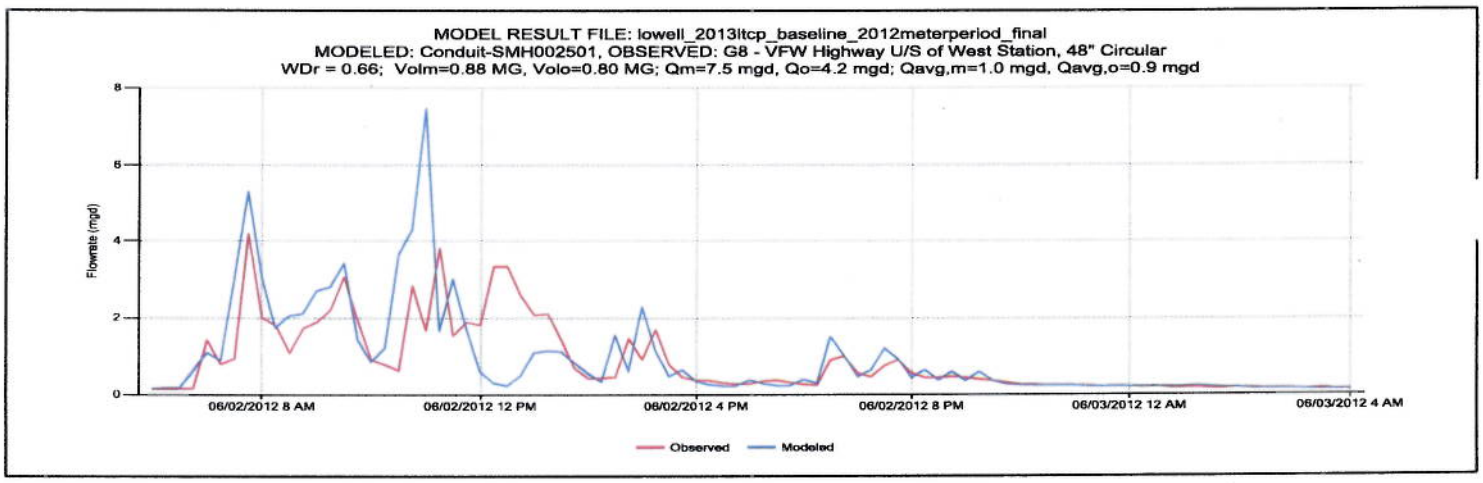

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002534, OBSERVED: G7 - West St. at Riverside Ave. U/S of West Station, 67.75"x68" Elliptical (H)
WDr = 0.55; Dm=4.8 feet, Do=4.0 feet; Davg,m=1.5 feet, Davg,o=1.4 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

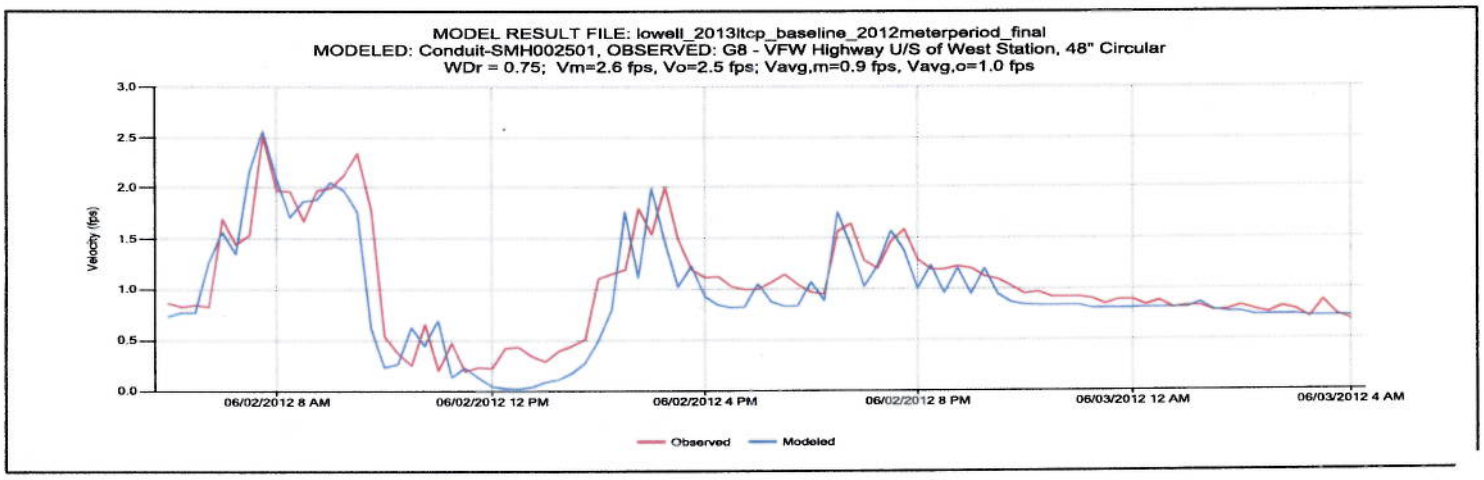

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH003131, OBSERVED: G7 - West St. at Riverside Ave. U/S of West Station, 67.75"x68" Elliptical (H)
WDr = 0.77; Volm=4.75 MG, Volo=4.44 MG; Qm=18.4 mgd, Qo=16.7 mgd; Qavg,m=5.2 mgd, Qavg,o=4.8 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH003131, OBSERVED: G7 - West St. at Riverside Ave. U/S of West Station, 67.75"x68" Elliptical (H)
WDr = 0.33; Vm=2.3 fps, Vo=2.8 fps; Vavg,m=1.7 fps, Vavg,o=1.4 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

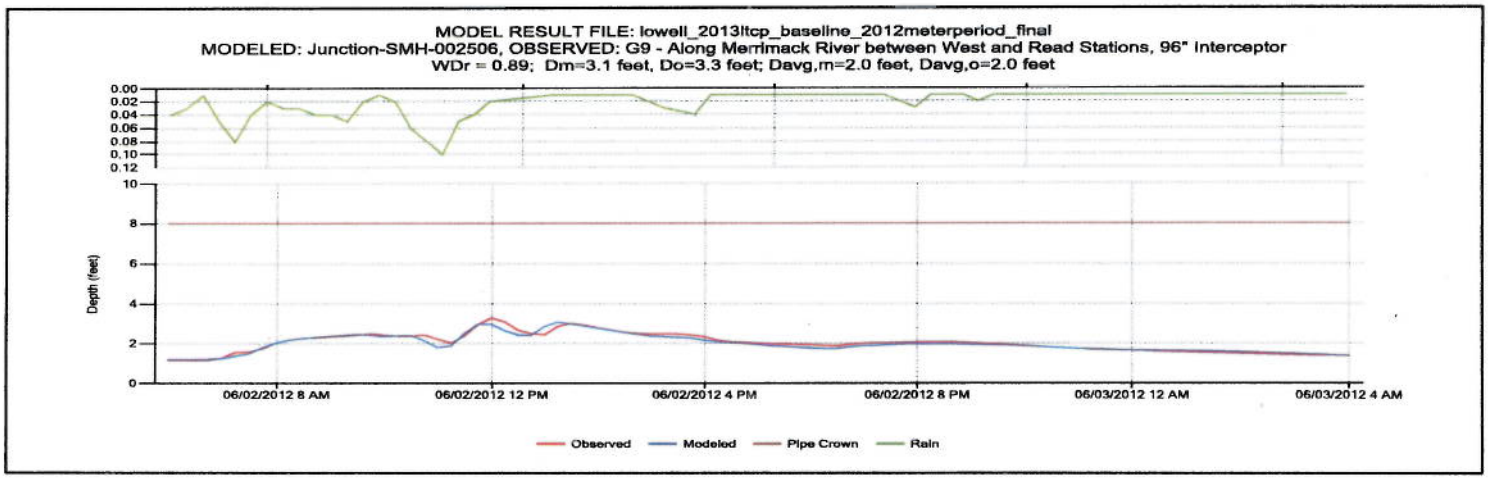
G8-Storm 3

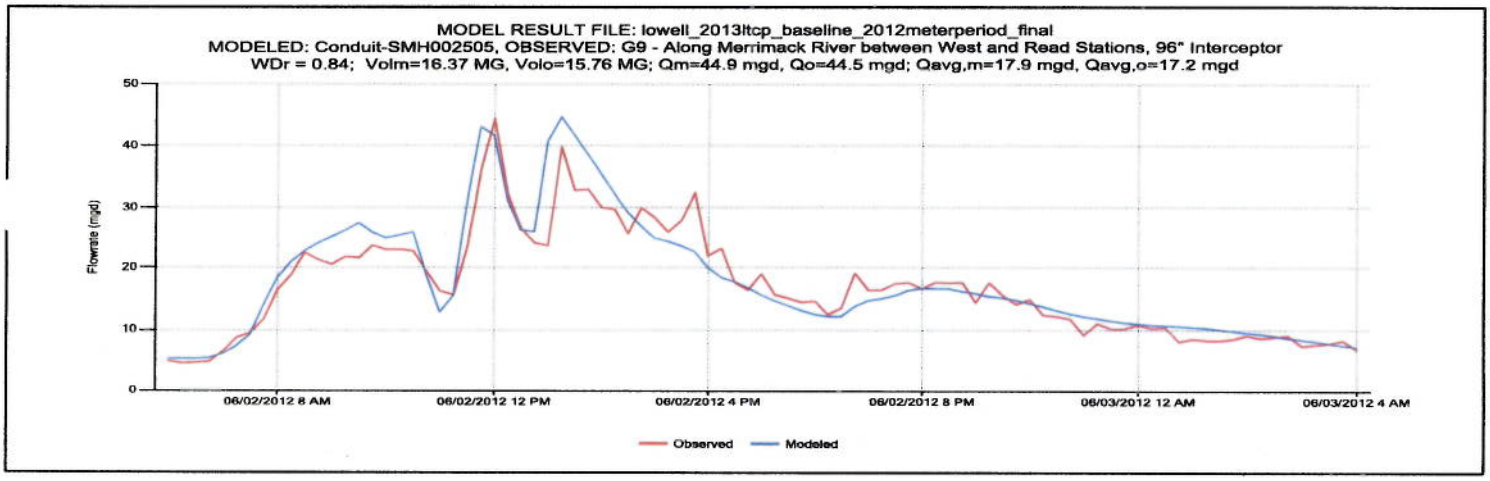

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002491, OBSERVED: G8 - VFW Highway U/S of West Station, 48" Circular
WDr = 0.84; Dm=5.9 feet, Do=5.2 feet; Davg,m=1.0 feet, Davg,o=0.9 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

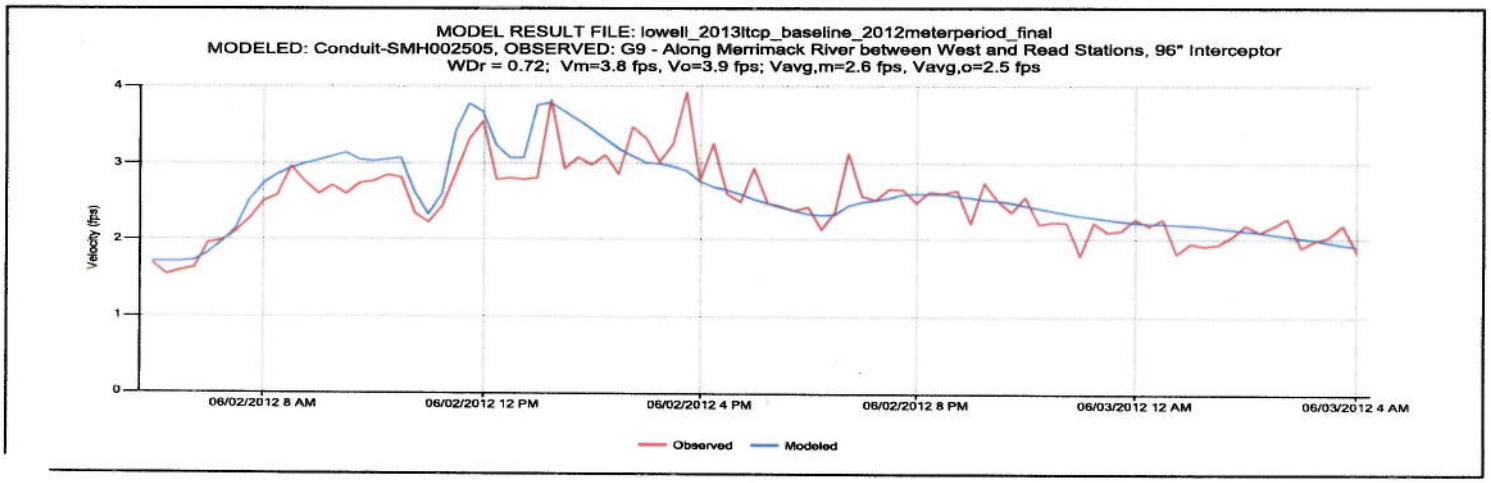

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002501, OBSERVED: G8 - VFW Highway U/S of West Station, 48" Circular
WDr = 0.66; Volm=0.88 MG, Volo=0.80 MG; Qm=7.5 mgd, Qo=4.2 mgd; Qavg,m=1.0 mgd, Qavg,o=0.9 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002501, OBSERVED: G8 - VFW Highway U/S of West Station, 48" Circular
WDr = 0.75; Vm=2.6 fps, Vo=2.5 fps; Vavg,m=0.9 fps, Vavg,o=1.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

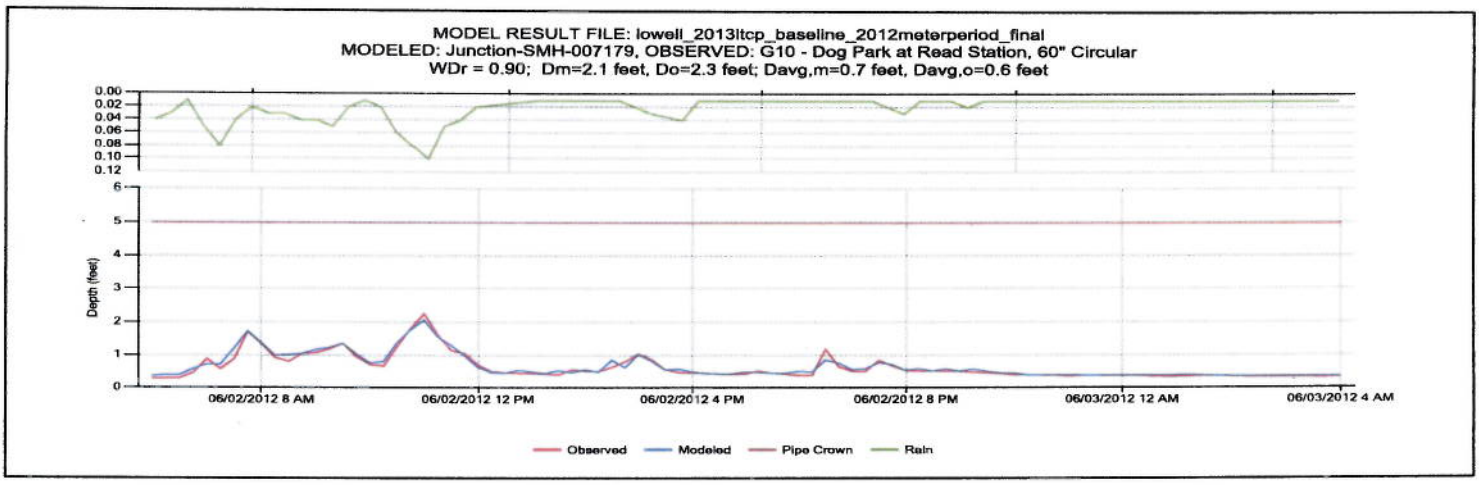
G9-Storm 3

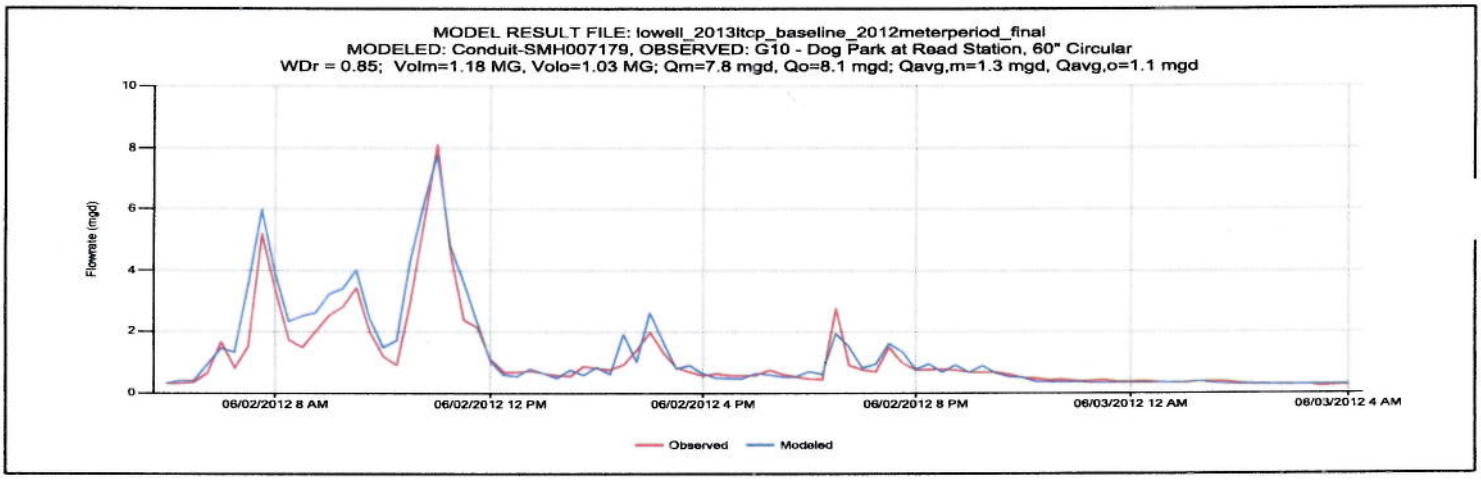

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002506, OBSERVED: G9 - Along Merrimack River between West and Read Stations, 96" Interceptor
WDr = 0.89; Dm=3.1 feet, Do=3.3 feet; Davg,m=2.0 feet, Davg,o=2.0 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

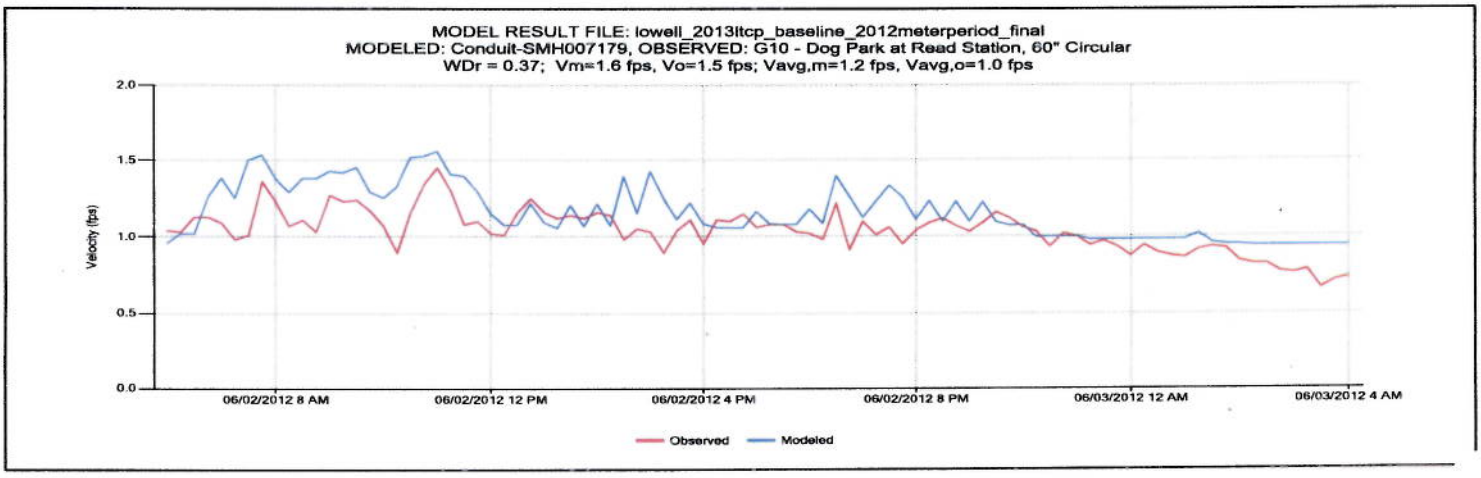

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002505, OBSERVED: G9 - Along Merrimack River between West and Read Stations, 96" Interceptor
WDr = 0.84; Volm=16.37 MG, Volo=15.76 MG; Qm=44.9 mgd, Qo=44.5 mgd; Qavg,m=17.9 mgd, Qavg,o=17.2 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002505, OBSERVED: G9 - Along Merrimack River between West and Read Stations, 96" Interceptor
WDr = 0.72; Vm=3.8 fps, Vo=3.9 fps; Vavg,m=2.6 fps, Vavg,o=2.5 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

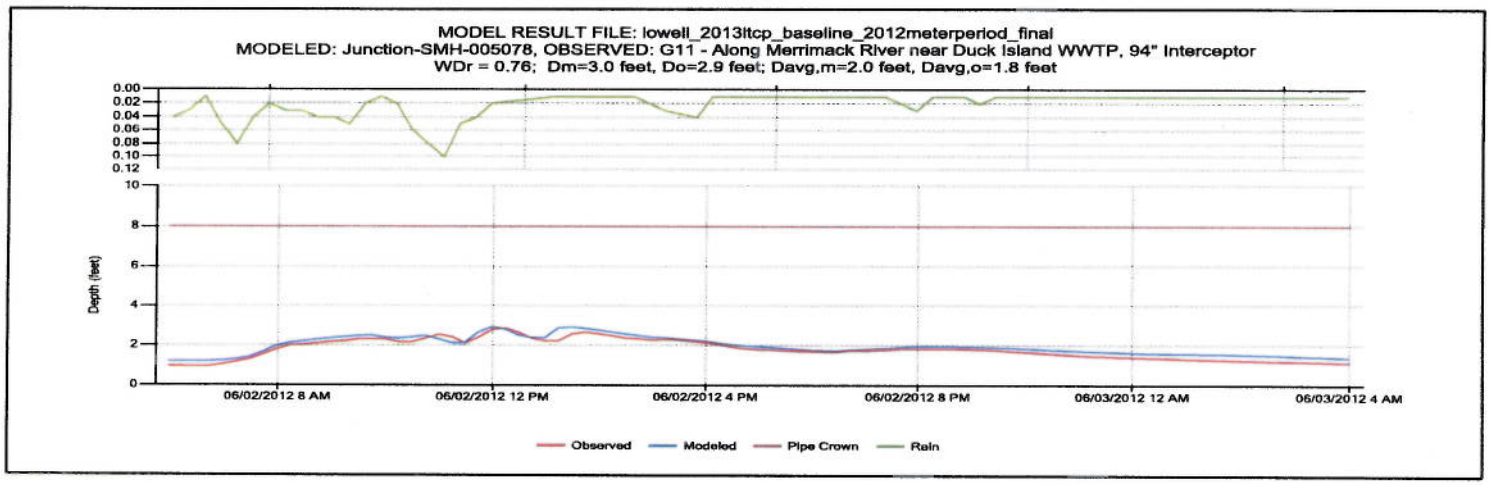
G10-Storm 3

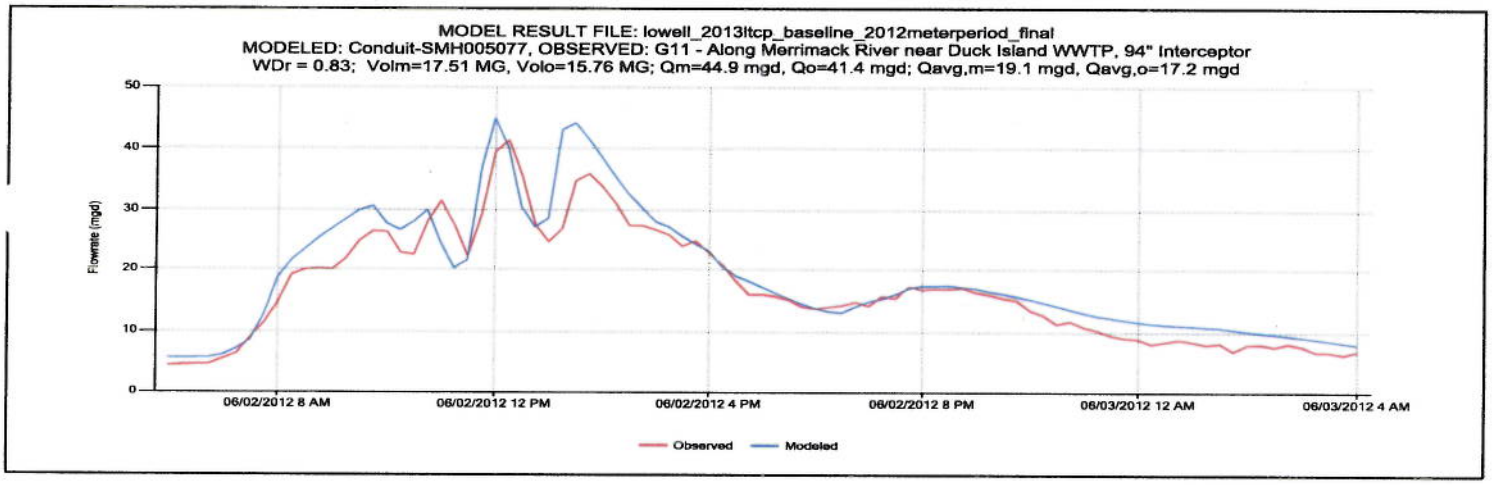

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-007179, OBSERVED: G10 - Dog Park at Read Station, 60" Circular
WDr = 0.90; Dm=2.1 feet, Do=2.3 feet; Davg,m=0.7 feet, Davg,o=0.6 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

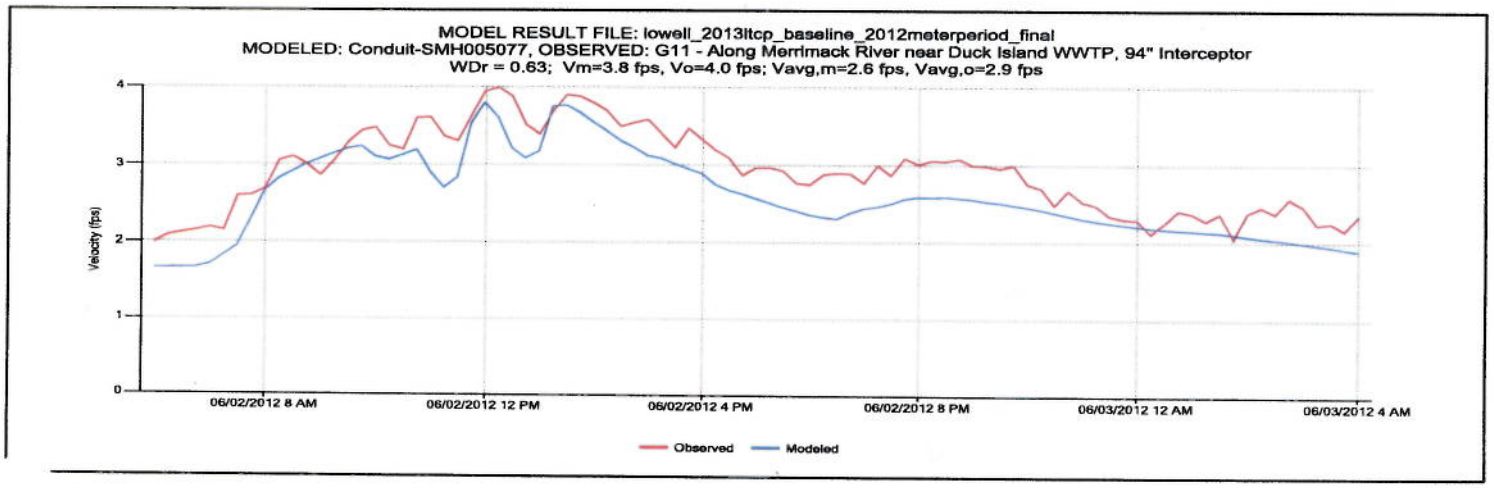

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH007179, OBSERVED: G10 - Dog Park at Read Station, 60" Circular
WDr = 0.85; Volm=1.18 MG, Volo=1.03 MG; Qm=7.8 mgd, Qo=8.1 mgd; Qavg,m=1.3 mgd, Qavg,o=1.1 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH007179, OBSERVED: G10 - Dog Park at Read Station, 60" Circular
WDr = 0.37; Vm=1.6 fps, Vo=1.5 fps; Vavg,m=1.2 fps, Vavg,o=1.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

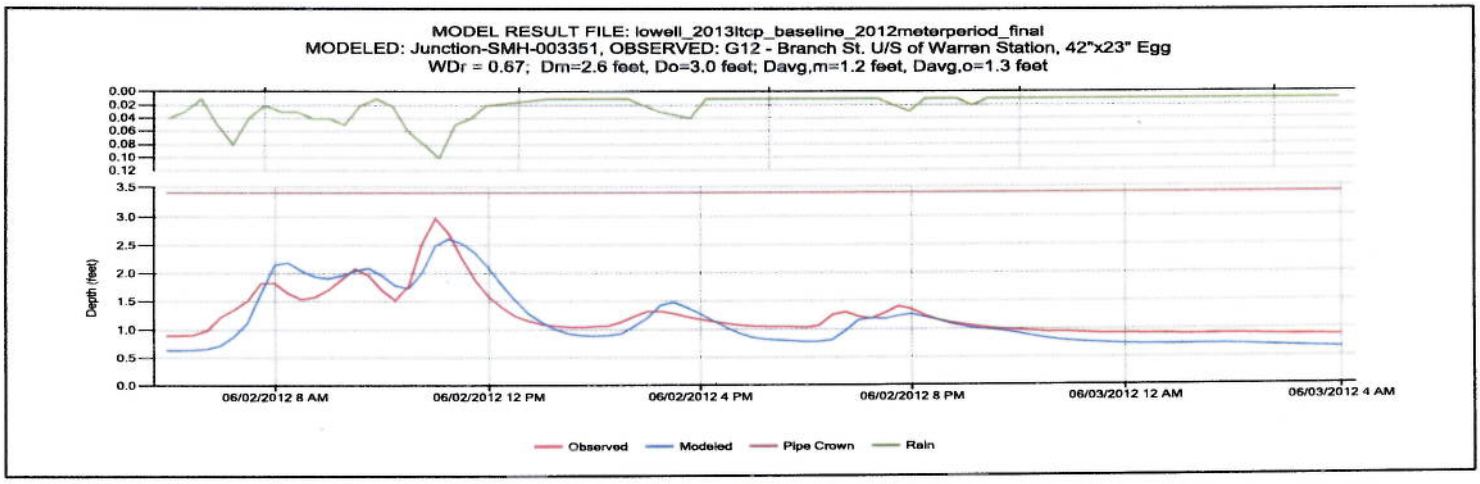
G11-Storm 3

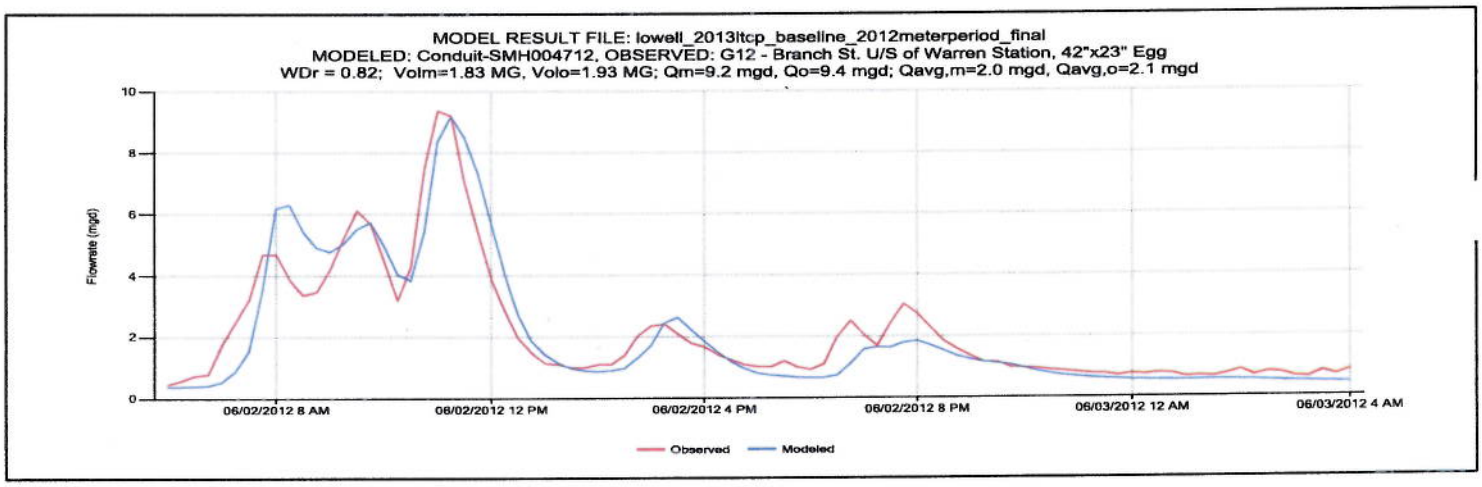

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-005078, OBSERVED: G11 - Along Merrimack River near Duck Island WWTP, 94" Interceptor
WDr = 0.76; Dm=3.0 feet, Do=2.9 feet; Davg,m=2.0 feet, Davg,o=1.8 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

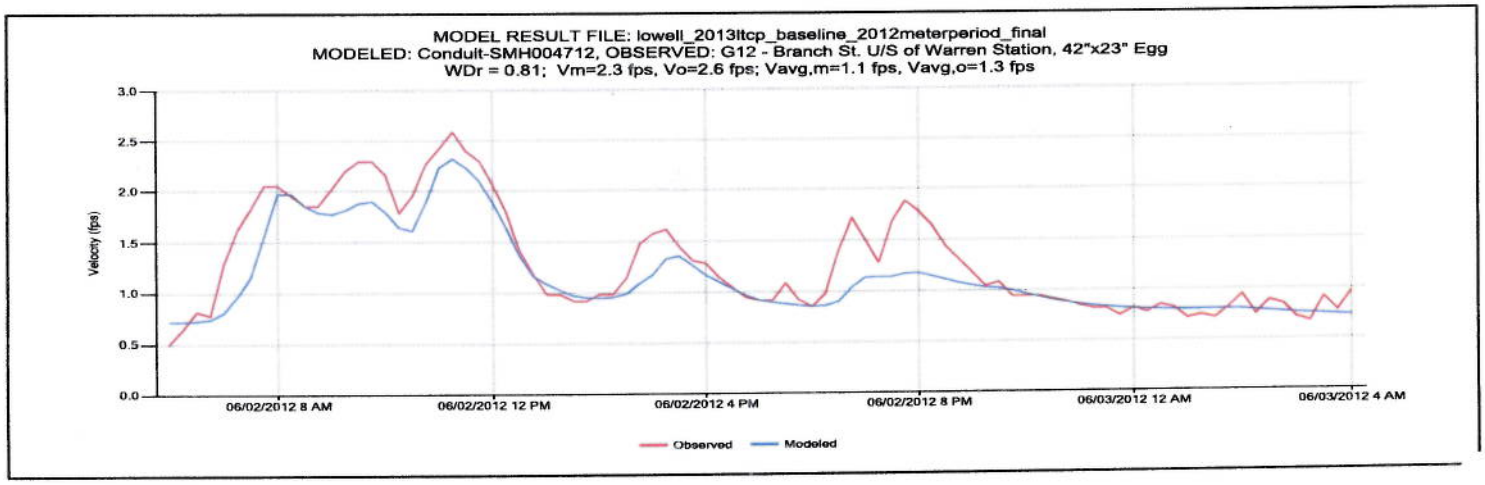

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005077, OBSERVED: G11 - Along Merrimack River near Duck Island WWTP, 94" Interceptor
WDr = 0.83; Volm=17.51 MG, Volo=15.76 MG; Qm=44.9 mgd, Qo=41.4 mgd; Qavg,m=19.1 mgd, Qavg,o=17.2 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005077, OBSERVED: G11 - Along Merrimack River near Duck Island WWTP, 94" Interceptor
WDr = 0.63; Vm=3.8 fps, Vo=4.0 fps; Vavg,m=2.6 fps, Vavg,o=2.9 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

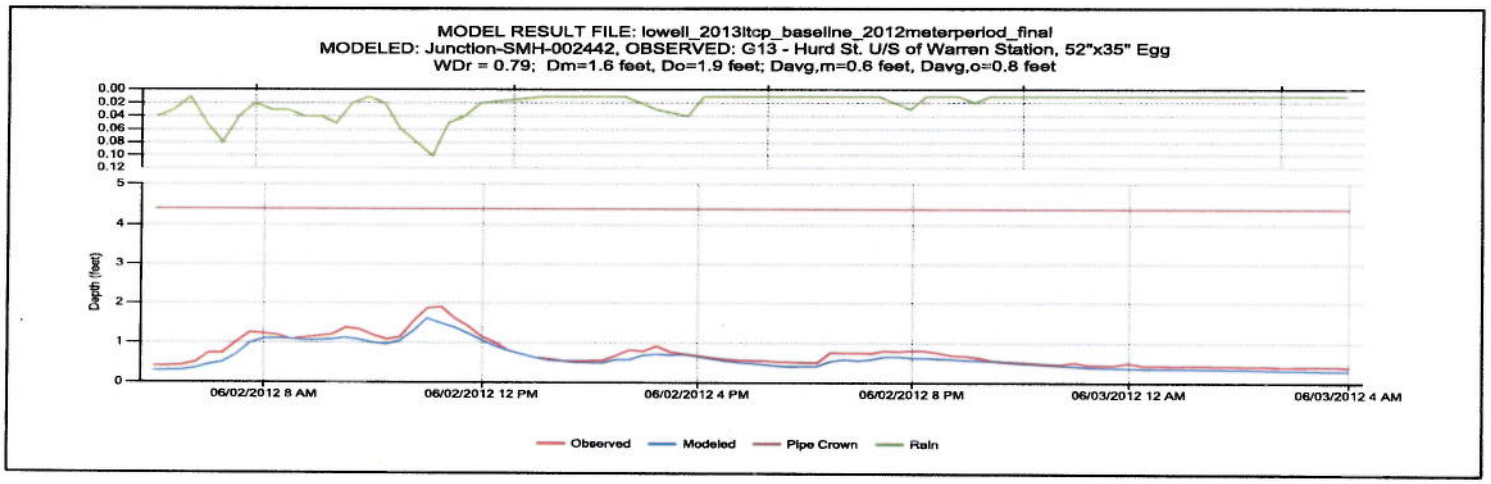
G12-Storm 3

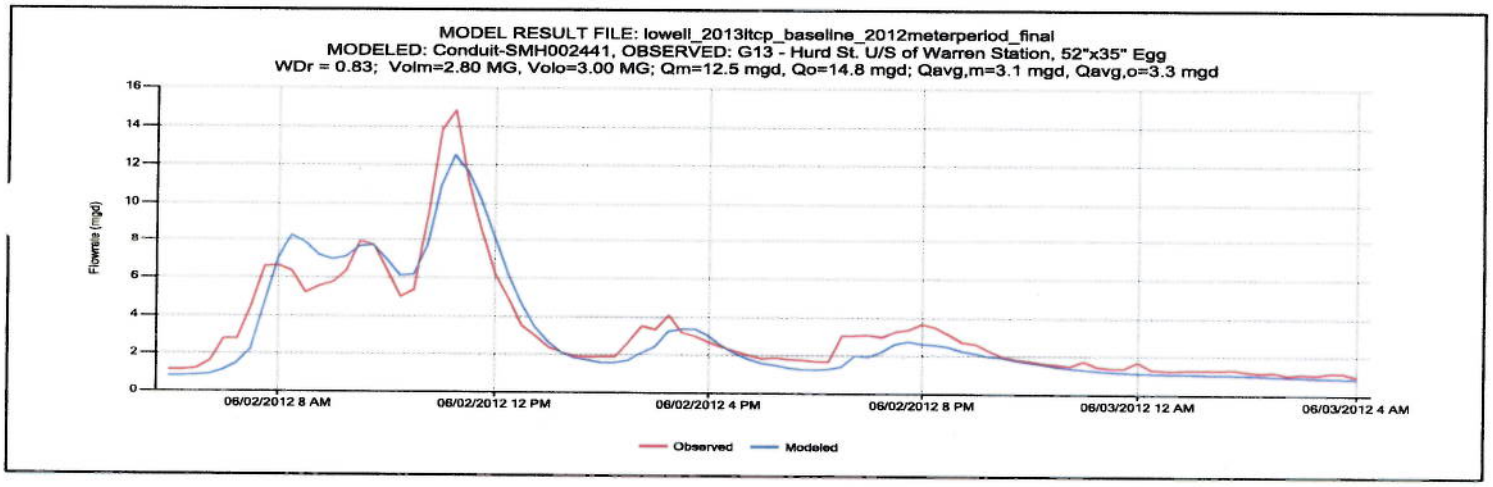

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-003351, OBSERVED: G12 - Branch St. U/S of Warren Station, 42"x23" Egg
WDr = 0.67; Dm=2.6 feet, Do=3.0 feet; Davg,m=1.2 feet, Davg,o=1.3 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

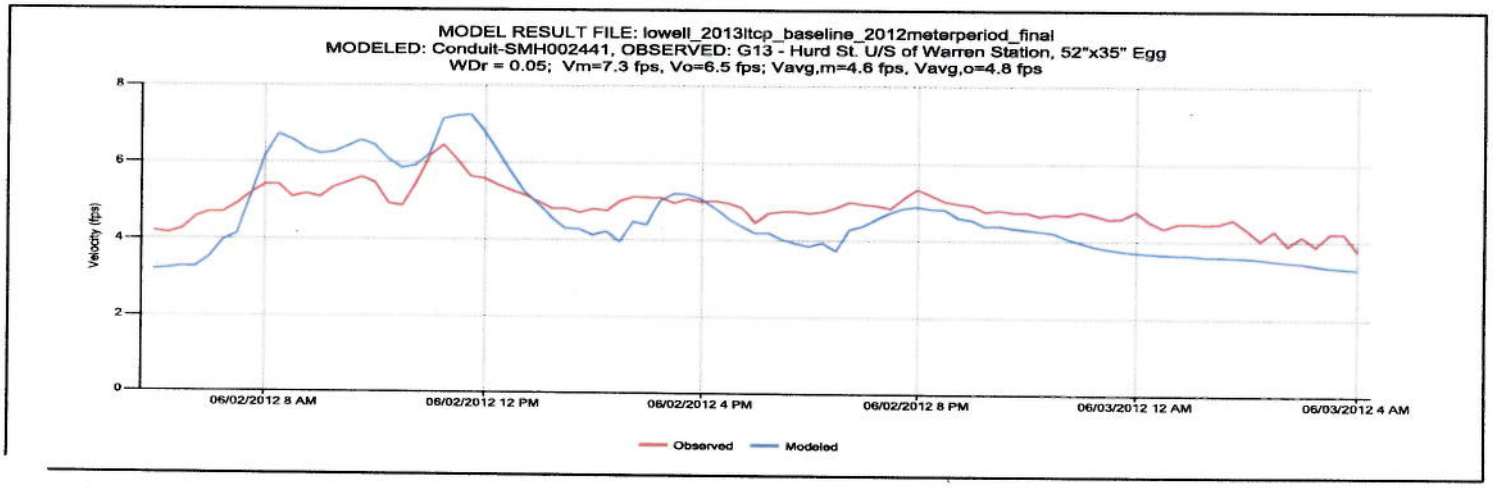

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004712, OBSERVED: G12 - Branch St. U/S of Warren Station, 42"x23" Egg
WDr = 0.82; Volm=1.83 MG, Volo=1.93 MG; Qm=9.2 mgd, Qo=9.4 mgd; Qavg,m=2.0 mgd, Qavg,o=2.1 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004712, OBSERVED: G12 - Branch St. U/S of Warren Station, 42"x23" Egg
WDr = 0.81; Vm=2.3 fps, Vo=2.6 fps; Vavg,m=1.1 fps, Vavg,o=1.3 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

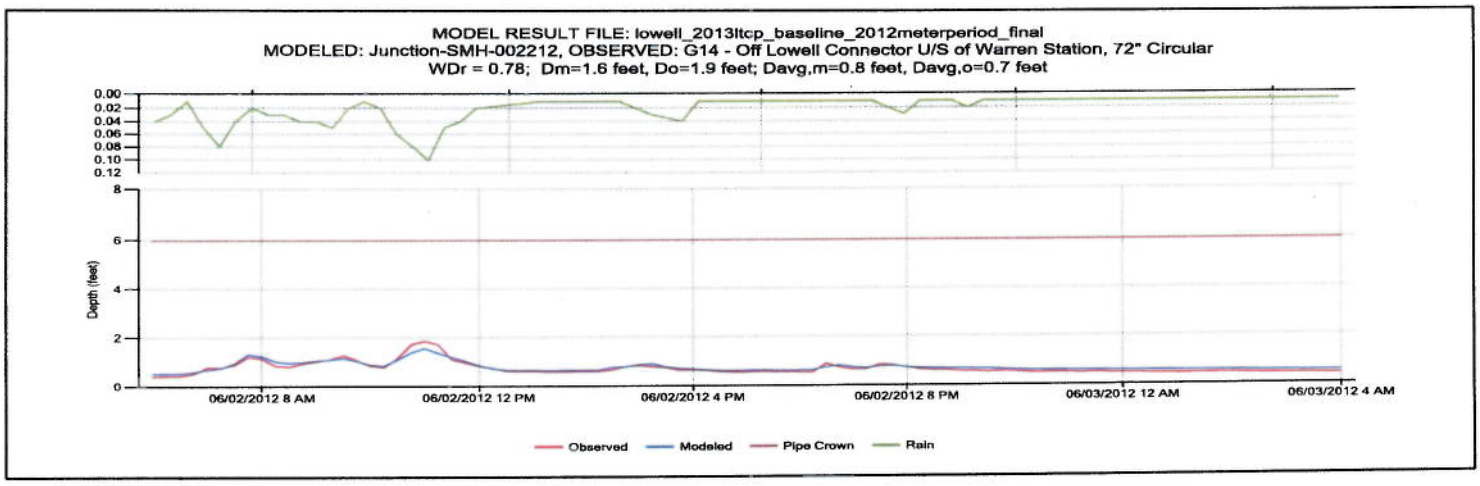
G13-Storm 3

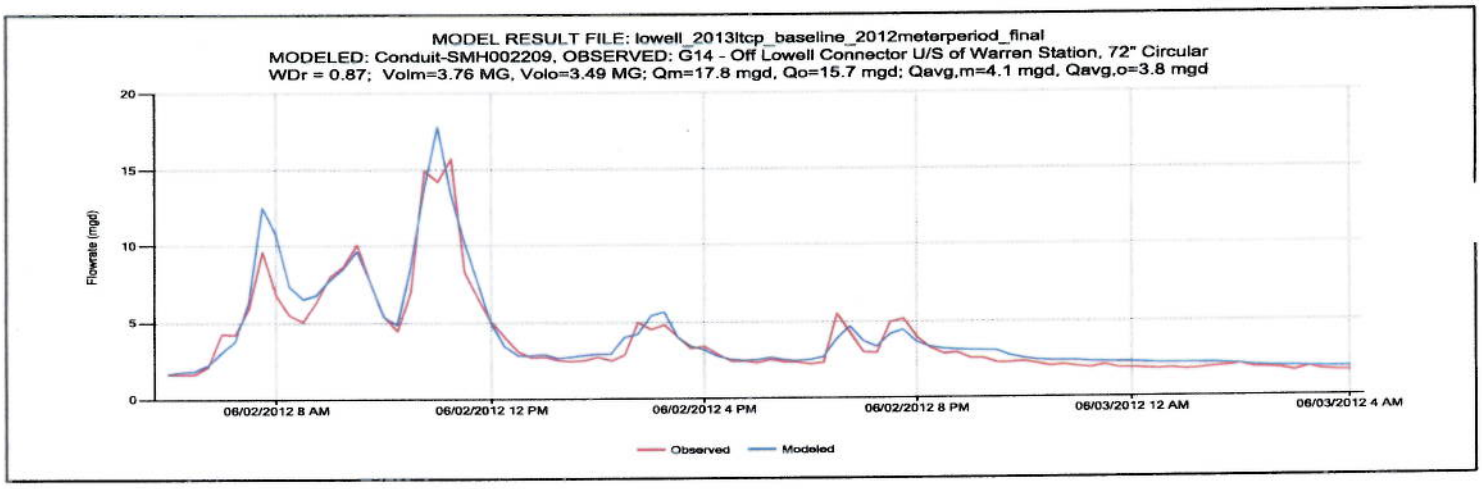

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002442, OBSERVED: G13 - Hurd St. U/S of Warren Station, 52"x35" Egg
WDr = 0.79; Dm=1.6 feet, Do=1.9 feet; Davg,m=0.6 feet, Davg,o=0.8 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

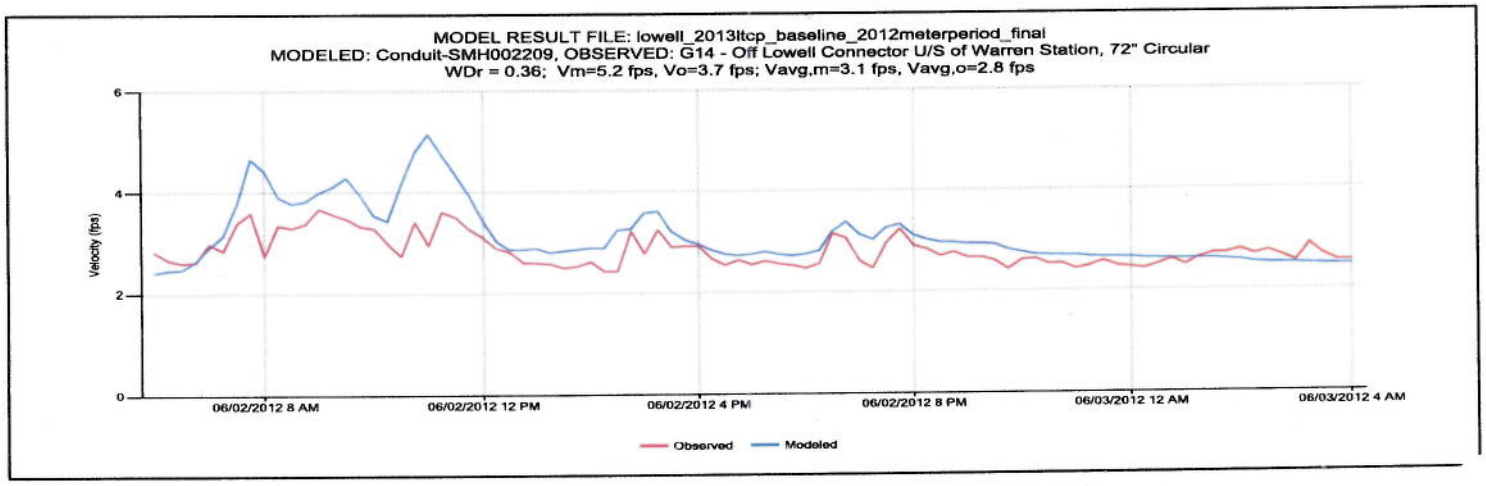

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002441, OBSERVED: G13 - Hurd St. U/S of Warren Station, 52"x35" Egg
WDr = 0.83; Volm=2.80 MG, Volo=3.00 MG; Qm=12.5 mgd, Qo=14.8 mgd; Qavg,m=3.1 mgd, Qavg,o=3.3 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002441, OBSERVED: G13 - Hurd St. U/S of Warren Station, 52"x35" Egg
WDr = 0.05; Vm=7.3 fps, Vo=6.5 fps; Vavg,m=4.6 fps, Vavg,o=4.8 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

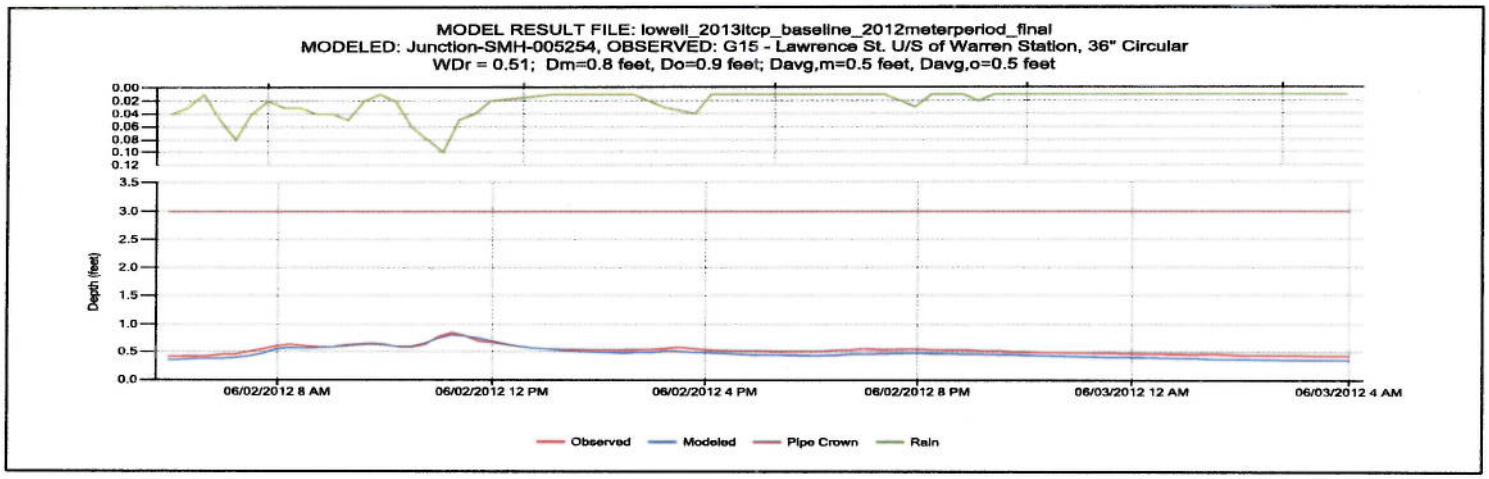
G14-Storm 3

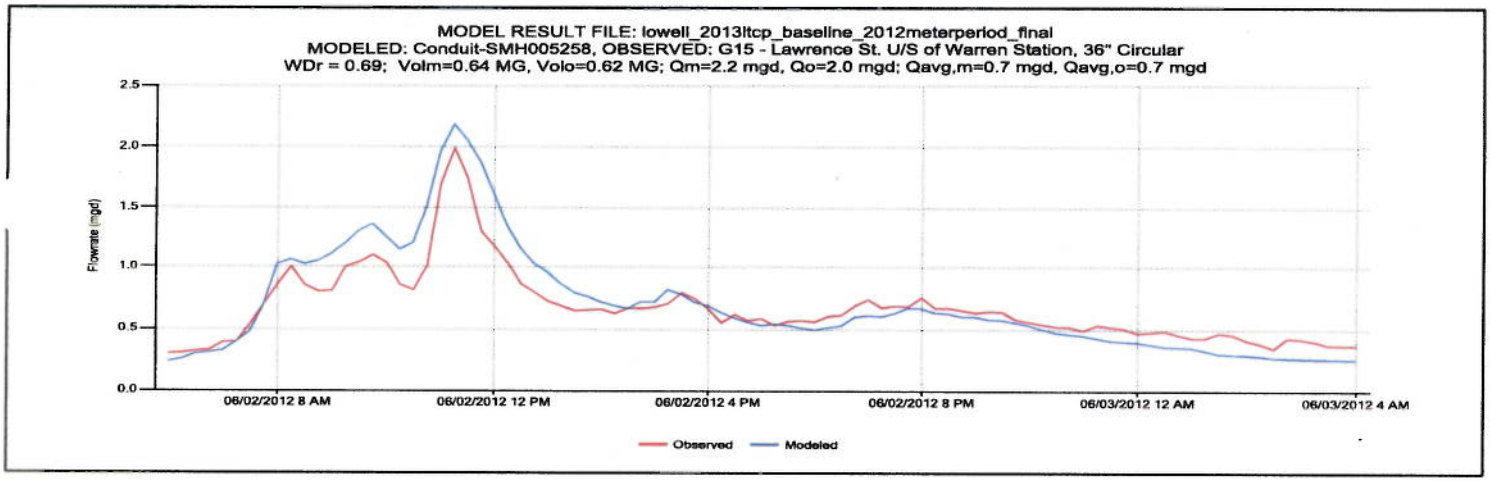

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002212, OBSERVED: G14 - Off Lowell Connector U/S of Warren Station, 72" Circular
WDr = 0.78; Dm=1.6 feet, Do=1.9 feet; Davg,m=0.8 feet, Davg,o=0.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

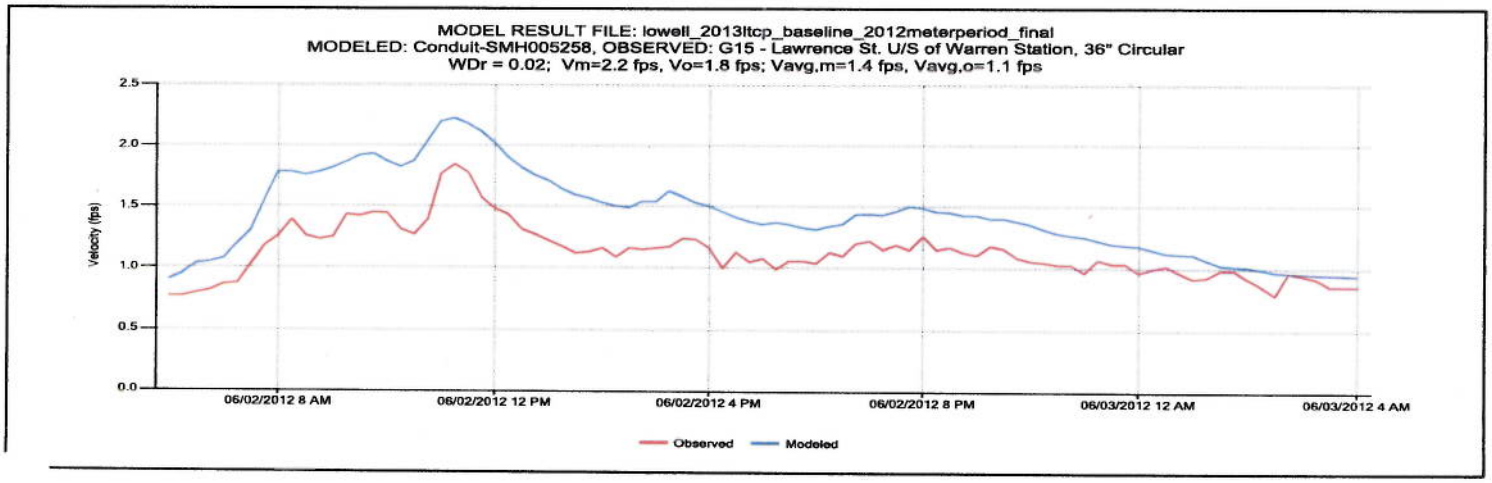

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002209, OBSERVED: G14 - Off Lowell Connector U/S of Warren Station, 72" Circular
WDr = 0.87; Volm=3.76 MG, Volo=3.49 MG; Qm=17.8 mgd, Qo=15.7 mgd; Qavg,m=4.1 mgd, Qavg,o=3.8 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002209, OBSERVED: G14 - Off Lowell Connector U/S of Warren Station, 72" Circular
WDr = 0.36; Vm=5.2 fps, Vo=3.7 fps; Vavg,m=3.1 fps, Vavg,o=2.8 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

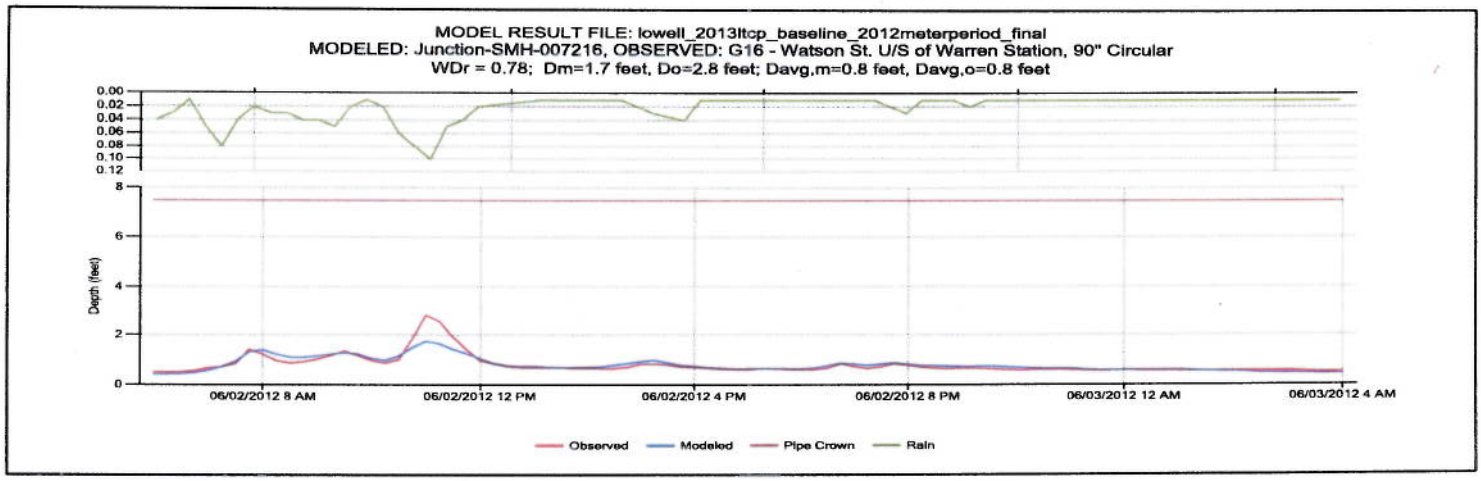
G15-Storm 3

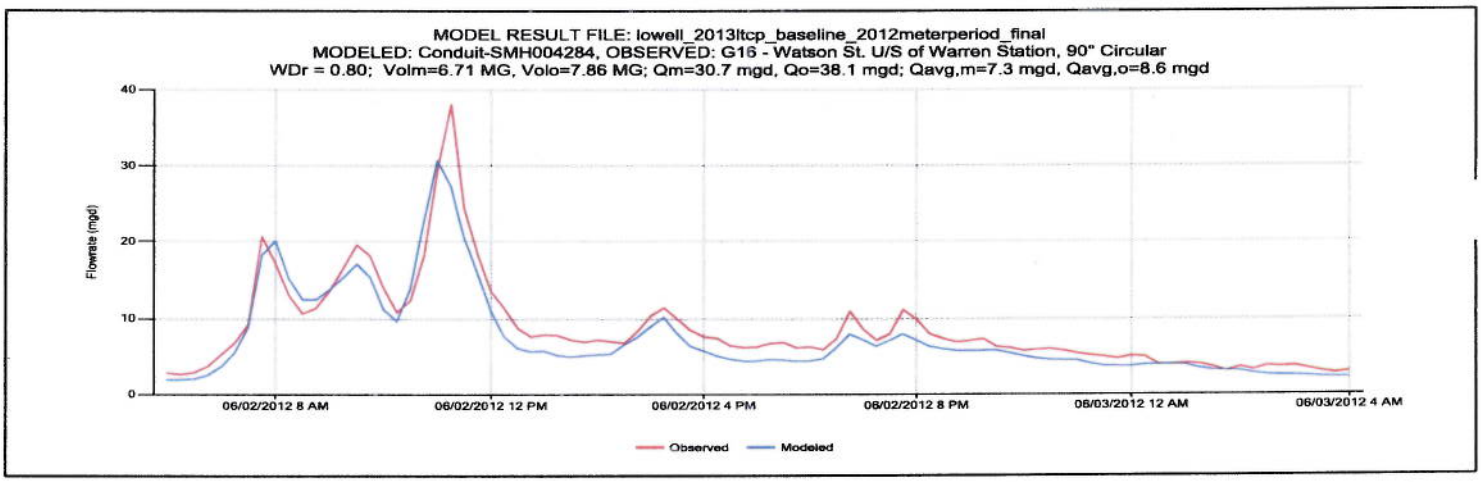

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-005254, OBSERVED: G15 - Lawrence St. U/S of Warren Station, 36" Circular
WDr = 0.51; Dm=0.8 feet, Do=0.9 feet; Davg,m=0.5 feet, Davg,o=0.5 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

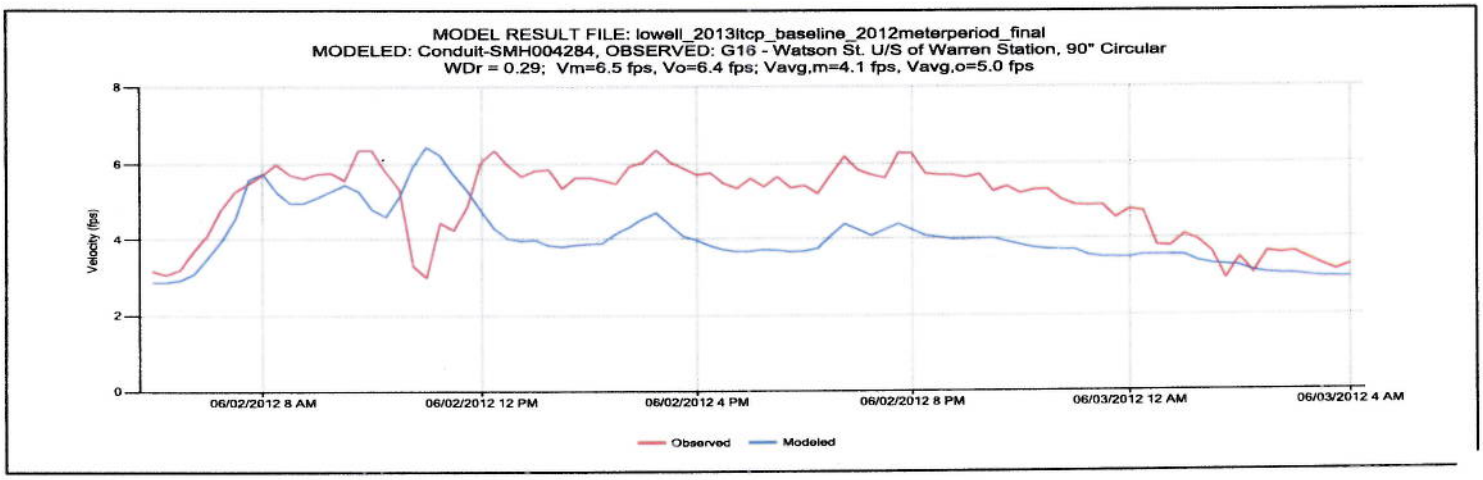

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005258, OBSERVED: G15 - Lawrence St. U/S of Warren Station, 36" Circular
WDr = 0.69; Volm=0.64 MG, Volo=0.62 MG; Qm=2.2 mgd, Qo=2.0 mgd; Qavg,m=0.7 mgd, Qavg,o=0.7 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005258, OBSERVED: G15 - Lawrence St. U/S of Warren Station, 36" Circular
WDr = 0.02; Vm=2.2 fps, Vo=1.8 fps; Vavg,m=1.4 fps, Vavg,o=1.1 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

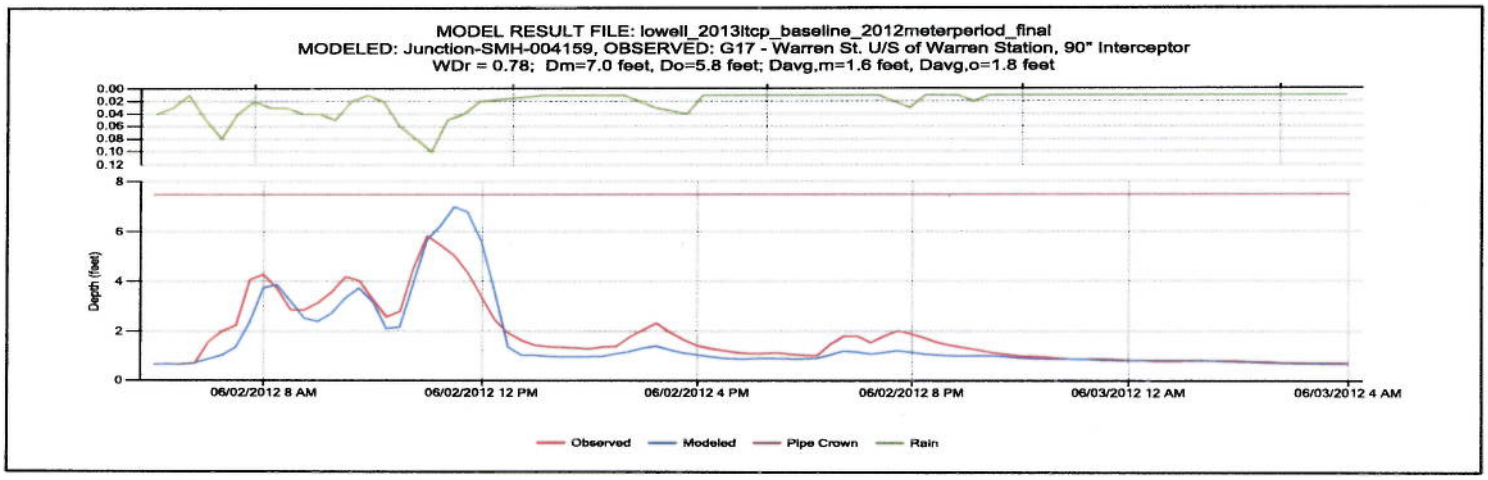
G16-Storm 3

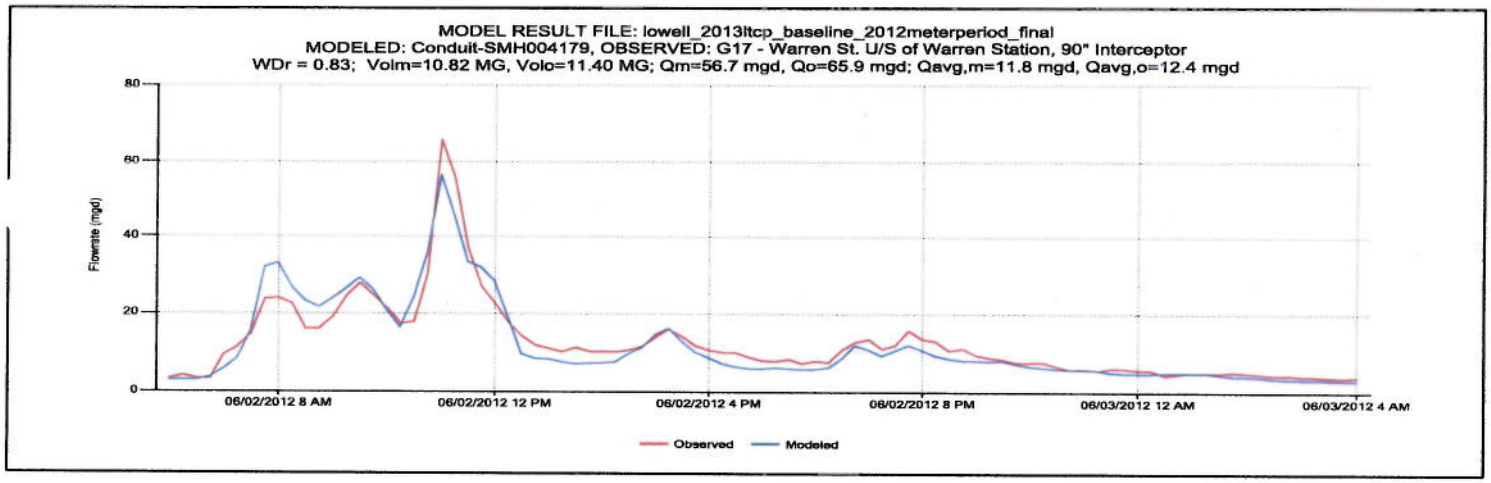

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-007216, OBSERVED: G16 - Watson St. U/S of Warren Station, 90" Circular
WDr = 0.78; Dm=1.7 feet, Do=2.8 feet; Davg,m=0.8 feet, Davg,o=0.8 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

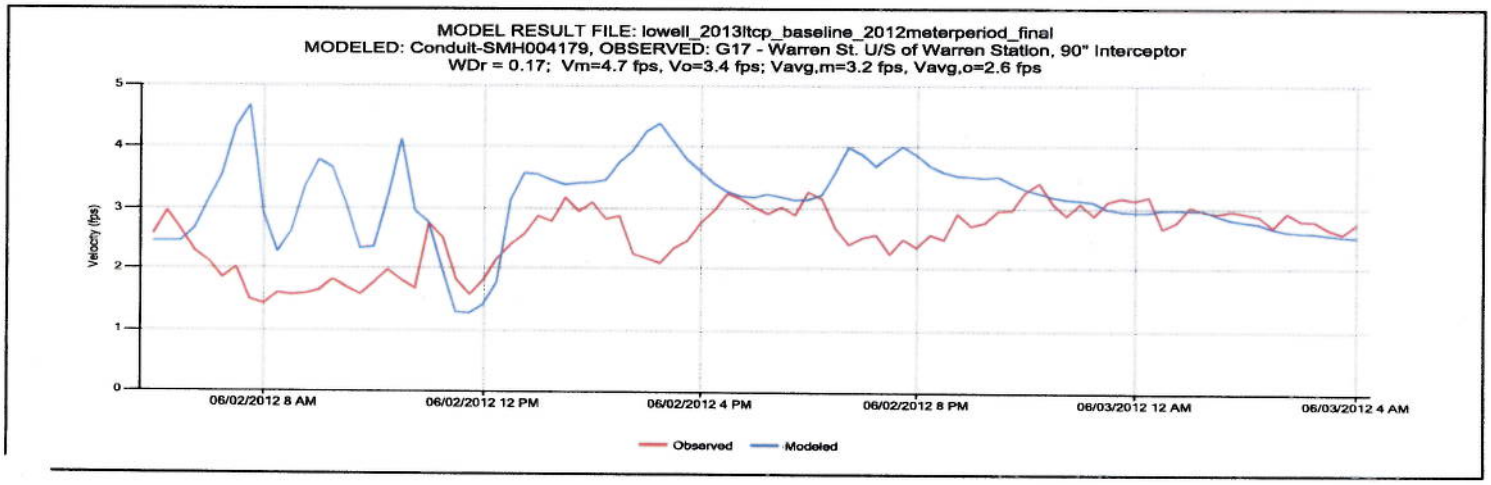

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004284, OBSERVED: G16 - Watson St. U/S of Warren Station, 90" Circular
WDr = 0.80; Volm=6.71 MG, Volo=7.86 MG; Qm=30.7 mgd, Qo=38.1 mgd; Qavg,m=7.3 mgd, Qavg,o=8.6 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004284, OBSERVED: G16 - Watson St. U/S of Warren Station, 90" Circular
WDr = 0.29; Vm=6.5 fps, Vo=6.4 fps; Vavg,m=4.1 fps, Vavg,o=5.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

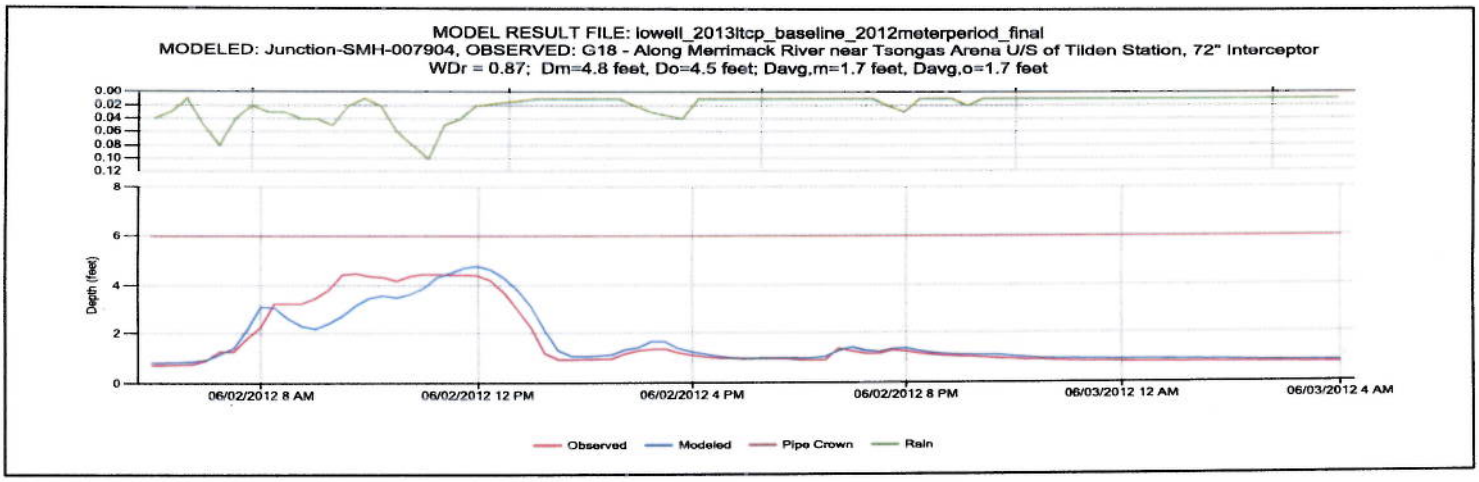
G17-Storm 3

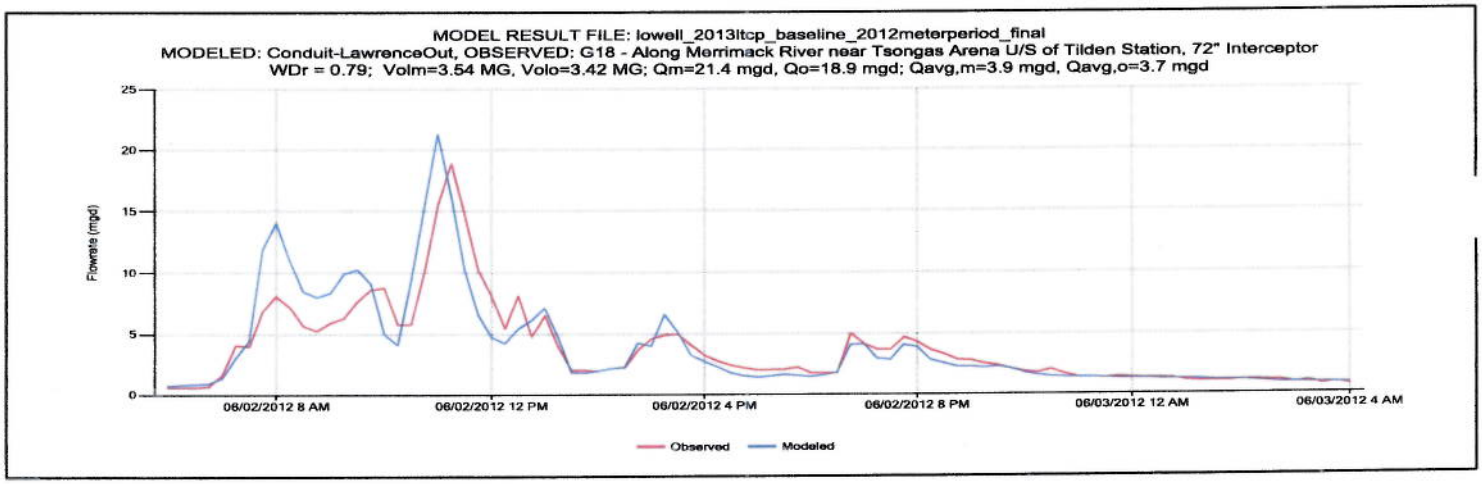

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-004159, OBSERVED: G17 - Warren St. U/S of Warren Station, 90" Interceptor
WDr = 0.78; Dm=7.0 feet, Do=5.8 feet; Davg,m=1.6 feet, Davg,o=1.8 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

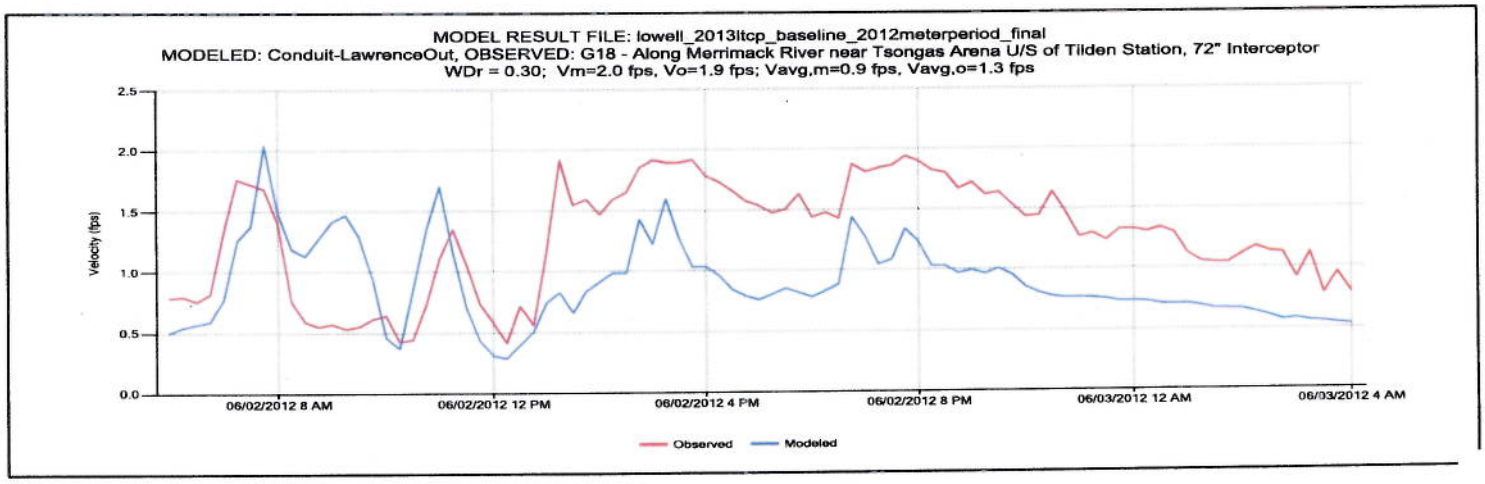

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004179, OBSERVED: G17 - Warren St. U/S of Warren Station, 90" Interceptor
WDr = 0.83; Volm=10.82 MG, Volo=11.40 MG; Qm=56.7 mgd, Qo=65.9 mgd; Qavg,m=11.8 mgd, Qavg,o=12.4 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004179, OBSERVED: G17 - Warren St. U/S of Warren Station, 90" Interceptor
WDr = 0.17; Vm=4.7 fps, Vo=3.4 fps; Vavg,m=3.2 fps, Vavg,o=2.6 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

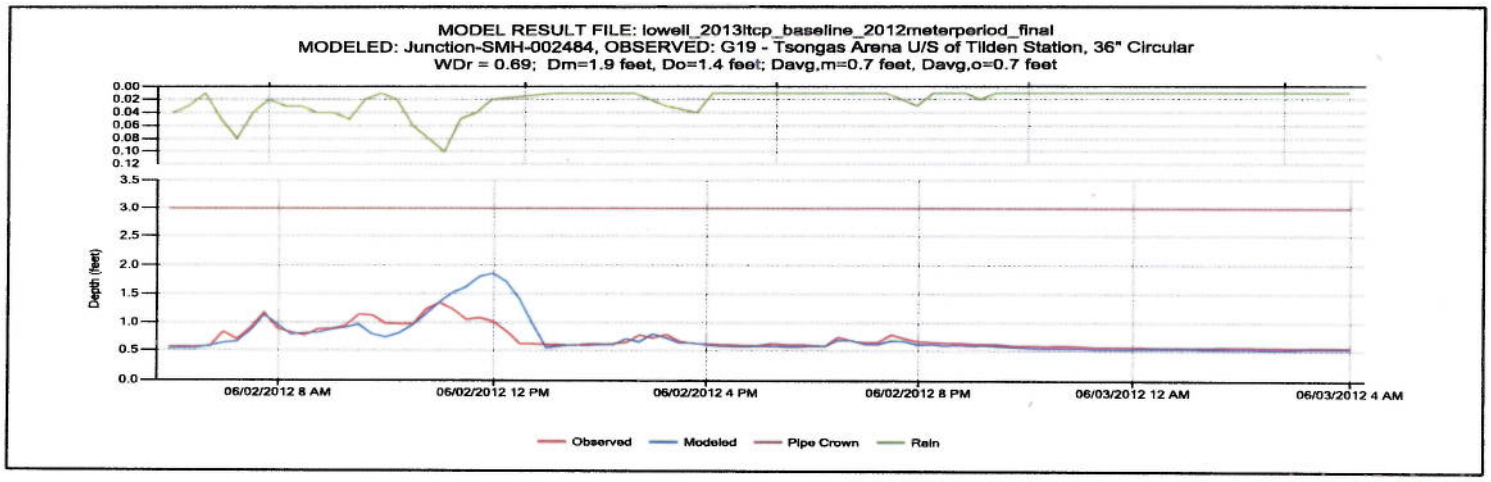
G18-Storm 3

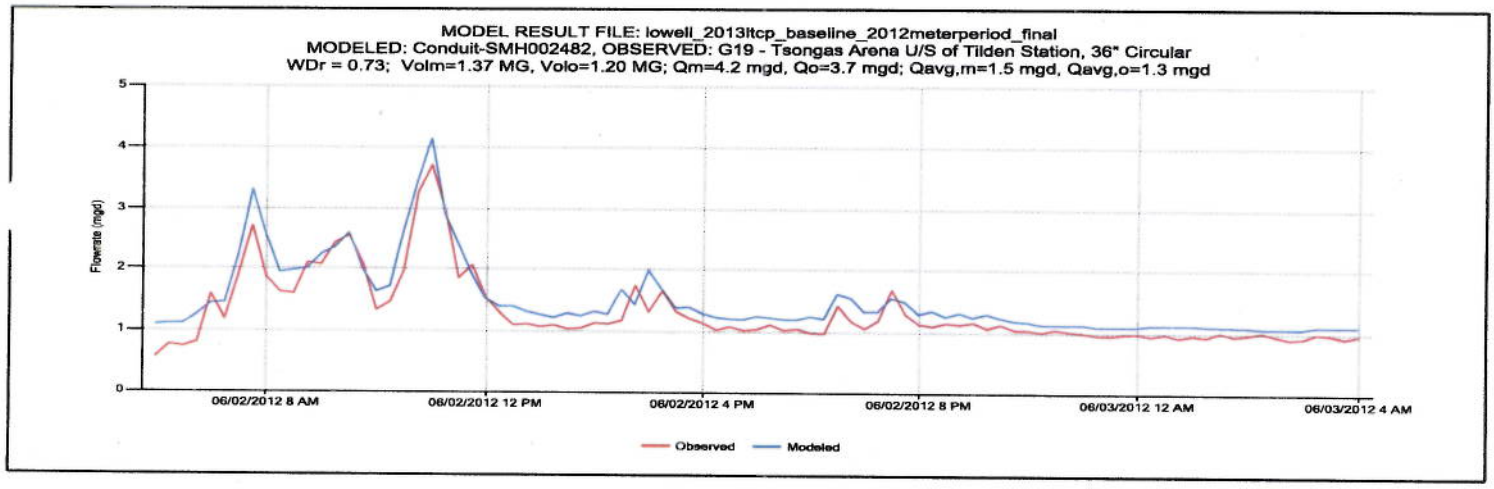

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-007904, OBSERVED: G18 - Along Merrimack River near Tsongas Arena U/S of Tilden Station, 72" Interceptor
WDr = 0.87; Dm=4.8 feet, Do=4.5 feet; Davg,m=1.7 feet, Davg,o=1.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

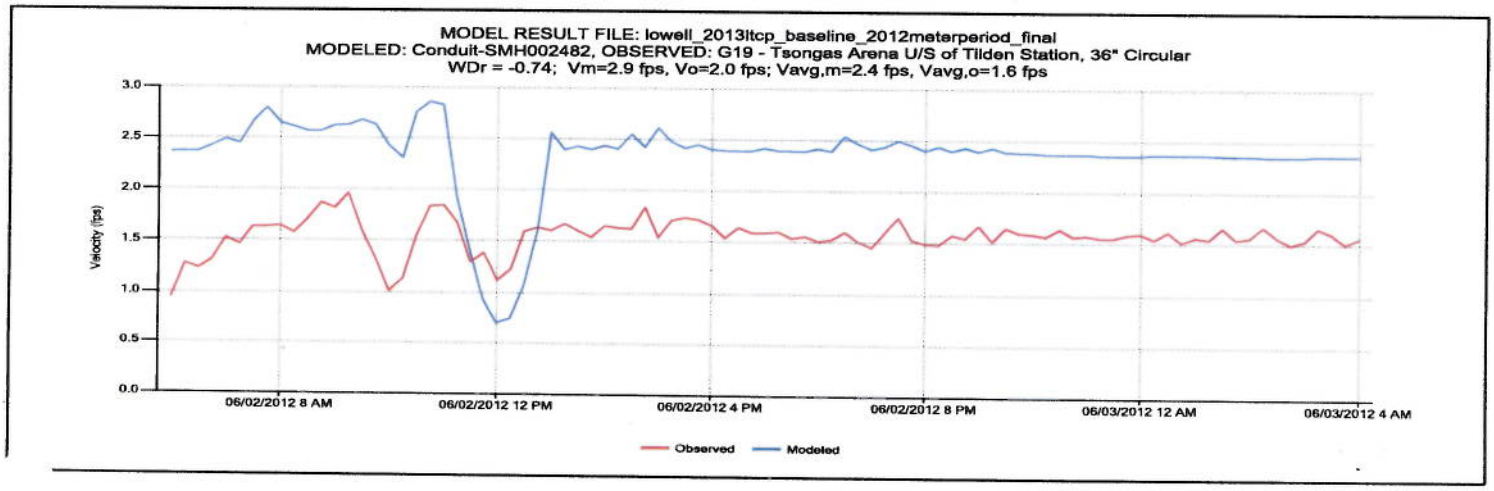

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-LawrenceOut, OBSERVED: G18 - Along Merrimack River near Tsongas Arena U/S of Tilden Station, 72" Interceptor
WDr = 0.79; Volm=3.54 MG, Volo=3.42 MG; Qm=21.4 mgd, Qo=18.9 mgd; Qavg,m=3.9 mgd, Qavg,o=3.7 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-LawrenceOut, OBSERVED: G18 - Along Merrimack River near Tsongas Arena U/S of Tilden Station, 72" Interceptor
WDr = 0.30; Vm=2.0 fps, Vo=1.9 fps; Vavg,m=0.9 fps, Vavg,o=1.3 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

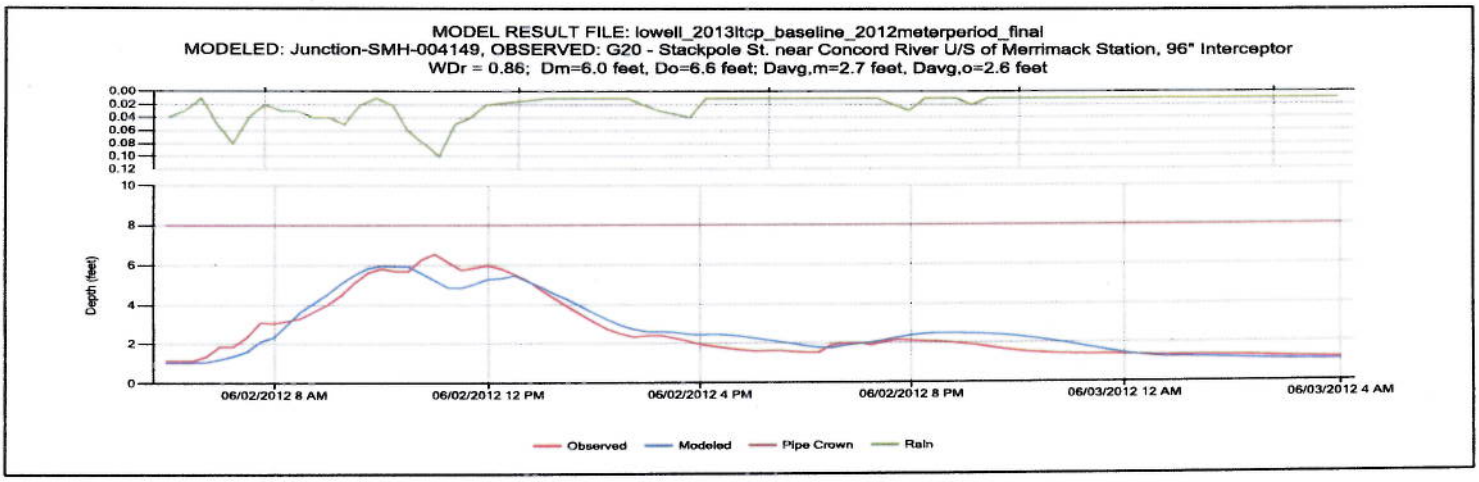
G19-Storm 3

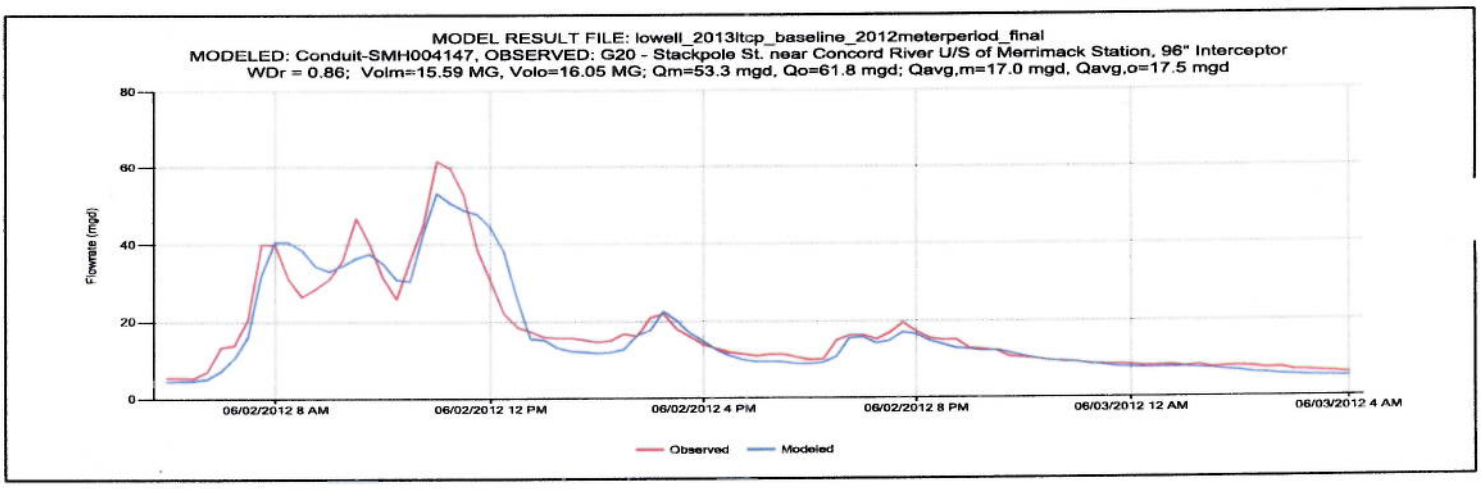

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-002484, OBSERVED: G19 - Tsongas Arena U/S of Tilden Station, 36" Circular
WDr = 0.69; Dm=1.9 feet, Do=1.4 feet; Davg,m=0.7 feet, Davg,o=0.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

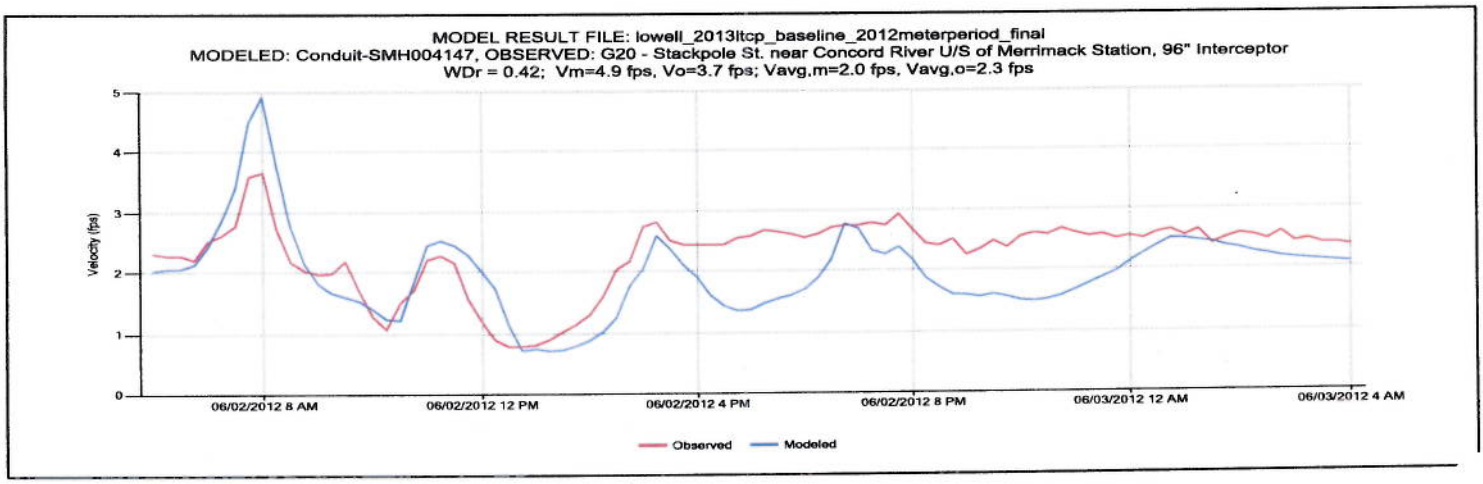

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002482, OBSERVED: G19 - Tsongas Arena U/S of Tilden Station, 36" Circular
WDr = 0.73; Volm=1.37 MG, Volo=1.20 MG; Qm=4.2 mgd, Qo=3.7 mgd; Qavg,m=1.5 mgd, Qavg,o=1.3 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH002482, OBSERVED: G19 - Tsongas Arena U/S of Tilden Station, 36" Circular
WDr = -0.74; Vm=2.9 fps, Vo=2.0 fps; Vavg,m=2.4 fps, Vavg,o=1.6 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

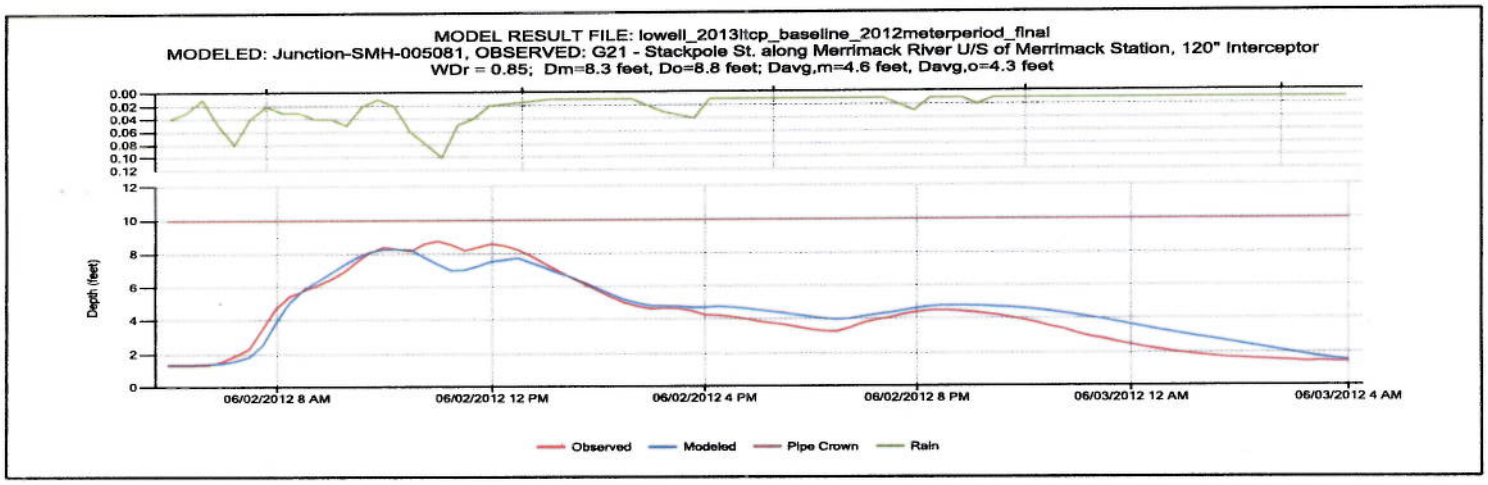
G20-Storm 3

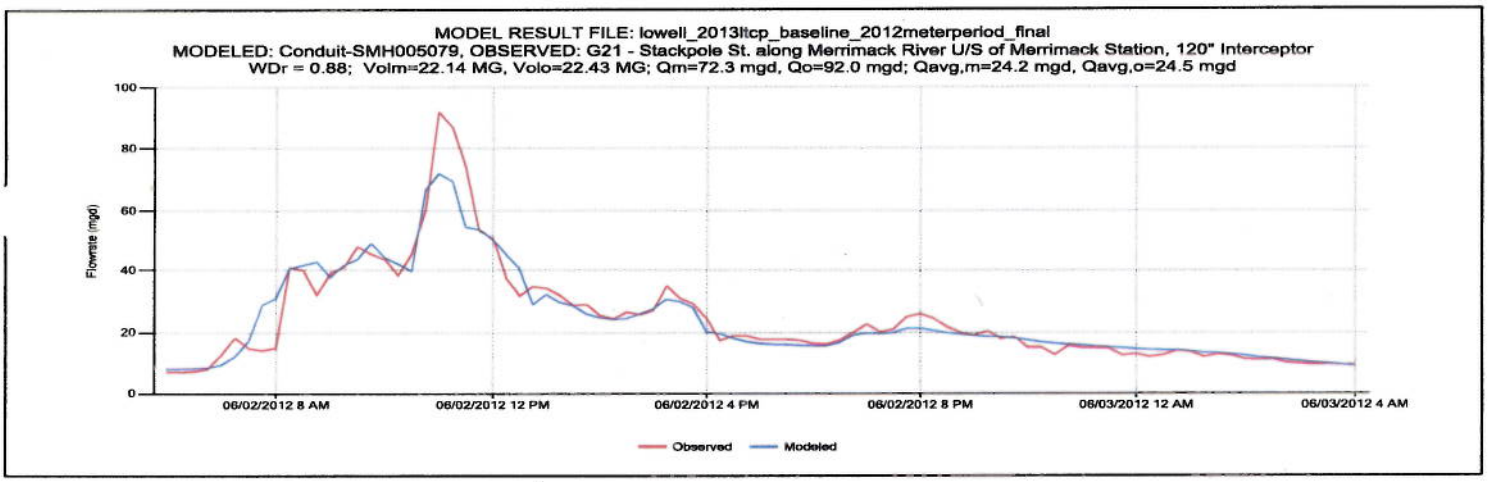

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-004149, OBSERVED: G20 - Stackpole St. near Concord River U/S of Merrimack Station, 96" Interceptor
WDr = 0.86; Dm=6.0 feet, Do=6.6 feet; Davg,m=2.7 feet, Davg,o=2.6 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

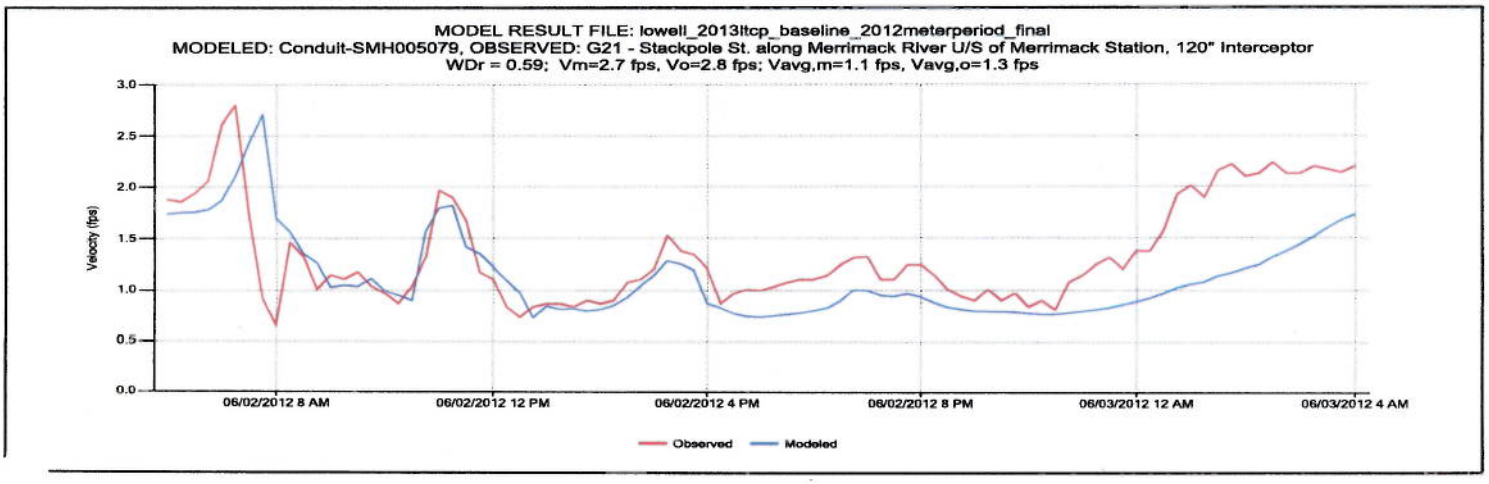

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004147, OBSERVED: G20 - Stackpole St. near Concord River U/S of Merrimack Station, 96" Interceptor
WDr = 0.86; Volm=15.59 MG, Volo=16.05 MG; Qm=53.3 mgd, Qo=61.8 mgd; Qavg,m=17.0 mgd, Qavg,o=17.5 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004147, OBSERVED: G20 - Stackpole St. near Concord River U/S of Merrimack Station, 96" Interceptor
WDr = 0.42; Vm=4.9 fps, Vo=3.7 fps; Vavg,m=2.0 fps, Vavg,o=2.3 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

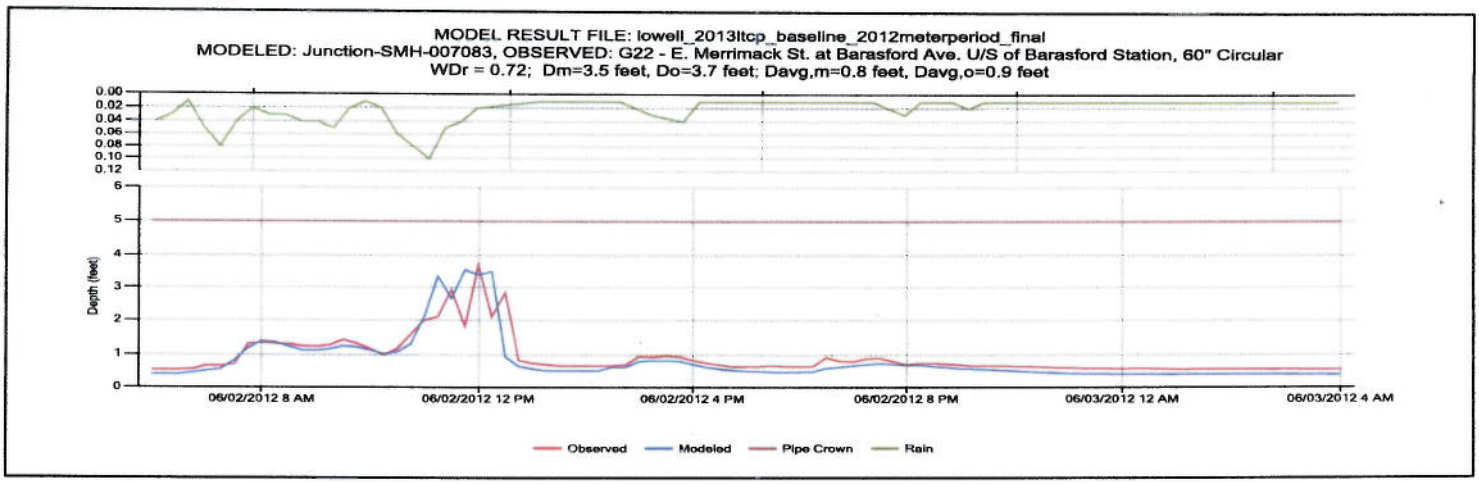
G21-Storm 3

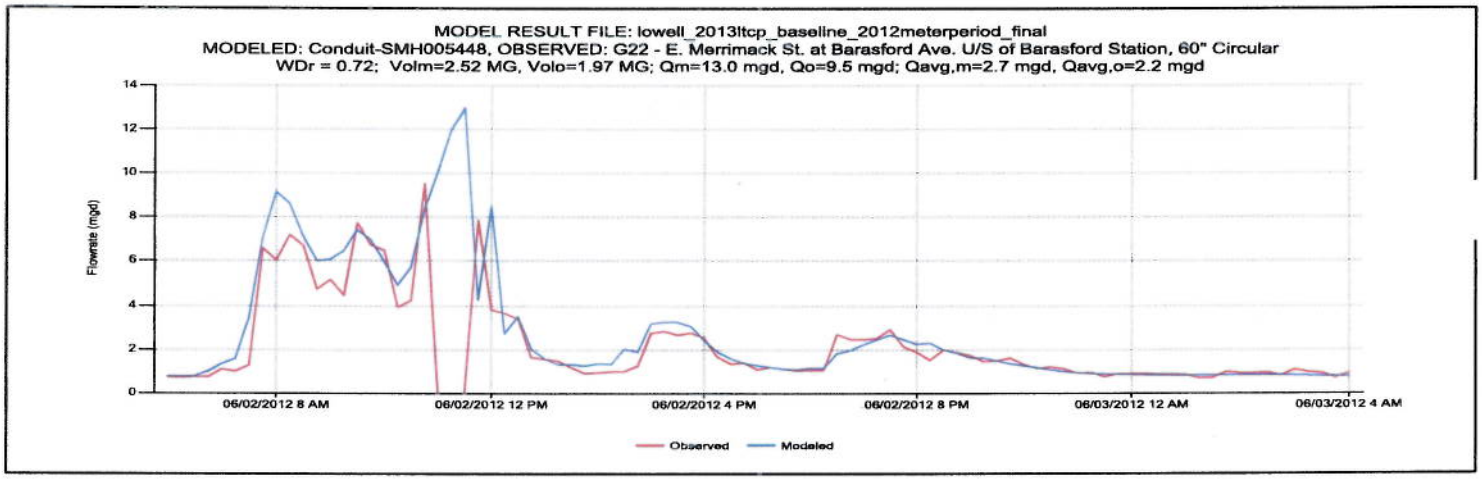

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-005081, OBSERVED: G21 - Stackpole St. along Merrimack River U/S of Merrimack Station, 120" Interceptor
WDr = 0.85; Dm=8.3 feet, Do=8.8 feet; Davg,m=4.6 feet, Davg,o=4.3 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

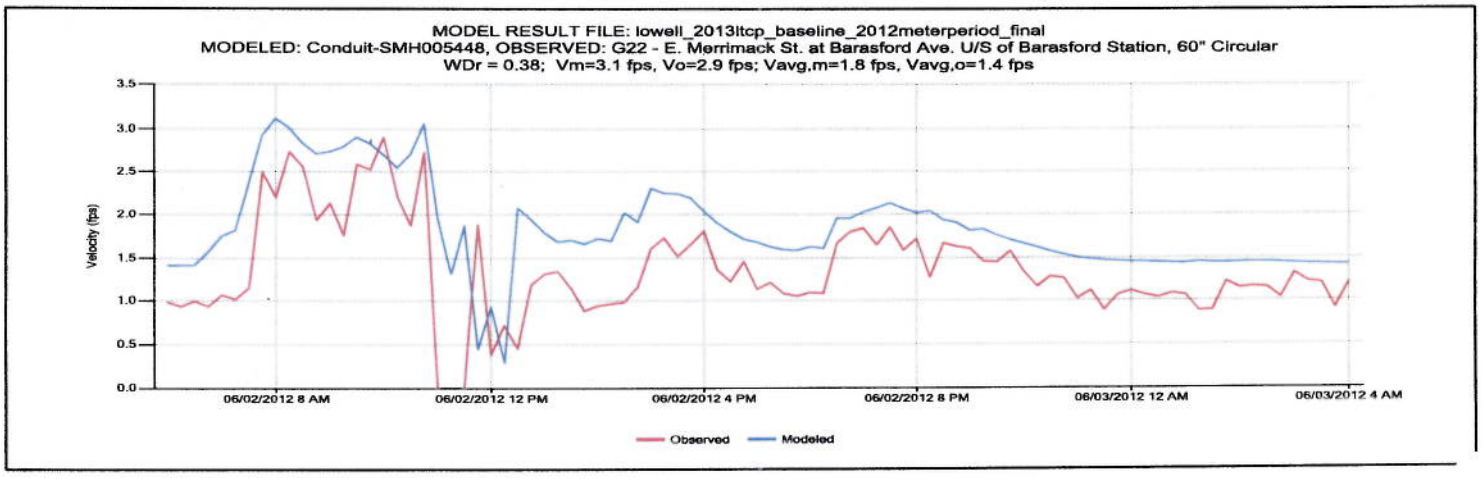

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005079, OBSERVED: G21 - Stackpole St. along Merrimack River U/S of Merrimack Station, 120" Interceptor
WDr = 0.88; Volm=22.14 MG, Volo=22.43 MG; Qm=72.3 mgd, Qo=92.0 mgd; Qavg,m=24.2 mgd, Qavg,o=24.5 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005079, OBSERVED: G21 - Stackpole St. along Merrimack River U/S of Merrimack Station, 120" Interceptor
WDr = 0.59; Vm=2.7 fps, Vo=2.8 fps; Vavg,m=1.1 fps, Vavg,o=1.3 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

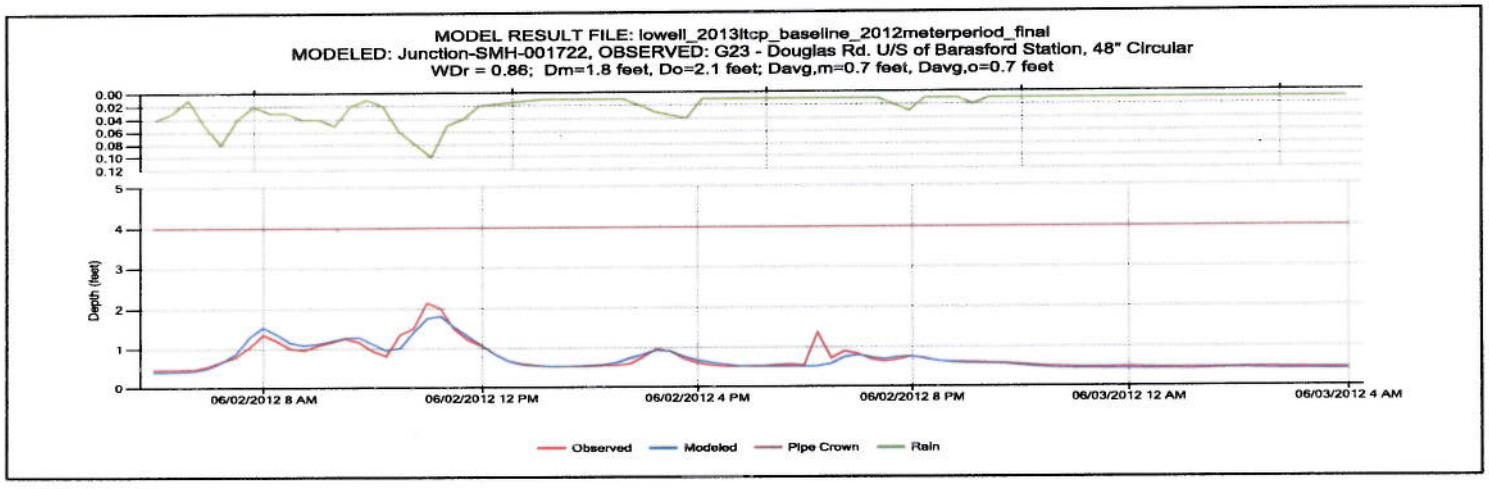
G22-Storm 3

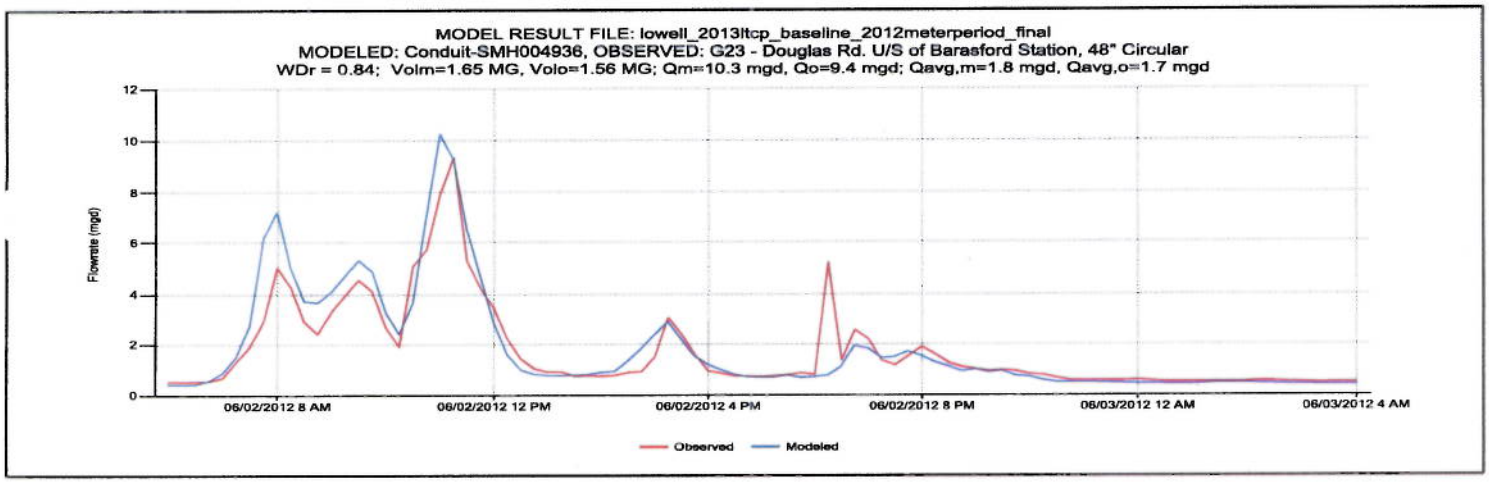

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-007083, OBSERVED: G22 - E. Merrimack St. at Barasford Ave. U/S of Barasford Station, 60" Circular
WDr = 0.72; Dm=3.5 feet, Do=3.7 feet; Davg,m=0.8 feet, Davg,o=0.9 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

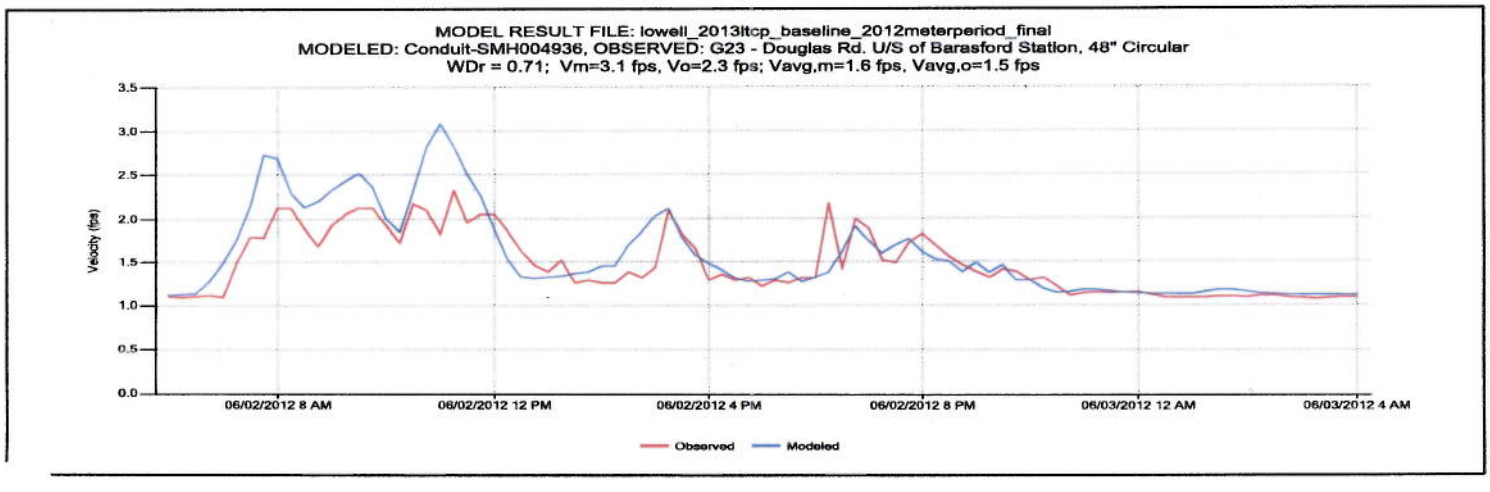

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005448, OBSERVED: G22 - E. Merrimack St. at Barasford Ave. U/S of Barasford Station, 60" Circular
WDr = 0.72; Volm=2.52 MG, Volo=1.97 MG; Qm=13.0 mgd, Qo=9.5 mgd; Qavg,m=2.7 mgd, Qavg,o=2.2 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH005448, OBSERVED: G22 - E. Merrimack St. at Barasford Ave. U/S of Barasford Station, 60" Circular
WDr = 0.38; Vm=3.1 fps, Vo=2.9 fps; Vavg,m=1.8 fps, Vavg,o=1.4 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

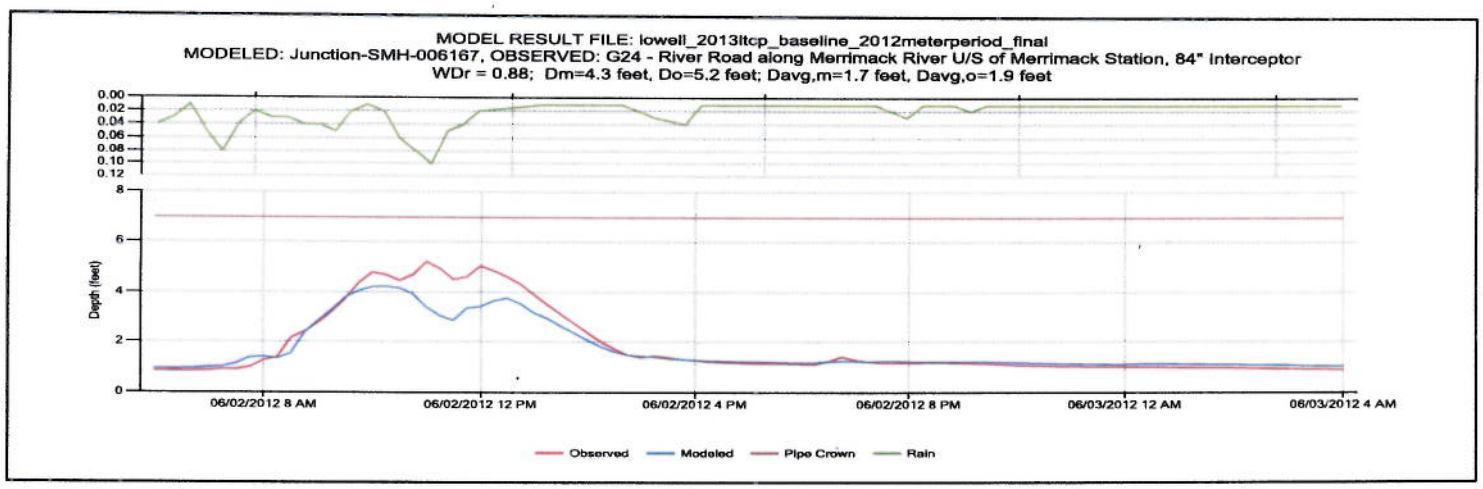
G23-Storm 3

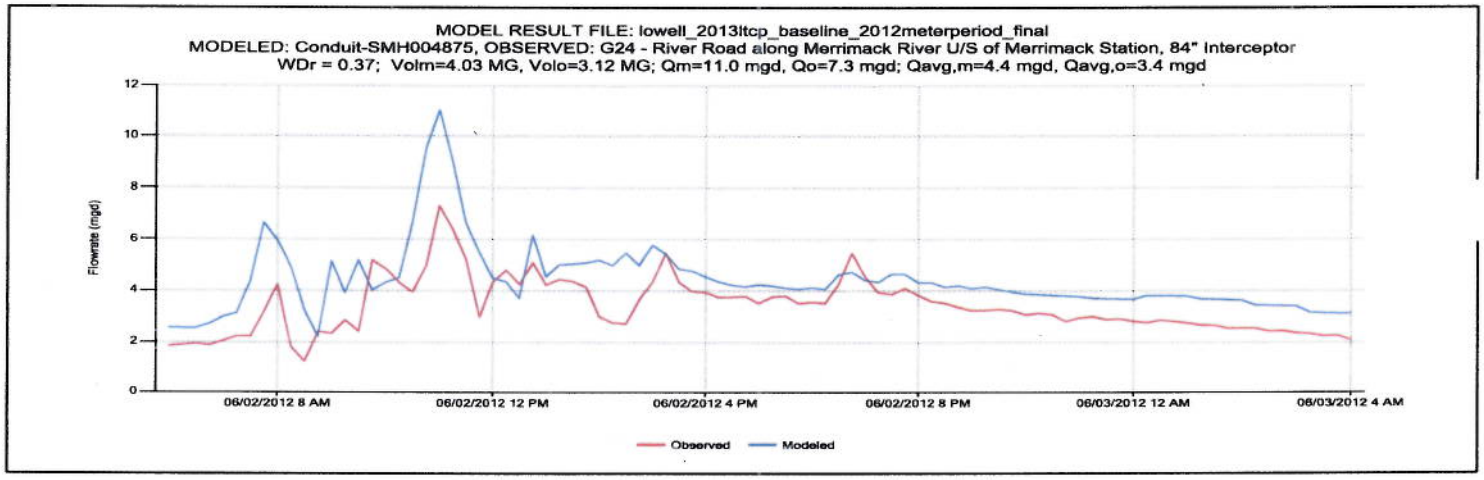

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-001722, OBSERVED: G23 - Douglas Rd. U/S of Barasford Station, 48" Circular
WDr = 0.86; Dm=1.8 feet, Do=2.1 feet; Davg,m=0.7 feet, Davg,o=0.7 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

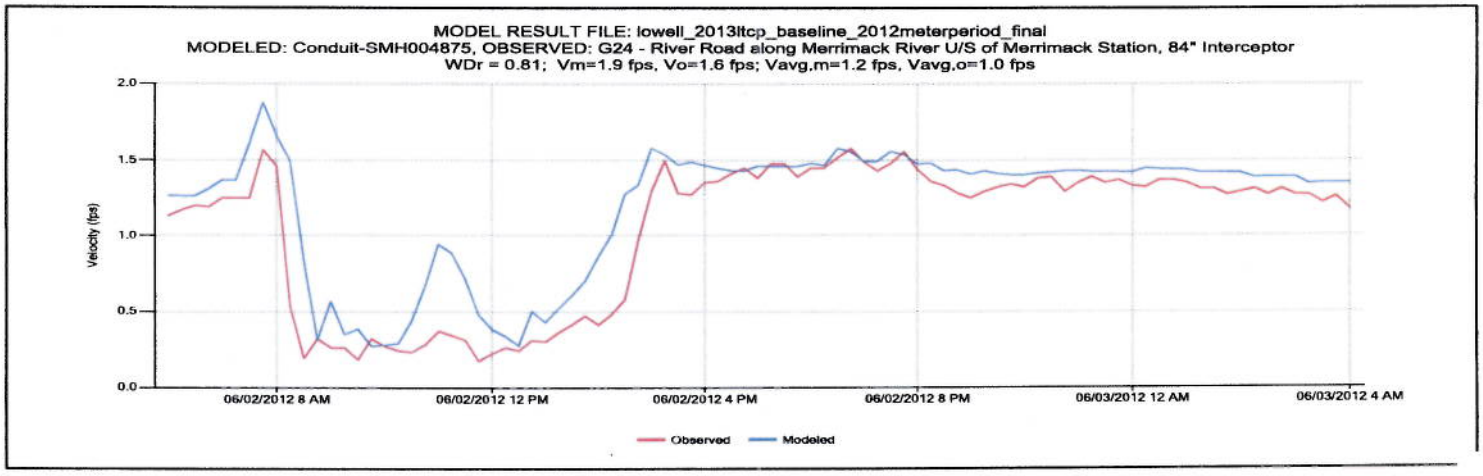

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004936, OBSERVED: G23 - Douglas Rd. U/S of Barasford Station, 48" Circular
WDr = 0.84; Volm=1.65 MG, Volo=1.56 MG; Qm=10.3 mgd, Qo=9.4 mgd; Qavg,m=1.8 mgd, Qavg,o=1.7 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004936, OBSERVED: G23 - Douglas Rd. U/S of Barasford Station, 48" Circular
WDr = 0.71; Vm=3.1 fps, Vo=2.3 fps; Vavg,m=1.6 fps, Vavg,o=1.5 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

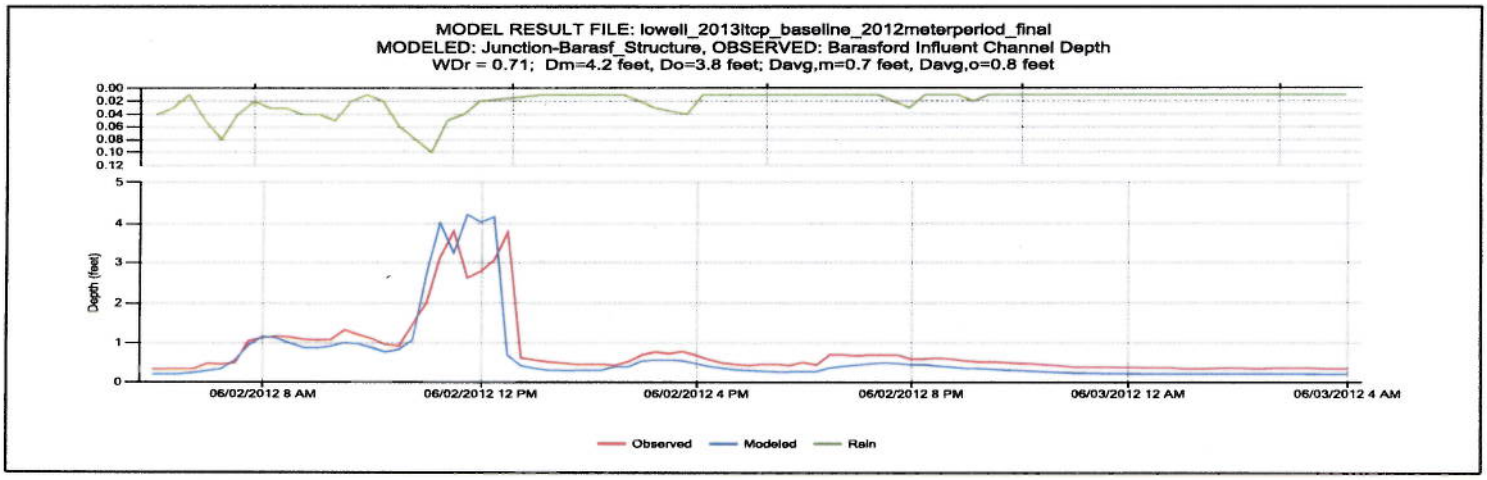
G24-Storm 3


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Junction-SMH-006167, OBSERVED: G24 - River Road along Merrimack River U/S of Merrimack Station, 84" Interceptor
WDr = 0.88; Dm=4.3 feet, Do=5.2 feet; Davg,m=1.7 feet, Davg,o=1.9 feet
Depth (feet)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled
Pipe Crown
Rain

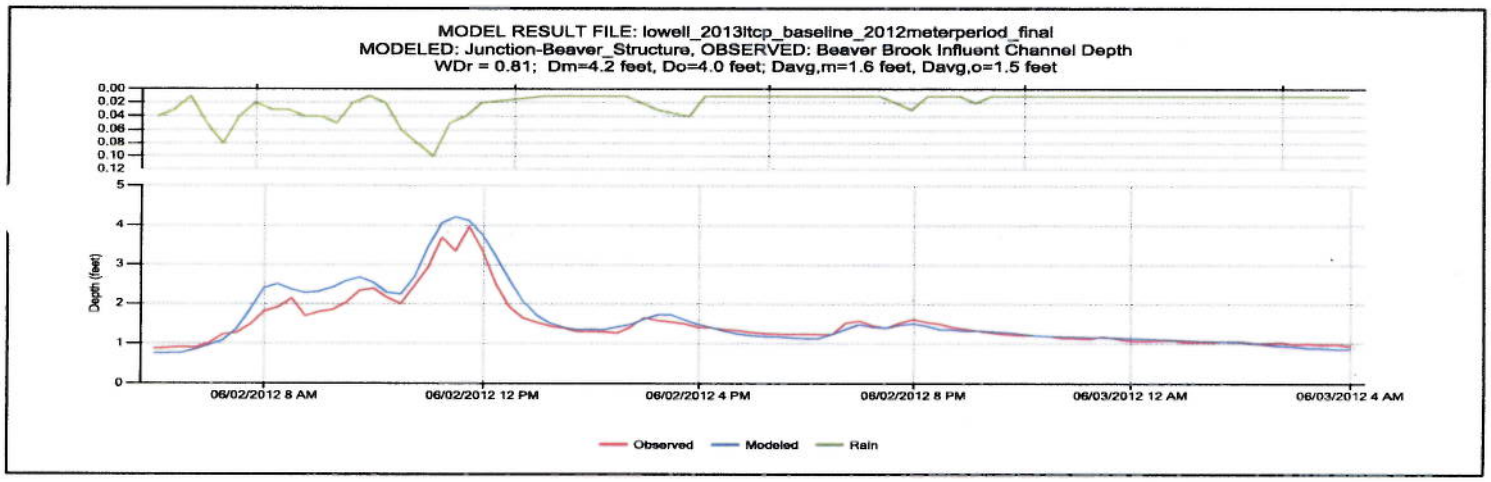

MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004875, OBSERVED: G24 - River Road along Merrimack River U/S of Merrimack Station, 84" Interceptor
WDr = 0.37; Volm=4.03 MG, Volo=3.12 MG; Qm=11.0 mgd, Qo=7.3 mgd; Qavg,m=4.4 mgd, Qavg,o=3.4 mgd
Flowrate (mgd)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled


MODEL RESULT FILE: lowell_2013ltcp_baseline_2012meterperiod_final
MODELED: Conduit-SMH004875, OBSERVED: G24 - River Road along Merrimack River U/S of Merrimack Station, 84" Interceptor
WDr = 0.81; Vm=1.9 fps, Vo=1.6 fps; Vavg,m=1.2 fps, Vavg,o=1.0 fps
Velocity (fps)
06/02/2012 8 AM
06/02/2012 12 PM
06/02/2012 4 PM
06/02/2012 8 PM
06/03/2012 12 AM
06/03/2012 4 AM
Observed
Modeled

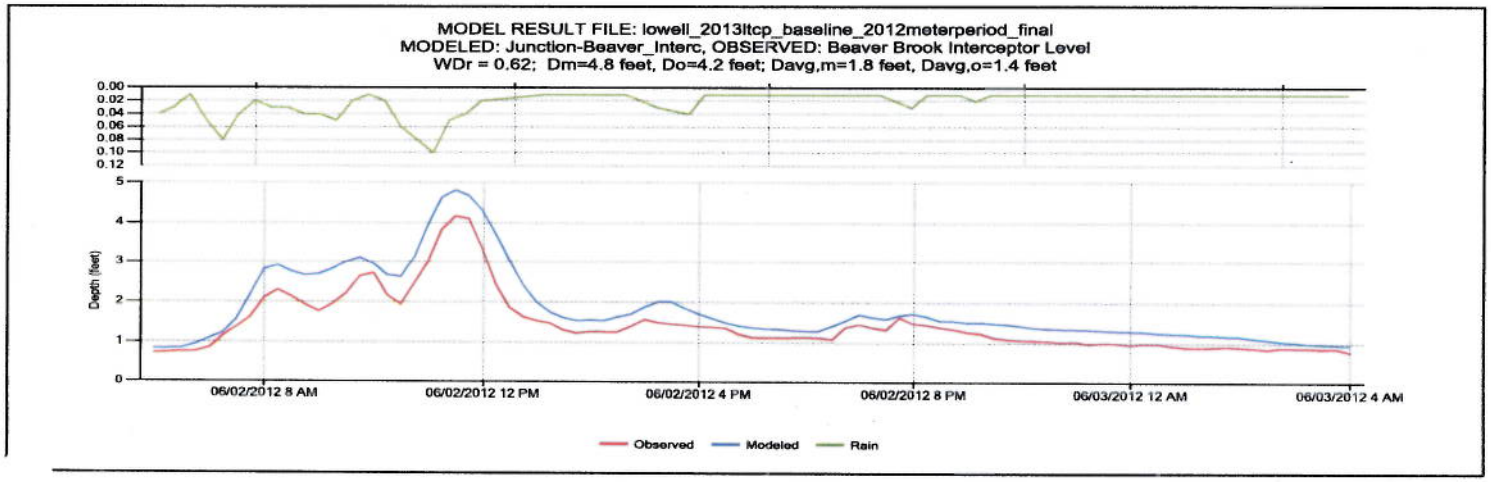
Barasford Influent Channel Depth



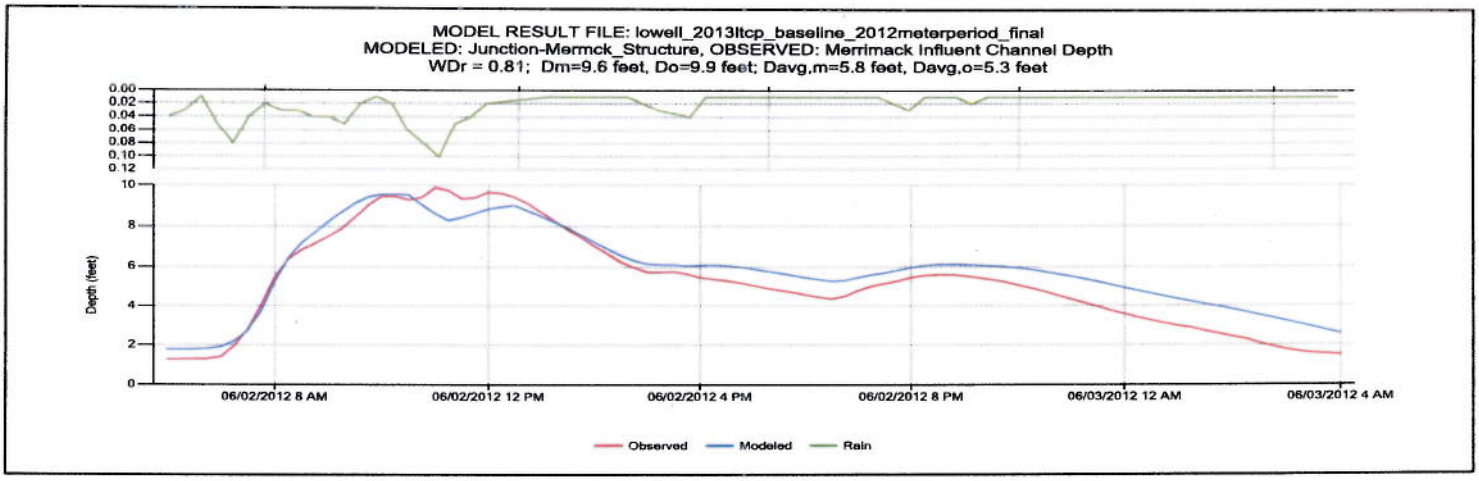
Beaver Brook Influent Channel Depth



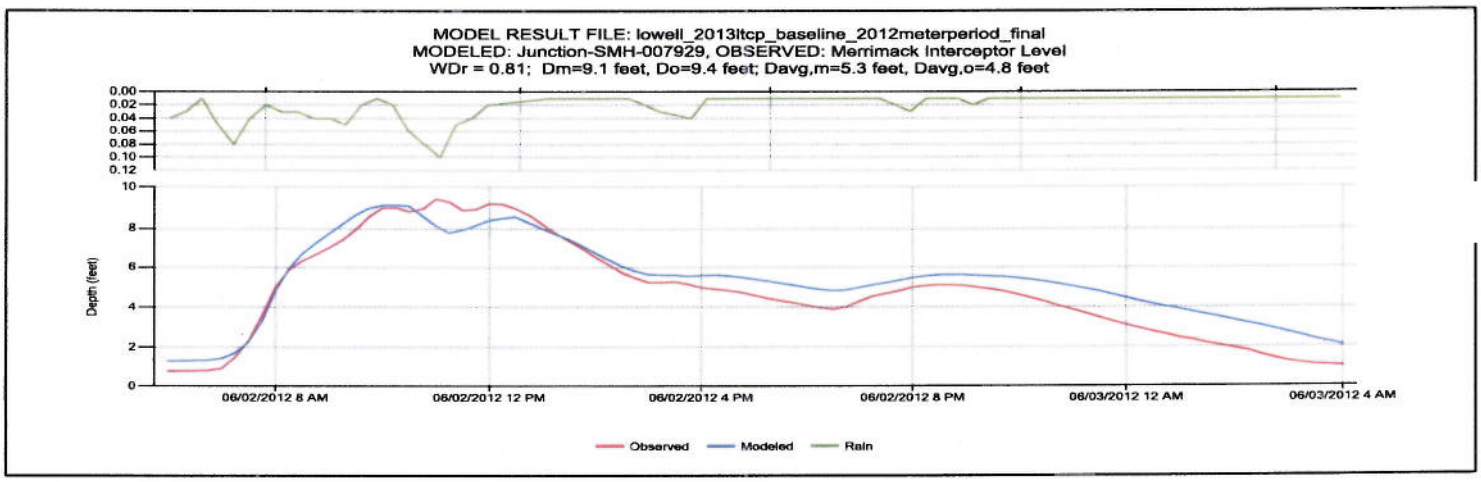
Beaver Brook Interceptor Depth



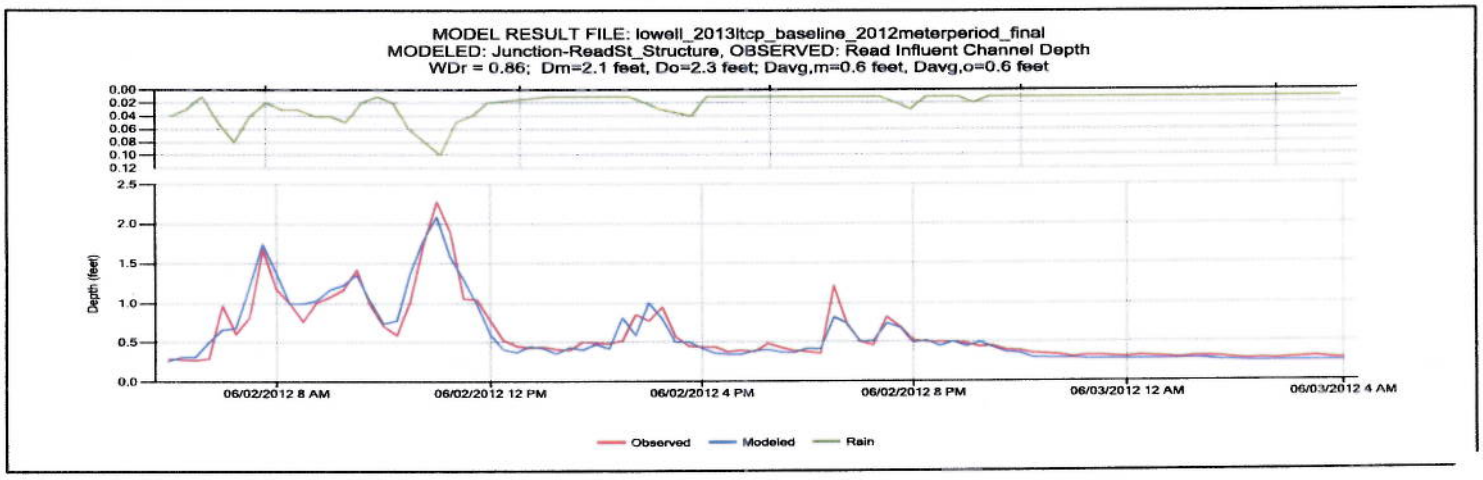
Merrimack Influent Channel Depth



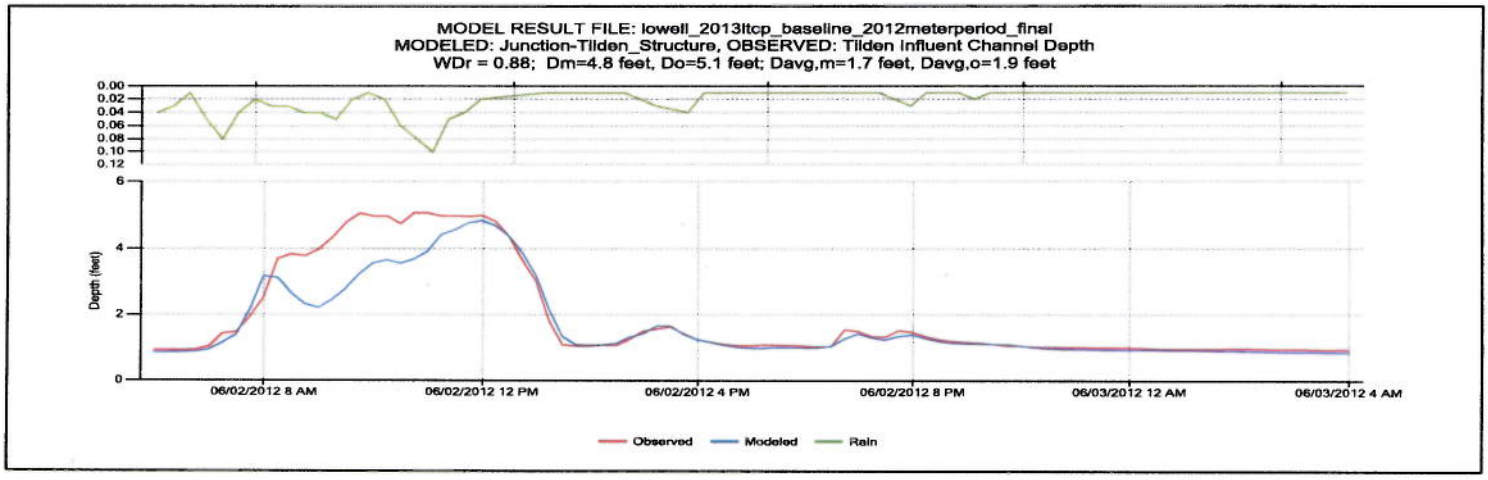
Merrimack Interceptor Depth



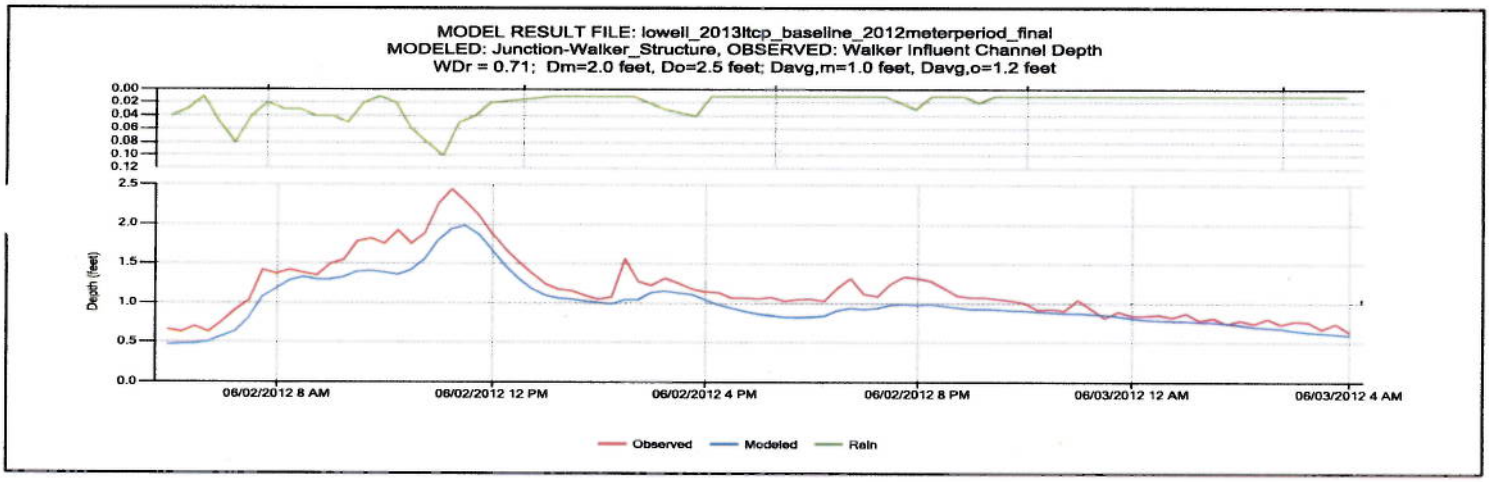
Read Influent Channel Depth



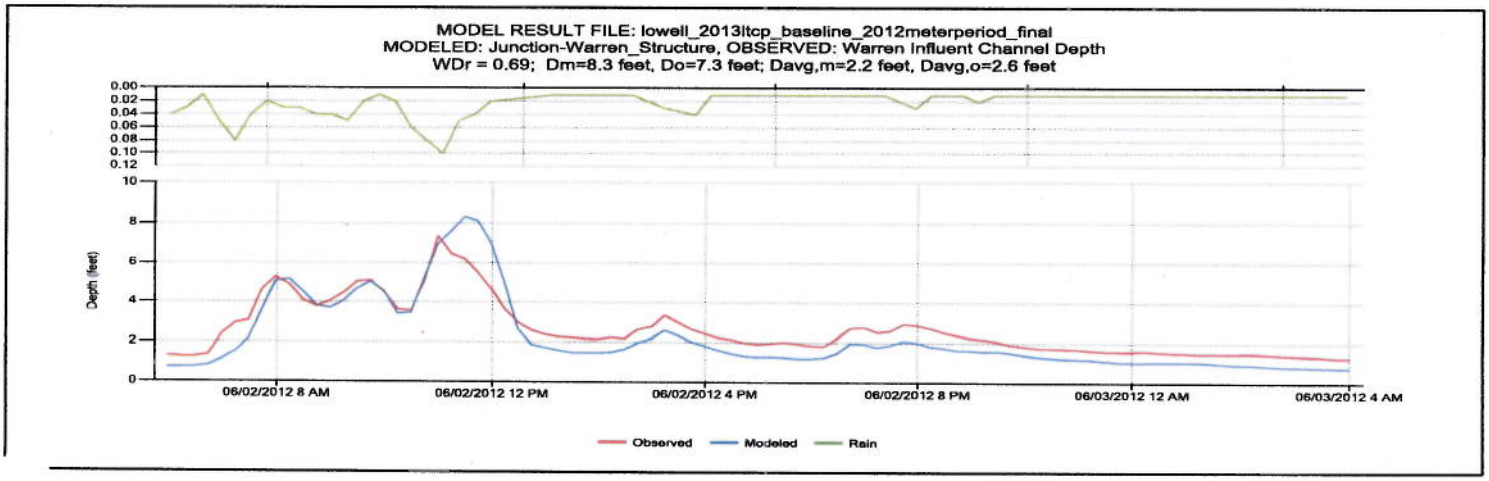
Tilden Influent Channel Depth



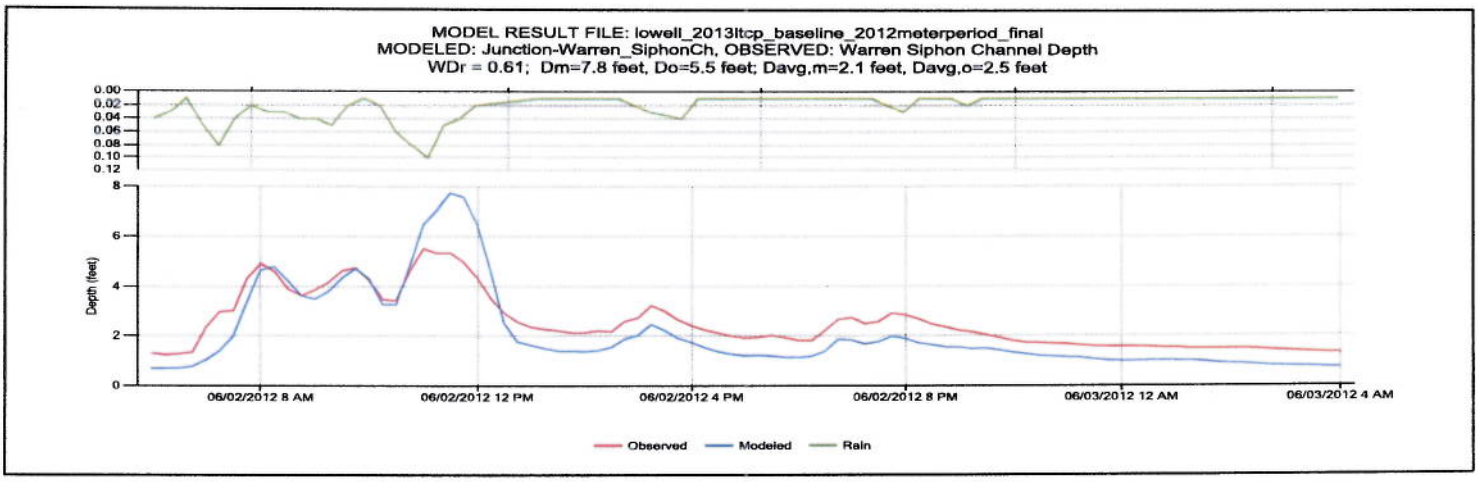
Walker Influent Channel Depth



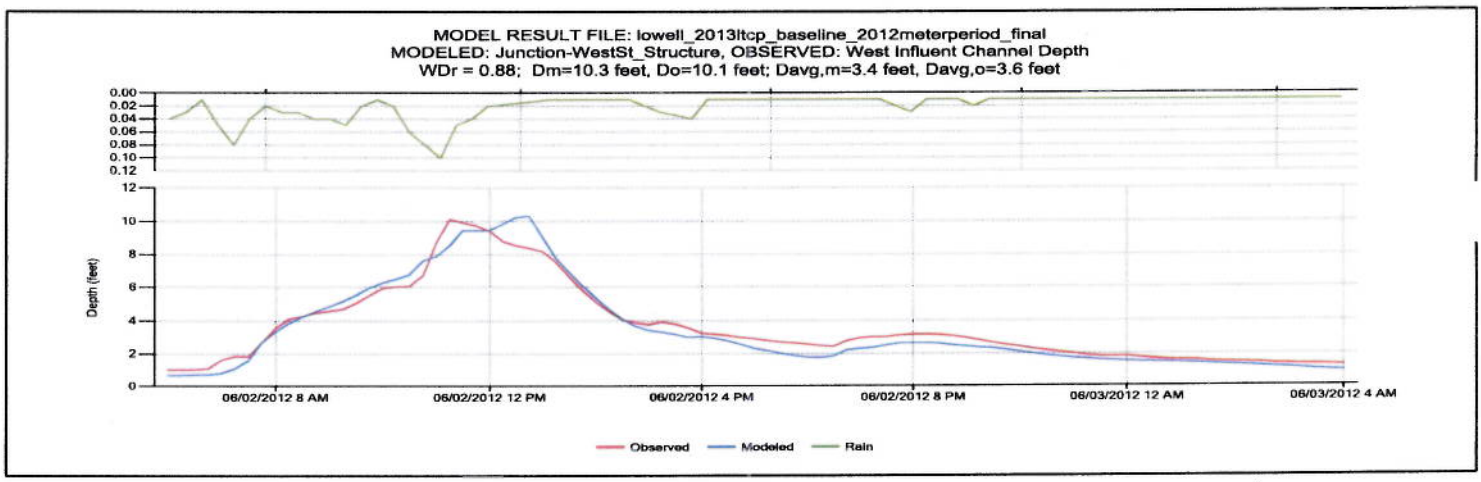
Warren Influent Channel Depth



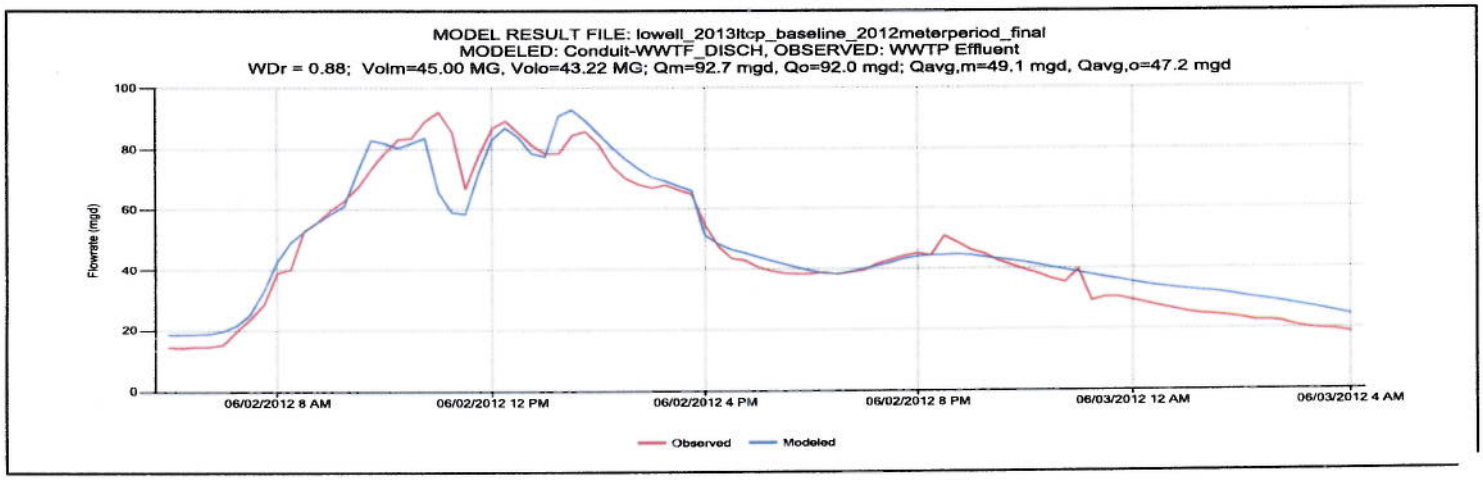
Warren Siphon Channel Depth



West Influent Channel Depth

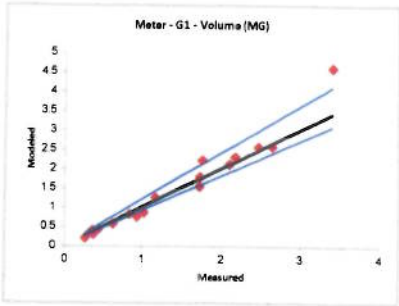


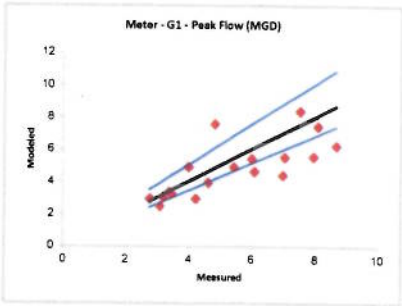
Lowell Regional WWTF Effluent Flow

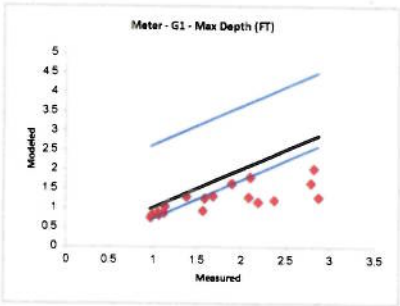


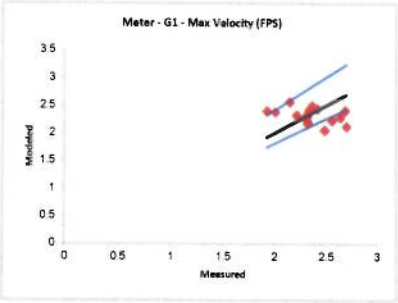
Attachment 4

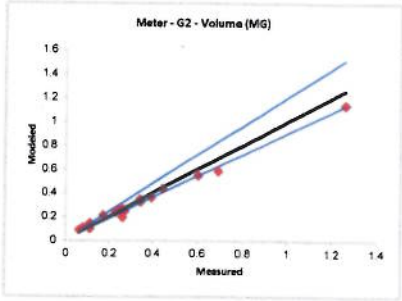
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

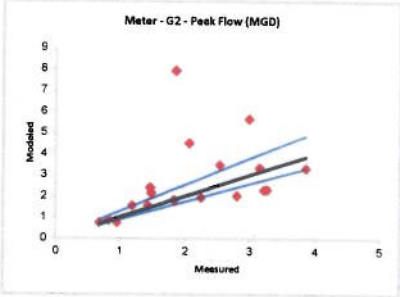


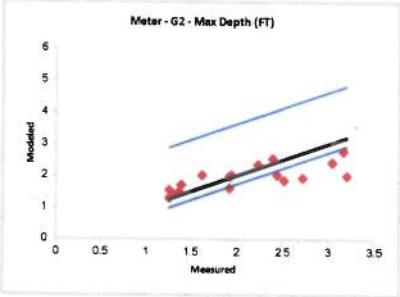


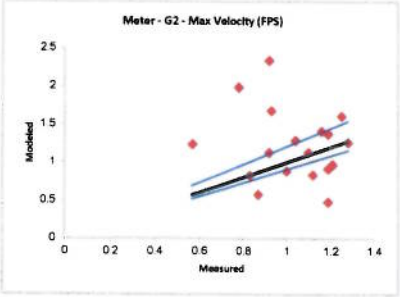


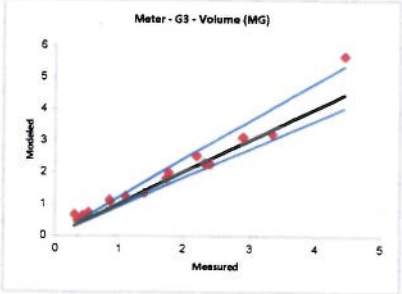


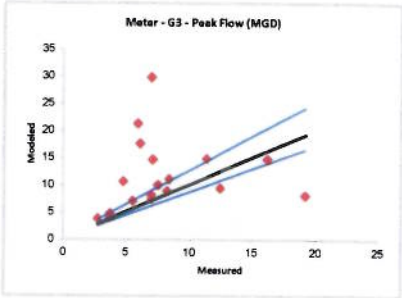


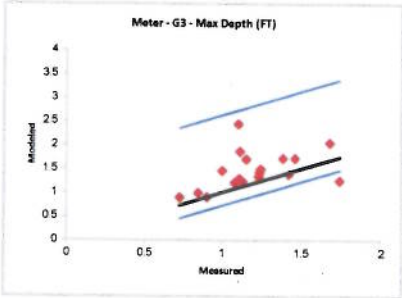


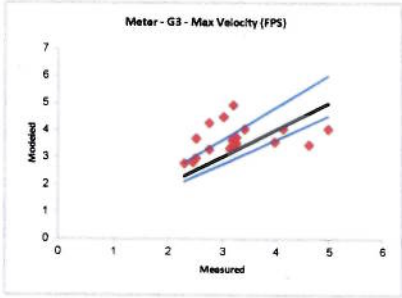


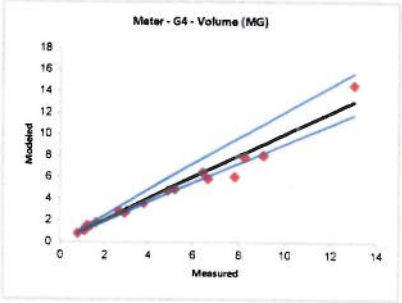


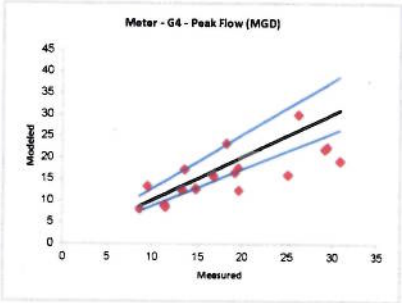


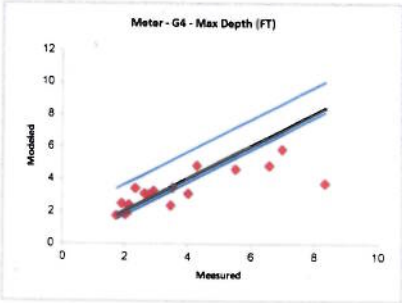


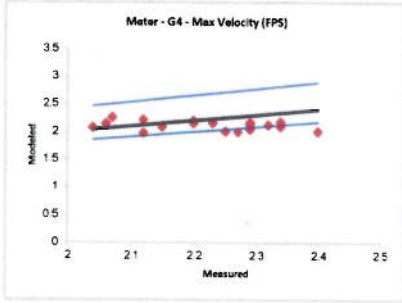




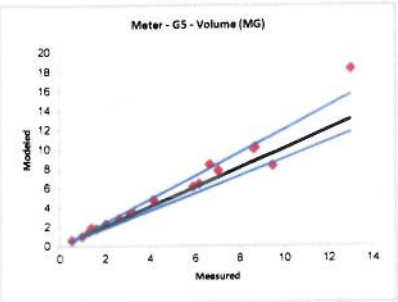


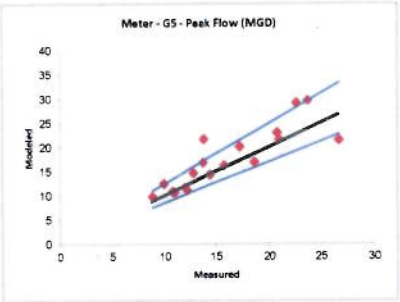


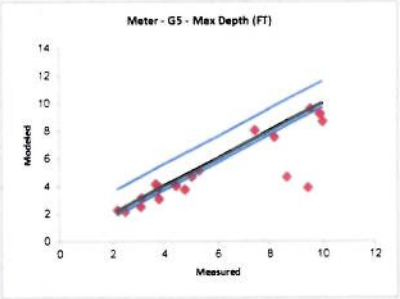


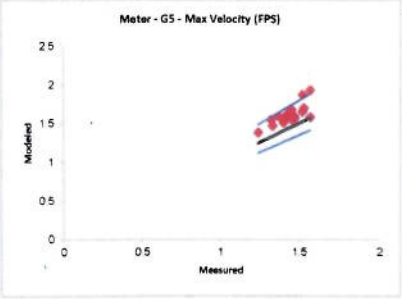


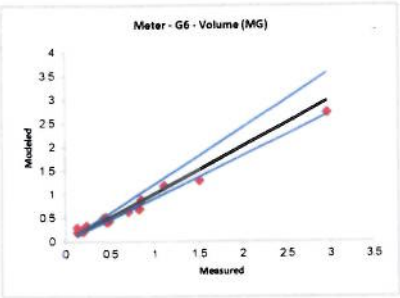
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

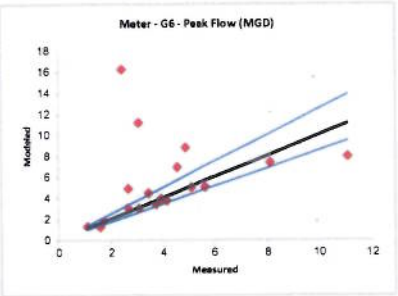


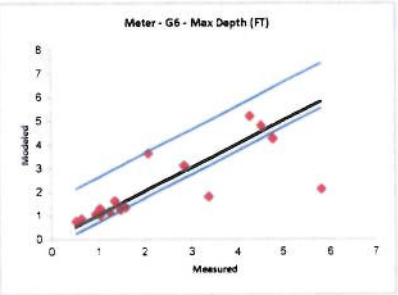


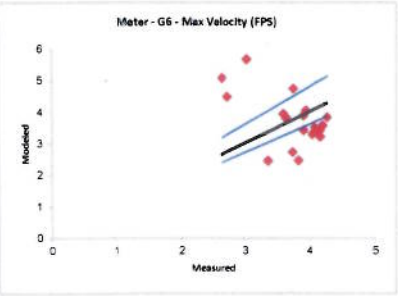


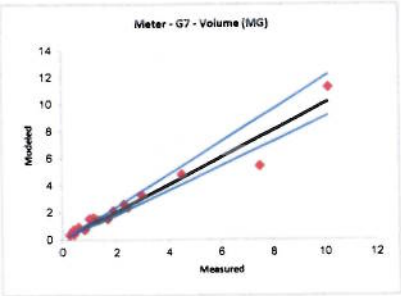


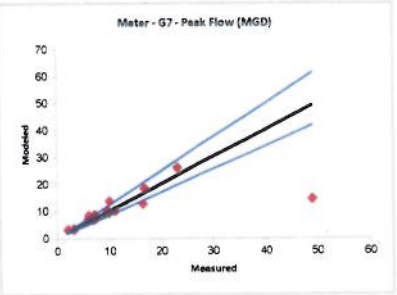


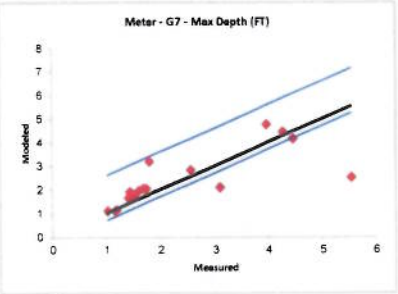


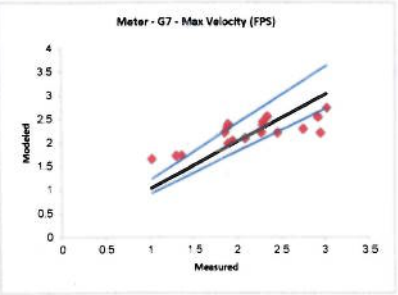


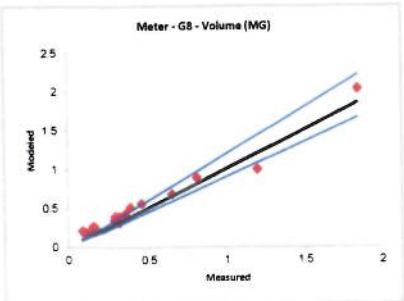


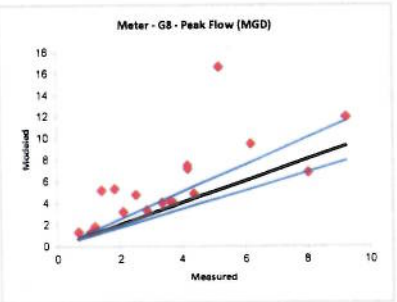


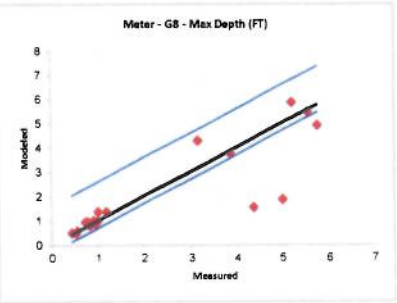


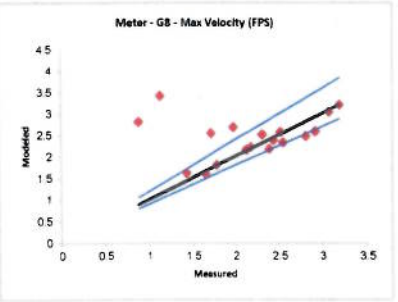




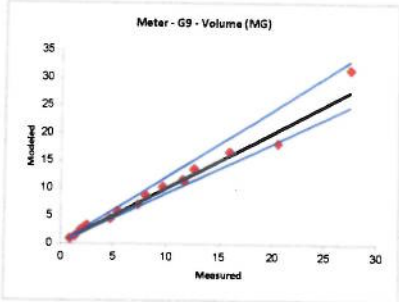


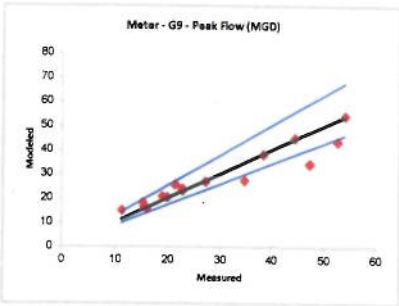


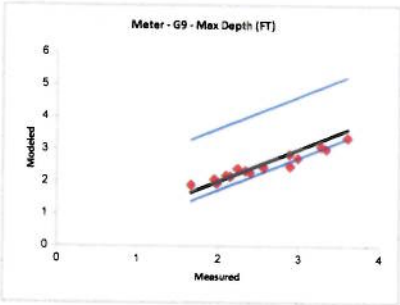


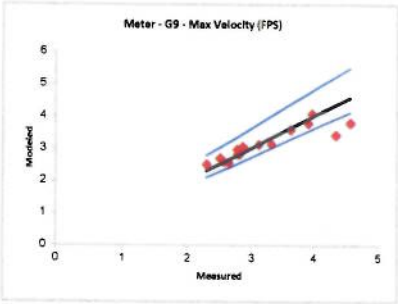


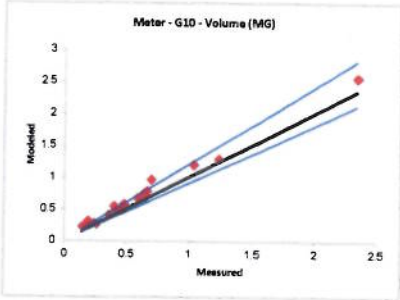
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

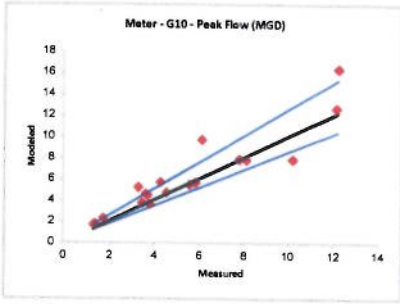


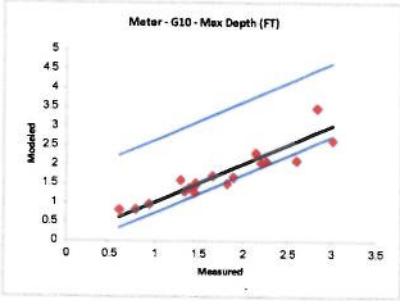


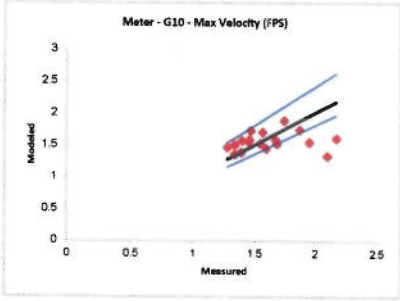


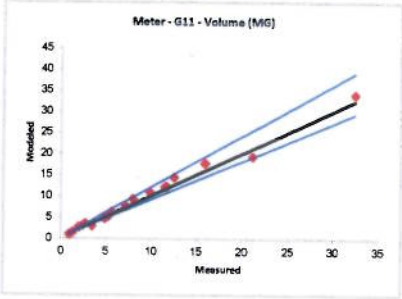


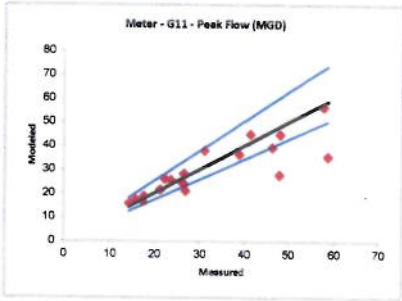


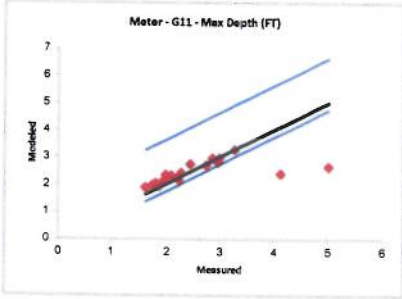


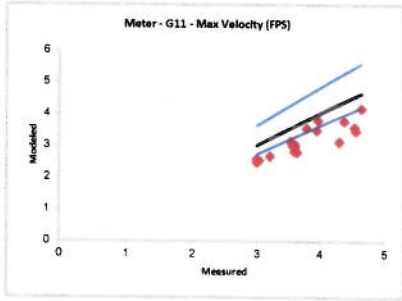


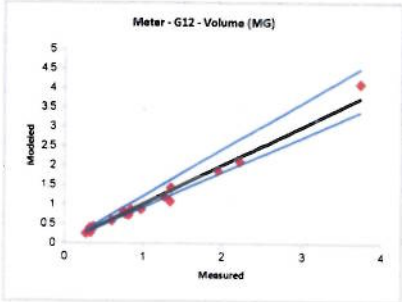


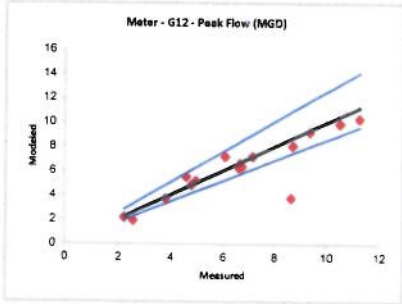


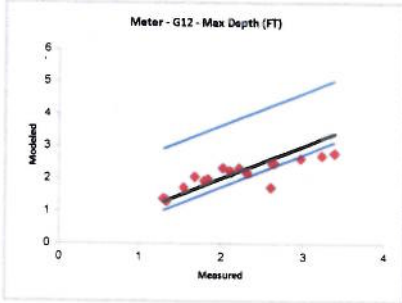


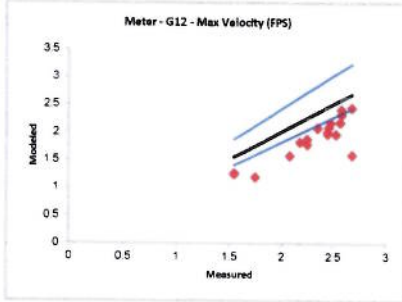




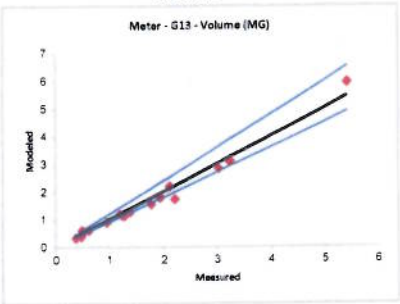


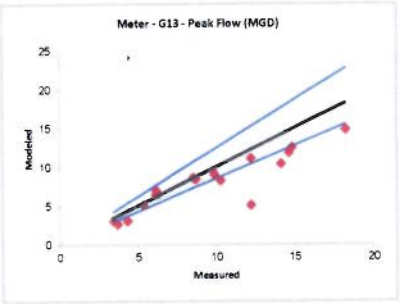


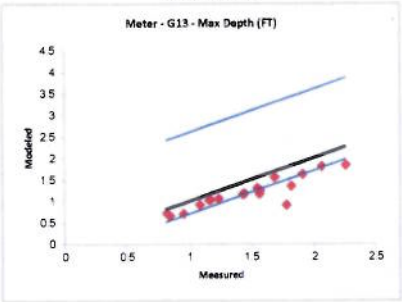


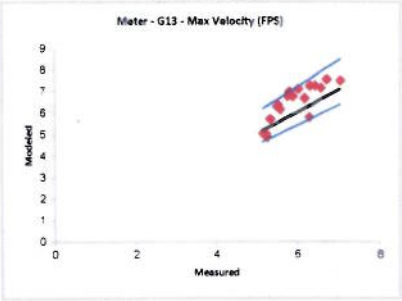


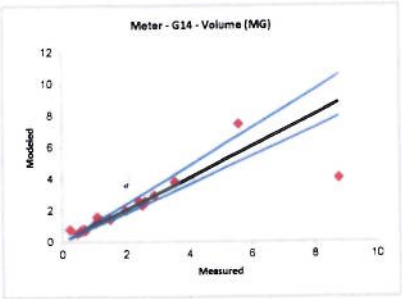
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

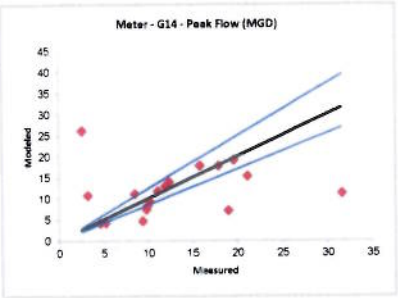


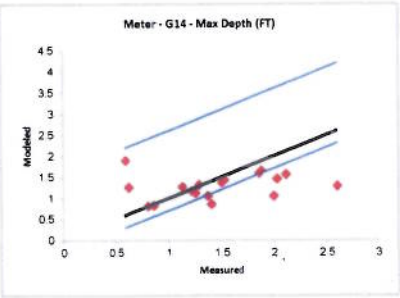


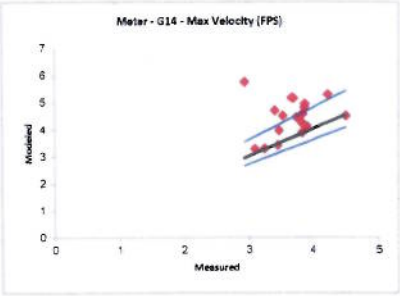


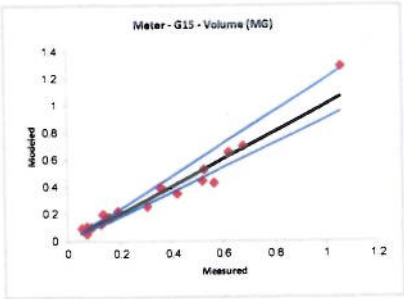


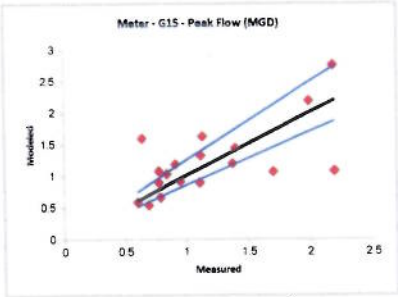


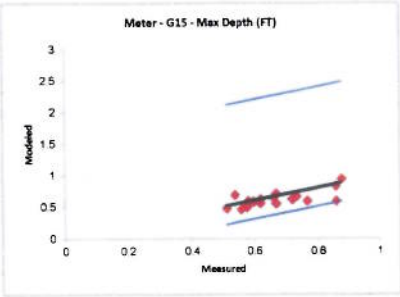


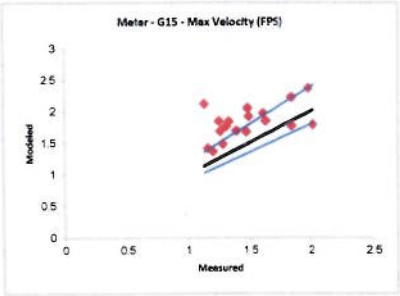


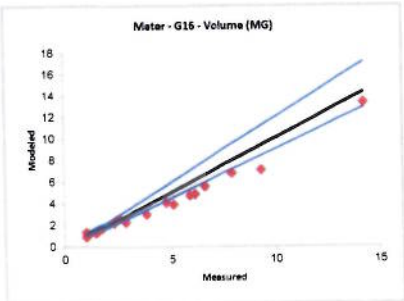


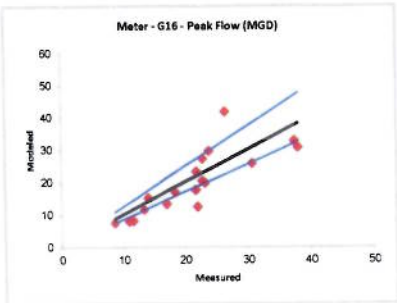


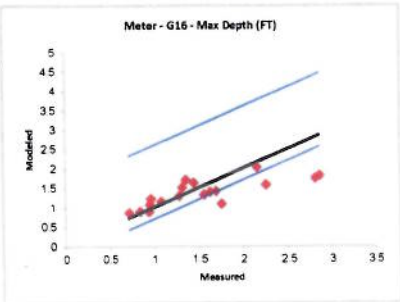


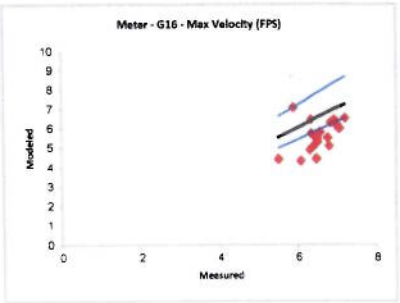




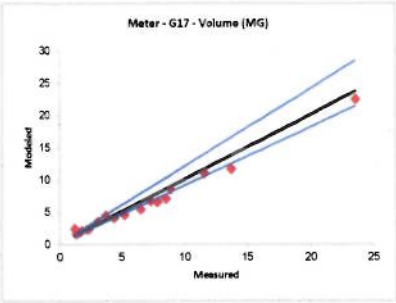


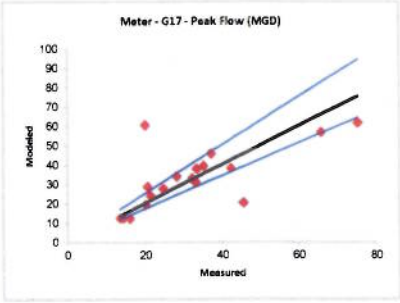


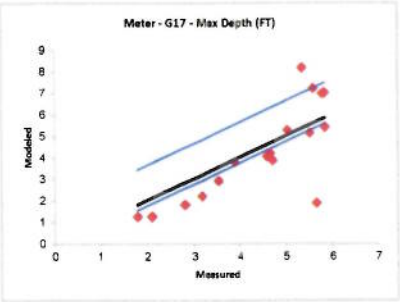


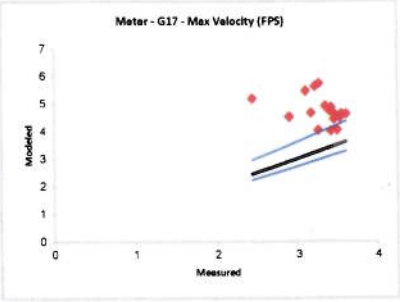


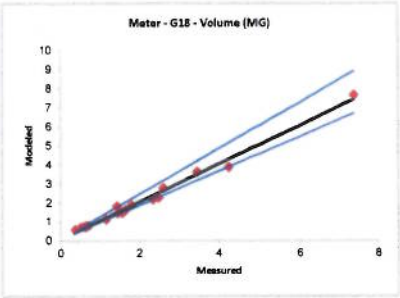
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

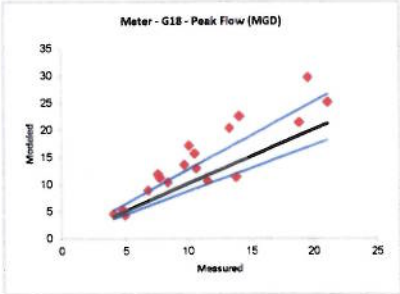


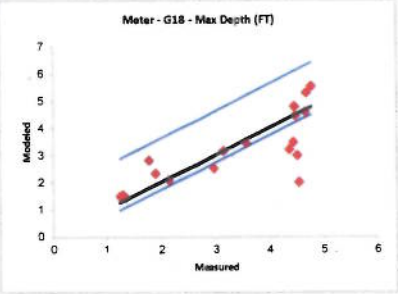


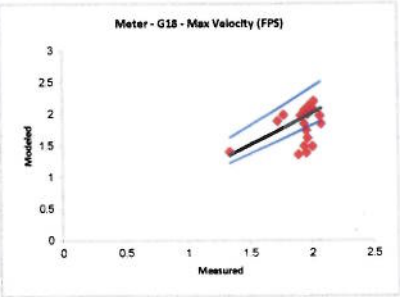


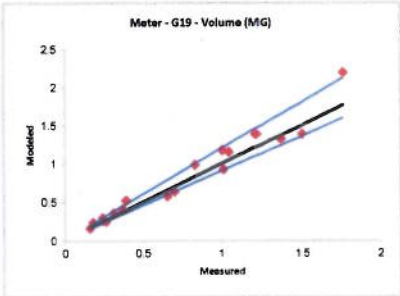


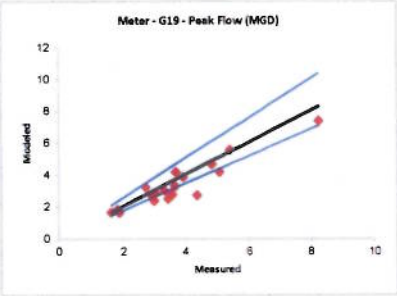


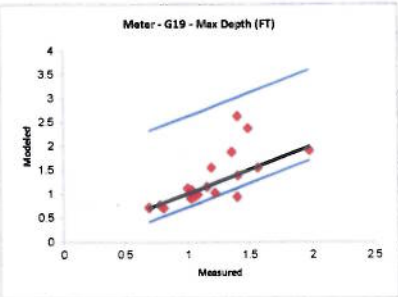


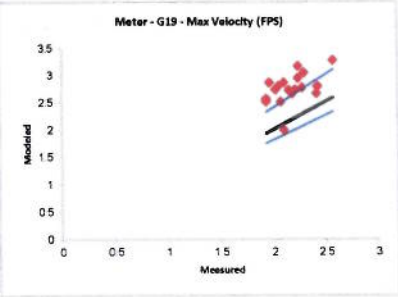


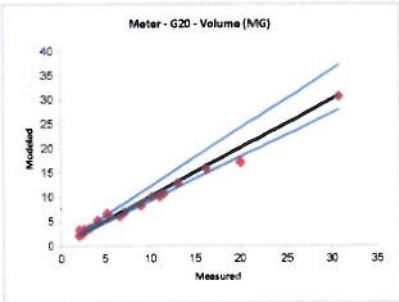


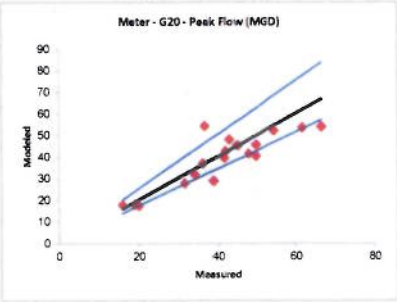


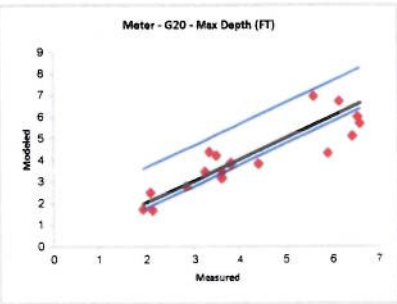


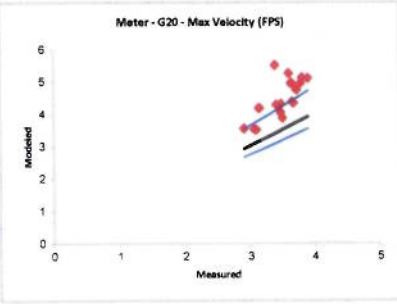




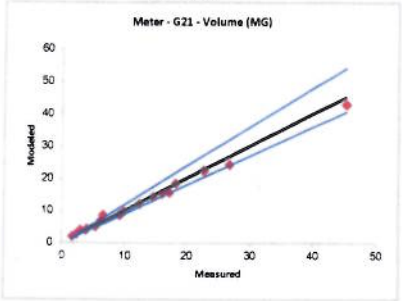


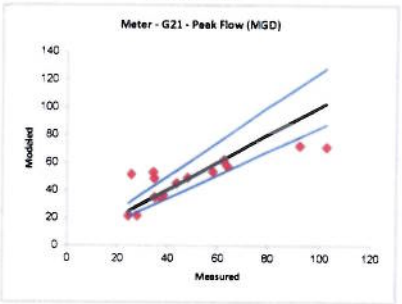


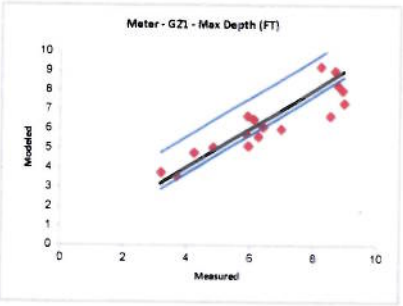


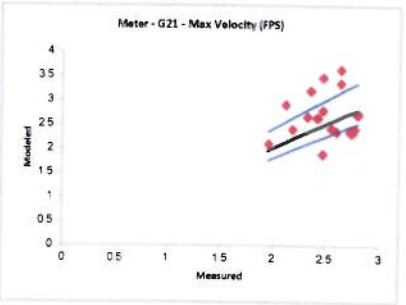


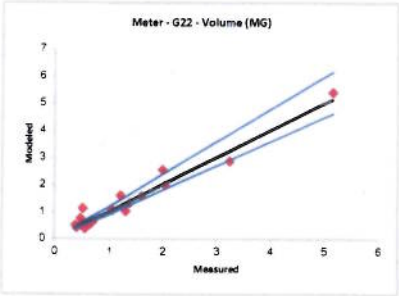
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

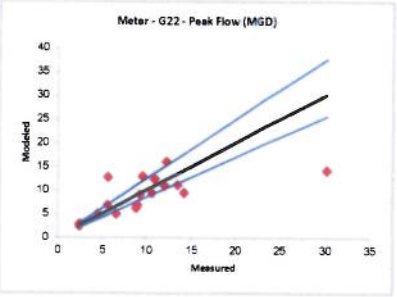


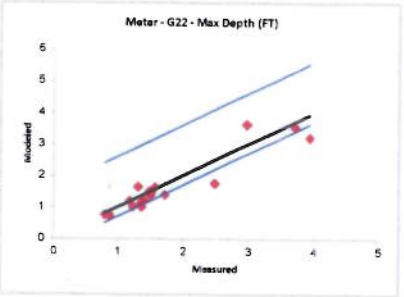


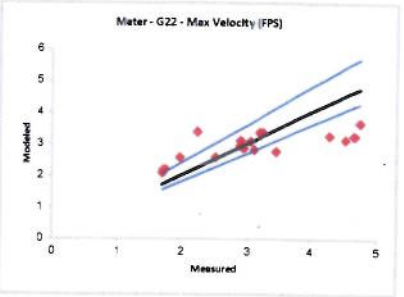


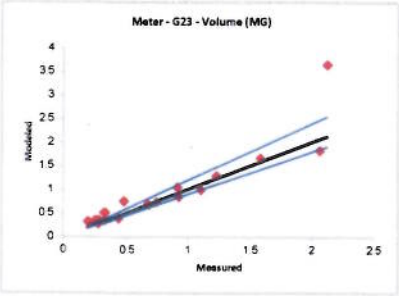


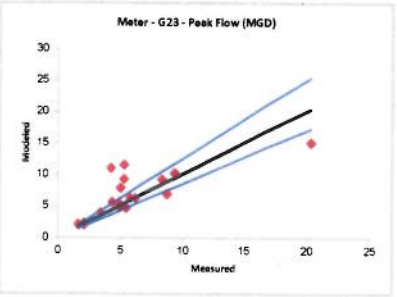


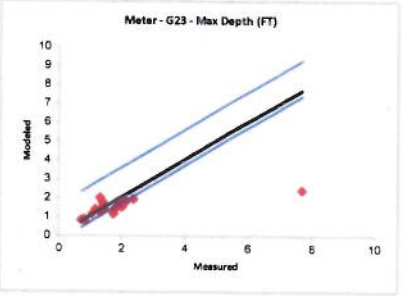


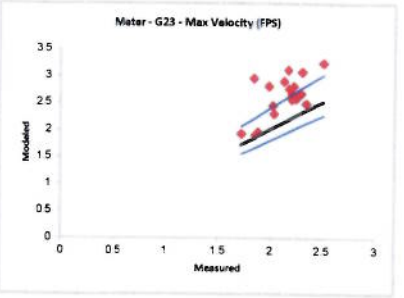


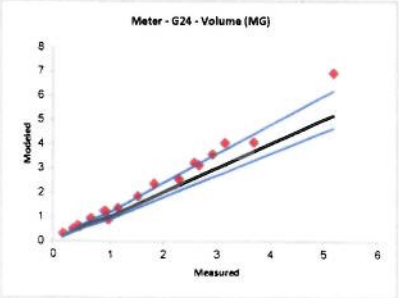


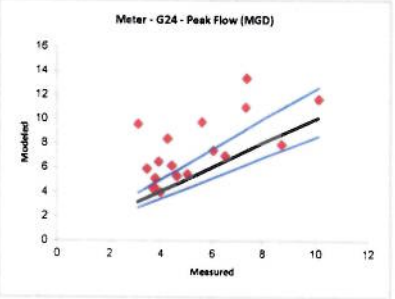


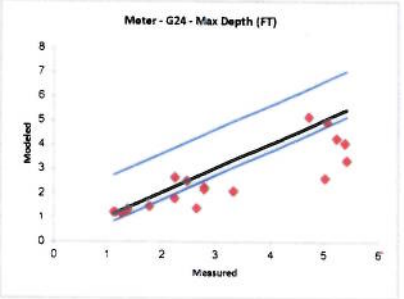


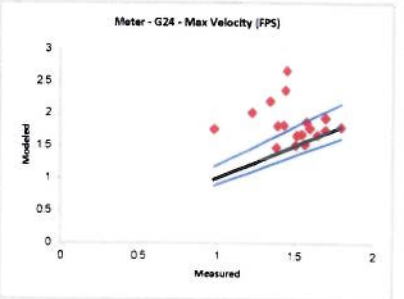




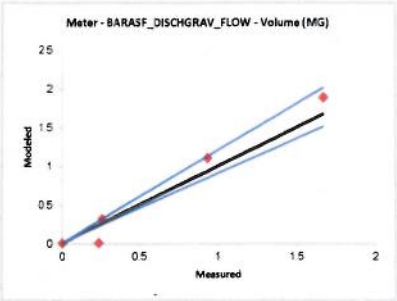


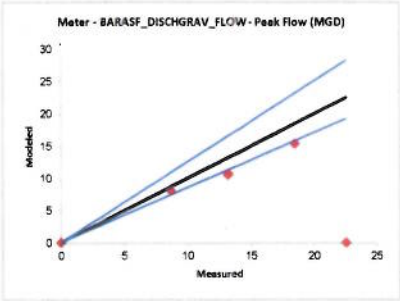


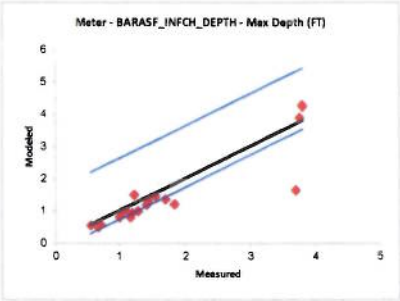


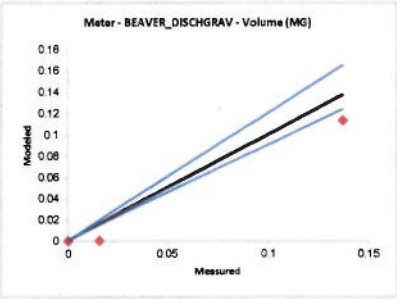


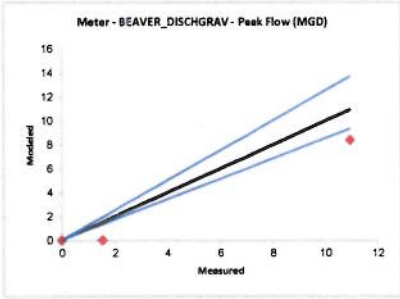
VOLUME | PEAK FLOW | MAX DEPTH | MAX VELOCITY

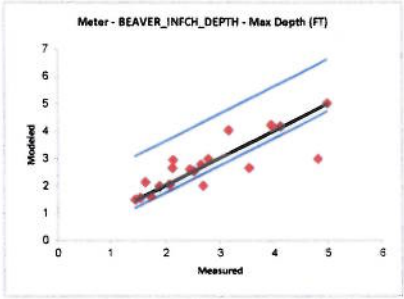


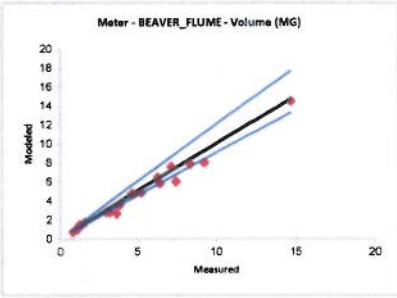


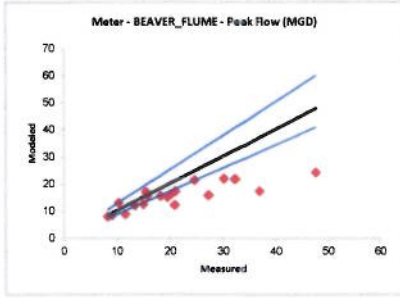


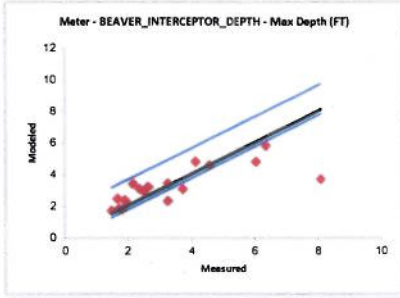


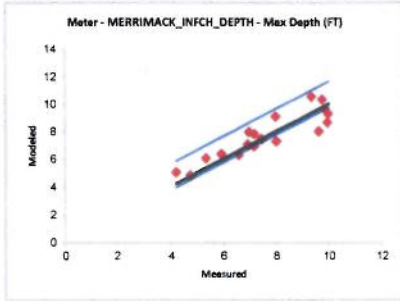










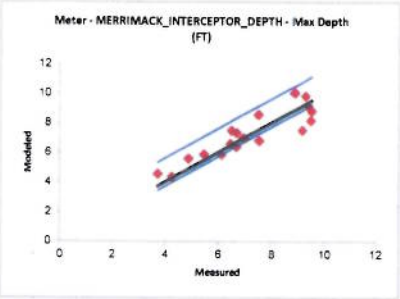


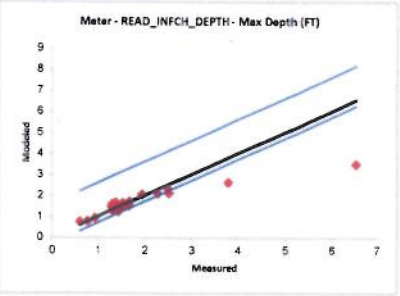
VOLUME

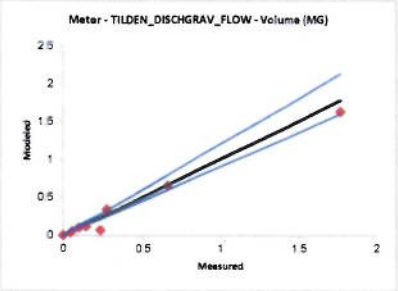
PEAK FLOW

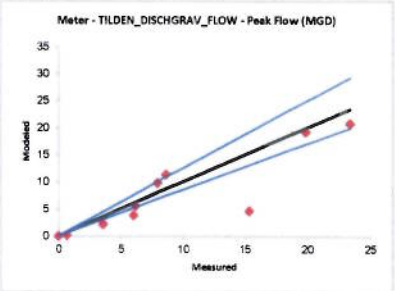
MAX DEPTH

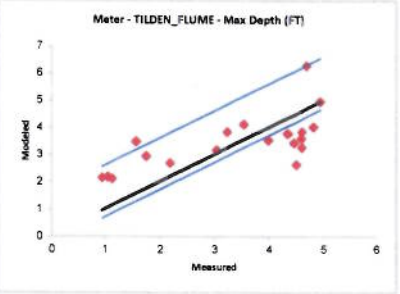
MAX VELOCITY

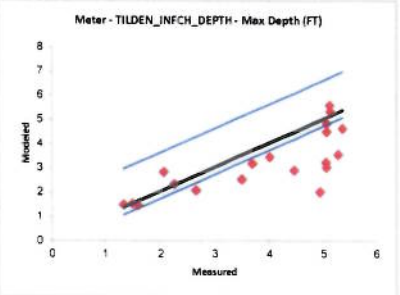




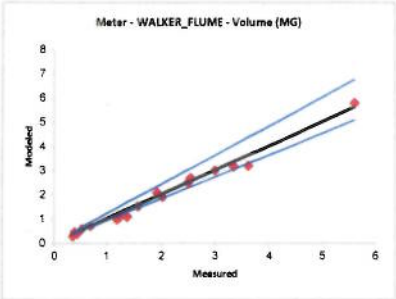


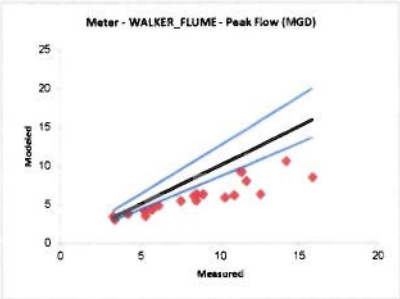


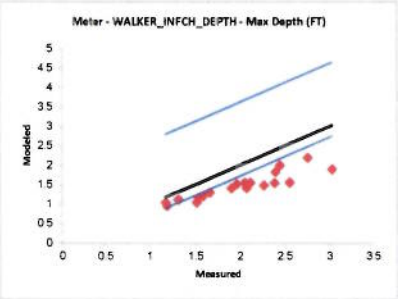


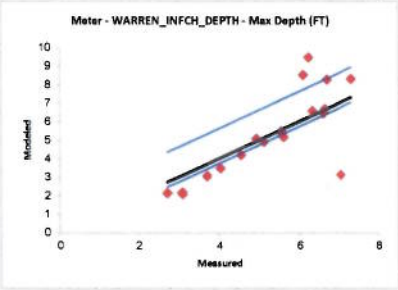


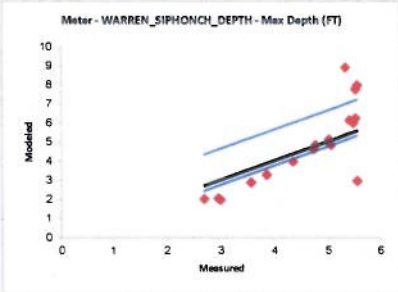
VOLUME	PEAK FLOW	MAX DEPTH	MAX VELOCITY

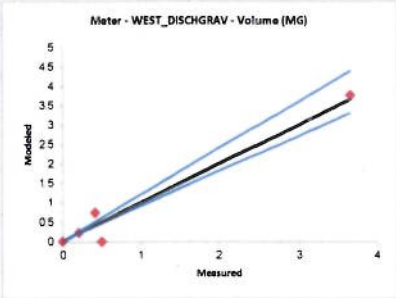


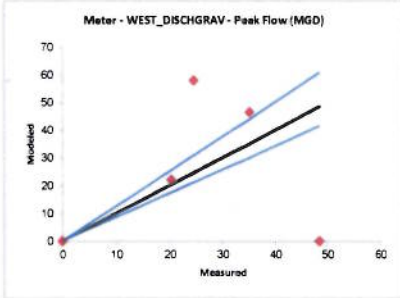


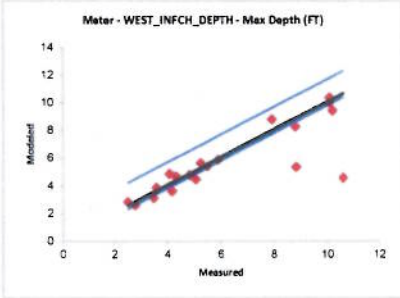












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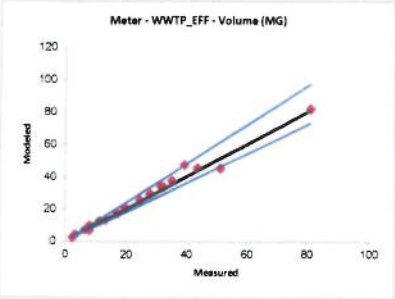

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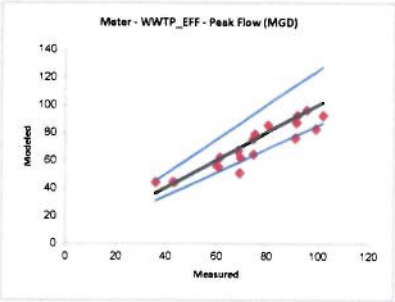
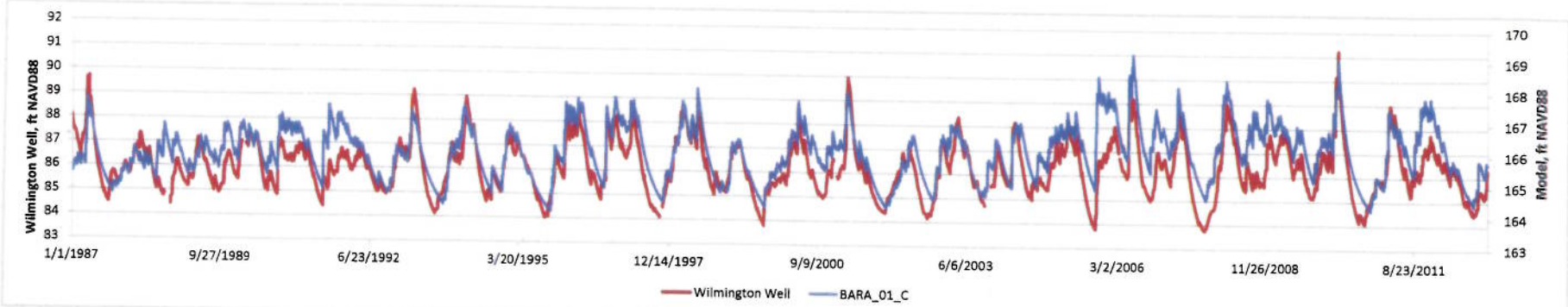


MAX DEPTH

MAX VELOCITY

Attachment 5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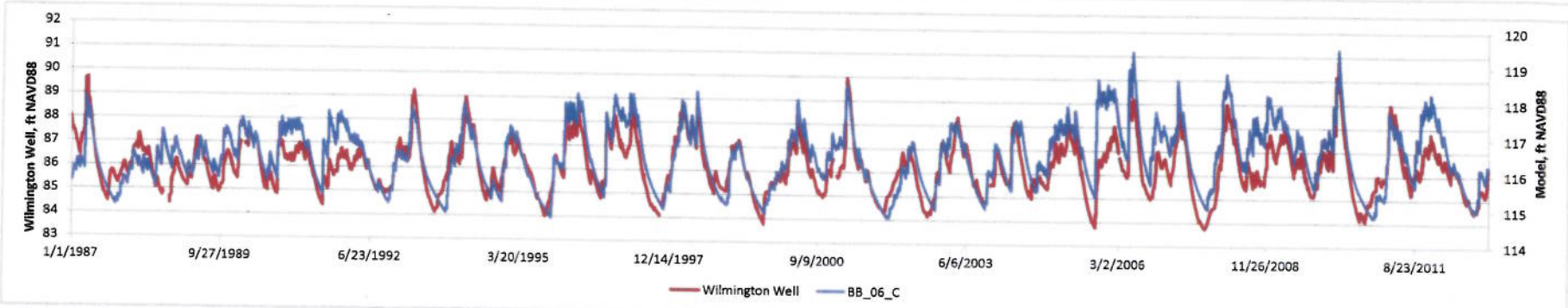
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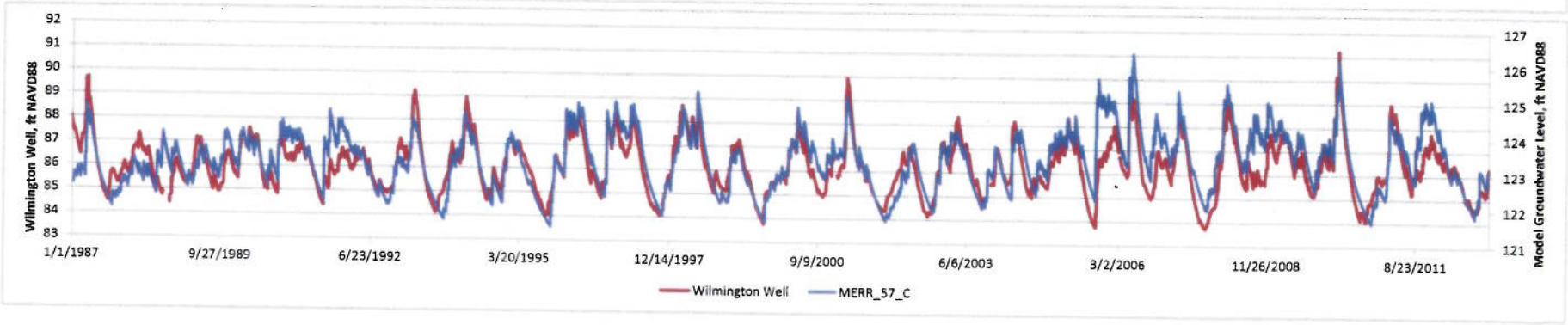
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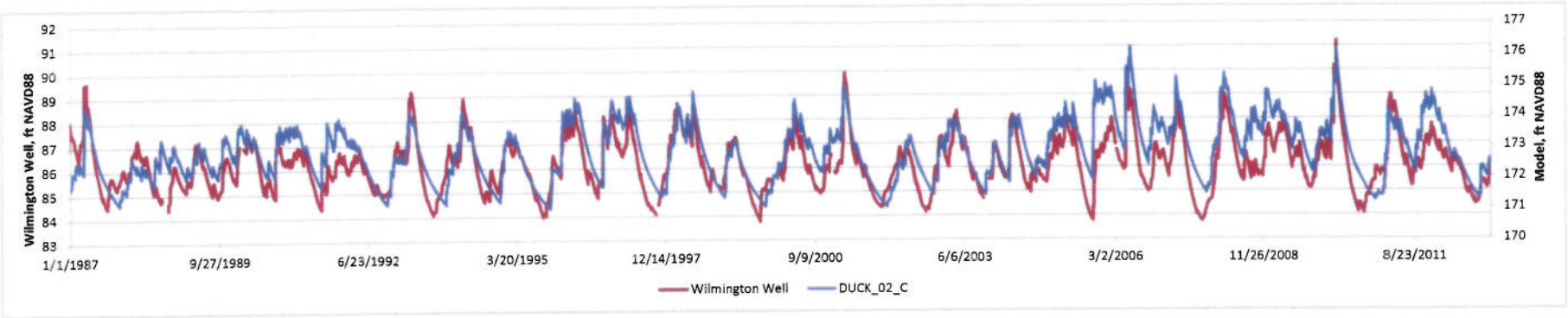
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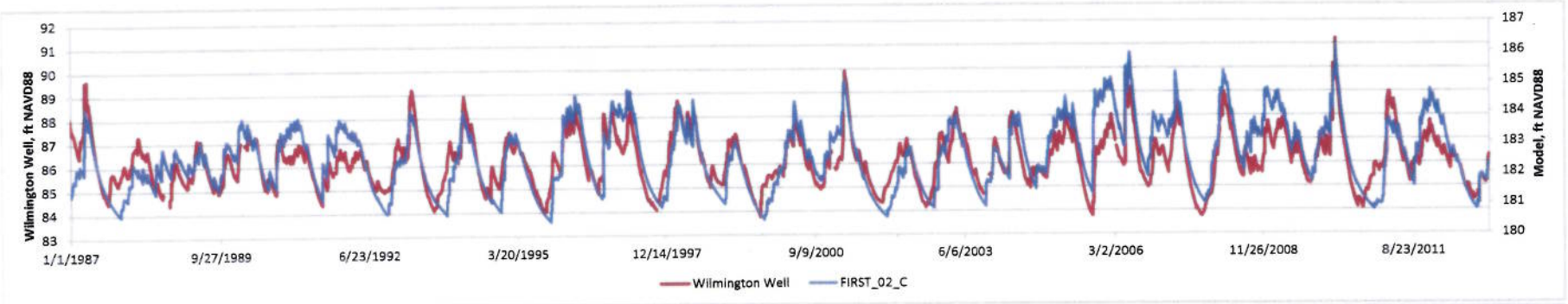
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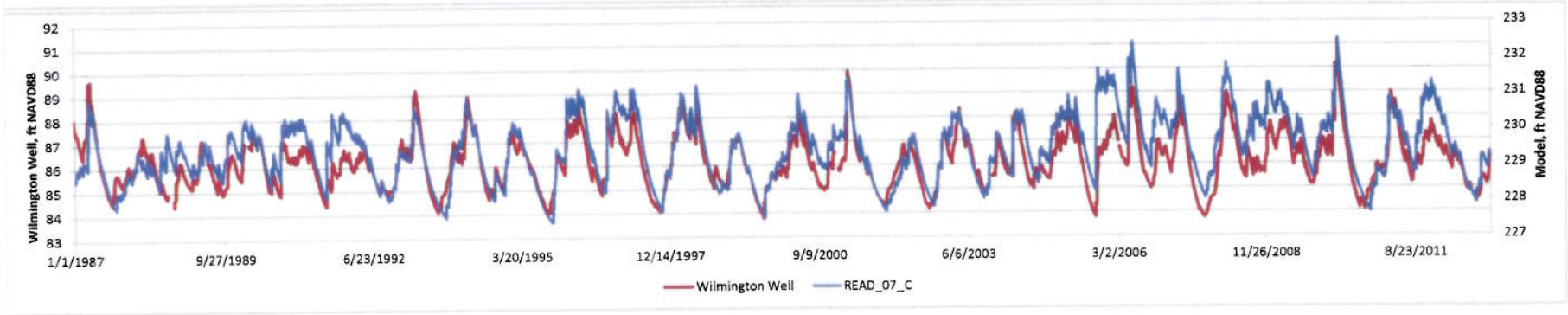
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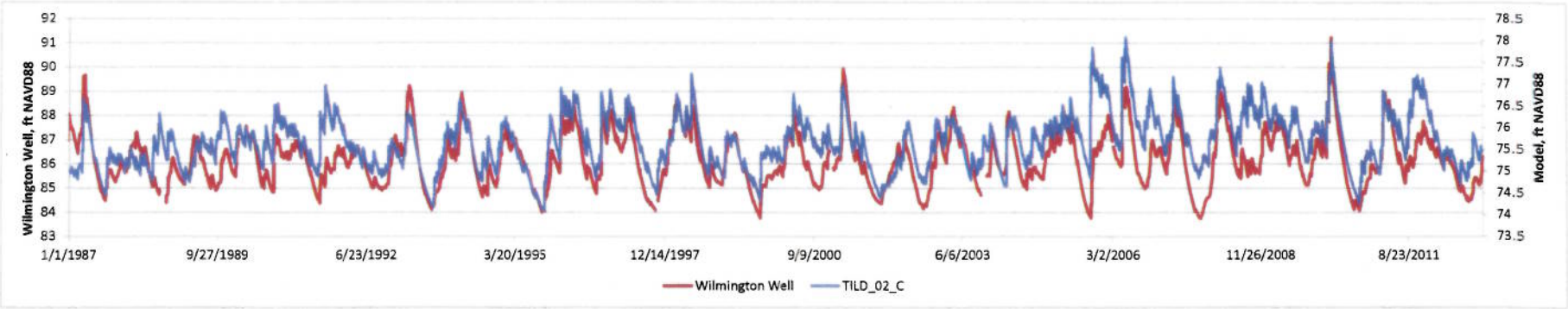
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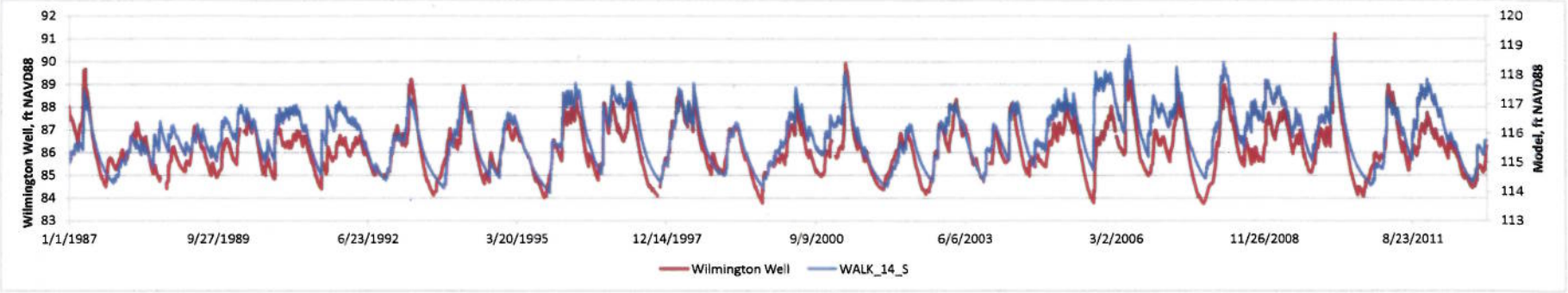
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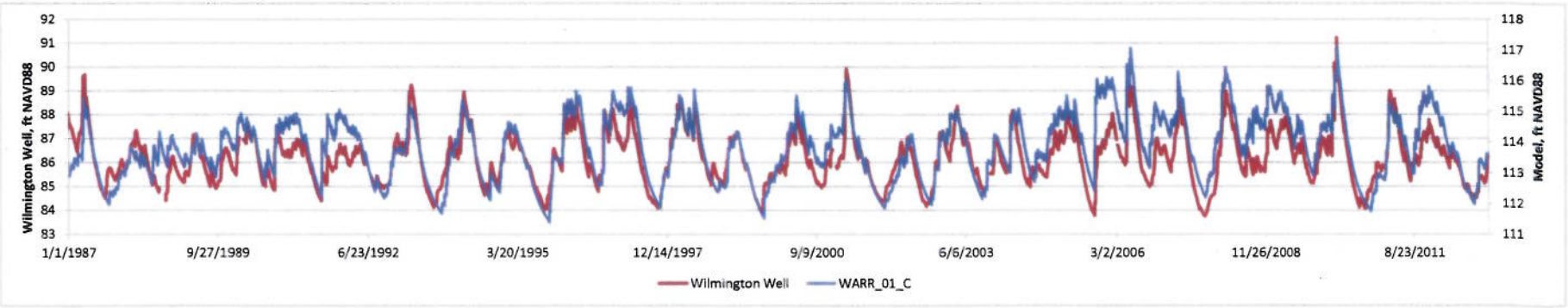
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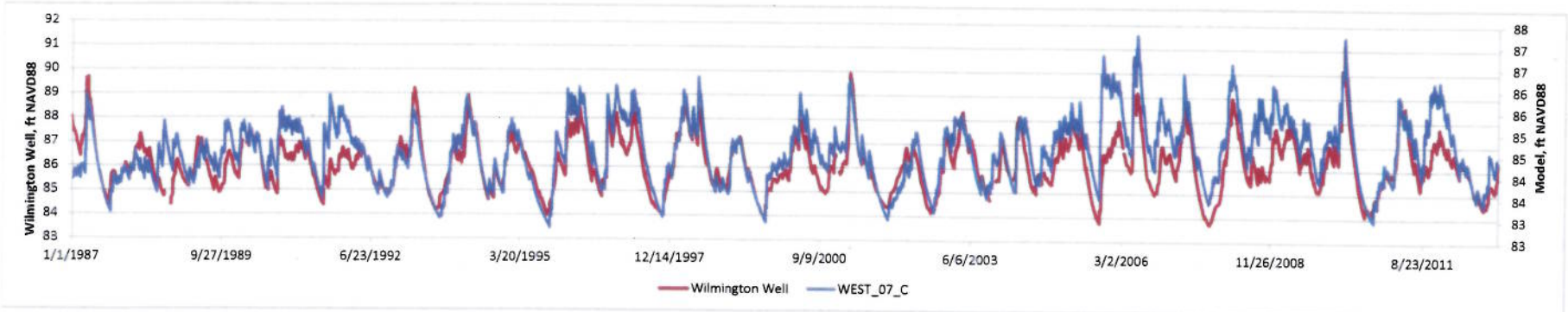
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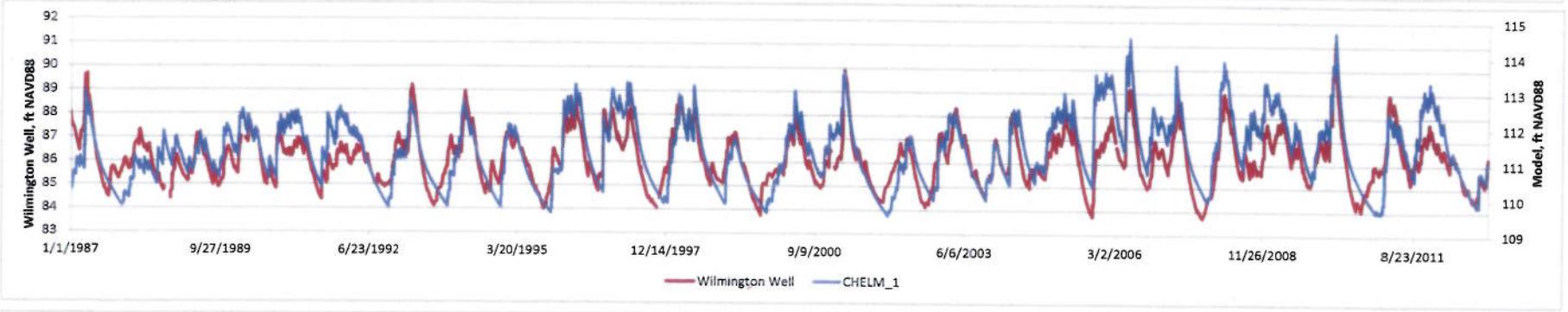
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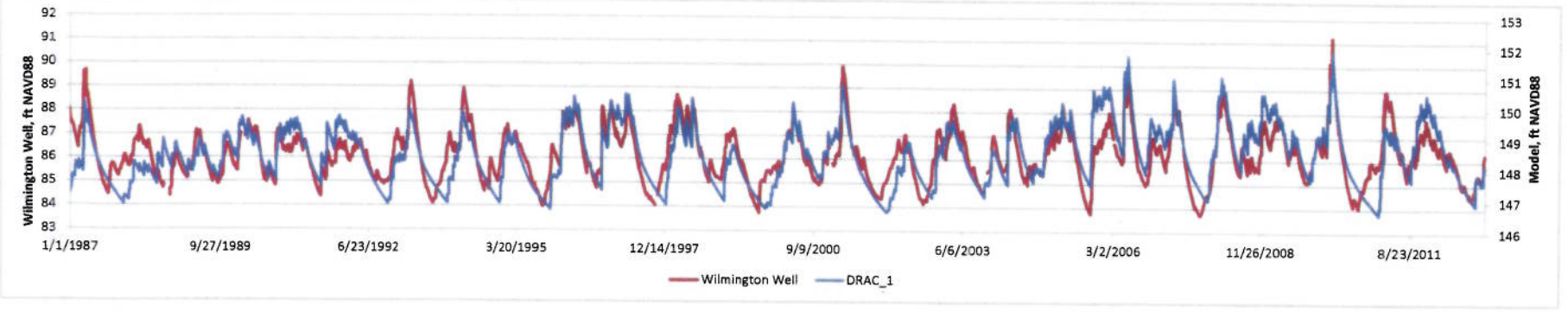
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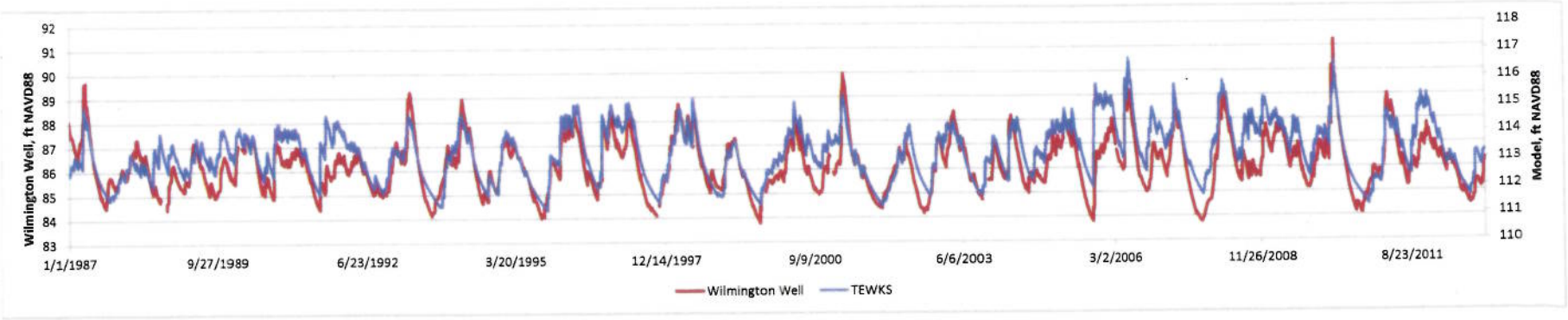
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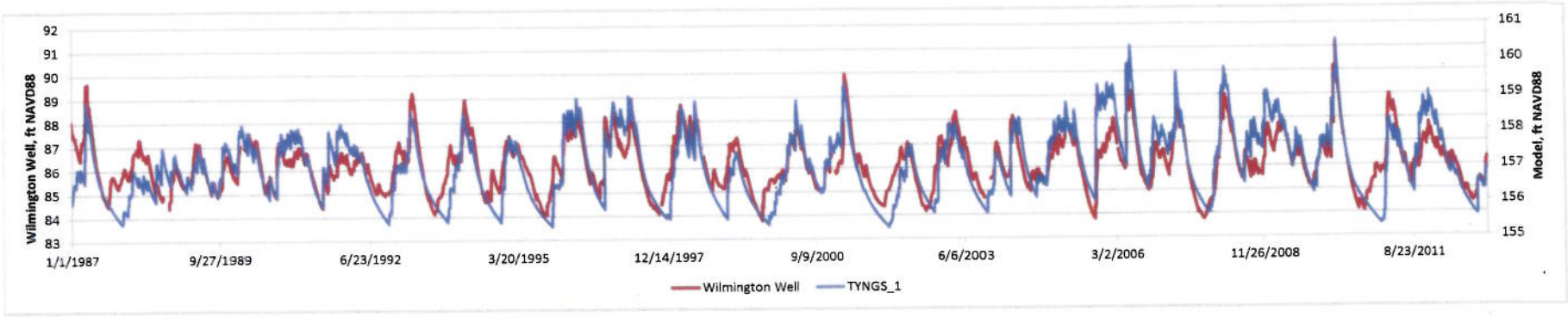
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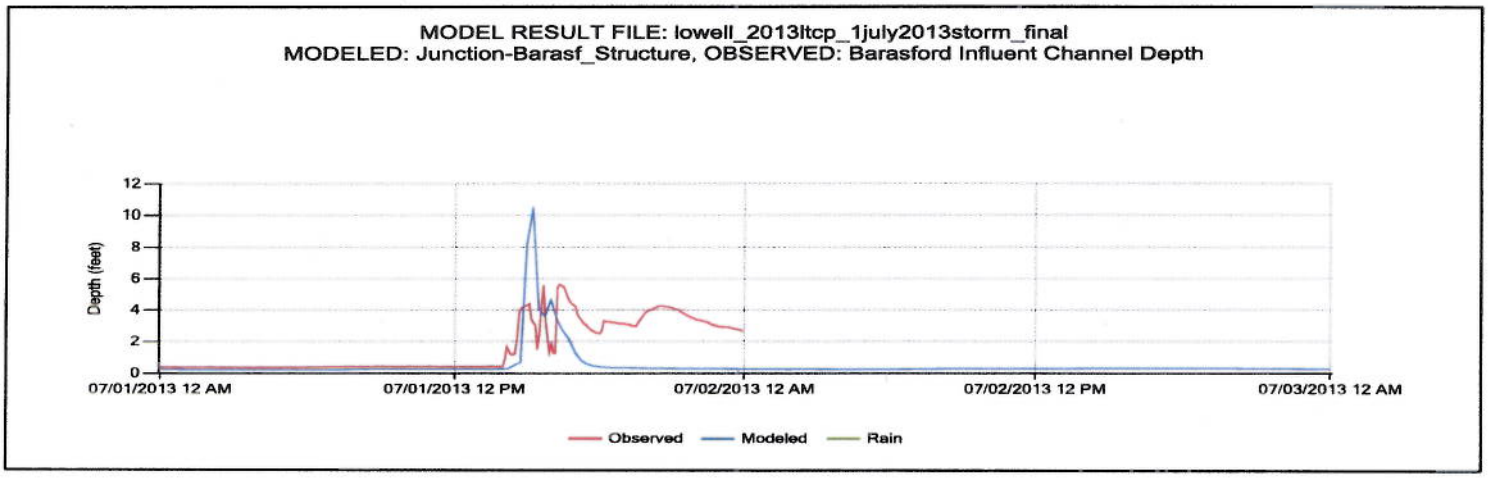
Wilmington Well
TYNGS_1

Attachment 6

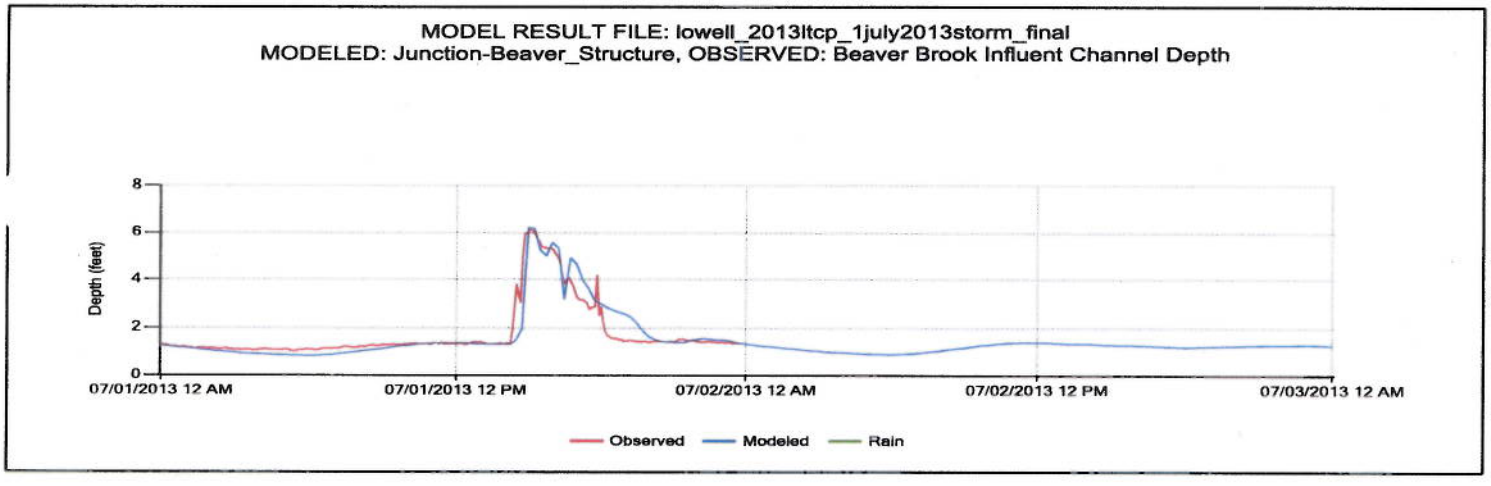
Attachment 7

July 1, 2013 Storm

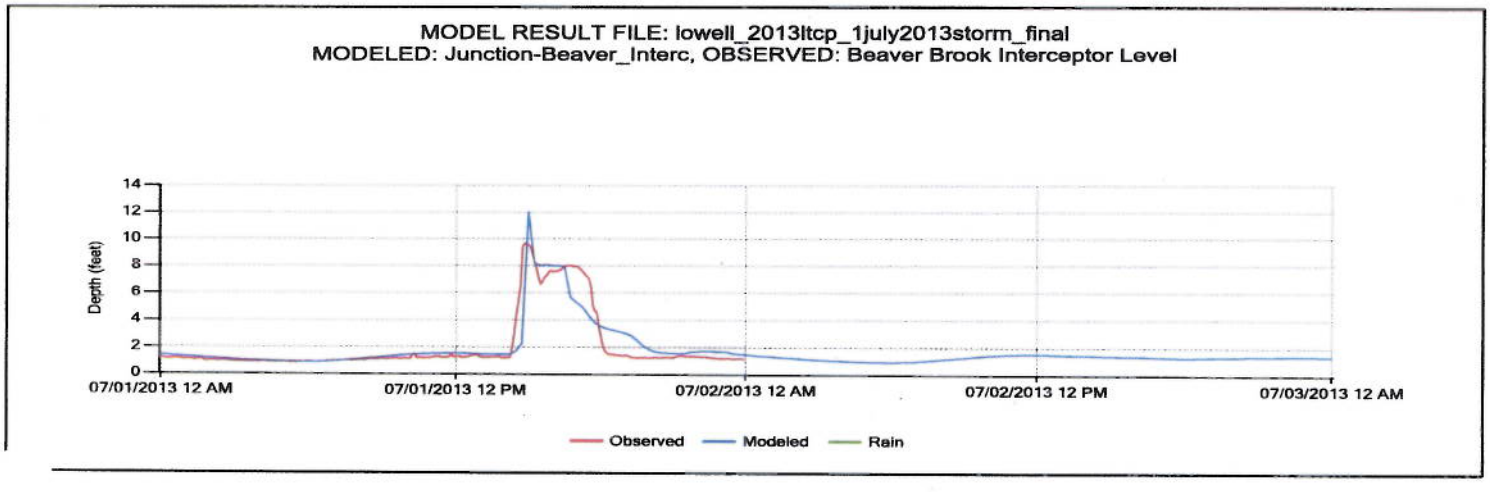
Barasford Influent Channel Depth



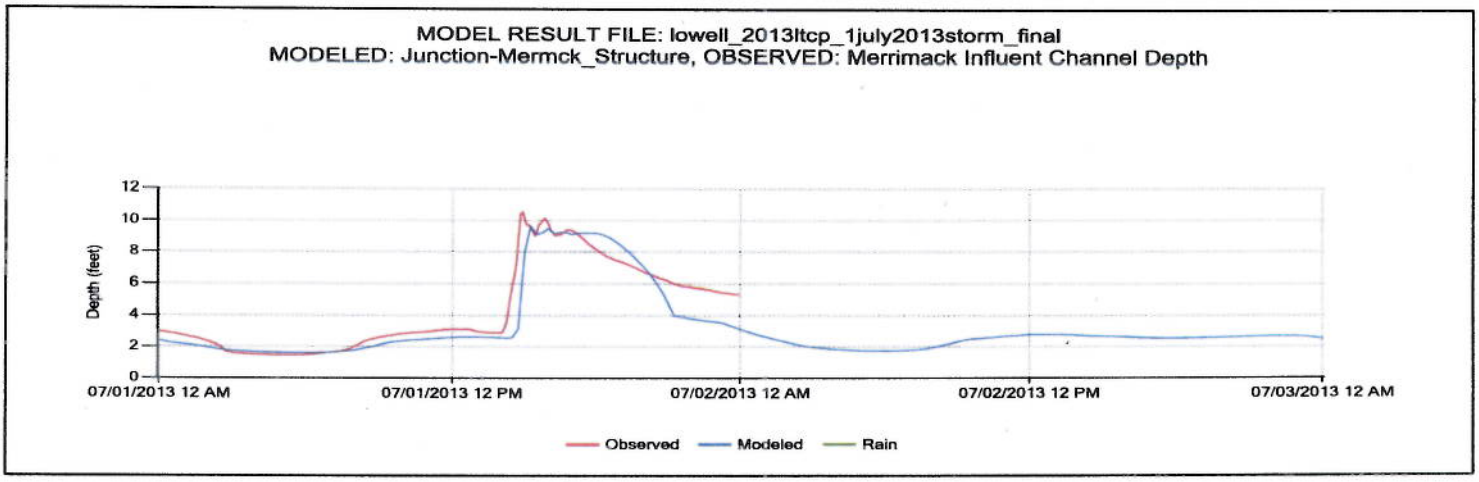
Beaver Brook Influent Channel Depth



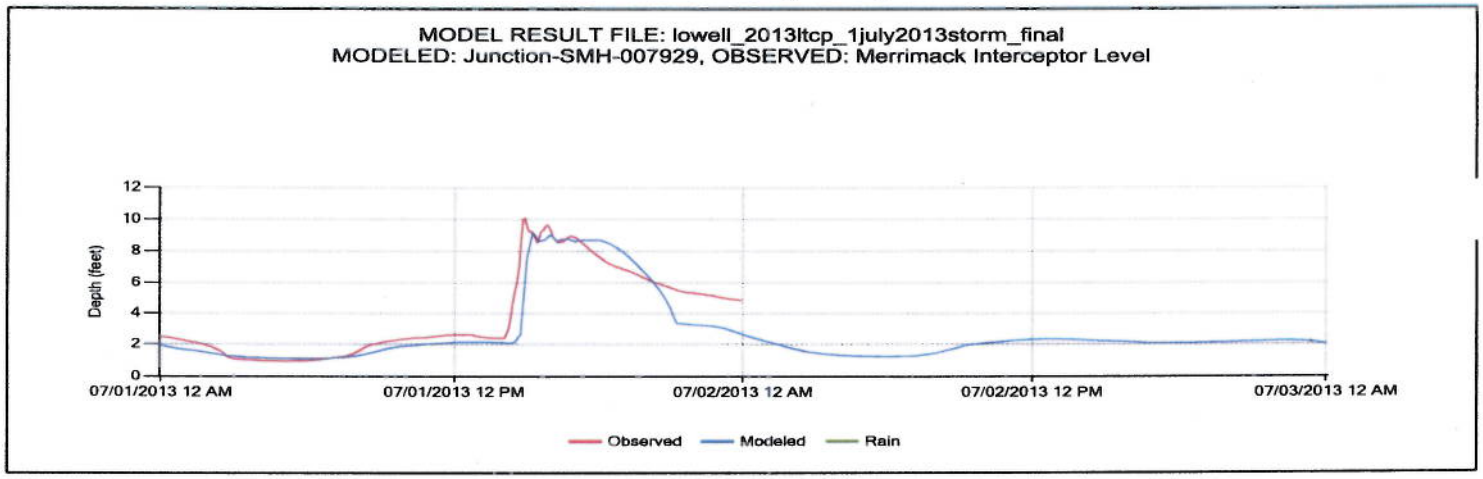
Beaver Brook Interceptor Depth



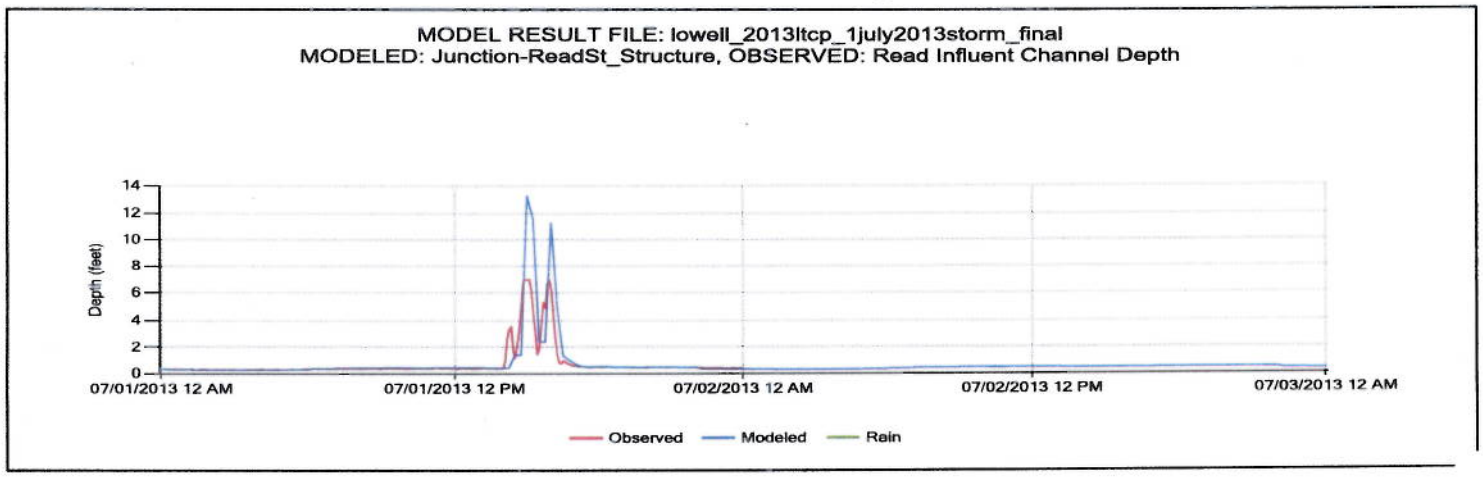
Merrimack Influent Channel Depth



Merrimack Interceptor Depth



Read Influent Channel Depth



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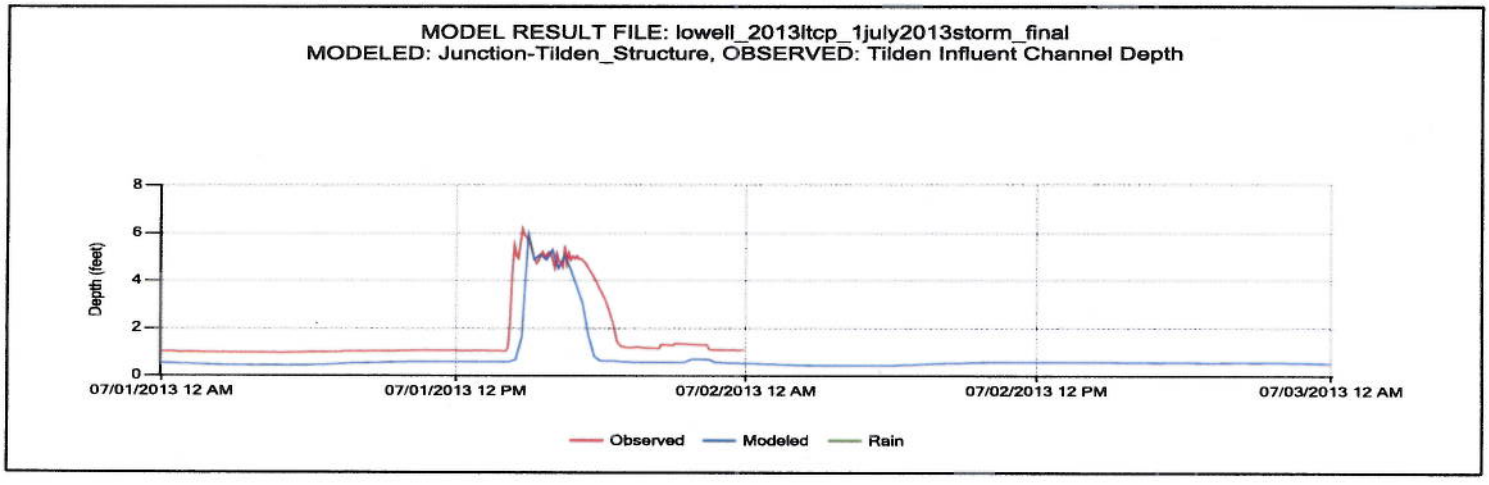
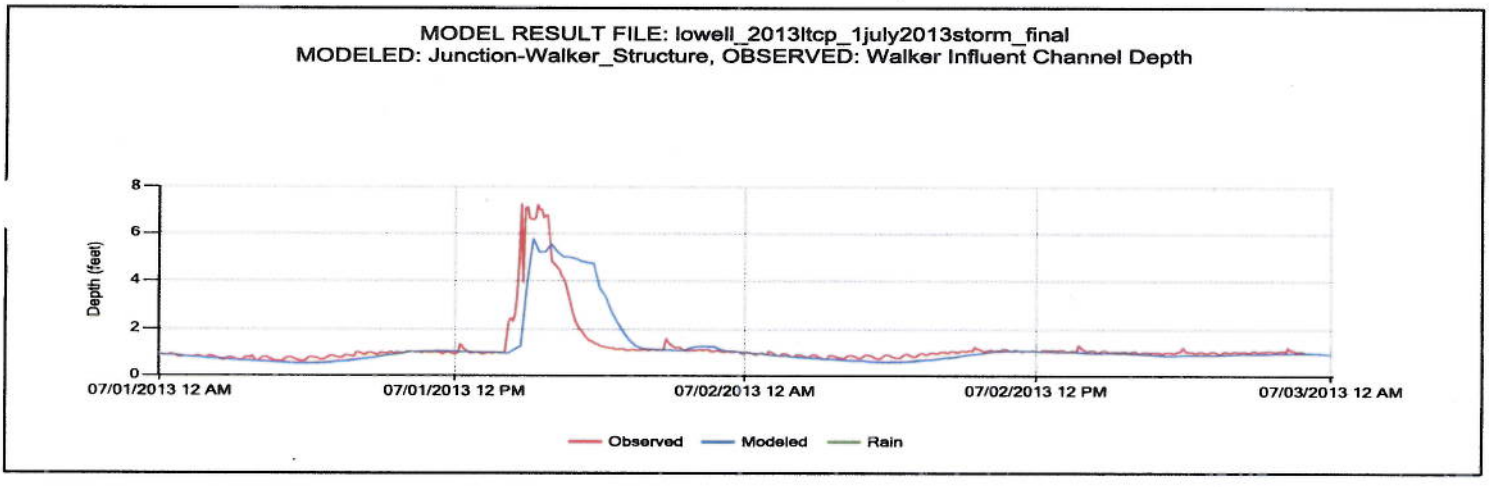
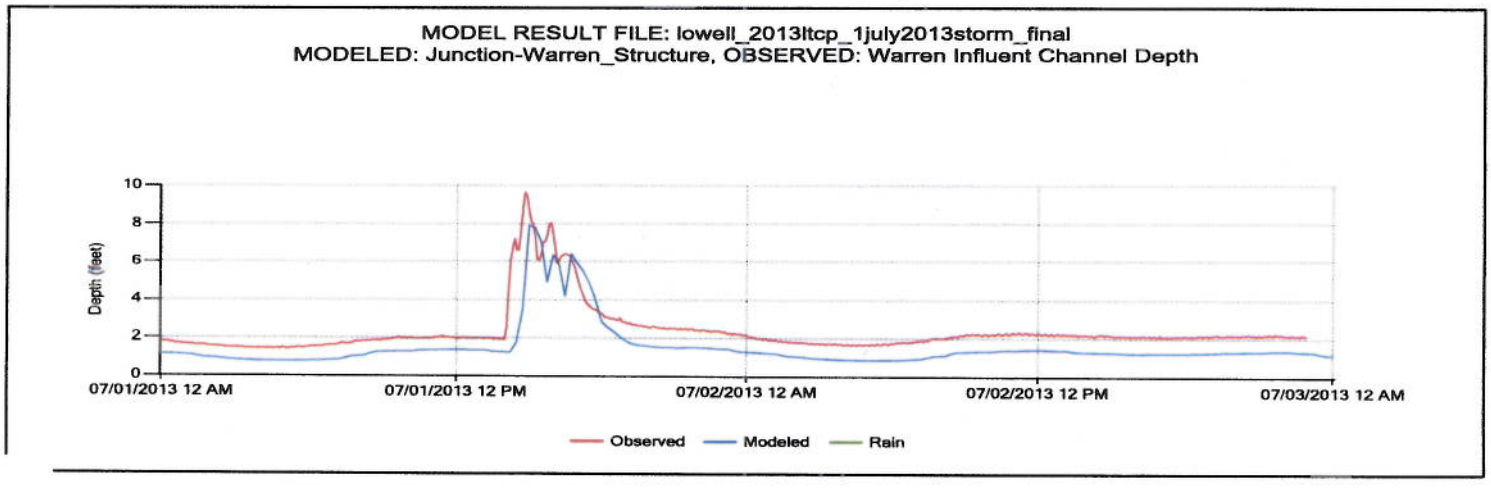


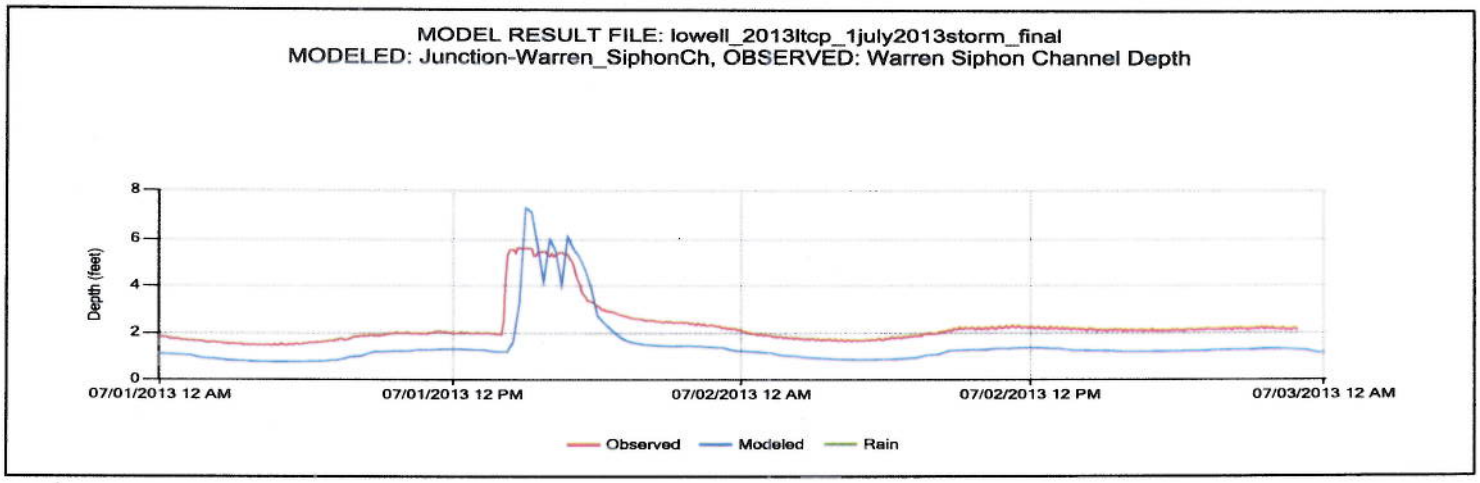
Walker Influent Channel Depth



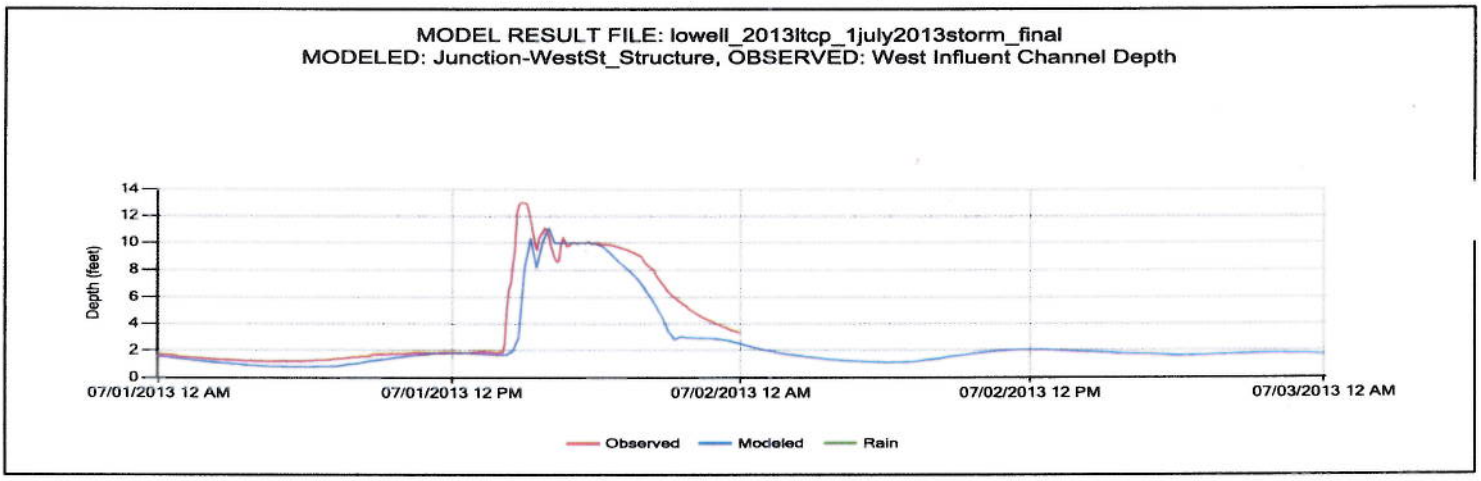
Warren Influent Channel Depth



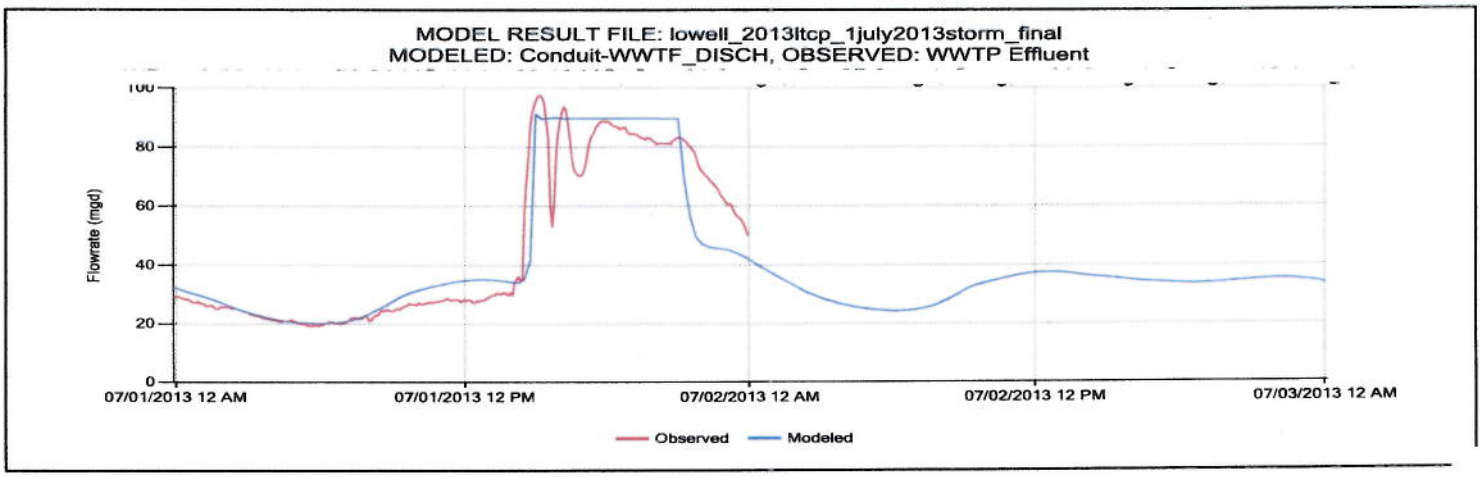
Warren Siphon Channel Depth



West Influent Channel Depth



Lowell Regional WWTF Effluent Flow



Appendix C

Design Storms and Representative Period

C.1 Data Sources

Previous CSO control plan modeling for Lowell was based on five-year rainfall-runoff simulations supplemented with analysis of one-week through five-year selected design storms. Those analyses used Logan Airport hourly precipitation for 1969-1973, along with design storms selected from the historic record at the airport. These same periods and events have also been used in studies for Haverhill and Lawrence. The selection of representative precipitation is re-examined here, considering the additional data that are available since these periods were selected in the 1990s.

Daily precipitation records for Lowell have been maintained since 1855. Data for 1892 through the present, collected at the water treatment plant, are maintained by the National Climatic Data Center (NCDC) as COOP station 194313. Significant gaps and deficiencies exist in this dataset however. Lawrence, 11 miles northeast of Lowell, has daily data beginning 1874, with a nearly continuous NCDC dataset beginning 1893. Data for two stations located in Lawrence are currently maintained at NCDC: COOP station 194105 along the south bank of the Essex Dam, and WBAN station 94723 at Lawrence Municipal Airport. The COOP data receives additional quality control as part of the US Historical Climatology Network. The airport station is an Automated Surface Observation System (ASOS) location; it has recorded data at one-minute intervals since 2005. The one-minute data are not quality-controlled; ASOS data generally require extensive checking and often have significant gaps.

Other datasets are available for the Lowell area. These include data collected by LRWWU at Duck Island and Warren stations, data collected by UMass Lowell, stations participating in the private Wunderground network (e.g. KMALOWEL7 in Fort Hill Park), CoCoRaHS daily precipitation station MA-MD-23, and daily COOP stations in Bedford MA (12 mi SE), Hudson (10 mi NW), and Nashua (9 mi NW).

These various sources of long-term daily and recent high-frequency precipitation data do not offer the long-term high-quality digital hourly precipitation data that is most useful for identifying historic simulation datasets. The nearest such dataset is from Logan Airport, 25 miles to the southeast. Development of a long-term precipitation dataset and design storm hyetographs for collection system simulation are thus most readily developed using Boston data with consideration for climatic differences between Lowell and Boston.

C.2 Annual Precipitation Statistics

Annual "normal" precipitation for Lowell, as defined by the National Weather Service is 47 inches, based on the period 1981-2010. Table 1 shows precipitation normals for Lowell and nearby cities.

Table 1 1981-2010 Lowell Area Precipitation Normals

COOP ID	Location	Distance	Inches
194313	Lowell		47.0
194105	Lawrence	11 NE	51.6
193505	Haverhill	17 NE	50.0
190535	Bedford	12 SE	45.7
196783	Reading	15 SE	50.8
190770	Boston Logan	25 SE	43.8
275702	Nashua	9 NW	46.3
274234	Hudson	10 NW	45.9
275712	Nashua 2 NNW	11 NW	48.0

Source: National Weather Service

The table indicates that Lowell receives more average annual precipitation than Boston, less than Lawrence and Haverhill to the northeast, and about the same as nearby New Hampshire communities.

Figure 1 shows annual precipitation at Lowell, Lawrence, and Boston since 1900, along with a 10-year moving average for Boston. The data suggest that Lowell has been markedly wetter than the other communities since 2008. However, this appears to be flawed data rather than a shift in local weather. The shift corresponds with relocation of the rain gage within the water treatment plant in December 2007. The moving average line for Boston shows that its precipitation averaged about 38 inches a year prior to 1950, but has averaged about 43 inches since 1970, close to the 1981-2010 average of 43.8 inches/year.

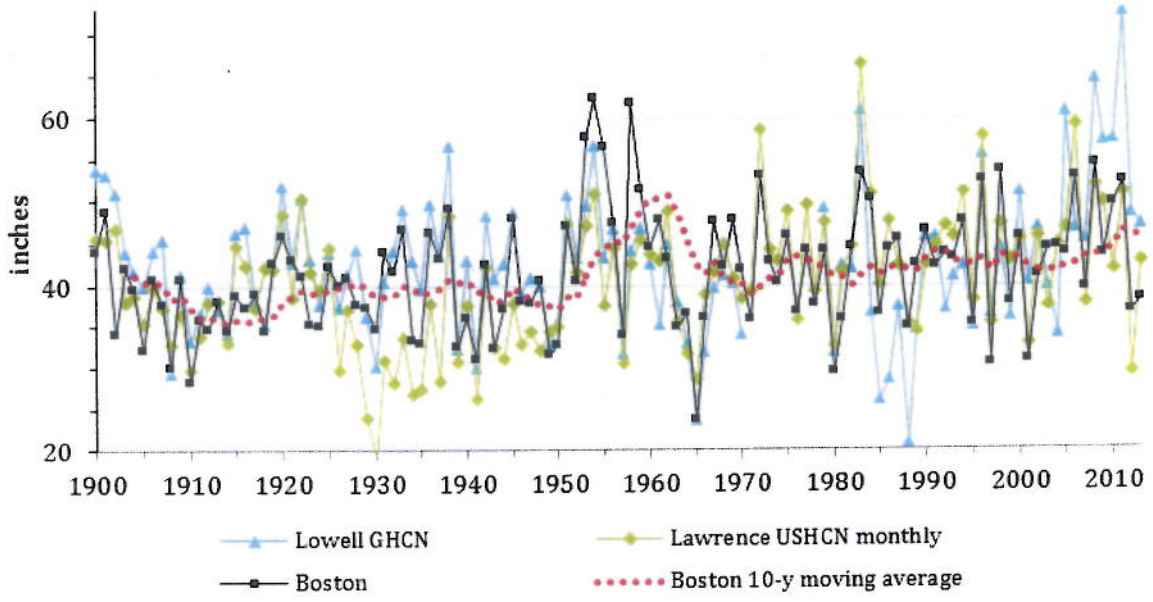



Figure 1 Annual Precipitation