



# COMUNE DI EMPOLI

Provincia di Firenze

## Secondo Regolamento Urbanistico del Comune di Empoli - PUA 2.6 UMI 1 e UMI 2 - Verifica degli effetti della trasformazione sul sistema fognario in occasione di eventi pluviometrici intensi

### STUDIO IDRAULICO

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Comune di Empoli (FI)

**Committenti:**

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ELABORATO	Relazione idrologico-idraulica di verifica del sistema di fognatura bianca
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## INDICE GENERALE

<b>1. PREMESSA.....</b>	<b>3</b>
<b>2. DESCRIZIONE DEL SISTEMA FOGNARIO.....</b>	<b>7</b>
<b>3. RELAZIONE IDROLOGICA.....</b>	<b>9</b>
3.1. Modello degli afflussi meteorici.....	9
3.1.1. Curve di possibilità pluviometrica.....	10
3.1.2. Ietogrammi di pioggia.....	10
3.1.3. Ragguaglio delle precipitazioni all'area di bacino.....	11
3.2. Modello di trasformazione afflussi-deflussi.....	11
3.2.1. Modello di perdita idrologica.....	12
3.2.2. Trasformazione afflussi netti – deflussi.....	12
3.3. Parametri del modello.....	13
3.4. Risultati delle simulazioni.....	15
<b>4. RELAZIONE IDRAULICA.....</b>	<b>16</b>
4.1. Modello idraulico a moto vario di SWMM.....	16
4.2. Condizioni al contorno.....	17
4.3. Risultati degli scenari di calcolo.....	17
<b>5. CONCLUSIONI.....</b>	<b>21</b>
<b>Allegati.....</b>	<b>23</b>
ALLEGATO 1. Planimetria del bacino e dei sottobacini idrografici.....	23
ALLEGATO 2. Rilievo del sistema fognario di interesse.....	24
ALLEGATO 3. Risultati del modello SWMM stato attuale.....	25
ALLEGATO 4. Risultati del modello SWMM stato di progetto.....	26

## 1. PREMESSA

Il sottoscritto **Ing. PAOLO PUCCI (H.S. INGEGNERIA srl)** ha ricevuto incarico

- dal **Sig. DI STEFANO DIEGO** quale procuratore speciale di Bagni Remo, Bagni Renzo, Bagni Fiorella e Malventi Alessio, proprietari assieme alla società COSTRUZIONI DI STEFANO srl dei terreni e fabbricati di cui al PUA 2.6 UMI 1;

e

- dalle **Sig.re BINI CARLA, BINI MORIANI ELENA e BINI MORIANI FRANCESCA** in qualità di proprietarie dei terreni di cui al PUA 2.6 UMI 2;

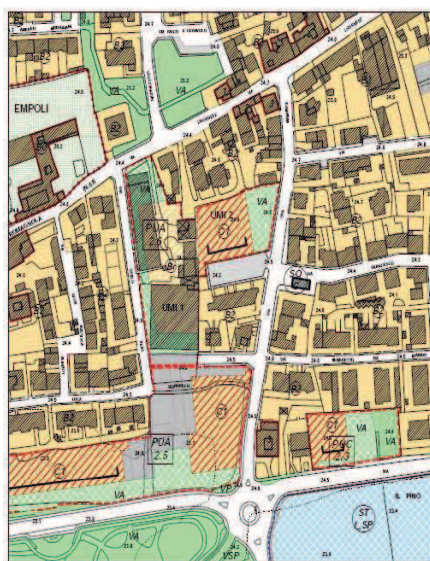
al fine di verificare gli effetti derivanti dalle trasformazioni a seguito dell'attuazione del PUA 2.6 UMI 1 e del PUA 2.6 UMI 2 in loc. Santa Maria, nel comune di Empoli (FI) sul sistema di fognatura in occasione di eventi pluviometrici intensi.

**L'obiettivo dello studio è quindi quello di verificare se l'attuazione delle trasformazioni di cui all'oggetto (PUA 2.6 UMI 1 e UMI 2) comporta effetti significativi, ed in particolare peggiorativi sul sistema di smaltimento fognario.**

E' necessario premettere il fatto che le simulazioni sono state eseguite nell'ipotesi di tubazioni pulite, in assenza di sedimenti. Pertanto in carenza di manutenzione i risultati raggiunti nel presente studio perdono di significato, in quanto fenomeni locali di ostruzione o di riduzione generalizzata delle sezioni idrauliche delle tubazioni possono alterare in maniera significativa il comportamento del sistema rispetto al simulato.

Nella figura seguente si riporta un estratto dalla carta uso del suolo e modalità di intervento del Secondo RU comunale relativo al PUA 2.6, di cui l'UMI1 si colloca in fregio a Via Reni e l'UMI2 si attesta su Via San Mamante:

PUA 2.6 - ESTRATTO CARTOGRAFICO R.U. scala 1:2.000



PERIMETRO PUA

Nella figura seguente si riporta uno stralcio dall'immagine satellitare relativa alla zona di interesse ed al suo intorno.



La rete fognaria nell'area è di tipo misto, e raccoglie quindi le acque nere in assenza di precipitazioni e sia acque bianche che nere in caso di eventi pluviometrici.

Al fine di raggiungere l'obiettivo del presente studio sono state svolte le seguenti attività:

- **sopralluogo congiunto con i tecnici di ACQUE Spa** (tecnico Fabrizio Maragliulo, Acque Spa – Settore Impianti acquedotto/sollevamenti fognari e reti programmate) per prendere conoscenza sul posto del sistema fognario e individuare eventuali pozzetti occulti da riportare a livello asfalto per le necessarie operazioni di rilievo
- **reperimento presso ACQUE Spa delle informazioni disponibili in merito all'assetto della rete fognaria** (tracciato, dimensione tubazioni, presenza di sfioratori, ecc.)
- **rilievo topografico di dettaglio delle aree**, in particolare al fine di avere le quote dei chiusini a livello dell'asfalto
- **rilievo delle quote di scorrimento e dei diametri delle tubazioni** nei vari pozzetti di interesse, anche al fine di verificare quanto fornito da ACQUE Spa
- **individuazione, sulla base del tracciato della rete fognaria, dei bacini idrografici** afferenti alla rete in occasione di eventi pluviometrici
- **modellazione idrologica** del sistema al fine di determinare gli idrogrammi di piena in uscita dal sistema in occasione di eventi pluviometrici di assegnato tempo di ritorno e durata (tempi di ritorno 20 e 200 anni, durate di pioggia 15-30-60 minuti)
- **modellazione idraulica del sistema nella zona di interesse allo stato attuale** al fine di definire le condizioni della rete pre-intervento

- **modellazione idraulica del sistema nella zona di interesse allo stato di progetto (attuazioni del PUA 2.6 UMI 1 e PUA 2.6 UMI 2)** al fine di valutare gli effetti delle urbanizzazioni sulla rete di smaltimento.

Nel seguito del presente documento si vanno a descrivere nel dettaglio le operazioni eseguite ed i risultati ottenuti dalle analisi.



## 2. DESCRIZIONE DEL SISTEMA FOGNARIO

In primo luogo si è provveduto a reperire presso ACQUE Spa le informazioni in merito al tracciato della rete. Il tecnico Fabrizio Maragliulo ha fornito la planimetria del sistema fognario riportata nella figura seguente:



Come si osserva dalla figura sopra riportata, per l'area di interesse si può definire una sezione di

chiusura in corrispondenza dell'incrocio tra Via San Mamante e Via Sanzio, in corrispondenza della rotatoria Est di accesso al centro commerciale EMPOLI\*CENTRO.

In tale punto, sulla base della planimetria fornita da ACQUE Spa, arrivano le acque drenate dalla porzione di territorio delimitata ad Ovest dalla SS 67, a Nord dalle urbanizzazioni su Via Maggini e Via Bassa, e a Sud da Via Sanzio. In allegato al presente documento si riporta il bacino idrografico complessivo drenato alla sezione di chiusura all'incrocio tra Via San Mamante e Via Sanzio, con l'indicazione anche dei vari sottobacini impiegati per la modellazione idrologica afferenti ai pozzetti significativi della rete oggetto di studio. Il bacino idrografico complessivo ha una superficie di 0.208 kmq.

Come già evidenziato la fognatura è di tipo misto, e raccoglie quindi le acque nere in tempo asciutto e acque bianche e nere in caso di eventi pluviometrici.

Il rilievo di dettaglio ha permesso di conoscere le quote di scorrimento e le dimensioni delle varie tubazioni componenti la rete, oltre ad andare a definire le caratteristiche degli sfioratori di troppo pieno esistenti.

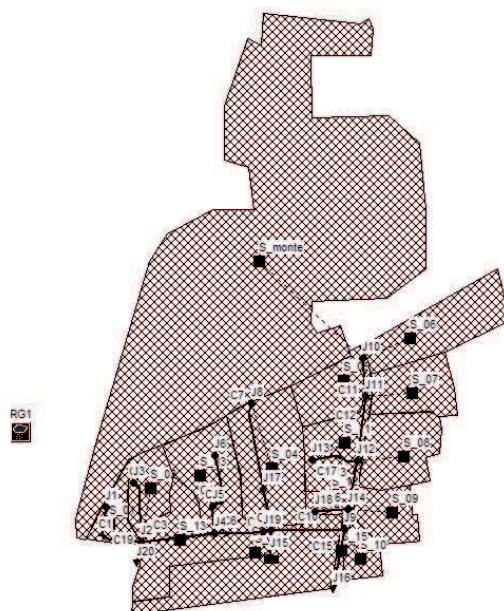
In allegato al presente documento si riporta una tavola grafica con l'indicazione delle geometrie e quote del reticolo fognario, limitatamente alla parte oggetto di simulazione idraulica, posta a Sud di Via Livornese.



### 3. RELAZIONE IDROLOGICA

La modellazione idrologica del sistema di fognatura in occasione di eventi pluviometrici intensi è stata effettuata mediante il software SWMM (Storm Water Management Model) prodotto dalla Environmental Protection Agency (EPA) americana, versione 5.1 release 5.1.010; tale software rappresenta un riferimento a livello mondiale nell'analisi di sistemi di fognatura.

Nella figura seguente si riporta lo schema del modello implementato, con riportata anche la rete di drenaggio:



Nel seguito del presente documento si riassumono le ipotesi effettuate e i metodi di calcolo impiegati per l'analisi.

#### 3.1. Modello degli afflussi meteorici

### 3.1.1. Curve di possibilità pluviometrica

La curva di possibilità pluviometrica rappresentativa delle piogge intense nell'area oggetto di studio è stata determinata sulla base delle *Linee segnalatrici di possibilità pluviometrica – Aggiornamento 2012* determinate nell'ambito dell'accordo di collaborazione tra Regione Toscana e Università di Firenze di cui alla DGRT 1133/2012 (referente scientifico Prof. Enrica Caporali).

Per il bacino oggetto di studio sono state impiegate le seguenti espressioni, per eventi con tempo di ritorno 20 e 200 anni (calcolate con riferimento alle coordinate geografiche del baricentro della zona di interesse):

$$h = 46.301 t^{0.24820} \quad \text{Tempo di ritorno 20 anni}$$

$$h = 70.175 t^{0.28148} \quad \text{Tempo di ritorno 200 anni}$$

### 3.1.2. Ietogrammi di pioggia

La curva di possibilità pluviometrica non descrive la variazione temporale dell'altezza di pioggia all'interno di un intervallo di assegnata durata  $t$ , fornendo solo l'intensità media di precipitazione. A parità di tempo di ritorno e di durata di pioggia possono aversi infinite realizzazioni dello ietogramma, a ciascuna delle quali sono associate differenti onde di piena.

Per la rete oggetto di studio, e per le finalità della presente indagine, si sono impiegati ietogrammi di pioggia ad intensità costante, di durate pari a 15 minuti, 30 minuti e 1 ora.

Poichè la curva di possibilità pluviometrica indicata al paragrafo precedente riguarda piogge di durata oraria o superiore, per le precipitazioni di durata 15 e 30 minuti si è fatto riferimento alla bibliografia in materia (V. Milano, Fognature), individuando per le durate di interesse il rapporto tra pioggia massima di durata assegnata e massima pioggia oraria attesa sulla base dell'osservazione di numerosi eventi di pioggia intensi in Italia e nel mondo. Si è quindi assunto che la pioggia di durata 15 minuti abbia un'altezza di pioggia attesa pari al 67% di quella oraria, e per quella di durata 30 minuti una percentuale pari al 89% dell'oraria.

Pertanto si riassumono nella seguente tabella le altezze di pioggia attese per assegnata durata e tempo di ritorno impiegate per la definizione degli ietogrammi di pioggia ad intensità costante:

Durata di pioggia [min]	Tempo di ritorno [anni]	Altezza di pioggia attesa [mm]
15	20	31.02
30	20	41.57
60	20	46.3
15	200	47.01
30	200	62.95
60	200	70.18

Sono state ovviamente trascurate le portate nere, in quanto la finalità dello studio è quella di verificare gli effetti della trasformazione in occasione di eventi pluviometrici intensi, e per eventi ventennali e duecentennali le portate nere concomitanti sono di diversi ordini di grandezza inferiori, e quindi non influenti sui risultati generali.

### 3.1.3. Raggiungimento delle precipitazioni all'area di bacino

In generale la curva di possibilità pluviometrica dedotta per una certa località non può essere assunta valida in tutta l'area A del bacino stesso. La stima dell'altezza di precipitazione di assegnate durata e tempo di ritorno può essere condotta moltiplicando l'altezza di pioggia puntuale di pari durata e tempo di ritorno per un fattore di raggiungimento  $r < 1$ :

$$h_A(t, T_R) = r \cdot h(d, T_R)$$

Il valore del coefficiente di raggiungimento dipende dalla durata della precipitazione e dall'area considerata. In generale occorre cautela nell'utilizzo dei fattori di raggiungimento delle piogge all'area. La World Meteorological Organization (WMO) consiglia di non effettuare alcun raggiungimento delle piogge all'area per aree inferiori a circa 25 Km<sup>2</sup>.

Considerando le ridotte dimensioni dei bacini in esame si è deciso cautelativamente di non effettuare alcun raggiungimento delle precipitazioni all'area.

## 3.2. Modello di trasformazione afflussi-deflussi

### 3.2.1. Modello di perdita idrologica

Il software SWMM effettua il calcolo delle perdite idrologiche in maniera separata per le aree permeabili e per le aree impermeabili del bacino.

Sulle aree impermeabili sono possibili solo perdite per intercezione e per invaso nelle depressioni superficiali del terreno (depression storage).

Per le parti permeabili del bacino si è assunta un'altezza di perdita pari a 3 mm, mentre per le parti impermeabili si è assunta un'altezza di perdita pari a 2 mm, concordemente con le indicazioni in merito riportate in letteratura tecnica. La percentuale di area impermeabile è stata definita in coerenza con le classi CORINE LAND COVER per le aree oggetto di studio; in linea generale, per il tessuto urbano discontinuo si ha una percentuale di impermeabilità variabile tra il 50 e l'80%, ed è stata pertanto fissata nel 65% di media.

Sulle aree permeabili a tali perdite si sommano le perdite per infiltrazione, valutate nel caso in esame con il metodo di Horton. Il metodo in questione prevede la definizione dei tassi massimo e minimo di infiltrazione. Per i bacini allo studio, in coerenza con le indicazioni di letteratura tecnica per le tipologie di suoli presenti, si sono fissati un tasso massimo di 76 mm/ora e un tasso minimo di 13 mm/ora.

### 3.2.2. Trasformazione afflussi netti – deflussi

Per la trasformazione afflussi netti – deflussi SWMM utilizza il modello NLR (Non Linear Reservoir, ovvero invaso non lineare).

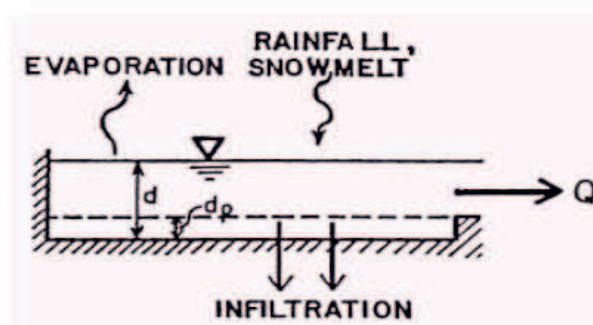


Figura 1: rappresentazione concettuale del modello di trasformazione afflussi deflussi di SWMM (estratto da SWMM user manual)

La superficie di ogni sottobacino è schematizzata come un invaso non lineare in cui le portate in ingresso sono legate alle precipitazioni e ad eventuali apporti da sottobacini a monte. Le portate in uscita dal sottobacino sono invece legate ai fenomeni di infiltrazione, evapotraspirazione e deflusso superficiale. La capacità dell'invaso è data dall'altezza di perdita associata alle depression storage  $d_p$  (fisicamente corrispondenti all'invaso nelle depressioni superficiali ed all'intercezione). Si ha deflusso superficiale  $Q$  in uscita dal sottobacino solo quando l'altezza liquida  $d$  risulta maggiore a  $d_p$ . L'idrogramma in uscita viene simulato con lo schema cinematico di propagazione dei deflussi (kinematic wave). L'altezza liquida  $d$  sulla superficie del sottobacino viene aggiornata sulla base dell'equazione di continuità ad ogni istante temporale di calcolo. In definitiva le equazioni alla base del modello di trasformazione afflussi netti – deflussi sono le seguenti:

$$\frac{dV}{dt} = \frac{d(Ad)}{dt} = A \frac{d(d)}{dt} \quad \text{equazione di continuità}$$

$$Q = \frac{W}{N} (d - d_p)^{5/3} \sqrt{S_0} \quad \text{equazione cinematica}$$

in cui, oltre ad i simboli riportati in figura,  $V$  è il volume invasato sulla superficie del sottobacino,  $A$  l'area del sottobacino,  $W$  la larghezza di deflusso superficiale (*overland flow width*) del sottobacino ed  $N$  il coefficiente di resistenza al moto per correnti di tipo overland, assunto pari a 0.011 per le aree impermeabili ed a 0.13 per le aree permeabili, come da indicazioni di letteratura. I valori della larghezza superficiale  $W$  sono stati ricavati sulla base della CTR in scala 1:2000 per ciascun sottobacino. I parametri di trasformazione afflussi-deflussi per i diversi sottobacini esaminati sono riportati in allegato al presente documento.

### 3.3. Parametri del modello

Per quanto concerne le piogge si sono già riportate in precedenza le altezze di pioggia con cui sono stati calcolati gli ietogrammi ad intensità costante per assegnata durata di precipitazione e tempo di ritorno.

Le caratteristiche degli elementi sottobacino impiegati per l'analisi idrologica sono riassunti nelle tabelle seguenti, per lo stato attuale e per lo stato di progetto.



## STATO ATTUALE

### Subcatchment Summary

\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000 RG1	J1
S_02	0.46	99.00	65.00	0.5000 RG1	J2
S_03	0.81	124.00	65.00	0.5000 RG1	J6
S_04	1.23	158.00	65.00	0.5000 RG1	J8
S_05	0.57	65.00	65.00	0.5000 RG1	J11
S_06	0.97	190.00	65.00	0.5000 RG1	J10
S_07	0.61	103.00	65.00	0.5000 RG1	J11
S_08	0.77	74.00	65.00	0.5000 RG1	J12
S_09	0.44	72.00	65.00	0.5000 RG1	J14
S_10	0.25	43.00	65.00	0.5000 RG1	J9
S_11	0.60	75.00	40.00	0.5000 RG1	J13
S_12	0.21	50.00	65.00	0.5000 RG1	J18
S_13	1.01	97.00	65.00	0.5000 RG1	J4
S_14	1.38	236.00	0.00	0.5000 RG1	J15
S_15	0.10	3.00	90.00	0.5000 RG1	J9
S_monte	11.11	470.00	65.00	0.5000 RG1	J10

## STATO DI PROGETTO

### Subcatchment Summary

\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000 RG1	J1
S_02	0.46	99.00	65.00	0.5000 RG1	J2
S_03	0.81	124.00	65.00	0.5000 RG1	J6
S_04	1.23	158.00	56.00	0.5000 RG1	J8
S_05	0.57	65.00	65.00	0.5000 RG1	J11
S_06	0.97	190.00	65.00	0.5000 RG1	J10
S_07	0.61	103.00	65.00	0.5000 RG1	J11
S_08	0.77	74.00	65.00	0.5000 RG1	J12
S_09	0.44	72.00	65.00	0.5000 RG1	J14
S_10	0.25	43.00	65.00	0.5000 RG1	J9
S_11	0.60	75.00	60.00	0.5000 RG1	J13
S_12	0.21	50.00	65.00	0.5000 RG1	J18
S_13	1.01	97.00	65.00	0.5000 RG1	J4
S_14	1.38	236.00	0.00	0.5000 RG1	J15
S_15	0.10	3.00	90.00	0.5000 RG1	J9
S_monte	11.11	470.00	65.00	0.5000 RG1	J10

Si osserva come allo stato di progetto si abbiano variazioni dei parametri esclusivamente nei sottobacini S\_04 e S\_11, che al loro interno racchiudono rispettivamente l'UMI 1 e l'UMI 2. Le variazioni si hanno solamente in termini di percentuale di aree impermeabili, che vanno a diminuire per l'UMI 1 e ad

aumentare per l'UMI 2; infatti l'UMI 1 prevede un aumento della superficie permeabile, legata alla realizzazione di spazi a verde in sostituzione delle serre coperte presenti attualmente, mentre l'UMI 2 prevede l'impermeabilizzazione di una limitata porzione di territorio.

La variazione di superficie impermeabile è stata determinata nella maniera seguente:

#### UMI 1

Superficie complessiva sottobacino S_04	12.335 mq
Percentuale area impermeabile stato attuale	65%
Area impermeabile stato attuale	$12.335 \times 0.65 = 8.018$ mq
Diminuzione superficie impermeabile stato di progetto	1.100 mq
Superficie impermeabile stato di progetto	$8.018 - 1.100 = 6.918$ mq
Percentuale area impermeabile stato di progetto	$6.918/12.335 = 56\%$

#### UMI 2

Superficie complessiva sottobacino S_11	6.049 mq
Percentuale area impermeabile stato attuale	40%
Area impermeabile stato attuale	$6.049 \times 0.40 = 2.420$ mq
Aumento area impermeabile stato di progetto	1.200 mq (da progetto PUA 2.6 UMI2)
Superficie impermeabile stato di progetto	$2.420 + 1.200 = 3.620$ mq
Percentuale area impermeabile stato di progetto	$3.620/6.049 = 60\%$

### 3.4. Risultati delle simulazioni

Le simulazioni sono state eseguite per eventi con tempi di ritorno 20 e 200 anni, con durate di pioggia 15, 30 minuti e 1 ora, per un totale di 6 simulazioni.

I risultati sono riportati in allegato al presente documento, assieme ai risultati delle modellazioni idrauliche, realizzate tutte all'interno dello stesso modello implementato con il software SWMM.

## 4. RELAZIONE IDRAULICA

Sulla base degli idrogrammi determinati nello studio idrologico dell'area in esame si è passati successivamente alla modellazione idraulica del sistema di drenaggio. L'analisi idraulica è stata condotta a moto vario utilizzando il modello idraulico dynamic wave di SWMM. Di seguito si riporta sinteticamente la descrizione dei modelli matematici. Per ulteriori dettagli sulle equazioni e gli algoritmi di calcolo si rimanda alla manualistica di SWMM.

### 4.1. Modello idraulico a moto vario di SWMM

Le equazioni del moto vario (o equazioni di De Saint Venant) utilizzate in SWMM per la modellazione dei condotti di fognatura presentano la seguente forma:

equazione di continuità (conservazione della massa):

$$\frac{\partial Q}{\partial x} + \frac{\partial A}{\partial t} = 0$$

equazione di conservazione della quantità di moto:

$$\frac{\partial Q}{\partial t} + \frac{\partial (Q^2/A)}{\partial x} + gA \frac{\partial H}{\partial x} + gAS_f + gAh_L = 0$$

con Q portata defluente all'interno del generico condotto, g accelerazione di gravità, A area liquida,  $S_f$  pendenza della linea dell'energia (valutata sulla base del coefficiente di Manning n), H quota della linea piezometrica (somma della quota di fondo z e dell'altezza liquida y),  $h_L$  perdita localizzata per unità di lunghezza del condotto (valutata sulla base dei coefficienti di perdita concentrata K), x l'ascissa, t il tempo.

Alle suddette equazioni viene associata un'ulteriore equazione di continuità per la modellazione dei nodi del sistema di fognatura.

Le equazioni del moto vengono risolte con uno schema alle differenze finite di tipo esplicito, con un algoritmo iterativo di successiva approssimazione e con l'utilizzo anche di metodi di rilassamento.

Nel caso di corrente veloce viene utilizzata la tecnica LPI "Local Partial Inertia", mediante la quale si

passa gradualmente dalla soluzione delle equazioni complete del moto alla soluzione del modello parabolico. Il modello matematico riesce così a garantire una buona stabilità di calcolo anche nei tratti interessati da corrente veloce o mista, pur mantenendo un'adeguata accuratezza di calcolo.

## 4.2. Condizioni al contorno

La rete idraulica simulata va da Sud di Via Livornese fino al pozzetto all'incrocio tra Via San Mamante e Via Sanzio laddove la tubazione si immette nel collettore principale su Via Sanzio. Non essendo note le quote di scorrimento dell'acqua in caso di eventi pluviometrici intensi nel collettore principale, ci si è posti nelle due condizioni limite, ipotizzando cioè lo scarico libero nel collettore di Via Sanzio (condizione al contorno FREE al pozzetto J16) e scarico completamente rigurgitato (condizione al contorno FIXED STAGE al pozzetto J16 con quota dell'acqua a 23.62 m slm, quota del cervello del tubo in ingresso al pozzetto). **La doppia assunzione ha permesso di simulare la rete nelle condizioni limite nelle quali può operare, e pertanto lavorando dalla parte della sicurezza.**

## 4.3. Risultati degli scenari di calcolo

Sulla base delle ipotesi di modellazione e dei metodi di calcolo precedentemente descritti si è provveduto alla modellazione dei bacini in esame e della rete di fognatura mista.

I 6 scenari simulati, variando la durata di pioggia e il tempo di ritorno, sono i seguenti:

- |                   |  |
|-------------------|--|
| • icTR20TR00.25h  | tempo di ritorno 20 anni, durata di pioggia 15 minuti  |
| • icTR20TR00.50h  | tempo di ritorno 20 anni, durata di pioggia 30 minuti  |
| • icTR20TR01.00h  | tempo di ritorno 20 anni, durata di pioggia 1 ora      |
| • icTR200TR00.25h | tempo di ritorno 200 anni, durata di pioggia 15 minuti |
| • icTR200TR00.50h | tempo di ritorno 200 anni, durata di pioggia 30 minuti |
| • icTR200TR01.00h | tempo di ritorno 200 anni, durata di pioggia 1 ora     |

Ciascuno scenario è stato simulato sia con condizione al contorno FREE che FIXED STAGE allo sbocco su Via Sanzio, per un totale di 12 simulazioni allo stato attuale e 12 simulazioni allo stato di progetto.

Scopo della presente indagine è quello di valutare gli effetti della trasformazione sul sistema di fognatura in occasione di eventi pluviometrici intensi. Si sono pertanto confrontate tra stato attuale e di progetto (attuazioni del PUA 2.6 UMI 1 e del PUA 2.6 UMI 2) varie grandezze ottenute dai modelli ed in particolare:

- massima portata uscente
- volume complessivo entrante, ed uscente verso Via Sanzio e verso il pozzetto J15 di modello;
- esondazione ai singoli pozzetti relativi all'area di Via Signorelli (pozzetti J1-J2-J3-J4-J5-J6-J7), di Via Reni (J8), di Via Livornese (J10) e di Via San Mamante (J11)

A livello di considerazioni di carattere generale si è rilevata una generalizzata insufficienza della rete di smaltimento delle acque meteoriche.

Nelle tabelle seguenti si riassumono in forma sintetica i risultati ottenuti dalle analisi, riportati nel dettaglio in allegato al presente documento.



**Confronto tra volumi entranti, volumi uscenti su Via Sanzio e volumi uscenti verso futuro PUA 2.5 e massime portate uscenti verso Via Sanzio:**

N.	STATO	Condizione al contorno	tp [min]	TR [anni]	Volume entrante nel modello [m3]	Volume uscente dal modello [m3]	Qmax uscente su Via Sanzio [m3/s]	Volume uscente J15 [m3]
1	Attuale	FREE	15	20	4051	2495	1.082	467
2	Progetto	FREE	15	20	4054	2490	1.082	466
Differenza percentuale (P-A)/P					0.07%	-0.20%	0.00%	-0.21%
3	Attuale	FREE	30	20	5721	3686	1.053	730
4	Progetto	FREE	30	20	5725	3672	1.053	726
Differenza percentuale (P-A)/P					0.07%	-0.38%	0.00%	-0.55%
5	Attuale	FREE	60	20	6222	5218	0.978	1018
6	Progetto	FREE	60	20	6227	5203	0.975	1013
Differenza percentuale (P-A)/P					0.08%	-0.29%	-0.31%	-0.49%
7	Attuale	FREE	15	200	7070	3235	1.16	701
8	Progetto	FREE	15	200	7075	3233	1.16	700
Differenza percentuale (P-A)/P					0.07%	-0.06%	0.00%	-0.14%
9	Attuale	FREE	30	200	9951	4714	1.113	1070
10	Progetto	FREE	30	200	9956	4711	1.113	1070
Differenza percentuale (P-A)/P					0.05%	-0.06%	0.00%	0.00%
11	Attuale	FREE	60	200	10934	6660	1.053	1445
12	Progetto	FREE	60	200	10940	6637	1.053	1439
Differenza percentuale (P-A)/P					0.05%	-0.35%	0.00%	-0.42%
13	Attuale	FIXED	15	20	4054	-897	0.897	2674
14	Progetto	FIXED	15	20	4058	-900	0.897	2674
Differenza percentuale (P-A)/P					0.10%	0.33%	0.00%	0.00%
15	Attuale	FIXED	30	20	5722	144	0.897	2712
16	Progetto	FIXED	30	20	5727	131	0.897	2712
Differenza percentuale (P-A)/P					0.09%	-9.92%	0.00%	0.00%
17	Attuale	FIXED	60	20	6222	1385	0.897	2743
18	Progetto	FIXED	60	20	6227	1361	0.897	2741
Differenza percentuale (P-A)/P					0.08%	-1.76%	0.00%	-0.07%
19	Attuale	FIXED	15	200	7073	-283	0.994	2719
20	Progetto	FIXED	15	200	7078	-285	0.994	2719
Differenza percentuale (P-A)/P					0.07%	0.70%	0.00%	0.00%
21	Attuale	FIXED	30	200	9954	1017	0.932	2775
22	Progetto	FIXED	30	200	9960	1016	0.932	2775
Differenza percentuale (P-A)/P					0.06%	-0.10%	0.00%	0.00%
23	Attuale	FIXED	60	200	10935	2690	0.897	2817
24	Progetto	FIXED	60	200	10941	2667	0.897	2817

Dalla tabella sopra riportata si osserva quanto segue:

- il volume idrico complessivo in ingresso al sistema resta di fatto invariato tra lo stato attuale e lo stato di progetto;
- il volume uscente dal modello cala in maniera leggerissima allo stato di progetto, comunque in quantità non significativa;

- non si ha incremento di portata massima in uscita su Via Sanzio tra lo stato attuale e di progetto;
- l'attuazione del PUA 2.6 UMI 1 e UMI 2 non produce alcun incremento di portate e volumi verso le aree contermini (elemento J15).

**Confronto tra volumi di esondazione ai singoli pozzetti relativi all'area di Via Signorelli (pozzetti J1-J2-J3-J4-J5-J6-J7), di Via Reni (J8), di Via Livornese (J10) e di Via San Mamante (J11)**

Volume esondato [m3]															
N.	STATO	Condizione al contorno	tp [min]	TR [anni]	J1	J2	J3	J4	J5	J6	J7	J8	J9	J10	J11
1	Attuale	FREE	15	20	0	1	0	1	0	68	0	41	0	1158	5
2	Progetto	FREE	15	20	0	1	0	1	0	68	0	26	0	1159	4
Differenza percentuale (P-A)/P					-	0.00%	-	0.00%	-	0.00%	-	-57.69%	-	0.09%	-25.00%
3	Attuale	FREE	30	20	0	0	0	0	0	46	0	4	0	1560	0
4	Progetto	FREE	30	20	0	0	0	0	0	45	0	0	0	1559	0
Differenza percentuale (P-A)/P					-	-	-	-	-	-2.22%	-	-	-	-0.06%	-
5	Attuale	FREE	60	20	0	0	0	0	0	0	0	0	0	759	0
6	Progetto	FREE	60	20	0	0	0	0	0	0	0	0	0	759	0
Differenza percentuale (P-A)/P					-	-	-	-	-	-	-	-	-	0.00%	-
7	Attuale	FREE	15	200	2	1	1	2	22	257	0	186	0	2676	167
8	Progetto	FREE	15	200	2	1	1	1	22	257	0	155	0	2678	167
Differenza percentuale (P-A)/P					0.00%	0.00%	0.00%	-100.00%	0.00%	0.00%	-	-20.00%	-	0.07%	0.00%
9	Attuale	FREE	30	200	0	1	1	1	0	299	0	160	0	3831	97
10	Progetto	FREE	30	200	0	1	1	0	0	299	0	160	0	3831	97
Differenza percentuale (P-A)/P					-	0.00%	0.00%	-100.00%	-	0.00%	-	0.00%	-	0.00%	0.00%
11	Attuale	FREE	60	200	0	0	0	0	0	77	0	2	0	3278	0
12	Progetto	FREE	60	200	0	0	0	0	0	75	0	0	0	3277	0
Differenza percentuale (P-A)/P					-	-	-	-	-	-2.67%	-	-100.00%	-	-0.03%	-
13	Attuale	FIXED	15	20	0	0	0	0	0	90	0	60	0	1222	24
14	Progetto	FIXED	15	20	0	0	0	0	0	90	0	40	0	1222	24
Differenza percentuale (P-A)/P					-	-	-	-	-	0.00%	-	-50.00%	-	0.00%	0.00%
15	Attuale	FIXED	30	20	0	0	0	0	0	62	0	17	0	1650	0
16	Progetto	FIXED	30	20	0	0	0	0	0	62	0	5	0	1648	0
Differenza percentuale (P-A)/P					-	-	-	-	-	0.00%	-	-240.00%	-	-0.12%	-
17	Attuale	FIXED	60	20	0	0	0	0	0	0	0	0	0	831	0
18	Progetto	FIXED	60	20	0	0	0	0	0	0	0	0	0	828	0
Differenza percentuale (P-A)/P					-	-	-	-	-	-	-	-	-	-0.36%	-
19	Attuale	FIXED	15	200	1	0	0	0	31	290	0	226	0	2750	215
20	Progetto	FIXED	15	200	1	0	0	0	31	289	0	192	0	2750	215
Differenza percentuale (P-A)/P					0.00%	-	-	-	0.00%	-0.35%	-	-17.71%	-	0.00%	0.00%
21	Attuale	FIXED	30	200	0	0	0	0	0	341	0	238	0	3899	171
22	Progetto	FIXED	30	200	0	0	0	0	0	341	0	196	0	3899	171
Differenza percentuale (P-A)/P					-	-	-	-	-	0.00%	-	-21.43%	-	0.00%	0.00%
23	Attuale	FIXED	60	200	0	0	0	0	0	105	0	25	0	3432	0
24	Progetto	FIXED	60	200	0	0	0	0	0	104	0	12	0	3429	0
Differenza percentuale (P-A)/P					-	-	-	-	-	-0.96%	-	-108.33%	-	-0.09%	-

Dalla tabella si osserva che **l'attuazione del PUA 2.6 UMI 1 e UMI 2 non produce incremento delle esondazioni nella zona di Via Signorelli e di Via San Mamante**. Pertanto, l'attuazione delle due trasformazioni (PUA 2.6 UMI 1 e UMI 2) nel rispetto delle NTA del Regolamento Urbanistico e della Relazione geologica di fattibilità del secondo RU comunale, ed in particolare nella parte relativa al contenimento dell'impermeabilizzazione dei suoli, non comportano incremento dei rischi di allagamento nelle aree contermini indagate.

## 5. CONCLUSIONI

Il sottoscritto **Ing. PAOLO PUCCI (H.S. INGEGNERIA srl)** ha ricevuto incarico dal **Sig. DI STEFANO DIEGO** quale procuratore speciale di Bagni Remo, Bagni Renzo, Bagni Fiorella e Malventi Alessio, proprietari assieme alla società COSTRUZIONI DI STEFANO srl dei terreni e fabbricati di cui al **PUA 2.6 UMI 1** e dalle **Sig.re BINI CARLA, BINI MORIANI ELENA e BINI MORIANI FRANCESCA** in qualità di proprietarie dei terreni di cui al **PUA 2.6 UMI 2** al fine di verificare gli effetti derivanti a seguito dell'attuazione del PUA 2.6 UMI 1 e UMI 2 in loc. Santa Maria, nel comune di Empoli (FI) sul sistema di fognatura in occasione di eventi pluviometrici intensi.

**L'obiettivo dello studio è quindi quello di verificare se l'attuazione delle trasformazioni di cui all'oggetto (PUA 2.6 UMI 1 e UMI 2) comporta effetti significativi, ed in particolare peggiorativi sul sistema di smaltimento fognario.**

In base alle analisi effettuate, basate su sopralluoghi in sito anche con i tecnici di ACQUE Spa, rilievi topografici di dettaglio e simulazioni idrologiche ed idrauliche di eventi pluviometrici con tempi di ritorno 20 e 200 anni e durata 15, 30 e 60 minuti, si può concludere quanto segue:

- si è rilevata una generalizzata insufficienza della rete di smaltimento delle acque meteoriche;
- il volume idrico complessivo in ingresso al sistema resta invariato tra lo stato attuale e lo stato di progetto (attuazione delle due trasformazioni PUA 2.6 UMI 1 e PUA 2.6 UMI 2);
- **non si ha incremento di portata massima in uscita su Via Sanzio** tra lo stato attuale e di progetto;
- **le attuazioni del PUA 2.6 UMI 1 e PUA 2.6 UMI 2 non producono incremento delle esondazioni nella zona di Via Signorelli e di Via San Mamante**, e nelle altre aree contermini. Pertanto, l'attuazione del PUA 2.6 nel rispetto delle NTA del Regolamento Urbanistico e della Relazione geologica di fattibilità del secondo RU comunale, ed in particolare nella parte relativa al contenimento dell'impermeabilizzazione dei suoli, non comportano incremento dei rischi di

allagamento nelle aree contermini indagate.

Nell'attuazione delle trasformazioni sarà necessario rispettare tutte le norme relative alla pericolosità e fattibilità idraulica, le norme relative alla costruzione ed esercizio di reti fognarie, le norme di buona tecnica costruttiva ed in particolare quanto prescritto dalla Relazione geologica di fattibilità del secondo RU comunale, specialmente nella parte relativa al contenimento dell'impermeabilizzazione dei suoli.

Progetto: *Secondo Regolamento Urbanistico del Comune di Empoli - PUA 2.6 UMI 1 e UMI 2 - Verifica degli effetti della trasformazione sul sistema fognario in occasione di eventi pluviometrici intensi*  
Elaborato: *Relazione idrologica ed idraulica di verifica del sistema di fognatura bianca*  
Ubicazione: *Via Guido Reni, Via San Mamante - Comune di Empoli (FI)*  
Data: *Luglio 2016*

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## **ALLEGATI**

### **ALLEGATO 1. *Planimetria del bacino e dei sottobacini idrografici***



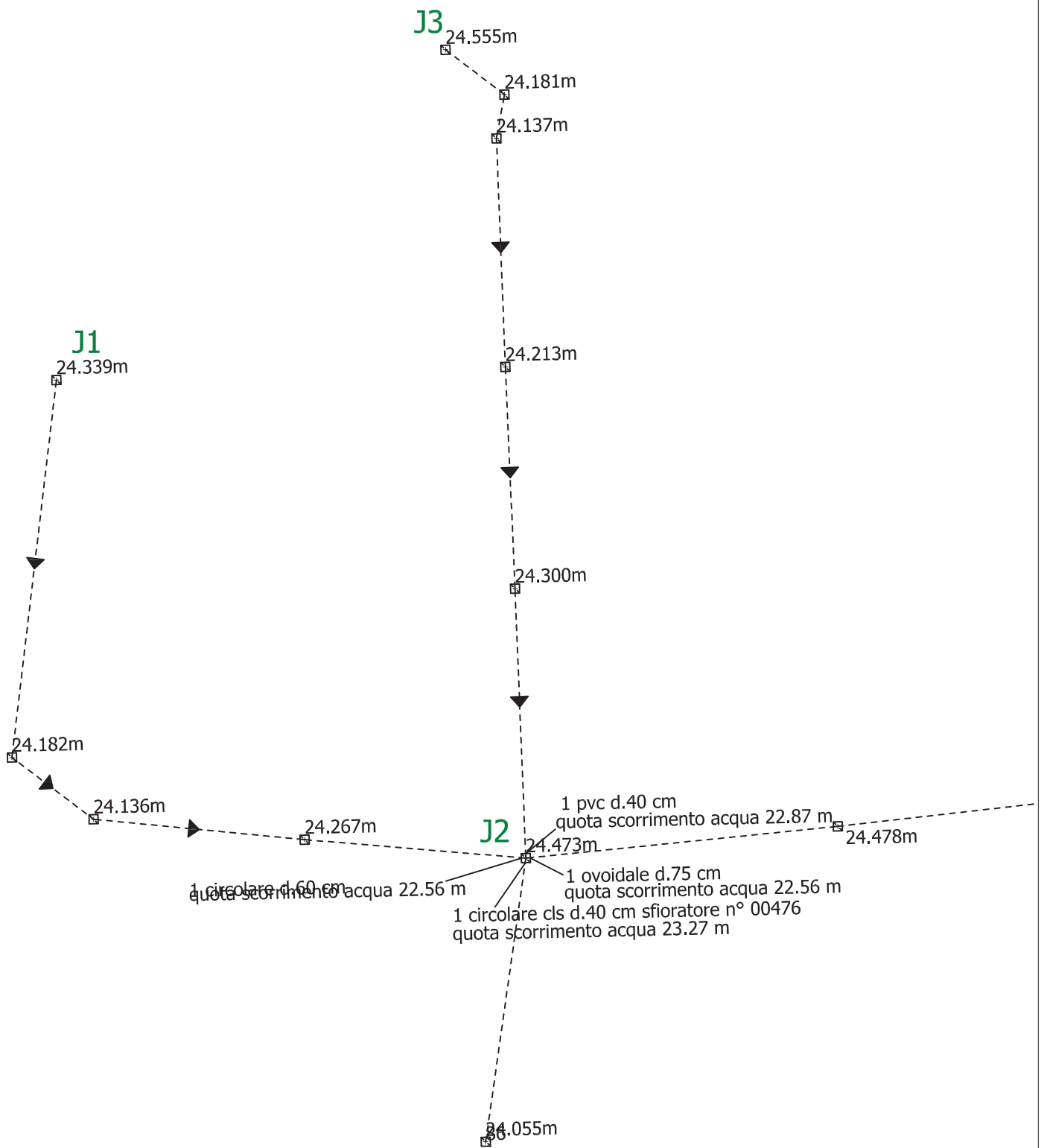


Progetto: Secondo Regolamento Urbanistico del Comune di Empoli - PUA 2.6 UMI 1 e UMI 2 - Verifica degli effetti della trasformazione sul sistema fognario in occasione di eventi pluviometrici intensi  
Elaborato: Relazione idrologica ed idraulica di verifica del sistema di fognatura bianca  
Ubicazione: Via Guido Reni, Via San Mamante - Comune di Empoli (FI)  
Data: Luglio 2016

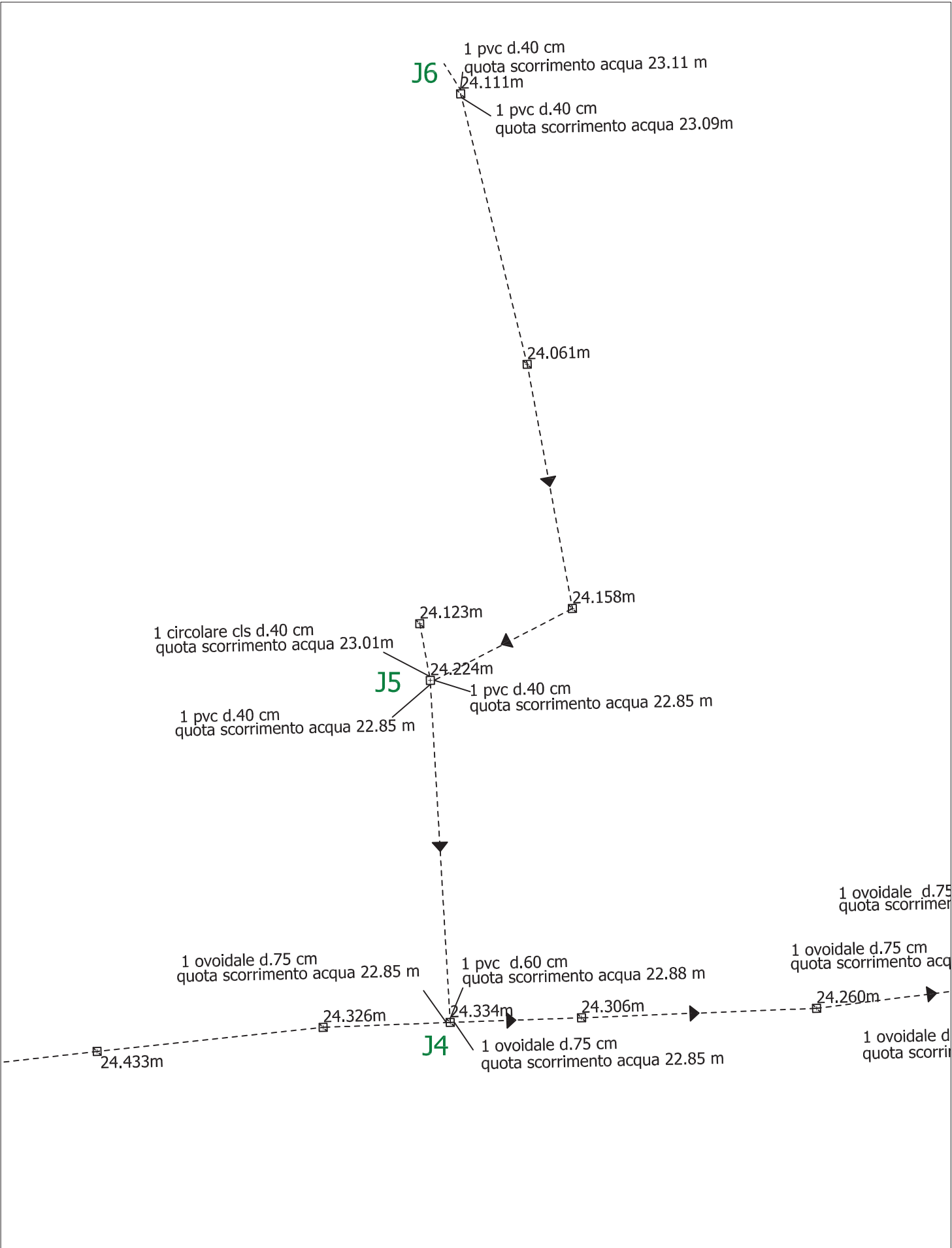
---

## **ALLEGATO 2. Rilievo del sistema fognario di interesse**

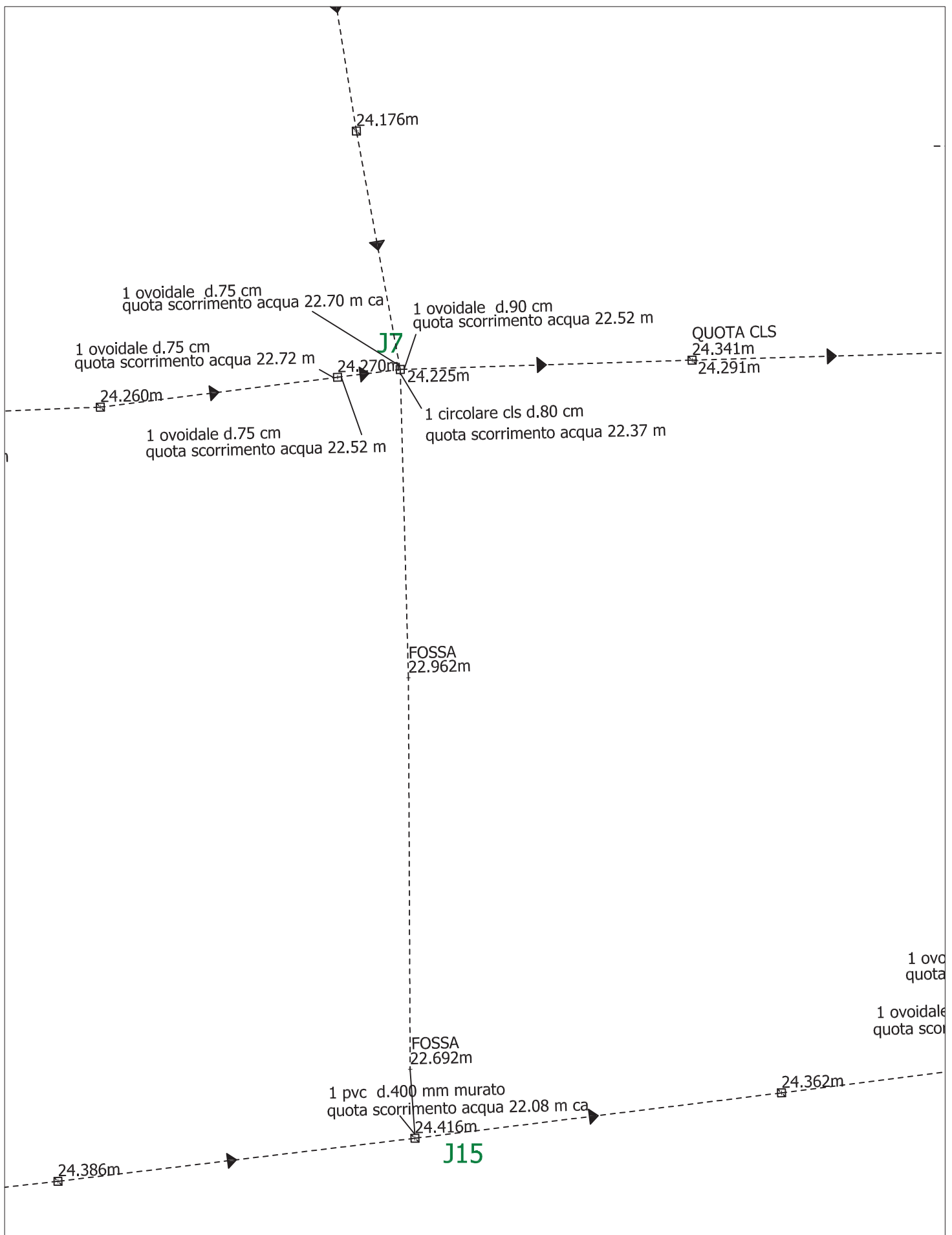
## RILIEVO - pozzetti J1-J2-J3



RILIEVO - pozzetti J4-J5-J6

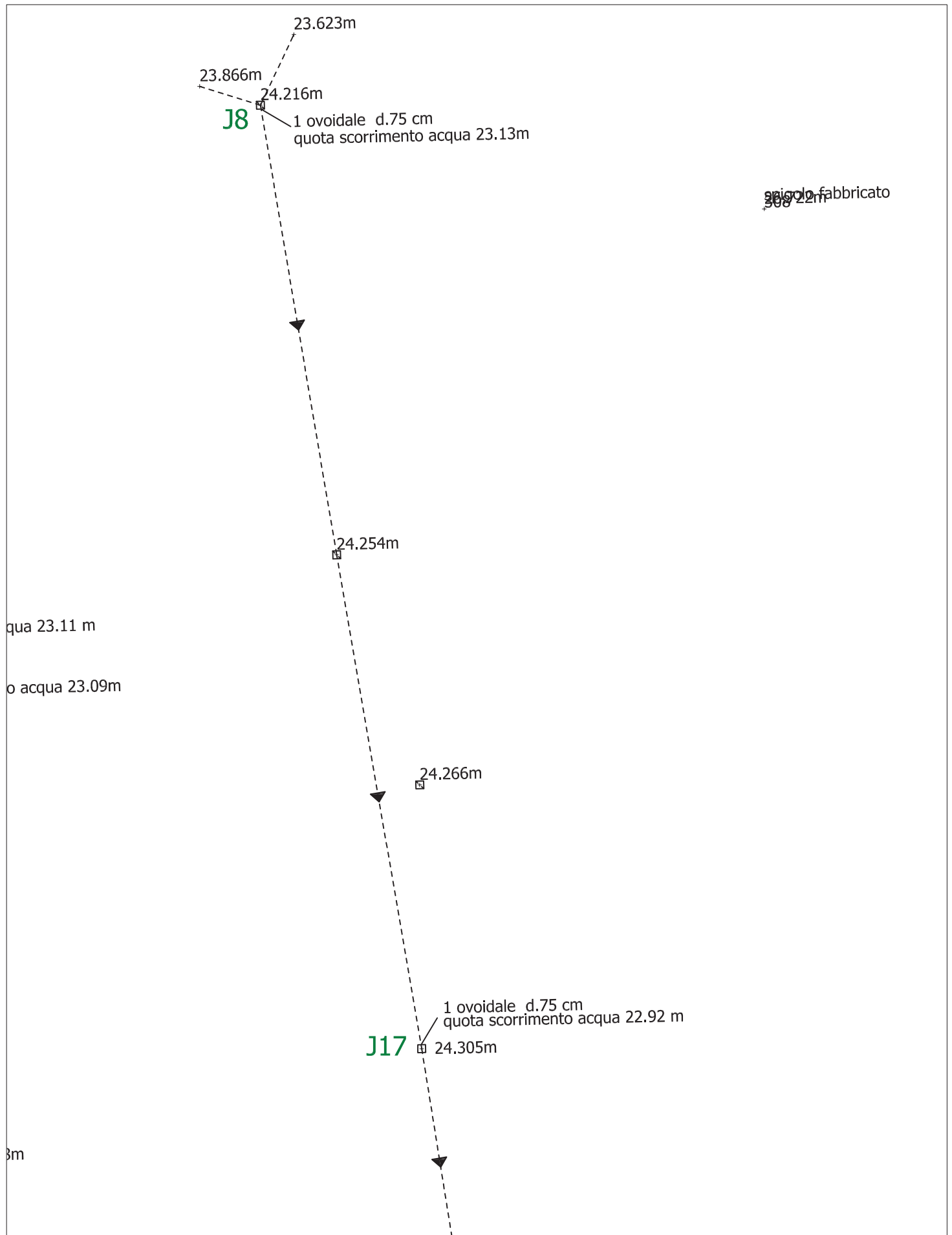


## RILIEVO - pozzetti J7-J15

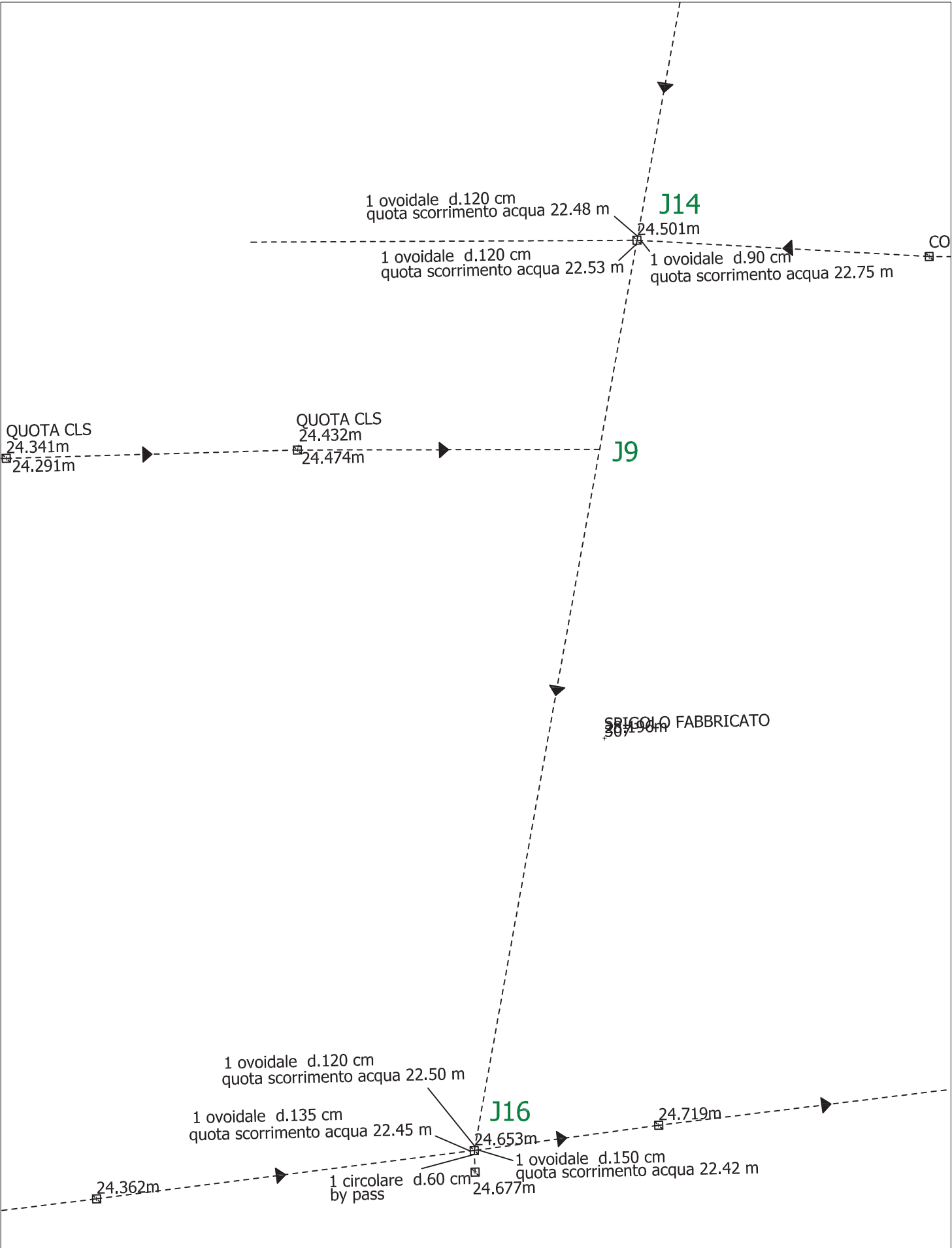




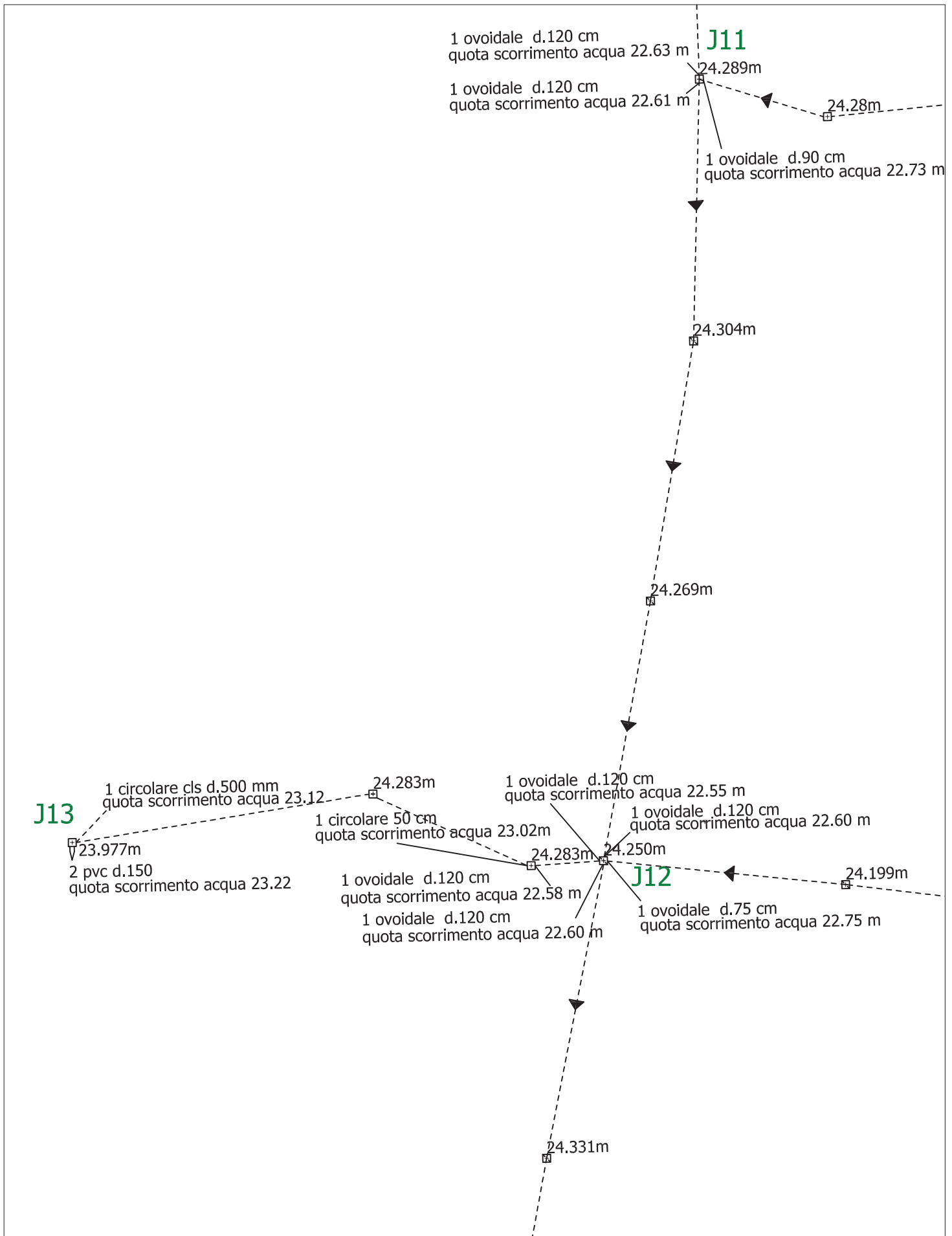
## RILIEVO - pozzetti J8-J17



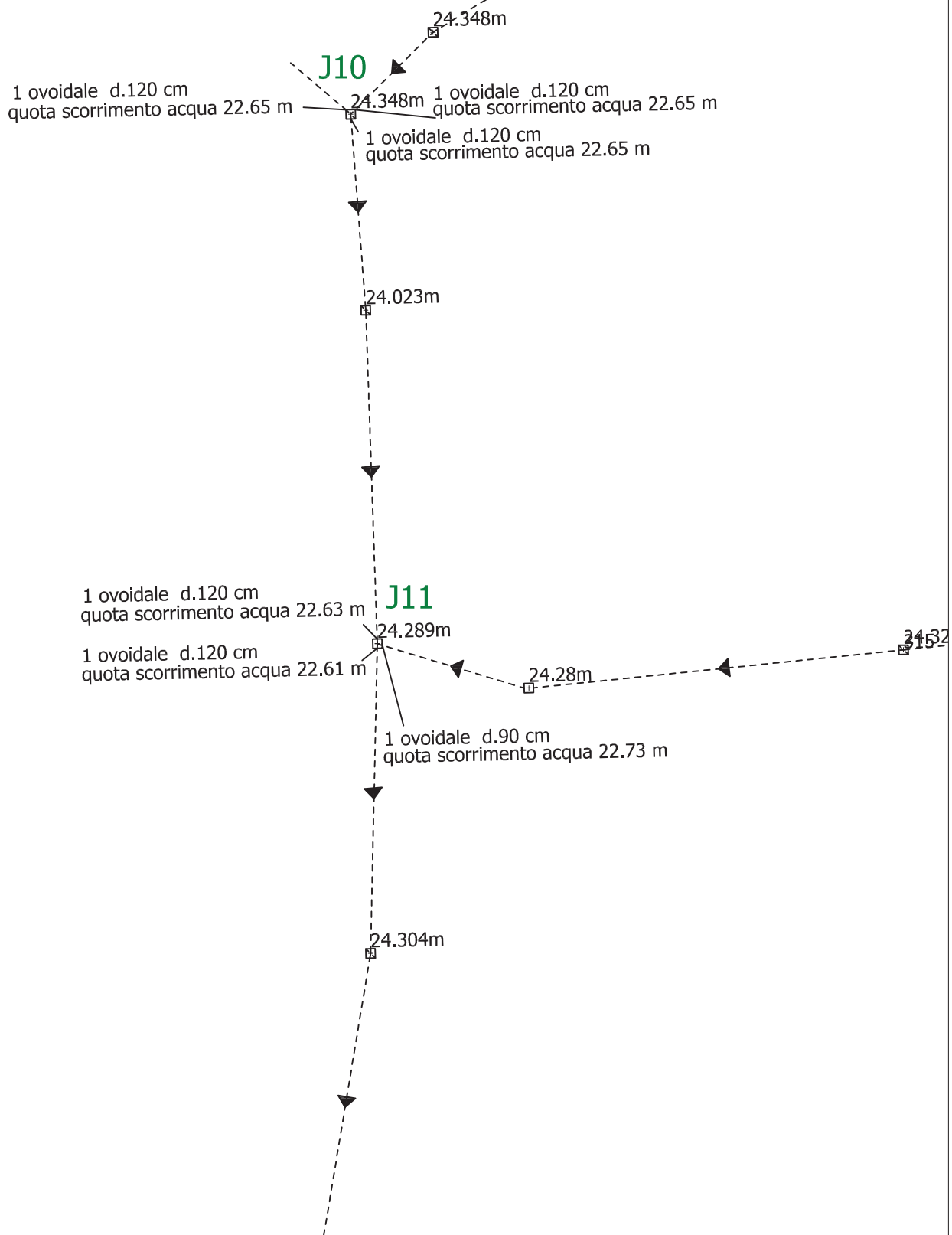
RILIEVO - pozzetti J9-J14-J16



## RILIEVO - pozzetti J11-J12-J13



## RILIEVO - pozzetti J10-J11



Progetto: Secondo Regolamento Urbanistico del Comune di Empoli - PUA 2.6 UMI 1 e UMI 2 - Verifica degli effetti della trasformazione sul sistema fognario in occasione di eventi pluviometrici intensi  
Elaborato: Relazione idrologica ed idraulica di verifica del sistema di fognatura bianca  
Ubicazione: Via Guido Reni, Via San Mamante - Comune di Empoli (FI)  
Data: Luglio 2016

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### **ALLEGATO 3. Risultati del modello SWMM stato attuale**

STATO ATTUALE - CARATTERISTICHE E PARAMETRI DEL MODELLO

[OPTIONS]	
;;Option	Value
FLOW_UNITS	CMS
INFILTRATION	HORTON
FLOW_ROUTING	DYNWAVE
LINK_OFFSETS	DEPTH
MIN_SLOPE	0
ALLOW_PONDING	NO
SKIP_STEADY_STATE	NO
START_DATE	06/20/2016
START_TIME	00:00:00
REPORT_START_DATE	06/20/2016
REPORT_START_TIME	00:00:00
END_DATE	06/20/2016
END_TIME	06:00:00
SWEEP_START	01/01
SWEEP_END	12/31
DRY_DAYS	0
REPORT_STEP	00:01:00
WET_STEP	00:01:00
DRY_STEP	00:01:00
ROUTING_STEP	0:00:05
INERTIAL_DAMPING	PARTIAL
NORMAL_FLOW_LIMITED	BOTH
FORCE_MAIN_EQUATION	D-W
VARIABLE_STEP	0.75
LENGTHENING_STEP	0
MIN_SURFAREA	1.14
MAX_TRIALS	8
HEAD_TOLERANCE	0.0015
SYS_FLOW_TOL	5
LAT_FLOW_TOL	5
MINIMUM_STEP	0.5
THREADS	1

[EVAPORATION]	
;;Data Source	Parameters
;;-----	
CONSTANT	0.0
DRY_ONLY	NO

[SUBCATCHMENTS]								
;;Name	Rain Gage	Outlet	Area	%Imperv	Width	%Slope	CurBlen	SnowPack
;;-----								
S_01	RG1	J1	0.2879	65	67	0.5	0	
S_02	RG1	J2	0.4569	65	99	0.5	0	
S_03	RG1	J6	0.8115	65	124	0.5	0	
S_04	RG1	J8	1.2335	65	158	0.5	0	
S_05	RG1	J11	0.5722	65	65	0.5	0	
S_06	RG1	J10	0.9682	65	190	0.5	0	
S_07	RG1	J11	0.6131	65	103	0.5	0	
S_08	RG1	J12	0.7655	65	74	0.5	0	
S_09	RG1	J14	0.4392	65	72	0.5	0	
S_10	RG1	J9	0.2533	65	43	0.5	0	
S_11	RG1	J13	0.6049	40	75	0.5	0	
S_12	RG1	J18	0.2079	65	50	0.5	0	
S_13	RG1	J4	1.0086	65	97	0.5	0	
S_14	RG1	J15	1.3757	0	236	0.5	0	
S_15	RG1	J9	0.097	90	3	0.5	0	
S_monte	RG1	J10	11.1103	65	470	0.5	0	

[SUBAREAS]							
;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
;;-----							
S_01	0.011	0.13	2	3	0	OUTLET	
S_02	0.011	0.13	2	3	0	OUTLET	
S_03	0.011	0.13	2	3	0	OUTLET	
S_04	0.011	0.13	2	3	0	OUTLET	
S_05	0.011	0.13	2	3	0	OUTLET	
S_06	0.011	0.13	2	3	0	OUTLET	
S_07	0.011	0.13	2	3	0	OUTLET	
S_08	0.011	0.13	2	3	0	OUTLET	
S_09	0.011	0.13	2	3	0	OUTLET	
S_10	0.011	0.13	2	3	0	OUTLET	
S_11	0.011	0.13	2	3	0	OUTLET	
S_12	0.011	0.13	2	3	0	OUTLET	
S_13	0.011	0.13	2	3	0	OUTLET	
S_14	0.011	0.13	2	3	0	OUTLET	
S_15	0.011	0.13	2	3	0	OUTLET	
S_monte	0.011	0.13	2	3	0	OUTLET	

[INFILTRATION]					
;;Subcatchment	MaxRate	MinRate	Decay	DryTime	MaxInfil

;;-----					
S_01	76	13	4.14	7	0
S_02	76	13	4.14	7	0
S_03	76	13	4.14	7	0
S_04	76	13	4.14	7	0
S_05	76	13	4.14	7	0
S_06	76	13	4.14	7	0
S_07	76	13	4.14	7	0
S_08	76	13	4.14	7	0
S_09	76	13	4.14	7	0
S_10	76	13	4.14	7	0
S_11	76	13	4.14	7	0
S_12	76	13	4.14	7	0
S_13	76	13	4.14	7	0
S_14	76	13	4.14	7	0
S_15	76	13	4.14	7	0
S_monte	76	13	4.14	7	0

[JUNCTIONS]					
;;Name	Elevation	MaxDepth	InitDepth	SurDepth	Aponded
;;-----					
J1	22.6	1.74	0	0	0
J2	22.56	1.91	0	0	0
J3	22.6	1.95	0	0	0
J4	22.85	1.48	0	0	0
J5	22.85	1.37	0	0	0
J6	23.09	1.02	0	0	0
J7	22.37	1.86	0	0	0
J8	23.13	1	0	0	0
J9	22.52	2.04	0	0	0
J10	22.65	1.7	0	0	0
J11	22.61	1.68	0	0	0
J12	22.55	1.7	0	0	0
J13	23.12	0.86	0	0	0
J14	22.48	2.02	0	0	0
J17	22.92	1.38	0	0	0
J18	22.55	1.2	0	0	0
J19	22.52	1.75	0	0	0

[STORAGE]							
;;Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params	N/A	Fevap
;;-----							
;;Name	IMD						
;;-----							
J15	22.46	1.60	0	TABULAR	ZonaviaSanzio	0	0

[CONDUITS]								
;;Name	From Node	To Node	Length	Roughness	InOffset	OutOffset	InitFlow	MaxFlow
;;-----								
C1	J1	J2	81.4	0.018	0	0	0	0
C2	J3	J2	74.5	0.014	0	0.31	0	0
C3	J2	J4	89.2	0.018	0	0	0	0
C4	J6	J5	69.1	0.014	0	0	0	0
C5	J5	J4	34.3	0.014	0	0.03	0	0
C7	J8	J17	97.9	0.018	0	0	0	0
C8	J17	J7	49.3	0.018	0	0.33	0	0
C9	J7	J15	31.5	0.018	0	0	0	0
C10	J7	J9	89.9	0.018	0.15	0	0	0
C11	J10	J11	45.8	0.018	0	0.02	0	0
C12	J11	J12	80.2	0.018	0	0.05	0	0
C13	J12	J14	61	0.018	0.05	0	0	0
C14	J14	J9	21.5	0.018	0.05	0	0	0
C15	J9	J16	72.1	0.018	0	0.08	0	0
C16	J18	J14	38.7	0.018	0	0.05	0	0
C17	J13	J12	53.8	0.018	0	0	0	0
C6	J4	J19	61.6	0.018	0	0.2	0	0
C18	J19	J7	6.5	0.018	0	0.15	0	0
C19	J2	J20	20	0.018	0.71	0.71	0	0

[XSECTIONS]							
;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert
;;-----							
C1	CIRCULAR	0.6	0	0	0	1	
C2	CIRCULAR	0.4	0	0	0	1	
C3	EGG	0.75	0	0	0	1	
C4	CIRCULAR	0.4	0	0	0	1	
C5	CIRCULAR	0.6	0	0	0	1	
C7	EGG	0.75	0	0	0	1	
C8	EGG	0.75	0	0	0	1	
C9	CIRCULAR	0.5	0	0	0	1	
C10	EGG	0.9	0	0	0	1	
C11	EGG	1.2	0	0	0	1	
C12	EGG	1.2	0	0	0	1	
C13	EGG	1.2	0	0	0	1	
C14	EGG	1.2	0	0	0	1	
C15	EGG	1.2	0	0	0	1	

C16	EGG	0.75	0	0	0	1
C17	CIRCULAR	0.5	0	0	0	1
C6	EGG	0.75	0	0	0	1
C18	EGG	0.75	0	0	0	1
C19	CIRCULAR	0.4	0	0	0	1

[CURVES]			
;;Name	Type	X-Value	Y-Value
;-----			
ZonaviaSanzio	Storage	0	0
ZonaviaSanzio		0.2	55
ZonaviaSanzio		0.4	145
ZonaviaSanzio		0.6	255
ZonaviaSanzio		0.8	1285
ZonaviaSanzio		1	9875
ZonaviaSanzio		1.2	10965
ZonaviaSanzio		1.4	11115
ZonaviaSanzio		1.6	12565

[TIMESERIES]			
;;Name	Date	Time	Value
;-----			
;TR 20 anni, durata di pioggia 15 minuti			
icTR20TP00.25h		00:00	0
icTR20TP00.25h		00:15	31.02
;			
;TR 20 anni pioggia 30 minuti			
icTR20TP00.50h		00:00	0
icTR20TP00.50h		00:15	20.785
icTR20TP00.50h		00:30	20.785
;			
;TR 20 anni pioggia 1 ora			
icTR20TP01.00h		00:00	0
icTR20TP01.00h		00:15	11.575
icTR20TP01.00h		00:30	11.575
icTR20TP01.00h		00:45	11.575
icTR20TP01.00h		01:00	11.575
;			
icTR200TP00.25h		00:00	0
icTR200TP00.25h		00:15	47.01
;			
icTR200TP00.50h		00:00	0
icTR200TP00.50h		00:15	31.474
icTR200TP00.50h		00:30	31.474
;			
icTR200TP01.00h		00:00	0
icTR200TP01.00h		00:15	17.544
icTR200TP01.00h		00:30	17.544
icTR200TP01.00h		00:45	17.544
icTR200TP01.00h		01:00	17.544

[REPORT]  
;;Reporting Options  
INPUT YES  
CONTROLS NO  
SUBCATCHMENTS ALL  
NODES ALL  
LINKS ALL

STATO ATTUALE

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 15 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
-----			
RG1	icTR20TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
-----						
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
-----					
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

\*\*\*\*\*  
Cross Section Summary  
\*\*\*\*\*

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
\*\*\*\*\*

\*\*\*\*\*

Analysis Options

\*\*\*\*\*

Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity hectare-m mm

Total Precipitation .....	0.645	31.020
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.215	10.341
Surface Runoff .....	0.405	19.486
Final Storage .....	0.026	1.231
Continuity Error (%) .....	-0.122	

\*\*\*\*\* Volume Volume

Flow Routing Continuity	hectare-m	10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.405	4.051
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.250	2.495
Flooding Loss .....	0.152	1.516
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.031
Continuity Error (%) .....	0.203	

\*\*\*\*\*

Highest Continuity Errors

\*\*\*\*\*  
Node J3 (56.74%)  
Node J2 (4.68%)  
Node J17 (1.29%)

\*\*\*\*\*

Time-Step Critical Elements

\*\*\*\*\*  
Link C18 (46.35%)  
Link C14 (5.81%)  
Link C19 (2.16%)

\*\*\*\*\*

Highest Flow Instability Indexes

\*\*\*\*\*  
Link C16 (3)  
Link C2 (2)  
Link C18 (2)  
Link C1 (2)  
Link C5 (2)

\*\*\*\*\*

Routing Time Step Summary

\*\*\*\*\*

Minimum Time Step	:	0.44 sec
Average Time Step	:	3.54 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.18
Percent Not Converging	:	1.26

\*\*\*\*\*

Subcatchment Runoff Summary

\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	31.02	0.00	0.00	7.85	21.94	0.06	0.08	0.707
S_02	31.02	0.00	0.00	7.92	21.87	0.10	0.13	0.705
S_03	31.02	0.00	0.00	8.27	21.50	0.17	0.22	0.693
S_04	31.02	0.00	0.00	8.46	21.31	0.26	0.33	0.687
S_05	31.02	0.00	0.00	8.58	21.18	0.12	0.15	0.683
S_06	31.02	0.00	0.00	8.02	21.76	0.21	0.27	0.702
S_07	31.02	0.00	0.00	8.18	21.60	0.13	0.17	0.696
S_08	31.02	0.00	0.00	8.74	21.01	0.16	0.20	0.677
S_09	31.02	0.00	0.00	8.20	21.57	0.09	0.12	0.695
S_10	31.02	0.00	0.00	8.17	21.61	0.05	0.07	0.697
S_11	31.02	0.00	0.00	15.48	14.78	0.09	0.11	0.476
S_12	31.02	0.00	0.00	7.82	21.97	0.05	0.06	0.708
S_13	31.02	0.00	0.00	8.75	21.00	0.21	0.26	0.677
S_14	31.02	0.00	0.00	26.32	4.71	0.06	0.09	0.152
S_15	31.02	0.00	0.00	2.47	26.61	0.03	0.02	0.858



S\_monte 31.02 0.00 0.00 9.52 20.18 2.24 2.49 0.650

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.45	1.74	24.34	0 00:22	0.46
J2	JUNCTION	0.49	1.91	24.47	0 00:22	0.46
J3	JUNCTION	0.45	1.95	24.55	0 00:21	0.45
J4	JUNCTION	0.21	1.48	24.33	0 00:22	0.37
J5	JUNCTION	0.21	1.37	24.22	0 00:22	0.37
J6	JUNCTION	0.10	1.02	24.11	0 00:22	0.31
J7	JUNCTION	0.54	1.73	24.10	0 00:22	0.44
J8	JUNCTION	0.09	1.00	24.13	0 00:22	0.30
J9	JUNCTION	0.38	1.25	23.77	0 00:23	0.38
J10	JUNCTION	0.35	1.70	24.35	0 00:19	0.52
J11	JUNCTION	0.37	1.68	24.29	0 00:19	0.51
J12	JUNCTION	0.39	1.51	24.06	0 00:23	0.46
J13	JUNCTION	0.08	0.86	23.98	0 00:20	0.26
J14	JUNCTION	0.43	1.36	23.84	0 00:23	0.41
J17	JUNCTION	0.16	1.38	24.30	0 00:22	0.30
J18	JUNCTION	0.36	1.20	23.75	0 00:20	0.37
J19	JUNCTION	0.40	1.63	24.15	0 00:22	0.40
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.44	0.88	23.34	0 00:46	0.27

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.081	0.091	0 00:20	0.0631	0.0651	8.800
J2	JUNCTION	0.128	0.328	0 00:22	0.0998	0.219	4.915
J3	JUNCTION	0.000	0.133	0 00:21	0	0.00546	131.177
J4	JUNCTION	0.258	0.362	0 00:22	0.212	0.353	0.508
J5	JUNCTION	0.000	0.174	0 00:22	0	0.106	-0.165
J6	JUNCTION	0.219	0.219	0 00:30	0.174	0.174	-0.137
J7	JUNCTION	0.000	0.608	0 00:21	0	1.08	-0.105
J8	JUNCTION	0.327	0.327	0 00:30	0.263	0.263	-0.435
J9	JUNCTION	0.093	1.369	0 00:20	0.0805	2.43	0.214
J10	JUNCTION	2.753	2.753	0 00:30	2.45	2.45	0.263
J11	JUNCTION	0.317	1.236	0 00:20	0.253	1.54	0.353
J12	JUNCTION	0.196	1.342	0 00:20	0.161	1.72	0.091
J13	JUNCTION	0.112	0.212	0 00:30	0.0893	0.141	-0.579
J14	JUNCTION	0.119	1.390	0 00:20	0.0947	1.78	0.009
J17	JUNCTION	0.000	0.251	0 00:22	0	0.222	1.305
J18	JUNCTION	0.059	0.257	0 00:30	0.0457	0.144	-0.273
J19	JUNCTION	0.000	0.281	0 00:30	0	0.293	-0.918
J16	OUTFALL	0.000	1.082	0 00:30	0	2.33	0.000
J20	OUTFALL	0.000	0.256	0 00:22	0	0.166	0.000
J15	STORAGE	0.094	0.490	0 00:22	0.0648	0.474	-0.494

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	0.85	1.140	0.000
J2	JUNCTION	0.17	0.800	0.000
J3	JUNCTION	1.54	1.550	0.000
J4	JUNCTION	0.22	0.730	0.000
J5	JUNCTION	0.31	0.770	0.000
J6	JUNCTION	0.32	0.620	0.000
J7	JUNCTION	0.31	0.650	0.130
J8	JUNCTION	0.15	0.250	0.000
J9	JUNCTION	0.13	0.049	0.791
J10	JUNCTION	0.32	0.500	0.000
J11	JUNCTION	0.31	0.460	0.000
J12	JUNCTION	0.28	0.256	0.194

J13	JUNCTION	0.33	0.360	0.000
J14	JUNCTION	0.21	0.111	0.659
J17	JUNCTION	0.18	0.630	0.000
J18	JUNCTION	0.47	0.450	0.000
J19	JUNCTION	0.29	0.677	0.123
J15	STORAGE	1.51	0.382	0.718

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.01	0.020	0 00:22	0.000	0.000
J2	0.01	0.192	0 00:22	0.001	0.000
J3	0.01	0.111	0 00:21	0.000	0.000
J4	0.01	0.202	0 00:22	0.001	0.000
J5	0.01	0.035	0 00:22	0.000	0.000
J6	0.15	0.174	0 00:30	0.068	0.000
J8	0.13	0.124	0 00:22	0.041	0.000
J10	0.27	2.193	0 00:30	1.158	0.000
J11	0.07	0.174	0 00:19	0.005	0.000
J13	0.24	0.212	0 00:30	0.115	0.000
J17	0.01	0.134	0 00:22	0.000	0.000
J18	0.20	0.257	0 00:30	0.127	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.105	1	0	0	0.467	6	0 00:46	0.147

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Flow Volume 10^6 ltr
J16	96.74	0.164	1.082	2.330
J20	10.09	0.107	0.256	0.166
System	53.41	0.271	1.313	2.495

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.081	0 00:30	0.29	0.82	1.00
C2	CONDUIT	0.133	0 00:21	1.09	1.14	1.00
C3	CONDUIT	0.156	0 00:22	0.68	0.62	1.00
C4	CONDUIT	0.174	0 00:22	1.38	1.53	1.00
C5	CONDUIT	0.171	0 00:22	0.67	1.01	1.00
C7	CONDUIT	0.251	0 00:22	1.08	1.23	1.00
C8	CONDUIT	0.222	0 00:31	1.10	0.76	1.00
C9	CONDUIT	0.471	0 00:22	2.40	3.23	1.00
C10	CONDUIT	0.392	0 00:21	1.02	29.77	1.00
C11	CONDUIT	1.042	0 00:20	1.42	3.24	1.00
C12	CONDUIT	1.237	0 00:20	1.73	7.19	1.00
C13	CONDUIT	1.264	0 00:20	1.82	1.85	1.00
C14	CONDUIT	1.312	0 00:20	2.59	3.95	1.00
C15	CONDUIT	1.082	0 00:30	1.71	4.22	0.82
C16	CONDUIT	0.199	0 00:30	0.69	1.99	1.00
C17	CONDUIT	0.128	0 00:20	0.66	0.45	1.00
C6	CONDUIT	0.281	0 00:30	0.98	1.39	1.00
C18	CONDUIT	0.281	0 00:30	0.98	9.32	1.00
C19	CONDUIT	0.256	0 00:22	2.08	43.53	0.95

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.74	0.00	
C5	1.00	0.03	0.00	0.00	0.86	0.00	0.11	0.00	0.00	0.00	
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.62	0.00	
C8	1.00	0.03	0.00	0.00	0.60	0.00	0.00	0.37	0.18	0.00	
C9	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C13	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.42	0.00	
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	
C16	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.82	0.00	
C6	1.00	0.03	0.00	0.00	0.57	0.00	0.00	0.40	0.08	0.00	
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C19	1.00	0.89	0.00	0.00	0.00	0.00	0.00	0.11	0.00	0.00	

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow		
C1	0.85	0.85	1.05	0.01		0.01
C2	0.56	0.56	1.54	0.01		0.01
C3	0.22	0.22	0.45	0.01		0.01
C4	0.32	0.32	0.64	0.05		0.04
C5	0.29	0.29	0.31	0.01		0.01
C7	0.15	0.15	0.18	0.16		0.14
C8	0.18	0.18	0.31	0.01		0.01
C9	1.51	1.51	1.75	0.49		0.14
C10	0.33	0.33	0.34	2.03		0.16
C11	0.31	0.32	0.31	0.44		0.31
C12	0.28	0.32	0.28	0.56		0.28
C13	0.25	0.28	0.25	0.32		0.25
C14	0.13	0.21	0.13	0.45		0.13
C15	0.01	0.13	0.01	0.73		0.01
C16	0.47	0.47	0.49	0.15		0.01
C17	0.33	0.33	1.21	0.01		0.01
C6	0.22	0.22	0.29	0.15		0.15
C18	0.55	0.55	0.55	0.45		0.38
C19	0.01	0.17	0.01	0.37		0.01

Analysis begun on: Fri Jul 08 17:33:36 2016  
Analysis ended on: Fri Jul 08 17:33:37 2016  
Total elapsed time: 00:00:01

STATO ATTUALE

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.865	41.570
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.268	12.859
Surface Runoff .....	0.572	27.502
Final Storage .....	0.026	1.233
Continuity Error (%) .....	-0.059	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.572	5.721
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.369	3.686
Flooding Loss .....	0.200	1.999
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.032
Continuity Error (%) .....	0.060	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (61.85%)  
Node J2 (3.17%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C18 (31.99%)  
Link C14 (16.62%)  
Link C19 (2.69%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C16 (4)  
Link C2 (3)  
Link C18 (3)  
Link C1 (2)  
Link C5 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 3.63 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.18  
Percent Not Converging : 1.53

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	41.57	0.00	0.00	9.84	30.48	0.09	0.06	0.733
S_02	41.57	0.00	0.00	9.91	30.40	0.14	0.09	0.731
S_03	41.57	0.00	0.00	10.28	30.02	0.24	0.16	0.722
S_04	41.57	0.00	0.00	10.48	29.82	0.37	0.24	0.717
S_05	41.57	0.00	0.00	10.62	29.67	0.17	0.11	0.714
S_06	41.57	0.00	0.00	10.01	30.30	0.29	0.19	0.729
S_07	41.57	0.00	0.00	10.17	30.13	0.18	0.12	0.725
S_08	41.57	0.00	0.00	10.81	29.47	0.23	0.14	0.709
S_09	41.57	0.00	0.00	10.20	30.10	0.13	0.09	0.724
S_10	41.57	0.00	0.00	10.16	30.14	0.08	0.05	0.725
S_11	41.57	0.00	0.00	19.16	21.63	0.13	0.09	0.520
S_12	41.57	0.00	0.00	9.81	30.51	0.06	0.04	0.734
S_13	41.57	0.00	0.00	10.82	29.46	0.30	0.19	0.709
S_14	41.57	0.00	0.00	32.62	8.95	0.12	0.11	0.215
S_15	41.57	0.00	0.00	3.05	36.56	0.04	0.02	0.879
S_monte	41.57	0.00	0.00	11.87	28.37	3.15	1.91	0.682

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.54	1.53	24.13	0 00:25	0.41
J2	JUNCTION	0.58	1.62	24.18	0 00:25	0.42
J3	JUNCTION	0.54	1.95	24.55	0 00:23	0.41
J4	JUNCTION	0.30	1.41	24.26	0 00:25	0.34
J5	JUNCTION	0.31	1.31	24.16	0 00:25	0.34
J6	JUNCTION	0.20	1.02	24.11	0 00:24	0.31
J7	JUNCTION	0.63	1.53	23.90	0 00:25	0.43
J8	JUNCTION	0.18	1.00	24.13	0 00:26	0.30
J9	JUNCTION	0.47	1.22	23.74	0 00:45	0.37
J10	JUNCTION	0.51	1.70	24.35	0 00:22	0.52
J11	JUNCTION	0.52	1.67	24.28	0 00:45	0.51
J12	JUNCTION	0.51	1.47	24.02	0 00:22	0.45
J13	JUNCTION	0.18	0.86	23.98	0 00:22	0.26
J14	JUNCTION	0.52	1.32	23.80	0 00:45	0.40
J17	JUNCTION	0.24	1.38	24.30	0 00:25	0.30
J18	JUNCTION	0.45	1.20	23.75	0 00:25	0.37
J19	JUNCTION	0.49	1.39	23.91	0 00:25	0.39
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.48	0.93	23.39	0 01:00	0.28

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.058	0.067	0 00:21	0.0897	6.177	
J2	JUNCTION	0.092	0.244	0 00:25	0.139	0.335	3.269
J3	JUNCTION	0.000	0.108	0 00:23	0	0.00574	162.120
J4	JUNCTION	0.189	0.287	0 00:24	0.297	0.531	0.307
J5	JUNCTION	0.000	0.118	0 00:25	0	0.198	-0.151
J6	JUNCTION	0.159	0.159	0 00:45	0.244	0.243	-0.128
J7	JUNCTION	0.000	0.529	0 00:23	0	1.63	-0.044
J8	JUNCTION	0.238	0.238	0 00:45	0.368	0.368	-0.415
J9	JUNCTION	0.070	1.248	0 00:23	0.112	3.51	0.123
J10	JUNCTION	2.100	2.100	0 00:45	3.45	3.45	0.121
J11	JUNCTION	0.230	1.066	0 00:22	0.354	2.24	0.179
J12	JUNCTION	0.144	1.202	0 00:22	0.226	2.49	0.007
J13	JUNCTION	0.089	0.166	0 00:45	0.131	0.21	-0.221
J14	JUNCTION	0.086	1.271	0 00:23	0.132	2.56	0.021
J17	JUNCTION	0.000	0.222	0 00:39	0	0.365	0.832
J18	JUNCTION	0.042	0.204	0 00:45	0.0634	0.232	-0.099
J19	JUNCTION	0.000	0.230	0 00:45	0	0.423	-0.494
J16	OUTFALL	0.000	1.053	0 00:45	0	3.4	0.000
J20	OUTFALL	0.000	0.198	0 00:45	0	0.282	0.000
J15	STORAGE	0.112	0.428	0 00:45	0.123	0.746	-0.335

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.32	0.935	0.205
J2	JUNCTION	0.37	0.509	0.291
J3	JUNCTION	2.13	1.550	0.000
J4	JUNCTION	0.43	0.661	0.069
J5	JUNCTION	0.53	0.707	0.063
J6	JUNCTION	0.50	0.620	0.000
J7	JUNCTION	0.51	0.454	0.326
J8	JUNCTION	0.33	0.250	0.000
J9	JUNCTION	0.17	0.018	0.822
J10	JUNCTION	0.53	0.500	0.000
J11	JUNCTION	0.52	0.447	0.013
J12	JUNCTION	0.48	0.225	0.225
J13	JUNCTION	0.55	0.360	0.000

J14	JUNCTION	0.41	0.073	0.697
J17	JUNCTION	0.38	0.630	0.000
J18	JUNCTION	0.73	0.450	0.000
J19	JUNCTION	0.50	0.438	0.362
J15	STORAGE	2.10	0.427	0.673

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.101	0 00:23	0.000	0.000
J6	0.34	0.069	0 00:45	0.046	0.000
J8	0.11	0.057	0 00:26	0.004	0.000
J10	0.46	1.468	0 00:45	1.560	0.000
J13	0.43	0.166	0 00:45	0.174	0.000
J17	0.01	0.087	0 00:25	0.000	0.000
J18	0.39	0.204	0 00:45	0.214	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.148	2	0	0	0.730	9	0 01:00	0.170

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.54	0.264	1.053	3.404
J20	22.23	0.132	0.198	0.282
System	59.38	0.396	1.251	3.686

\*\*\*\*\*  
Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.058	0 00:45	0.20	0.59	1.00
C2	CONDUIT	0.108	0 00:23	0.99	0.93	1.00
C3	CONDUIT	0.133	0 00:25	0.60	0.53	1.00
C4	CONDUIT	0.118	0 00:25	0.95	1.03	1.00
C5	CONDUIT	0.127	0 00:25	0.53	0.75	1.00
C7	CONDUIT	0.222	0 00:39	0.93	1.09	1.00
C8	CONDUIT	0.221	0 00:39	1.03	0.75	1.00
C9	CONDUIT	0.406	0 00:25	2.07	2.78	1.00
C10	CONDUIT	0.373	0 00:23	0.96	28.34	1.00
C11	CONDUIT	0.917	0 00:22	1.25	2.85	1.00
C12	CONDUIT	1.066	0 00:22	1.45	6.20	1.00
C13	CONDUIT	1.183	0 00:23	1.67	1.73	1.00
C14	CONDUIT	1.207	0 00:23	2.00	3.63	1.00
C15	CONDUIT	1.053	0 00:45	1.68	4.10	0.82
C16	CONDUIT	0.163	0 00:45	0.57	1.62	1.00
C17	CONDUIT	0.077	0 00:45	0.48	0.28	1.00
C6	CONDUIT	0.230	0 00:45	0.80	1.14	1.00
C18	CONDUIT	0.230	0 00:45	0.80	7.62	1.00
C19	CONDUIT	0.198	0 00:45	1.66	33.75	0.90

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Up Dry	Down Dry	Fraction of Sub Dry	Time in Flow Class Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.64
C5	1.00	0.03	0.00	0.00	0.93	0.00	0.04	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.54
C8	1.00	0.03	0.00	0.00	0.65	0.00	0.00	0.31	0.17
C9	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.33
C14	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.77
C6	1.00	0.03	0.00	0.00	0.62	0.00	0.00	0.34	0.08
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00
C19	1.00	0.77	0.00	0.00	0.00	0.00	0.23	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full Both Ends	Hours Full Upstream	Hours Full Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	1.32	1.32	1.63	0.01	0.01
C2	0.86	0.86	2.13	0.01	0.01
C3	0.43	0.43	0.75	0.01	0.01
C4	0.51	0.51	0.95	0.02	0.03
C5	0.51	0.51	0.53	0.01	0.01
C7	0.33	0.33	0.38	0.21	0.21
C8	0.38	0.38	0.51	0.01	0.01
C9	2.10	2.10	2.33	1.31	0.76
C10	0.53	0.54	0.56	2.62	0.39
C11	0.52	0.53	0.52	0.67	0.52
C12	0.48	0.53	0.48	0.81	0.48
C13	0.45	0.48	0.45	0.54	0.45
C14	0.17	0.41	0.17	0.68	0.17
C15	0.01	0.17	0.01	1.02	0.01
C16	0.73	0.73	0.76	0.30	0.01
C17	0.55	0.55	1.76	0.01	0.01
C6	0.43	0.43	0.50	0.31	0.32
C18	0.86	0.86	0.87	0.65	0.58
C19	0.01	0.37	0.01	0.60	0.01

Analysis begun on: Fri Jul 08 17:35:19 2016  
Analysis ended on: Fri Jul 08 17:35:20 2016  
Total elapsed time: 00:00:01

## STATO ATTUALE

### TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 60 MINUTI

### CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

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Element Count  
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Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Rainage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	65.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.963	46.300
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.316	15.168
Surface Runoff .....	0.622	29.905
Final Storage .....	0.026	1.237
Continuity Error (%) .....	-0.023	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.622	6.222
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.522	5.218
Flooding Loss .....	0.097	0.970
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.034
Continuity Error (%) .....	0.005	

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Highest Continuity Errors

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Node J3 (64.96%)  
Node J2 (2.66%)

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Time-Step Critical Elements

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Link C18 (30.72%)  
Link C14 (26.23%)

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Highest Flow Instability Indexes

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Link C16 (5)  
Link C2 (3)  
Link C1 (3)  
Link C18 (3)  
Link C17 (2)

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Routing Time Step Summary

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Minimum Time Step : 0.35 sec  
Average Time Step : 3.48 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.14  
Percent Not Converging : 0.68

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	46.30	0.00	0.00	12.06	32.96	0.09	0.03	0.712
S_02	46.30	0.00	0.00	12.12	32.90	0.15	0.05	0.711
S_03	46.30	0.00	0.00	12.43	32.58	0.26	0.09	0.704
S_04	46.30	0.00	0.00	12.60	32.41	0.40	0.13	0.700
S_05	46.30	0.00	0.00	12.72	32.28	0.18	0.06	0.697
S_06	46.30	0.00	0.00	12.20	32.81	0.32	0.11	0.709
S_07	46.30	0.00	0.00	12.34	32.67	0.20	0.07	0.706
S_08	46.30	0.00	0.00	12.89	32.11	0.25	0.08	0.693
S_09	46.30	0.00	0.00	12.36	32.65	0.14	0.05	0.705
S_10	46.30	0.00	0.00	12.33	32.68	0.08	0.03	0.706
S_11	46.30	0.00	0.00	22.64	22.87	0.14	0.05	0.494
S_12	46.30	0.00	0.00	12.03	32.99	0.07	0.02	0.712
S_13	46.30	0.00	0.00	12.89	32.10	0.32	0.11	0.693
S_14	46.30	0.00	0.00	38.34	7.96	0.11	0.07	0.172
S_15	46.30	0.00	0.00	3.65	40.66	0.04	0.01	0.878
S_monte	46.30	0.00	0.00	13.82	31.13	3.46	1.10	0.672

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Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.59	1.74	24.34	0 00:28	0.35
J2	JUNCTION	0.63	1.18	23.74	0 01:15	0.36
J3	JUNCTION	0.58	1.95	24.55	0 00:27	0.35
J4	JUNCTION	0.35	0.91	23.76	0 01:15	0.28
J5	JUNCTION	0.36	0.92	23.77	0 01:15	0.28
J6	JUNCTION	0.23	1.02	24.11	0 00:30	0.25
J7	JUNCTION	0.72	1.31	23.68	0 01:15	0.40
J8	JUNCTION	0.20	0.68	23.81	0 01:15	0.21
J9	JUNCTION	0.56	1.16	23.68	0 01:15	0.35
J10	JUNCTION	0.64	1.70	24.35	0 00:32	0.52
J11	JUNCTION	0.65	1.63	24.24	0 01:15	0.50
J12	JUNCTION	0.62	1.43	23.98	0 01:15	0.44
J13	JUNCTION	0.24	0.86	23.98	0 00:34	0.26
J14	JUNCTION	0.62	1.28	23.76	0 01:15	0.39
J17	JUNCTION	0.29	0.81	23.73	0 01:15	0.25
J18	JUNCTION	0.55	1.20	23.75	0 00:40	0.37
J19	JUNCTION	0.58	1.17	23.69	0 01:15	0.36
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.58	0.97	23.43	0 01:26	0.29

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Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.032	0.047	0 00:28	0.0949	0.0976	5.706
J2	JUNCTION	0.051	0.138	0 01:15	0.15	0.416	2.737
J3	JUNCTION	0.000	0.071	0 00:27	0	0.00569	185.428
J4	JUNCTION	0.108	0.197	0 01:15	0.324	0.623	0.239
J5	JUNCTION	0.000	0.090	0 01:15	0	0.265	0.150
J6	JUNCTION	0.090	0.090	0 01:15	0.264	0.264	-0.175
J7	JUNCTION	0.000	0.341	0 00:27	0	2.13	0.029
J8	JUNCTION	0.135	0.135	0 01:15	0.4	0.4	-0.327
J9	JUNCTION	0.040	1.068	0 00:32	0.122	5.11	0.062
J10	JUNCTION	1.207	1.207	0 01:15	3.78	3.78	0.056
J11	JUNCTION	0.130	0.910	0 00:32	0.385	3.4	0.016
J12	JUNCTION	0.082	1.001	0 00:32	0.246	3.7	0.033
J13	JUNCTION	0.052	0.075	0 01:15	0.138	0.155	-0.210
J14	JUNCTION	0.049	1.055	0 00:32	0.143	3.85	0.033
J17	JUNCTION	0.000	0.134	0 01:15	0	0.401	0.710
J18	JUNCTION	0.023	0.090	0 01:15	0.0686	0.138	-0.105
J19	JUNCTION	0.000	0.143	0 01:15	0	0.453	-0.348
J16	OUTFALL	0.000	0.978	0 01:15	0	4.86	0.000
J20	OUTFALL	0.000	0.138	0 01:15	0	0.362	0.000
J15	STORAGE	0.074	0.330	0 01:15	0.11	1.04	-0.275

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Node Surge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	2.00	1.140	0.000
J2	JUNCTION	0.58	0.073	0.727
J3	JUNCTION	2.88	1.550	0.000
J4	JUNCTION	0.77	0.157	0.573
J5	JUNCTION	0.89	0.315	0.455
J6	JUNCTION	0.87	0.620	0.000
J7	JUNCTION	0.87	0.235	0.545
J10	JUNCTION	0.87	0.500	0.000
J11	JUNCTION	0.86	0.413	0.047
J12	JUNCTION	0.80	0.184	0.266
J13	JUNCTION	0.89	0.360	0.000
J14	JUNCTION	0.73	0.029	0.741
J17	JUNCTION	0.61	0.061	0.569
J18	JUNCTION	1.13	0.450	0.000

J19	JUNCTION	0.86	0.222	0.578
J15	STORAGE	2.86	0.465	0.635

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.01	0.035	0 00:28	0.000	0.000
J3	0.01	0.061	0 00:27	0.000	0.000
J6	0.01	0.022	0 00:30	0.000	0.000
J10	0.76	0.461	0 01:15	0.759	0.000
J13	0.73	0.075	0 01:15	0.102	0.000
J18	0.62	0.090	0 01:15	0.108	0.000

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Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.271	3	0	0	1.018	13	0 01:26	0.186

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.37	0.337	0.978	4.856
J20	30.59	0.100	0.138	0.362
System	63.48	0.436	1.116	5.218

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.032	0 01:15	0.16	0.33	1.00
C2	CONDUIT	0.071	0 00:27	0.89	0.61	1.00
C3	CONDUIT	0.066	0 00:27	0.48	0.26	1.00
C4	CONDUIT	0.090	0 01:15	0.81	0.79	1.00
C5	CONDUIT	0.090	0 01:15	0.43	0.53	1.00
C7	CONDUIT	0.134	0 01:15	0.77	0.66	0.96
C8	CONDUIT	0.136	0 01:15	0.96	0.46	1.00
C9	CONDUIT	0.319	0 00:34	1.62	2.19	1.00
C10	CONDUIT	0.265	0 00:30	0.74	20.14	1.00
C11	CONDUIT	0.813	0 00:32	1.11	2.52	1.00
C12	CONDUIT	0.910	0 00:32	1.24	5.29	1.00
C13	CONDUIT	1.001	0 00:32	1.36	1.47	1.00
C14	CONDUIT	1.041	0 00:32	1.50	3.13	0.98
C15	CONDUIT	0.978	0 01:15	1.62	3.81	0.79
C16	CONDUIT	0.067	0 01:15	0.24	0.66	1.00
C17	CONDUIT	0.035	0 00:28	0.37	0.13	1.00
C6	CONDUIT	0.143	0 01:15	0.67	0.71	1.00
C18	CONDUIT	0.143	0 01:15	0.63	4.73	1.00
C19	CONDUIT	0.138	0 01:15	1.23	23.55	0.84

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Up Dry	Down Dry	Fraction of Time in Flow Class	Time in Flow Class	Flow Class	Norm	Inlet

C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00
C2	1.00	0.05	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.02	0.00
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.52	0.00
C5	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.41	0.00
C8	1.00	0.03	0.00	0.00	0.75	0.00	0.00	0.21	0.17	0.00
C9	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.95	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.20	0.00
C14	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.68	0.00
C6	1.00	0.03	0.00	0.00	0.72	0.00	0.00	0.24	0.07	0.00
C18	1.00	0.03	0.00	0.00	0.95	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.69	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00

\*\*\*\*\*  
Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	----- Hours Full -----			Hours	Hours
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	2.00	2.00	2.37	0.01	0.01
C2	1.31	1.31	2.88	0.01	0.01
C3	0.77	0.77	1.17	0.01	0.01
C4	0.87	0.87	1.43	0.01	0.01
C5	0.86	0.86	0.89	0.01	0.01
C7	0.01	0.01	0.61	0.01	0.01
C8	0.61	0.61	0.87	0.01	0.01
C9	2.86	2.86	3.10	2.14	1.21
C10	0.89	0.91	0.91	3.25	0.34
C11	0.86	0.87	0.86	1.05	0.86
C12	0.80	0.87	0.80	1.22	0.80
C13	0.77	0.80	0.77	0.89	0.77
C14	0.01	0.73	0.01	1.07	0.01
C15	0.01	0.01	0.01	1.46	0.01
C16	1.13	1.13	1.16	0.01	0.01
C17	0.89	0.89	2.51	0.01	0.01
C6	0.77	0.77	0.86	0.01	0.01
C18	1.31	1.31	1.31	0.99	0.96
C19	0.01	0.58	0.01	1.01	0.01

Analysis begun on: Fri Jul 08 17:36:39 2016  
Analysis ended on: Fri Jul 08 17:36:40 2016  
Total elapsed time: 00:00:01

## STATO ATTUALE

## TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 15 MINUTI

## CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Rainage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	



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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... DYNWAVE

Starting Date ..... JUN-20-2016 00:00:00

Ending Date ..... JUN-20-2016 06:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:01:00

Wet Time Step ..... 00:01:00

Dry Time Step ..... 00:01:00

Routing Time Step ..... 5.00 sec

Variable Time Step ..... YES

Maximum Trials ..... 8

Number of Threads ..... 1

Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity hectare-m mm

Total Precipitation .....	0.978	47.010
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.247	11.861
Surface Runoff .....	0.707	33.990
Final Storage .....	0.026	1.231
Continuity Error (%) .....	-0.155	

\*\*\*\*\* Volume Volume

Flow Routing Continuity .....	hectare-m	10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.707	7.070
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.324	3.235
Flooding Loss .....	0.379	3.794
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.003	0.032
Continuity Error (%) .....	0.125	

\*\*\*\*\*

Highest Continuity Errors

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Node J3 (53.32%)

Node J2 (3.11%)

Node J17 (1.29%)

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Time-Step Critical Elements

\*\*\*\*\*

Link C18 (34.10%)

Link C14 (7.35%)

Link C19 (4.06%)

\*\*\*\*\*

Highest Flow Instability Indexes

\*\*\*\*\*

Link C16 (3)

Link C2 (2)

Link C18 (2)

Link C5 (2)

Link C1 (1)

\*\*\*\*\*

Routing Time Step Summary

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Minimum Time Step : 0.47 sec

Average Time Step : 3.93 sec

Maximum Time Step : 5.00 sec

Percent in Steady State : 0.00

Average Iterations per Step : 2.20

Percent Not Converging : 1.44

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	47.01	0.00	0.00	8.34	37.51	0.11	0.13	0.798
S_02	47.01	0.00	0.00	8.44	37.41	0.17	0.21	0.796
S_03	47.01	0.00	0.00	8.96	36.86	0.30	0.37	0.784
S_04	47.01	0.00	0.00	9.24	36.56	0.45	0.55	0.778
S_05	47.01	0.00	0.00	9.44	36.35	0.21	0.25	0.773
S_06	47.01	0.00	0.00	8.58	37.26	0.36	0.45	0.793
S_07	47.01	0.00	0.00	8.81	37.01	0.23	0.28	0.787
S_08	47.01	0.00	0.00	9.72	36.06	0.28	0.33	0.767
S_09	47.01	0.00	0.00	8.85	36.97	0.16	0.20	0.786
S_10	47.01	0.00	0.00	8.80	37.03	0.09	0.12	0.788
S_11	47.01	0.00	0.00	17.56	28.73	0.17	0.21	0.611
S_12	47.01	0.00	0.00	8.29	37.56	0.08	0.10	0.799
S_13	47.01	0.00	0.00	9.73	36.05	0.36	0.43	0.767
S_14	47.01	0.00	0.00	30.26	16.77	0.23	0.27	0.357
S_15	47.01	0.00	0.00	2.72	42.36	0.04	0.04	0.901

S\_monte 47.01 0.00 0.00 11.26 34.45 3.83 4.21 0.733

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.48	1.74	24.34	0 00:19	0.53
J2	JUNCTION	0.52	1.91	24.47	0 00:20	0.53
J3	JUNCTION	0.47	1.95	24.55	0 00:20	0.51
J4	JUNCTION	0.24	1.48	24.33	0 00:20	0.43
J5	JUNCTION	0.24	1.37	24.22	0 00:20	0.42
J6	JUNCTION	0.13	1.02	24.11	0 00:18	0.31
J7	JUNCTION	0.56	1.80	24.17	0 00:20	0.47
J8	JUNCTION	0.11	1.00	24.13	0 00:19	0.30
J9	JUNCTION	0.39	1.38	23.90	0 00:20	0.41
J10	JUNCTION	0.38	1.70	24.35	0 00:18	0.52
J11	JUNCTION	0.39	1.68	24.29	0 00:18	0.51
J12	JUNCTION	0.41	1.58	24.13	0 00:20	0.48
J13	JUNCTION	0.11	0.86	23.98	0 00:19	0.26
J14	JUNCTION	0.44	1.48	23.96	0 00:20	0.44
J17	JUNCTION	0.17	1.38	24.30	0 00:20	0.32
J18	JUNCTION	0.37	1.20	23.75	0 00:19	0.37
J19	JUNCTION	0.42	1.70	24.22	0 00:20	0.43
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.45	0.92	23.38	0 00:49	0.28

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.134	0.134	0 00:30	0.108	0.109	4.864
J2	JUNCTION	0.212	0.428	0 00:19	0.171	0.331	3.209
J3	JUNCTION	0.000	0.150	0 00:20	0	0.00568	114.232
J4	JUNCTION	0.432	0.499	0 00:30	0.364	0.507	0.622
J5	JUNCTION	0.000	0.206	0 00:19	0	0.143	-0.277
J6	JUNCTION	0.365	0.442	0 00:30	0.299	0.339	-0.109
J7	JUNCTION	0.000	0.728	0 00:20	0	1.45	-0.189
J8	JUNCTION	0.546	0.546	0 00:30	0.451	0.451	-0.202
J9	JUNCTION	0.157	1.532	0 00:19	0.135	3.07	0.192
J10	JUNCTION	4.654	4.654	0 00:30	4.19	4.19	0.202
J11	JUNCTION	0.528	1.451	0 00:18	0.435	1.94	0.349
J12	JUNCTION	0.328	1.487	0 00:18	0.276	2.07	-0.000
J13	JUNCTION	0.206	0.340	0 00:30	0.174	0.268	-0.282
J14	JUNCTION	0.199	1.491	0 00:19	0.162	2.16	-0.012
J17	JUNCTION	0.000	0.364	0 00:20	0	0.266	1.302
J18	JUNCTION	0.097	0.365	0 00:30	0.0781	0.261	-0.182
J19	JUNCTION	0.000	0.334	0 00:24	0	0.384	-0.948
J16	OUTFALL	0.000	1.160	0 00:30	0	2.98	0.000
J20	OUTFALL	0.000	0.284	0 00:20	0	0.252	0.000
J15	STORAGE	0.267	0.631	0 00:30	0.231	0.72	-0.334

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.18	1.140	0.000
J2	JUNCTION	0.24	0.800	0.000
J3	JUNCTION	1.97	1.550	0.000
J4	JUNCTION	0.30	0.730	0.000
J5	JUNCTION	0.41	0.770	0.000
J6	JUNCTION	0.42	0.620	0.000
J7	JUNCTION	0.41	0.722	0.058
J8	JUNCTION	0.24	0.250	0.000
J9	JUNCTION	0.20	0.177	0.663
J10	JUNCTION	0.41	0.500	0.000
J11	JUNCTION	0.40	0.460	0.000
J12	JUNCTION	0.36	0.331	0.119

J13	JUNCTION	0.42	0.360	0.000
J14	JUNCTION	0.29	0.230	0.540
J17	JUNCTION	0.25	0.630	0.000
J18	JUNCTION	0.60	0.450	0.000
J19	JUNCTION	0.39	0.755	0.045
J15	STORAGE	1.94	0.423	0.677

\*\*\*\*\*  
Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.05	0.085	0 00:19	0.002	0.000
J2	0.01	0.220	0 00:20	0.001	0.000
J3	0.01	0.132	0 00:20	0.001	0.000
J4	0.01	0.262	0 00:20	0.002	0.000
J5	0.12	0.092	0 00:30	0.022	0.000
J6	0.24	0.442	0 00:30	0.257	0.000
J8	0.21	0.359	0 00:30	0.186	0.000
J10	0.35	4.092	0 00:30	2.676	0.000
J11	0.20	0.397	0 00:18	0.167	0.000
J13	0.32	0.340	0 00:30	0.236	0.000
J17	0.01	0.148	0 00:20	0.001	0.000
J18	0.27	0.365	0 00:30	0.244	0.000

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Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.133	2	0	0	0.701	9	0 00:49	0.169

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Flow Volume 10^6 ltr
J16	96.52	0.186	1.160	2.983
J20	14.63	0.119	0.284	0.252
System	55.58	0.306	1.433	3.235

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.131	0 00:28	0.46	1.33	1.00
C2	CONDUIT	0.150	0 00:20	1.21	1.29	1.00
C3	CONDUIT	0.177	0 00:19	0.77	0.71	1.00
C4	CONDUIT	0.206	0 00:19	1.64	1.81	1.00
C5	CONDUIT	0.196	0 00:19	0.93	1.16	1.00
C7	CONDUIT	0.364	0 00:20	1.36	1.79	1.00
C8	CONDUIT	0.266	0 00:20	1.20	0.91	1.00
C9	CONDUIT	0.527	0 00:20	2.80	3.61	1.00
C10	CONDUIT	0.397	0 00:20	1.02	30.17	1.00
C11	CONDUIT	1.209	0 00:18	1.65	3.76	1.00
C12	CONDUIT	1.344	0 00:18	1.90	7.81	1.00
C13	CONDUIT	1.308	0 00:19	1.90	1.91	1.00
C14	CONDUIT	1.449	0 00:19	2.88	4.36	1.00
C15	CONDUIT	1.160	0 00:30	1.81	4.52	0.83
C16	CONDUIT	0.268	0 00:30	0.93	2.68	1.00
C17	CONDUIT	0.135	0 00:30	0.69	0.48	1.00
C6	CONDUIT	0.334	0 00:24	1.16	1.65	1.00
C18	CONDUIT	0.334	0 00:24	1.16	11.09	1.00
C19	CONDUIT	0.284	0 00:20	2.29	48.29	0.96

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.67	0.00	
C5	1.00	0.03	0.00	0.00	0.89	0.00	0.07	0.00	0.00	0.00	
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.57	0.00	
C8	1.00	0.03	0.00	0.00	0.60	0.00	0.00	0.36	0.17	0.00	
C9	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.36	0.00	
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.80	0.00	
C6	1.00	0.03	0.00	0.00	0.57	0.00	0.00	0.40	0.08	0.00	
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C19	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00	

\*\*\*\*\*  
Conduit Surchage Summary  
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Conduit	Hours Full			Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow		
C1	1.18	1.18	1.47	0.17		0.17
C2	0.75	0.75	1.97	0.01		0.01
C3	0.30	0.30	0.63	0.01		0.01
C4	0.42	0.42	0.85	0.04		0.04
C5	0.39	0.39	0.41	0.03		0.02
C7	0.22	0.24	0.25	0.07		0.04
C8	0.25	0.25	0.41	0.01		0.01
C9	1.94	1.94	2.17	1.13		0.71
C10	0.42	0.43	0.43	2.45		0.24
C11	0.40	0.41	0.40	0.53		0.40
C12	0.36	0.40	0.36	0.68		0.36
C13	0.33	0.36	0.33	0.41		0.33
C14	0.20	0.29	0.20	0.55		0.20
C15	0.01	0.20	0.01	0.90		0.01
C16	0.60	0.60	0.64	0.22		0.01
C17	0.42	0.42	1.58	0.01		0.01
C6	0.30	0.30	0.39	0.21		0.20
C18	0.74	0.74	0.74	0.50		0.43
C19	0.01	0.24	0.01	0.48		0.01

Analysis begun on: Fri Jul 08 17:37:50 2016  
Analysis ended on: Fri Jul 08 17:37:51 2016  
Total elapsed time: 00:00:01

STATO ATTUALE

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	1.310	62.948
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.290	13.916
Surface Runoff .....	0.995	47.839
Final Storage .....	0.026	1.233
Continuity Error (%) .....	-0.064	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.995	9.951
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.471	4.714
Flooding Loss .....	0.520	5.199
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.003	0.033
Continuity Error (%) .....	0.056	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (57.84%)  
Node J2 (2.24%)

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Time-Step Critical Elements

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Link C18 (32.45%)  
Link C14 (8.45%)  
Link C19 (7.57%)

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Highest Flow Instability Indexes

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Link C18 (3)  
Link C16 (2)  
Link C2 (2)  
Link C5 (2)  
Link C1 (1)

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Routing Time Step Summary

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Minimum Time Step : 0.50 sec  
Average Time Step : 3.89 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.19  
Percent Not Converging : 1.39

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	62.95	0.00	0.00	10.13	51.60	0.15	0.09	0.820
S_02	62.95	0.00	0.00	10.22	51.50	0.24	0.15	0.818
S_03	62.95	0.00	0.00	10.69	51.01	0.41	0.26	0.810
S_04	62.95	0.00	0.00	10.96	50.74	0.63	0.39	0.806
S_05	62.95	0.00	0.00	11.15	50.54	0.29	0.18	0.803
S_06	62.95	0.00	0.00	10.34	51.37	0.50	0.31	0.816
S_07	62.95	0.00	0.00	10.55	51.16	0.31	0.20	0.813
S_08	62.95	0.00	0.00	11.43	50.25	0.38	0.24	0.798
S_09	62.95	0.00	0.00	10.59	51.12	0.22	0.14	0.812
S_10	62.95	0.00	0.00	10.54	51.17	0.13	0.08	0.813
S_11	62.95	0.00	0.00	20.53	41.66	0.25	0.16	0.662
S_12	62.95	0.00	0.00	10.09	51.64	0.11	0.07	0.820
S_13	62.95	0.00	0.00	11.44	50.24	0.51	0.31	0.798
S_14	62.95	0.00	0.00	35.30	27.66	0.38	0.28	0.439
S_15	62.95	0.00	0.00	3.21	57.79	0.06	0.03	0.918
S_monte	62.95	0.00	0.00	13.13	48.49	5.39	3.20	0.770

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.55	1.74	24.34	0 00:22	0.48
J2	JUNCTION	0.58	1.91	24.47	0 00:22	0.48
J3	JUNCTION	0.54	1.95	24.55	0 00:21	0.47
J4	JUNCTION	0.31	1.48	24.33	0 00:22	0.39
J5	JUNCTION	0.31	1.37	24.22	0 00:22	0.39
J6	JUNCTION	0.18	1.02	24.11	0 00:22	0.31
J7	JUNCTION	0.65	1.70	24.07	0 00:22	0.45
J8	JUNCTION	0.16	1.00	24.13	0 00:22	0.30
J9	JUNCTION	0.47	1.27	23.79	0 00:45	0.39
J10	JUNCTION	0.48	1.70	24.35	0 00:19	0.52
J11	JUNCTION	0.49	1.68	24.29	0 00:19	0.51
J12	JUNCTION	0.50	1.52	24.07	0 00:45	0.46
J13	JUNCTION	0.15	0.86	23.98	0 00:20	0.26
J14	JUNCTION	0.52	1.37	23.85	0 00:45	0.42
J17	JUNCTION	0.23	1.38	24.30	0 00:22	0.31
J18	JUNCTION	0.45	1.20	23.75	0 00:20	0.37
J19	JUNCTION	0.51	1.58	24.10	0 00:22	0.41
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.53	0.97	23.43	0 01:04	0.30

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10 <sup>6</sup> ltr	Total Inflow Volume 10 <sup>6</sup> ltr	Flow Balance Error Percent
J1	JUNCTION	0.093	0.093	0 00:45	0.149	0.15	3.689
J2	JUNCTION	0.148	0.335	0 00:22	0.235	0.468	2.289
J3	JUNCTION	0.000	0.137	0 00:21	0	0.00557	137.184
J4	JUNCTION	0.314	0.365	0 00:22	0.507	0.66	0.237
J5	JUNCTION	0.000	0.176	0 00:22	0	0.129	-0.236
J6	JUNCTION	0.260	0.285	0 00:45	0.414	0.421	-0.078
J7	JUNCTION	0.000	0.632	0 00:21	0	2.18	-0.064
J8	JUNCTION	0.392	0.392	0 00:45	0.626	0.626	-0.220
J9	JUNCTION	0.114	1.377	0 00:20	0.186	4.39	0.135
J10	JUNCTION	3.512	3.512	0 00:45	5.88	5.88	0.118
J11	JUNCTION	0.377	1.240	0 00:20	0.603	2.65	0.172
J12	JUNCTION	0.239	1.347	0 00:20	0.385	2.97	0.026
J13	JUNCTION	0.165	0.278	0 00:45	0.252	0.41	-0.245
J14	JUNCTION	0.141	1.392	0 00:20	0.224	3.06	0.010
J17	JUNCTION	0.000	0.254	0 00:22	0	0.428	0.677
J18	JUNCTION	0.067	0.294	0 00:45	0.107	0.419	-0.079
J19	JUNCTION	0.000	0.289	0 00:36	0	0.566	-0.517
J16	OUTFALL	0.000	1.113	0 00:45	0	4.3	0.000
J20	OUTFALL	0.000	0.257	0 00:22	0	0.417	0.000
J15	STORAGE	0.283	0.609	0 00:45	0.38	1.1	-0.239

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Node Surcharging Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.83	1.140	0.000
J2	JUNCTION	0.45	0.800	0.000
J3	JUNCTION	2.71	1.550	0.000
J4	JUNCTION	0.53	0.730	0.000
J5	JUNCTION	0.65	0.770	0.000
J6	JUNCTION	0.65	0.620	0.000
J7	JUNCTION	0.65	0.616	0.164
J8	JUNCTION	0.42	0.250	0.000
J9	JUNCTION	0.40	0.069	0.771
J10	JUNCTION	0.64	0.500	0.000
J11	JUNCTION	0.63	0.460	0.000
J12	JUNCTION	0.59	0.274	0.176
J13	JUNCTION	0.65	0.360	0.000

J14	JUNCTION	0.51	0.123	0.647
J17	JUNCTION	0.47	0.630	0.000
J18	JUNCTION	0.89	0.450	0.000
J19	JUNCTION	0.63	0.634	0.166
J15	STORAGE	2.67	0.471	0.629

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10 <sup>6</sup> ltr	Maximum Ponded Depth Meters
J1	0.01	0.023	0 00:22	0.000	0.000
J2	0.01	0.198	0 00:22	0.001	0.000
J3	0.01	0.116	0 00:21	0.001	0.000
J4	0.01	0.207	0 00:22	0.001	0.000
J5	0.01	0.047	0 00:22	0.000	0.000
J6	0.42	0.285	0 00:45	0.299	0.000
J8	0.40	0.194	0 00:45	0.199	0.000
J10	0.58	2.952	0 00:45	3.831	0.000
J11	0.34	0.173	0 00:19	0.097	0.000
J13	0.54	0.278	0 00:45	0.368	0.000
J17	0.01	0.133	0 00:22	0.000	0.000
J18	0.49	0.294	0 00:45	0.402	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.252	3	0	0	1.070	13	0 01:04	0.188

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10 <sup>6</sup> ltr
J16	96.41	0.250	1.113	4.296
J20	20.54	0.126	0.257	0.417
System	58.48	0.377	1.355	4.714

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.093	0 00:45	0.33	0.95	1.00
C2	CONDUIT	0.137	0 00:21	1.11	1.18	1.00
C3	CONDUIT	0.160	0 00:22	0.69	0.64	1.00
C4	CONDUIT	0.176	0 00:22	1.40	1.55	1.00
C5	CONDUIT	0.172	0 00:22	0.67	1.02	1.00
C7	CONDUIT	0.254	0 00:22	1.08	1.25	1.00
C8	CONDUIT	0.219	0 00:24	1.11	0.75	1.00
C9	CONDUIT	0.476	0 00:22	2.43	3.27	1.00
C10	CONDUIT	0.391	0 00:21	1.02	29.67	1.00
C11	CONDUIT	1.043	0 00:20	1.42	3.24	1.00
C12	CONDUIT	1.241	0 00:20	1.73	7.21	1.00
C13	CONDUIT	1.265	0 00:20	1.82	1.85	1.00
C14	CONDUIT	1.320	0 00:20	2.59	3.97	1.00
C15	CONDUIT	1.113	0 00:45	1.75	4.34	0.82
C16	CONDUIT	0.227	0 00:45	0.79	2.27	1.00
C17	CONDUIT	0.125	0 00:20	0.66	0.45	1.00
C6	CONDUIT	0.289	0 00:36	1.01	1.43	1.00
C18	CONDUIT	0.289	0 00:36	1.01	9.60	1.00
C19	CONDUIT	0.257	0 00:22	2.09	43.73	0.95

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Crit	Ltd	Inlet Ctrl	
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.54	0.00	
C5	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.46	0.00	
C8	1.00	0.03	0.00	0.00	0.70	0.00	0.00	0.27	0.16	0.00	
C9	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.24	0.00	
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.73	0.00	
C6	1.00	0.03	0.00	0.00	0.67	0.00	0.00	0.30	0.07	0.00	
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C19	1.00	0.79	0.00	0.00	0.00	0.00	0.00	0.21	0.00	0.00	

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
	Both Ends	Upstream	Dnstream		
C1	1.83	1.83	2.21	0.01	0.01
C2	1.11	1.11	2.71	0.01	0.01
C3	0.53	0.53	0.95	0.01	0.01
C4	0.65	0.65	1.26	0.05	0.04
C5	0.62	0.62	0.65	0.01	0.01
C7	0.42	0.42	0.47	0.23	0.21
C8	0.47	0.47	0.65	0.01	0.01
C9	2.67	2.67	2.90	1.92	1.30
C10	0.67	0.68	0.68	3.19	0.49
C11	0.63	0.64	0.63	0.79	0.63
C12	0.59	0.64	0.59	0.95	0.59
C13	0.55	0.59	0.55	0.64	0.55
C14	0.40	0.51	0.40	0.80	0.40
C15	0.01	0.40	0.01	1.24	0.01
C16	0.89	0.89	0.92	0.42	0.01
C17	0.65	0.65	2.29	0.01	0.01
C6	0.53	0.53	0.63	0.41	0.41
C18	1.11	1.11	1.11	0.68	0.62
C19	0.01	0.45	0.01	0.79	0.01

Analysis begun on: Fri Jul 08 17:39:16 2016  
Analysis ended on: Fri Jul 08 17:39:17 2016  
Total elapsed time: 00:00:01

STATO ATTUALE

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

\*\*\*\*\*  
WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19  
\*\*\*\*\*

\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	1.460	70.176
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.341	16.400
Surface Runoff .....	1.093	52.557
Final Storage .....	0.026	1.238
Continuity Error (%) .....	-0.027	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.093	10.934
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.666	6.660
Flooding Loss .....	0.424	4.237
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.004	0.036
Continuity Error (%) .....	0.014	

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Highest Continuity Errors

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Node J3 (63.88%)

Node J2 (1.69%)

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Time-Step Critical Elements

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Link C14 (27.38%)

Link C18 (27.38%)

Link C19 (5.86%)

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Highest Flow Instability Indexes

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Link C16 (3)

Link C18 (2)

Link C1 (2)

Link C2 (2)

Link C5 (2)

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Routing Time Step Summary

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Minimum Time Step : 0.50 sec  
Average Time Step : 3.28 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.17  
Percent Not Converging : 1.52

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Subcatchment Runoff Summary

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Subcatchment	Total Precip	Total Runon	Total Evap	Total Infil	Total Runoff	Total Runoff	Peak Runoff	Runoff Coeff
	mm	mm	mm	mm	mm	10^6 ltr	CMS	
S_01	70.18	0.00	0.00	12.52	56.38	0.16	0.05	0.803
S_02	70.18	0.00	0.00	12.60	56.31	0.26	0.08	0.802
S_03	70.18	0.00	0.00	13.00	55.90	0.45	0.15	0.797
S_04	70.18	0.00	0.00	13.23	55.66	0.69	0.22	0.793
S_05	70.18	0.00	0.00	13.40	55.48	0.32	0.10	0.791
S_06	70.18	0.00	0.00	12.70	56.20	0.54	0.17	0.801
S_07	70.18	0.00	0.00	12.88	56.02	0.34	0.11	0.798
S_08	70.18	0.00	0.00	13.65	55.23	0.42	0.14	0.787
S_09	70.18	0.00	0.00	12.91	55.99	0.25	0.08	0.798
S_10	70.18	0.00	0.00	12.87	56.03	0.14	0.05	0.798
S_11	70.18	0.00	0.00	24.25	45.14	0.27	0.10	0.643
S_12	70.18	0.00	0.00	12.49	56.42	0.12	0.04	0.804
S_13	70.18	0.00	0.00	13.66	55.22	0.56	0.18	0.787
S_14	70.18	0.00	0.00	41.43	28.75	0.40	0.19	0.410
S_15	70.18	0.00	0.00	3.85	64.33	0.06	0.02	0.917
S_monte	70.18	0.00	0.00	15.24	53.59	5.95	1.88	0.764

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.70	1.39	23.99	0 00:27	0.41
J2	JUNCTION	0.74	1.43	23.99	0 00:27	0.42
J3	JUNCTION	0.70	1.95	24.55	0 00:24	0.40
J4	JUNCTION	0.47	1.30	24.15	0 00:26	0.33
J5	JUNCTION	0.47	1.22	24.07	0 00:26	0.33
J6	JUNCTION	0.35	1.02	24.11	0 00:26	0.31
J7	JUNCTION	0.84	1.41	23.78	0 01:15	0.43
J8	JUNCTION	0.31	1.00	24.13	0 00:28	0.30
J9	JUNCTION	0.65	1.22	23.74	0 01:15	0.37
J10	JUNCTION	0.77	1.70	24.35	0 00:24	0.52
J11	JUNCTION	0.77	1.66	24.27	0 01:15	0.51
J12	JUNCTION	0.73	1.47	24.02	0 01:15	0.45
J13	JUNCTION	0.30	0.86	23.98	0 00:24	0.26
J14	JUNCTION	0.72	1.32	23.80	0 01:15	0.40
J17	JUNCTION	0.39	1.07	23.99	0 00:27	0.30
J18	JUNCTION	0.65	1.20	23.75	0 00:27	0.37
J19	JUNCTION	0.70	1.27	23.79	0 01:15	0.39
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.66	1.01	23.47	0 01:30	0.31

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10 <sup>6</sup> ltr	Total Inflow Volume 10 <sup>6</sup> ltr	Flow Balance Error Percent
J1	JUNCTION	0.052	0.059	0 00:22	0.162	0.165	3.451
J2	JUNCTION	0.082	0.208	0 00:26	0.257	0.643	1.718
J3	JUNCTION	0.000	0.095	0 00:24	0	0.00565	176.881
J4	JUNCTION	0.179	0.273	0 01:15	0.557	0.967	0.191
J5	JUNCTION	0.000	0.116	0 00:38	0	0.377	0.022
J6	JUNCTION	0.146	0.146	0 01:15	0.454	0.453	-0.100
J7	JUNCTION	0.000	0.468	0 00:24	0	3.02	-0.000
J8	JUNCTION	0.221	0.221	0 01:15	0.686	0.686	-0.203
J9	JUNCTION	0.064	1.203	0 00:24	0.204	6.19	0.074
J10	JUNCTION	2.056	2.056	0 01:15	6.5	6.5	0.051
J11	JUNCTION	0.213	1.000	0 00:24	0.661	3.88	0.062
J12	JUNCTION	0.136	1.119	0 00:24	0.423	4.34	0.003
J13	JUNCTION	0.098	0.172	0 01:15	0.273	0.445	-0.088
J14	JUNCTION	0.079	1.200	0 00:24	0.246	4.44	0.027
J17	JUNCTION	0.000	0.217	0 01:06	0	0.686	0.461
J18	JUNCTION	0.038	0.198	0 01:15	0.117	0.497	-0.038
J19	JUNCTION	0.000	0.214	0 01:15	0	0.744	-0.268
J16	OUTFALL	0.000	1.053	0 01:15	0	6.07	0.000
J20	OUTFALL	0.000	0.193	0 01:15	0	0.593	0.000
J15	STORAGE	0.185	0.465	0 01:15	0.396	1.48	-0.225

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	2.66	0.795	0.345
J2	JUNCTION	0.84	0.320	0.480
J3	JUNCTION	3.57	1.550	0.000
J4	JUNCTION	0.93	0.550	0.180
J5	JUNCTION	1.06	0.615	0.155
J6	JUNCTION	1.02	0.620	0.000
J7	JUNCTION	1.06	0.328	0.452
J8	JUNCTION	0.74	0.250	0.000
J9	JUNCTION	0.41	0.018	0.822
J10	JUNCTION	1.04	0.500	0.000
J11	JUNCTION	1.02	0.439	0.021
J12	JUNCTION	0.98	0.220	0.230
J13	JUNCTION	1.05	0.360	0.000

J14	JUNCTION	0.89	0.072	0.698
J17	JUNCTION	0.85	0.319	0.311
J18	JUNCTION	1.31	0.450	0.000
J19	JUNCTION	1.03	0.323	0.477
J15	STORAGE	3.54	0.511	0.589

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10 <sup>6</sup> ltr	Maximum Ponded Depth Meters
J3	0.01	0.085	0 00:24	0.000	0.000
J6	0.63	0.052	0 01:15	0.077	0.000
J8	0.15	0.008	0 00:28	0.002	0.000
J10	0.95	1.409	0 01:15	3.278	0.000
J13	0.91	0.172	0 01:15	0.400	0.000
J18	0.87	0.198	0 01:15	0.480	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Full	Evap Loss	Exfil Pcnt	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.410	5	0	0	1.445	18	0 01:30	0.202

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10 <sup>6</sup> ltr
J16	96.78	0.429	1.053	6.067
J20	38.32	0.137	0.193	0.593
System	67.55	0.566	1.246	6.660

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.052	0 01:15	0.18	0.53	1.00
C2	CONDUIT	0.095	0 00:24	0.96	0.82	1.00
C3	CONDUIT	0.115	0 00:26	0.56	0.46	1.00
C4	CONDUIT	0.116	0 00:38	0.92	1.02	1.00
C5	CONDUIT	0.116	0 00:38	0.50	0.69	1.00
C7	CONDUIT	0.217	0 01:06	0.88	1.07	1.00
C8	CONDUIT	0.217	0 01:06	1.01	0.74	1.00
C9	CONDUIT	0.373	0 00:27	1.90	2.56	1.00
C10	CONDUIT	0.343	0 00:25	0.87	26.05	1.00
C11	CONDUIT	0.868	0 00:24	1.18	2.70	1.00
C12	CONDUIT	0.998	0 00:24	1.36	5.80	1.00
C13	CONDUIT	1.124	0 00:24	1.57	1.64	1.00
C14	CONDUIT	1.167	0 00:24	1.81	3.51	1.00
C15	CONDUIT	1.053	0 01:15	1.68	4.10	0.82
C16	CONDUIT	0.161	0 01:15	0.56	1.61	1.00
C17	CONDUIT	0.074	0 01:15	0.44	0.26	1.00
C6	CONDUIT	0.214	0 01:15	0.77	1.06	1.00
C18	CONDUIT	0.214	0 01:15	0.75	7.11	1.00
C19	CONDUIT	0.193	0 01:15	1.62	32.83	0.90

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*



Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class								
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.02	0.00
C4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.40	0.00
C5	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.32	0.00
C8	1.00	0.03	0.00	0.00	0.84	0.00	0.00	0.13	0.16	0.00
C9	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.09	0.00
C14	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.64	0.00
C6	1.00	0.03	0.00	0.00	0.81	0.00	0.00	0.16	0.07	0.00
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.60	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00

\*\*\*\*\*  
Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	2.66	2.66	3.06	0.01	0.01
C2	1.64	1.64	3.57	0.01	0.01
C3	0.93	0.93	1.41	0.01	0.01
C4	1.02	1.02	1.84	0.06	0.06
C5	1.02	1.02	1.06	0.01	0.01
C7	0.74	0.74	0.85	0.38	0.38
C8	0.85	0.85	1.06	0.01	0.01
C9	3.54	3.54	3.77	2.83	1.81
C10	1.07	1.12	1.10	4.02	0.92
C11	1.02	1.04	1.02	1.20	1.02
C12	0.98	1.03	0.98	1.37	0.98
C13	0.94	0.98	0.94	1.04	0.94
C14	0.41	0.89	0.41	1.22	0.41
C15	0.01	0.41	0.01	1.71	0.01
C16	1.31	1.31	1.35	0.65	0.01
C17	1.05	1.05	3.16	0.01	0.01
C6	0.93	0.93	1.03	0.56	0.56
C18	1.64	1.64	1.64	1.05	0.99
C19	0.01	0.84	0.01	1.23	0.01

Analysis begun on: Fri Jul 08 17:40:51 2016  
Analysis ended on: Fri Jul 08 17:40:52 2016  
Total elapsed time: 00:00:01

## STATO ATTUALE

## TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 15 MINUTI

## CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.645	31.020
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.215	10.341
Surface Runoff .....	0.405	19.486
Final Storage .....	0.026	1.231
Continuity Error (%) .....	-0.122	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.405	4.054
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	-0.090	-0.897
Flooding Loss .....	0.187	1.869
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.307	3.072
Continuity Error (%) .....	0.648	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.30%)  
Node J5 (12.02%)  
Node J17 (8.40%)  
Node J2 (2.88%)  
Node J12 (2.83%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (18.10%)  
Link C19 (5.33%)  
Link C18 (4.70%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (18)  
Link C16 (4)  
Link C14 (3)  
Link C1 (2)  
Link C18 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.53 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.20  
Percent Not Converging : 1.51

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	31.02	0.00	0.00	7.85	21.94	0.06	0.08	0.707
S_02	31.02	0.00	0.00	7.92	21.87	0.10	0.13	0.705
S_03	31.02	0.00	0.00	8.27	21.50	0.17	0.22	0.693
S_04	31.02	0.00	0.00	8.46	21.31	0.26	0.33	0.687
S_05	31.02	0.00	0.00	8.58	21.18	0.12	0.15	0.683
S_06	31.02	0.00	0.00	8.02	21.76	0.21	0.27	0.702
S_07	31.02	0.00	0.00	8.18	21.60	0.13	0.17	0.696
S_08	31.02	0.00	0.00	8.74	21.01	0.16	0.20	0.677
S_09	31.02	0.00	0.00	8.20	21.57	0.09	0.12	0.695
S_10	31.02	0.00	0.00	8.17	21.61	0.05	0.07	0.697
S_11	31.02	0.00	0.00	15.48	14.78	0.09	0.11	0.476
S_12	31.02	0.00	0.00	7.82	21.97	0.05	0.06	0.708
S_13	31.02	0.00	0.00	8.75	21.00	0.21	0.26	0.677

S_14	31.02	0.00	0.00	26.32	4.71	0.06	0.09	0.152
S_15	31.02	0.00	0.00	2.47	26.61	0.03	0.02	0.858
S_monte	31.02	0.00	0.00	9.52	20.18	2.24	2.49	0.650

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.91	1.53	24.13	0 00:30	0.47
J2	JUNCTION	0.95	1.54	24.10	0 00:30	0.47
J3	JUNCTION	0.90	1.95	24.55	0 00:14	0.46
J4	JUNCTION	0.69	1.25	24.10	0 00:30	0.38
J5	JUNCTION	0.69	1.25	24.10	0 00:30	0.38
J6	JUNCTION	0.47	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.18	1.50	23.87	0 00:30	0.46
J8	JUNCTION	0.44	1.00	24.13	0 00:19	0.30
J9	JUNCTION	1.10	1.44	23.96	0 00:17	0.44
J10	JUNCTION	1.01	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.04	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.08	1.70	24.25	0 00:17	0.51
J13	JUNCTION	0.51	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.14	1.58	24.06	0 00:17	0.43
J17	JUNCTION	0.64	1.07	23.99	0 00:18	0.32
J18	JUNCTION	1.06	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.03	1.37	23.89	0 00:30	0.42
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.00	1.13	23.59	0 06:00	0.34

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.081	0.081	0 00:30	0.0632	0.0759	20.330
J2	JUNCTION	0.128	0.236	0 00:30	0.0999	1.38	2.967
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00579	2026.215
J4	JUNCTION	0.258	0.286	0 00:29	0.212	1.46	1.820
J5	JUNCTION	0.000	0.106	0 00:31	0	0.0978	13.668
J6	JUNCTION	0.219	0.219	0 00:30	0.174	0.178	2.744
J7	JUNCTION	0.000	0.445	0 00:30	0	3.89	0.670
J8	JUNCTION	0.327	0.327	0 00:30	0.263	0.269	3.466
J9	JUNCTION	0.093	0.897	0 00:01	0.0805	4.8	1.588
J10	JUNCTION	2.753	2.753	0 00:30	2.45	2.48	0.587
J11	JUNCTION	0.317	0.874	0 00:30	0.254	1.56	2.708
J12	JUNCTION	0.196	0.978	0 00:30	0.161	1.75	2.912
J13	JUNCTION	0.112	0.232	0 00:30	0.0894	0.192	3.048
J14	JUNCTION	0.119	0.977	0 00:30	0.0947	1.8	2.538
J17	JUNCTION	0.000	0.204	0 00:31	0	0.225	9.168
J18	JUNCTION	0.059	0.328	0 00:30	0.0457	0.304	2.306
J19	JUNCTION	0.000	0.258	0 00:30	0	1.37	0.779
J16	OUTFALL	0.000	0.897	0 00:01	0	4.36	0.000
J20	OUTFALL	0.000	0.236	0 00:30	0	1.32	0.000
J15	STORAGE	0.094	0.446	0 00:30	0.0648	2.68	-49.943

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.927	0.213
J2	JUNCTION	0.26	0.429	0.371
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.36	0.502	0.228
J5	JUNCTION	5.71	0.651	0.119
J6	JUNCTION	5.71	0.620	0.000
J7	JUNCTION	5.70	0.417	0.363
J8	JUNCTION	0.22	0.250	0.000
J9	JUNCTION	0.31	0.241	0.599
J10	JUNCTION	0.38	0.500	0.000

J11	JUNCTION	0.38	0.460	0.000
J12	JUNCTION	0.36	0.450	0.000
J13	JUNCTION	0.60	0.360	0.000
J14	JUNCTION	0.35	0.325	0.445
J17	JUNCTION	0.30	0.319	0.311
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.419	0.381
J15	STORAGE	5.91	0.631	0.469

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.22	0.191	0 00:30	0.090	0.000
J8	0.20	0.140	0 00:30	0.060	0.000
J10	0.30	2.192	0 00:30	1.222	0.000
J11	0.14	0.093	0 00:30	0.024	0.000
J12	0.01	0.223	0 00:17	0.001	0.000
J13	0.32	0.232	0 00:30	0.176	0.000
J18	0.35	0.328	0 00:30	0.294	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.608	20	0	0	2.674	33	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.235	0.897	4.357
J20	92.85	0.067	0.236	1.324
System	96.42	0.302	1.130	5.680

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.081	0 00:30	0.43	0.82	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.106	0 00:31	0.84	0.93	1.00
C5	CONDUIT	0.106	0 00:31	0.76	0.63	1.00
C7	CONDUIT	0.204	0 00:31	0.71	1.00	1.00
C8	CONDUIT	0.204	0 00:31	0.71	0.69	1.00
C9	CONDUIT	0.371	0 00:19	1.89	2.54	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.808	0 00:36	1.10	2.51	1.00
C12	CONDUIT	0.855	0 00:36	1.16	4.97	1.00
C13	CONDUIT	0.877	0 00:36	1.19	1.28	1.00
C14	CONDUIT	0.771	0 00:36	1.48	2.32	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.270	0 00:30	0.94	2.69	1.00
C17	CONDUIT	0.120	0 00:30	0.61	0.43	1.00
C6	CONDUIT	0.258	0 00:30	0.90	1.28	1.00
C18	CONDUIT	0.258	0 00:30	0.90	8.57	1.00
C19	CONDUIT	0.236	0 00:30	1.93	40.19	0.93

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Up Dry	Down Dry	Sub Dry	Fraction of Time in Flow Class	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	----- Both Ends	Hours Full Upstream	----- Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.36	0.36	5.74	0.01	0.01
C4	5.71	5.71	5.79	0.01	0.01
C5	5.71	5.71	5.71	0.01	0.01
C7	0.22	0.22	0.30	0.01	0.01
C8	0.30	0.30	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.62	0.01
C10	5.71	5.71	5.91	5.98	0.20
C11	0.38	0.38	0.38	0.44	0.38
C12	0.36	0.38	0.36	0.60	0.36
C13	0.36	0.36	0.38	0.34	0.34
C14	0.31	0.35	0.31	0.54	0.31
C15	0.01	0.31	0.01	0.70	0.01
C16	5.94	5.95	5.95	0.33	0.01
C17	0.60	0.60	5.95	0.01	0.01
C6	0.36	0.36	5.70	0.16	0.17
C18	5.87	5.87	5.87	5.78	0.28
C19	0.01	0.26	0.01	5.73	0.01

Analysis begun on: Fri Jul 08 17:51:38 2016  
Analysis ended on: Fri Jul 08 17:51:38 2016  
Total elapsed time: < 1 sec

STATO ATTUALE

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

\*\*\*\*\*  
WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.865	41.570
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.268	12.859
Surface Runoff .....	0.572	27.502
Final Storage .....	0.026	1.233
Continuity Error (%) .....	-0.059	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.572	5.722
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.014	0.144
Flooding Loss .....	0.246	2.456
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.311	3.110
Continuity Error (%) .....	0.588	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.30%)  
Node J5 (5.88%)  
Node J17 (5.26%)  
Node J2 (2.67%)  
Node J12 (1.98%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (18.67%)  
Link C19 (9.21%)  
Link C18 (4.64%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (17)  
Link C16 (4)  
Link C1 (2)  
Link C14 (2)  
Link C18 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.30 sec  
Average Time Step : 4.47 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.22  
Percent Not Converging : 1.92

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	41.57	0.00	0.00	9.84	30.48	0.09	0.06	0.733
S_02	41.57	0.00	0.00	9.91	30.40	0.14	0.09	0.731
S_03	41.57	0.00	0.00	10.28	30.02	0.24	0.16	0.722
S_04	41.57	0.00	0.00	10.48	29.82	0.37	0.24	0.717
S_05	41.57	0.00	0.00	10.62	29.67	0.17	0.11	0.714
S_06	41.57	0.00	0.00	10.01	30.30	0.29	0.19	0.729
S_07	41.57	0.00	0.00	10.17	30.13	0.18	0.12	0.725
S_08	41.57	0.00	0.00	10.81	29.47	0.23	0.14	0.709
S_09	41.57	0.00	0.00	10.20	30.10	0.13	0.09	0.724
S_10	41.57	0.00	0.00	10.16	30.14	0.08	0.05	0.725
S_11	41.57	0.00	0.00	19.16	21.63	0.13	0.09	0.520
S_12	41.57	0.00	0.00	9.81	30.51	0.06	0.04	0.734
S_13	41.57	0.00	0.00	10.82	29.46	0.30	0.19	0.709

S_14	41.57	0.00	0.00	32.62	8.95	0.12	0.11	0.215
S_15	41.57	0.00	0.00	3.05	36.56	0.04	0.02	0.879
S_monte	41.57	0.00	0.00	11.87	28.37	3.15	1.91	0.682

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.92	1.39	23.99	0 00:45	0.42
J2	JUNCTION	0.96	1.42	23.98	0 00:45	0.43
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.42
J4	JUNCTION	0.71	1.14	23.99	0 00:45	0.35
J5	JUNCTION	0.71	1.15	24.00	0 00:45	0.35
J6	JUNCTION	0.49	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.20	1.47	23.84	0 00:45	0.45
J8	JUNCTION	0.46	1.00	24.13	0 00:20	0.30
J9	JUNCTION	1.10	1.34	23.86	0 00:19	0.40
J10	JUNCTION	1.04	1.70	24.35	0 00:19	0.52
J11	JUNCTION	1.07	1.68	24.29	0 00:19	0.51
J12	JUNCTION	1.10	1.70	24.25	0 00:19	0.46
J13	JUNCTION	0.53	0.86	23.98	0 00:19	0.26
J14	JUNCTION	1.15	1.42	23.90	0 00:19	0.42
J17	JUNCTION	0.66	1.02	23.94	0 00:45	0.31
J18	JUNCTION	1.07	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.05	1.33	23.85	0 00:45	0.41
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.00	1.13	23.59	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.058	0.058	0 00:45	0.0877	0.101	14.578
J2	JUNCTION	0.092	0.207	0 00:45	0.139	1.5	2.745
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00577	2029.864
J4	JUNCTION	0.189	0.267	0 00:45	0.297	1.62	1.624
J5	JUNCTION	0.000	0.108	0 00:23	0	0.197	6.251
J6	JUNCTION	0.159	0.159	0 00:45	0.244	0.248	1.961
J7	JUNCTION	0.000	0.413	0 00:08	0	3.87	0.670
J8	JUNCTION	0.238	0.238	0 00:45	0.368	0.374	2.607
J9	JUNCTION	0.070	0.897	0 00:01	0.112	5.16	1.472
J10	JUNCTION	2.100	2.100	0 00:45	3.45	3.47	0.426
J11	JUNCTION	0.230	0.855	0 00:50	0.355	2.22	1.890
J12	JUNCTION	0.144	0.960	0 00:45	0.226	2.51	2.025
J13	JUNCTION	0.089	0.193	0 00:45	0.131	0.286	2.050
J14	JUNCTION	0.086	0.942	0 00:45	0.132	2.55	1.774
J17	JUNCTION	0.000	0.202	0 00:33	0	0.373	5.549
J18	JUNCTION	0.042	0.288	0 00:45	0.0634	0.475	1.471
J19	JUNCTION	0.000	0.209	0 00:45	0	1.46	0.722
J16	OUTFALL	0.000	0.897	0 00:01	0	4.71	0.000
J20	OUTFALL	0.000	0.207	0 00:45	0	1.44	0.000
J15	STORAGE	0.112	0.436	0 00:45	0.123	2.72	-49.943

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.793	0.347
J2	JUNCTION	0.49	0.308	0.492
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.60	0.394	0.336
J5	JUNCTION	5.70	0.550	0.220
J6	JUNCTION	5.70	0.620	0.000
J7	JUNCTION	5.70	0.389	0.391
J8	JUNCTION	0.43	0.250	0.000
J9	JUNCTION	0.52	0.143	0.697
J10	JUNCTION	0.61	0.500	0.000

J11	JUNCTION	0.61	0.460	0.000
J12	JUNCTION	0.59	0.450	0.000
J13	JUNCTION	0.87	0.360	0.000
J14	JUNCTION	0.57	0.169	0.601
J17	JUNCTION	0.52	0.267	0.363
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.384	0.416
J15	STORAGE	5.91	0.634	0.466

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.38	0.081	0 00:45	0.062	0.000
J8	0.22	0.042	0 00:45	0.017	0.000
J10	0.50	1.513	0 00:45	1.650	0.000
J11	0.01	0.008	0 00:19	0.000	0.000
J12	0.01	0.084	0 00:19	0.000	0.000
J13	0.52	0.193	0 00:45	0.261	0.000
J18	0.57	0.288	0 00:45	0.464	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.683	21	0	0	2.712	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.254	0.897	4.707
J20	92.94	0.073	0.207	1.442
System	96.47	0.326	1.055	6.149

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.058	0 00:45	0.43	0.59	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.108	0 00:23	0.86	0.95	1.00
C5	CONDUIT	0.108	0 00:23	0.76	0.64	1.00
C7	CONDUIT	0.202	0 00:33	0.70	0.99	1.00
C8	CONDUIT	0.202	0 00:33	0.70	0.69	1.00
C9	CONDUIT	0.348	0 00:21	1.77	2.39	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.802	0 00:50	1.09	2.49	1.00
C12	CONDUIT	0.855	0 00:50	1.16	4.97	1.00
C13	CONDUIT	0.874	0 00:50	1.19	1.28	1.00
C14	CONDUIT	0.763	0 00:51	1.48	2.30	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.246	0 00:45	0.86	2.46	1.00
C17	CONDUIT	0.104	0 00:45	0.53	0.37	1.00
C6	CONDUIT	0.209	0 00:45	0.73	1.03	1.00
C18	CONDUIT	0.209	0 00:45	0.82	6.94	1.00
C19	CONDUIT	0.207	0 00:45	1.73	35.26	0.91

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	----- Fraction of Time in Flow Class -----								
		Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	----- Hours Full -----			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.60	0.60	5.74	0.01	0.01
C4	5.70	5.70	5.79	0.01	0.01
C5	5.70	5.70	5.70	0.01	0.01
C7	0.43	0.43	0.52	0.01	0.01
C8	0.52	0.52	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.41	0.01
C10	5.71	5.71	5.91	5.95	0.41
C11	0.61	0.61	0.61	0.67	0.61
C12	0.59	0.62	0.59	0.85	0.58
C13	0.59	0.59	0.61	0.55	0.56
C14	0.52	0.57	0.52	0.78	0.52
C15	0.01	0.52	0.01	0.95	0.01
C16	5.94	5.95	5.95	0.53	0.01
C17	0.87	0.87	5.95	0.01	0.01
C6	0.60	0.60	5.70	0.09	0.09
C18	5.87	5.87	5.87	5.77	0.50
C19	0.01	0.49	0.01	5.73	0.01

Analysis begun on: Fri Jul 08 17:49:36 2016  
Analysis ended on: Fri Jul 08 17:49:37 2016  
Total elapsed time: 00:00:01

STATO ATTUALE

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

\*\*\*\*\*  
WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19  
\*\*\*\*\*

\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
\*\*\*\*\*

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.963	46.300
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.316	15.168
Surface Runoff .....	0.622	29.905
Final Storage .....	0.026	1.237
Continuity Error (%) .....	-0.023	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.622	6.222
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.138	1.385
Flooding Loss .....	0.168	1.682
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.314	3.140
Continuity Error (%) .....	0.589	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.44%)  
Node J17 (4.73%)  
Node J5 (4.11%)  
Node J2 (2.58%)  
Node J12 (1.34%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (21.35%)  
Link C19 (13.74%)  
Link C18 (4.55%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (16)  
Link C16 (5)  
Link C18 (5)  
Link C1 (3)  
Link C17 (3)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step	:	0.50 sec
Average Time Step	:	4.39 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.22
Percent Not Converging	:	1.44

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	46.30	0.00	0.00	12.06	32.96	0.09	0.03	0.712
S_02	46.30	0.00	0.00	12.12	32.90	0.15	0.05	0.711
S_03	46.30	0.00	0.00	12.43	32.58	0.26	0.09	0.704
S_04	46.30	0.00	0.00	12.60	32.41	0.40	0.13	0.700
S_05	46.30	0.00	0.00	12.72	32.28	0.18	0.06	0.697
S_06	46.30	0.00	0.00	12.20	32.81	0.32	0.11	0.709
S_07	46.30	0.00	0.00	12.34	32.67	0.20	0.07	0.706
S_08	46.30	0.00	0.00	12.89	32.11	0.25	0.08	0.693
S_09	46.30	0.00	0.00	12.36	32.65	0.14	0.05	0.705
S_10	46.30	0.00	0.00	12.33	32.68	0.08	0.03	0.706
S_11	46.30	0.00	0.00	22.64	22.87	0.14	0.05	0.494
S_12	46.30	0.00	0.00	12.03	32.99	0.07	0.02	0.712
S_13	46.30	0.00	0.00	12.89	32.10	0.32	0.11	0.693



S_14	46.30	0.00	0.00	38.34	7.96	0.11	0.07	0.172
S_15	46.30	0.00	0.00	3.65	40.66	0.04	0.01	0.878
S_monte	46.30	0.00	0.00	13.82	31.13	3.46	1.10	0.672

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.93	1.21	23.81	0 01:15	0.37
J2	JUNCTION	0.97	1.24	23.80	0 01:15	0.38
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.37
J4	JUNCTION	0.72	0.98	23.83	0 01:15	0.30
J5	JUNCTION	0.71	0.99	23.84	0 01:15	0.30
J6	JUNCTION	0.50	0.90	23.99	0 01:15	0.27
J7	JUNCTION	1.21	1.41	23.78	0 01:15	0.43
J8	JUNCTION	0.47	0.78	23.91	0 01:15	0.24
J9	JUNCTION	1.11	1.26	23.78	0 01:15	0.38
J10	JUNCTION	1.08	1.70	24.35	0 00:30	0.52
J11	JUNCTION	1.10	1.64	24.25	0 01:15	0.50
J12	JUNCTION	1.12	1.46	24.01	0 01:15	0.45
J13	JUNCTION	0.55	0.86	23.98	0 00:28	0.26
J14	JUNCTION	1.16	1.34	23.82	0 01:15	0.41
J17	JUNCTION	0.66	0.90	23.82	0 01:15	0.28
J18	JUNCTION	1.08	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.06	1.26	23.78	0 01:15	0.38
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.01	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow 10^6 ltr	Total Inflow 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.032	0.056	0 00:11	0.0949	0.108	13.514
J2	JUNCTION	0.051	0.158	0 01:15	0.15	1.57	2.653
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00576	2093.825
J4	JUNCTION	0.108	0.197	0 01:15	0.324	1.67	1.580
J5	JUNCTION	0.000	0.090	0 01:15	0	0.281	4.286
J6	JUNCTION	0.090	0.090	0 01:15	0.264	0.269	1.819
J7	JUNCTION	0.000	0.413	0 00:08	0	3.78	0.704
J8	JUNCTION	0.135	0.135	0 01:15	0.4	0.407	2.502
J9	JUNCTION	0.040	0.897	0 00:01	0.122	5.83	1.299
J10	JUNCTION	1.207	1.207	0 01:15	3.78	3.81	0.404
J11	JUNCTION	0.130	0.854	0 00:33	0.385	3.41	1.230
J12	JUNCTION	0.082	0.925	0 01:15	0.246	3.72	1.363
J13	JUNCTION	0.052	0.119	0 01:15	0.138	0.296	1.987
J14	JUNCTION	0.049	0.916	0 00:30	0.143	3.77	1.195
J17	JUNCTION	0.000	0.135	0 01:15	0	0.422	4.960
J18	JUNCTION	0.023	0.214	0 01:15	0.0686	0.602	1.148
J19	JUNCTION	0.000	0.137	0 00:13	0	1.4	0.775
J16	OUTFALL	0.000	0.897	0 00:01	0	5.14	0.000
J20	OUTFALL	0.000	0.158	0 01:15	0	1.51	0.000
J15	STORAGE	0.074	0.351	0 01:15	0.109	2.75	-49.944

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.608	0.532
J2	JUNCTION	0.86	0.134	0.666
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	1.02	0.230	0.500
J5	JUNCTION	5.69	0.388	0.382
J6	JUNCTION	5.67	0.497	0.123
J7	JUNCTION	5.69	0.326	0.454
J8	JUNCTION	0.22	0.034	0.216
J9	JUNCTION	0.87	0.056	0.784
J10	JUNCTION	0.99	0.500	0.000

J11	JUNCTION	0.98	0.422	0.038
J12	JUNCTION	0.95	0.212	0.238
J13	JUNCTION	1.31	0.360	0.000
J14	JUNCTION	0.94	0.093	0.677
J17	JUNCTION	0.91	0.152	0.478
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.67	0.311	0.489
J15	STORAGE	5.91	0.637	0.463

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J10	0.80	0.493	0 01:15	0.831	0.000
J13	0.84	0.119	0 01:15	0.262	0.000
J18	0.94	0.214	0 01:15	0.588	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Loss	Exfil Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.718	21	0	0	2.743	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.273	0.897	5.143
J20	93.07	0.076	0.158	1.513
System	96.53	0.348	0.897	6.656

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.056	0 00:11	0.43	0.57	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.090	0 01:15	0.71	0.79	1.00
C5	CONDUIT	0.090	0 01:15	0.76	0.53	1.00
C7	CONDUIT	0.135	0 01:15	0.47	0.66	1.00
C8	CONDUIT	0.135	0 01:15	0.47	0.46	1.00
C9	CONDUIT	0.303	0 00:30	1.54	2.08	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.789	0 01:17	1.07	2.45	1.00
C12	CONDUIT	0.854	0 00:33	1.16	4.96	1.00
C13	CONDUIT	0.880	0 00:30	1.20	1.29	1.00
C14	CONDUIT	0.763	0 00:30	1.48	2.30	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.190	0 01:15	0.84	1.90	1.00
C17	CONDUIT	0.066	0 01:15	0.36	0.24	1.00
C6	CONDUIT	0.135	0 00:13	0.73	0.67	1.00
C18	CONDUIT	0.137	0 00:13	0.82	4.53	1.00
C19	CONDUIT	0.158	0 01:15	1.37	26.92	0.86

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Up Dry	Down Dry	Fraction of Sub Dry	Time in Flow Class Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.93	0.00	0.00

\*\*\*\*\*  
Conduit Surcharge Summary  
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Conduit	Both Ends	Hours Full Upstream	Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	1.02	1.02	5.74	0.01	0.01
C4	5.67	5.67	5.79	0.01	0.01
C5	5.67	5.67	5.69	0.01	0.01
C7	0.22	0.22	0.91	0.01	0.01
C8	0.91	0.91	5.69	0.01	0.01
C9	5.91	5.91	5.97	1.49	0.01
C10	5.70	5.70	5.91	5.99	0.01
C11	0.98	0.99	0.98	1.06	0.98
C12	0.95	0.99	0.95	1.26	0.95
C13	0.95	0.95	1.00	0.91	0.90
C14	0.87	0.94	0.87	1.19	0.87
C15	0.01	0.87	0.01	1.38	0.01
C16	5.94	5.95	5.95	0.87	0.01
C17	1.31	1.31	5.95	0.01	0.01
C6	1.02	1.02	5.67	0.01	0.01
C18	5.87	5.87	5.87	5.77	0.90
C19	0.01	0.86	0.01	5.72	0.01

Analysis begun on: Fri Jul 08 17:48:28 2016  
Analysis ended on: Fri Jul 08 17:48:29 2016  
Total elapsed time: 00:00:01

## STATO ATTUALE

### TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 15 MINUTI

### CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Rainage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
\*\*\*\*\*

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

\*\*\*\*\*  
Cross Section Summary  
\*\*\*\*\*

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.978	47.010
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.247	11.861
Surface Runoff .....	0.707	33.990
Final Storage .....	0.026	1.231
Continuity Error (%) .....	-0.155	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.707	7.073
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	-0.028	-0.283
Flooding Loss .....	0.423	4.232
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.312	3.116
Continuity Error (%) .....	0.404	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.04%)  
Node J5 (8.37%)  
Node J17 (7.66%)  
Node J2 (2.65%)  
Node J12 (2.36%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (17.72%)  
Link C19 (6.92%)  
Link C18 (4.64%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (16)  
Link C16 (4)  
Link C14 (2)  
Link C13 (2)  
Link C11 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.48 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.20  
Percent Not Converging : 1.47

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	47.01	0.00	0.00	8.34	37.51	0.11	0.13	0.798
S_02	47.01	0.00	0.00	8.44	37.41	0.17	0.21	0.796
S_03	47.01	0.00	0.00	8.96	36.86	0.30	0.37	0.784
S_04	47.01	0.00	0.00	9.24	36.56	0.45	0.55	0.778
S_05	47.01	0.00	0.00	9.44	36.35	0.21	0.25	0.773
S_06	47.01	0.00	0.00	8.58	37.26	0.36	0.45	0.793
S_07	47.01	0.00	0.00	8.81	37.01	0.23	0.28	0.787
S_08	47.01	0.00	0.00	9.72	36.06	0.28	0.33	0.767
S_09	47.01	0.00	0.00	8.85	36.97	0.16	0.20	0.786
S_10	47.01	0.00	0.00	8.80	37.03	0.09	0.12	0.788
S_11	47.01	0.00	0.00	17.56	28.73	0.17	0.21	0.611
S_12	47.01	0.00	0.00	8.29	37.56	0.08	0.10	0.799
S_13	47.01	0.00	0.00	9.73	36.05	0.36	0.43	0.767

S_14	47.01	0.00	0.00	30.26	16.77	0.23	0.27	0.357
S_15	47.01	0.00	0.00	2.72	42.36	0.04	0.04	0.901
S_monte	47.01	0.00	0.00	11.26	34.45	3.83	4.21	0.733

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.93	1.74	24.34	0 00:17	0.53
J2	JUNCTION	0.97	1.72	24.28	0 00:30	0.52
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.51
J4	JUNCTION	0.72	1.41	24.26	0 00:30	0.43
J5	JUNCTION	0.71	1.37	24.22	0 00:22	0.42
J6	JUNCTION	0.48	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.20	1.56	23.93	0 00:30	0.47
J8	JUNCTION	0.45	1.00	24.13	0 00:18	0.30
J9	JUNCTION	1.10	1.54	24.06	0 00:17	0.42
J10	JUNCTION	1.02	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.05	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.09	1.70	24.25	0 00:17	0.48
J13	JUNCTION	0.52	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.15	1.56	24.04	0 00:17	0.45
J17	JUNCTION	0.65	1.38	24.30	0 00:17	0.33
J18	JUNCTION	1.06	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.05	1.44	23.96	0 00:30	0.44
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.01	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow 10^6 ltr	Total Inflow 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.134	0.134	0 00:30	0.108	0.121	11.867
J2	JUNCTION	0.212	0.337	0 00:30	0.171	1.5	2.723
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00581	1914.150
J4	JUNCTION	0.432	0.495	0 00:30	0.364	1.62	1.574
J5	JUNCTION	0.000	0.187	0 00:30	0	0.14	9.133
J6	JUNCTION	0.365	0.442	0 00:30	0.299	0.346	1.366
J7	JUNCTION	0.000	0.479	0 00:23	0	3.82	0.686
J8	JUNCTION	0.546	0.546	0 00:30	0.451	0.457	2.043
J9	JUNCTION	0.157	0.994	0 00:30	0.135	4.93	1.554
J10	JUNCTION	4.654	4.654	0 00:30	4.19	4.22	0.330
J11	JUNCTION	0.528	1.086	0 00:30	0.435	1.95	2.139
J12	JUNCTION	0.328	0.999	0 00:30	0.276	2.07	2.415
J13	JUNCTION	0.206	0.354	0 00:30	0.174	0.32	1.798
J14	JUNCTION	0.199	1.050	0 00:30	0.162	2.14	2.107
J17	JUNCTION	0.000	0.231	0 00:17	0	0.246	8.293
J18	JUNCTION	0.097	0.416	0 00:30	0.0781	0.429	1.621
J19	JUNCTION	0.000	0.308	0 00:30	0	1.47	0.719
J16	OUTFALL	0.000	0.994	0 00:30	0	4.46	0.000
J20	OUTFALL	0.000	0.274	0 00:30	0	1.42	0.000
J15	STORAGE	0.267	0.632	0 00:30	0.231	2.72	-49.943

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	1.140	0.000
J2	JUNCTION	0.32	0.607	0.193
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.44	0.659	0.071
J5	JUNCTION	5.72	0.770	0.000
J6	JUNCTION	5.72	0.620	0.000
J7	JUNCTION	5.71	0.475	0.305
J8	JUNCTION	0.26	0.250	0.000
J9	JUNCTION	0.38	0.338	0.502
J10	JUNCTION	0.47	0.500	0.000

J11	JUNCTION	0.46	0.460	0.000
J12	JUNCTION	0.44	0.450	0.000
J13	JUNCTION	0.73	0.360	0.000
J14	JUNCTION	0.42	0.306	0.464
J17	JUNCTION	0.36	0.630	0.000
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.71	0.487	0.313
J15	STORAGE	5.91	0.635	0.465

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.05	0.019	0 00:17	0.001	0.000
J3	0.01	0.038	0 00:14	0.000	0.000
J5	0.13	0.110	0 00:30	0.031	0.000
J6	0.27	0.442	0 00:30	0.290	0.000
J8	0.24	0.381	0 00:30	0.226	0.000
J10	0.38	4.092	0 00:30	2.750	0.000
J11	0.23	0.415	0 00:30	0.215	0.000
J12	0.01	0.270	0 00:17	0.001	0.000
J13	0.39	0.353	0 00:30	0.299	0.000
J17	0.01	0.110	0 00:17	0.001	0.000
J18	0.42	0.415	0 00:30	0.419	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.705	21	0	0	2.719	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.248	0.994	4.460
J20	92.93	0.073	0.274	1.417
System	96.47	0.321	1.268	5.878

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.129	0 00:27	0.46	1.32	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.143	0 00:17	0.84	0.57	1.00
C4	CONDUIT	0.130	0 00:17	1.03	1.14	1.00
C5	CONDUIT	0.187	0 00:30	0.76	1.11	1.00
C7	CONDUIT	0.202	0 00:32	0.70	0.99	1.00
C8	CONDUIT	0.202	0 00:32	0.70	0.69	1.00
C9	CONDUIT	0.386	0 00:18	1.97	2.65	1.00
C10	CONDUIT	0.427	0 00:17	1.05	32.45	1.00
C11	CONDUIT	0.813	0 00:40	1.11	2.53	1.00
C12	CONDUIT	0.854	0 00:39	1.16	4.96	1.00
C13	CONDUIT	0.880	0 00:40	1.20	1.29	1.00
C14	CONDUIT	0.774	0 00:40	1.48	2.33	1.00
C15	CONDUIT	0.994	0 00:30	1.86	3.87	0.97
C16	CONDUIT	0.319	0 00:30	1.11	3.18	1.00
C17	CONDUIT	0.148	0 00:30	0.75	0.53	1.00
C6	CONDUIT	0.308	0 00:30	1.07	1.52	1.00
C18	CONDUIT	0.308	0 00:30	1.07	10.21	1.00

C19 CONDUIT 0.274 0 00:30 2.21 46.62 0.96

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	----- Up		Fraction of Time in Flow Class		----- Down		Up		Down		Norm Ltd	Inlet Ctrl
		Dry	Dry	Dry	Crit	Crit	Crit	Crit	Crit	Crit	Crit		
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	----- Hours Full -----		Dnstream	Hours	Hours
	Both Ends	Upstream		Above Full	Capacity
				Normal Flow	Limited
C1	5.74	5.74	5.75	0.18	0.19
C2	5.74	5.74	5.76	0.01	0.01
C3	0.44	0.44	5.74	0.01	0.01
C4	5.72	5.72	5.79	0.01	0.01
C5	5.71	5.71	5.72	0.04	0.05
C7	0.26	0.26	0.36	0.01	0.01
C8	0.36	0.36	5.71	0.01	0.01
C9	5.91	5.91	5.97	1.32	0.01
C10	5.72	5.72	5.91	5.98	0.24
C11	0.46	0.47	0.46	0.54	0.46
C12	0.44	0.47	0.44	0.71	0.44
C13	0.44	0.44	0.46	0.42	0.42
C14	0.38	0.42	0.38	0.63	0.38
C15	0.01	0.38	0.01	0.78	0.01
C16	5.94	5.95	5.95	0.40	0.01
C17	0.73	0.73	5.95	0.01	0.01
C6	0.44	0.44	5.71	0.23	0.24
C18	5.87	5.87	5.87	5.79	0.31
C19	0.01	0.32	0.01	5.73	0.01

Analysis begun on: Fri Jul 08 17:46:31 2016  
Analysis ended on: Fri Jul 08 17:46:31 2016  
Total elapsed time: < 1 sec

STATO ATTUALE

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	1.310	62.948
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.290	13.916
Surface Runoff .....	0.995	47.839
Final Storage .....	0.026	1.233
Continuity Error (%) .....	-0.064	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.995	9.954
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.102	1.017
Flooding Loss .....	0.576	5.756
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.317	3.173
Continuity Error (%) .....	0.296	

\*\*\*\*\*

Highest Continuity Errors

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Node J3 (95.10%)  
Node J5 (9.47%)  
Node J17 (4.64%)  
Node J2 (2.43%)  
Node J12 (1.66%)

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Time-Step Critical Elements

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Link C14 (18.14%)  
Link C19 (11.35%)  
Link C18 (4.54%)  
Link C6 (1.72%)

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Highest Flow Instability Indexes

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Link C2 (16)  
Link C16 (3)  
Link C14 (3)  
Link C13 (2)  
Link C11 (2)

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Routing Time Step Summary

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Minimum Time Step : 0.50 sec  
Average Time Step : 4.38 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.19  
Percent Not Converging : 1.38

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	62.95	0.00	0.00	10.13	51.60	0.15	0.09	0.820
S_02	62.95	0.00	0.00	10.22	51.50	0.24	0.15	0.818
S_03	62.95	0.00	0.00	10.69	51.01	0.41	0.26	0.810
S_04	62.95	0.00	0.00	10.96	50.74	0.63	0.39	0.806
S_05	62.95	0.00	0.00	11.15	50.54	0.29	0.18	0.803
S_06	62.95	0.00	0.00	10.34	51.37	0.50	0.31	0.816
S_07	62.95	0.00	0.00	10.55	51.16	0.31	0.20	0.813
S_08	62.95	0.00	0.00	11.43	50.25	0.38	0.24	0.798
S_09	62.95	0.00	0.00	10.59	51.12	0.22	0.14	0.812
S_10	62.95	0.00	0.00	10.54	51.17	0.13	0.08	0.813
S_11	62.95	0.00	0.00	20.53	41.66	0.25	0.16	0.662
S_12	62.95	0.00	0.00	10.09	51.64	0.11	0.07	0.820

S_13	62.95	0.00	0.00	11.44	50.24	0.51	0.31	0.798
S_14	62.95	0.00	0.00	35.30	27.66	0.38	0.28	0.439
S_15	62.95	0.00	0.00	3.21	57.79	0.06	0.03	0.918
S_monte	62.95	0.00	0.00	13.13	48.49	5.39	3.20	0.770

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Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.95	1.58	24.18	0 00:45	0.48
J2	JUNCTION	0.99	1.59	24.15	0 00:45	0.48
J3	JUNCTION	0.95	1.95	24.55	0 00:14	0.47
J4	JUNCTION	0.74	1.30	24.15	0 00:45	0.39
J5	JUNCTION	0.74	1.29	24.14	0 00:45	0.39
J6	JUNCTION	0.51	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.22	1.52	23.89	0 00:45	0.46
J8	JUNCTION	0.49	1.00	24.13	0 00:19	0.30
J9	JUNCTION	1.11	1.78	24.30	0 00:17	0.47
J10	JUNCTION	1.06	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.09	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.12	1.70	24.25	0 00:17	0.48
J13	JUNCTION	0.54	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.16	1.56	24.04	0 00:18	0.46
J17	JUNCTION	0.67	1.07	23.99	0 00:18	0.32
J18	JUNCTION	1.07	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.07	1.40	23.92	0 00:45	0.43
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.02	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.093	0.093	0 00:45	0.149	0.161	8.626
J2	JUNCTION	0.148	0.246	0 00:45	0.235	1.64	2.488
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00578	1940.086
J4	JUNCTION	0.314	0.314	0 00:45	0.507	1.77	1.475
J5	JUNCTION	0.000	0.105	0 00:19	0	0.124	10.466
J6	JUNCTION	0.260	0.301	0 00:45	0.414	0.436	1.098
J7	JUNCTION	0.000	0.447	0 00:32	0	3.79	0.683
J8	JUNCTION	0.392	0.392	0 00:45	0.626	0.632	1.481
J9	JUNCTION	0.114	0.932	0 00:45	0.186	5.33	1.424
J10	JUNCTION	3.512	3.512	0 00:45	5.89	5.92	0.239
J11	JUNCTION	0.377	0.935	0 00:45	0.603	2.66	1.558
J12	JUNCTION	0.239	0.984	0 00:45	0.385	2.94	1.688
J13	JUNCTION	0.165	0.295	0 00:45	0.252	0.481	1.190
J14	JUNCTION	0.141	0.995	0 00:45	0.225	3	1.492
J17	JUNCTION	0.000	0.200	0 00:47	0	0.409	4.870
J18	JUNCTION	0.067	0.355	0 00:45	0.107	0.661	1.047
J19	JUNCTION	0.000	0.268	0 00:45	0	1.64	0.648
J16	OUTFALL	0.000	0.932	0 00:45	0	4.84	0.000
J20	OUTFALL	0.000	0.246	0 00:45	0	1.58	0.000
J15	STORAGE	0.283	0.617	0 00:45	0.381	2.78	-49.945

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.981	0.159
J2	JUNCTION	0.55	0.475	0.325
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.70	0.545	0.185
J5	JUNCTION	5.71	0.693	0.077
J6	JUNCTION	5.71	0.620	0.000
J7	JUNCTION	5.70	0.442	0.338
J8	JUNCTION	0.49	0.250	0.000
J9	JUNCTION	0.62	0.584	0.256

J10	JUNCTION	0.72	0.500	0.000
J11	JUNCTION	0.71	0.460	0.000
J12	JUNCTION	0.68	0.450	0.000
J13	JUNCTION	1.05	0.360	0.000
J14	JUNCTION	0.67	0.312	0.458
J17	JUNCTION	0.61	0.324	0.306
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.446	0.354
J15	STORAGE	5.91	0.640	0.460

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.48	0.301	0 00:45	0.341	0.000
J8	0.47	0.214	0 00:45	0.238	0.000
J10	0.61	2.953	0 00:45	3.899	0.000
J11	0.40	0.190	0 00:45	0.171	0.000
J12	0.01	0.194	0 00:17	0.001	0.000
J13	0.63	0.295	0 00:45	0.455	0.000
J18	0.67	0.355	0 00:45	0.651	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.828	23	0	0	2.775	35	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.272	0.932	4.843
J20	93.09	0.082	0.246	1.585
System	96.54	0.354	1.178	6.428

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.093	0 00:45	0.43	0.95	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.105	0 00:19	0.84	0.93	1.00
C5	CONDUIT	0.105	0 00:19	0.76	0.62	1.00
C7	CONDUIT	0.200	0 00:47	0.70	0.98	1.00
C8	CONDUIT	0.200	0 00:47	0.70	0.68	1.00
C9	CONDUIT	0.371	0 00:19	1.89	2.55	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.811	0 00:54	1.10	2.52	1.00
C12	CONDUIT	0.853	0 00:54	1.16	4.96	1.00
C13	CONDUIT	0.878	0 00:54	1.19	1.28	1.00
C14	CONDUIT	0.770	0 00:55	1.48	2.32	1.00
C15	CONDUIT	0.932	0 00:45	1.86	3.63	0.97
C16	CONDUIT	0.287	0 00:45	1.00	2.87	1.00
C17	CONDUIT	0.130	0 00:45	0.66	0.46	1.00
C6	CONDUIT	0.268	0 00:45	0.93	1.33	1.00
C18	CONDUIT	0.268	0 00:45	0.93	8.90	1.00
C19	CONDUIT	0.246	0 00:45	2.01	41.95	0.94

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Crit	Ltd	Inlet Ctrl	
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
	Both Ends	Upstream	Dnstream		
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.70	0.70	5.74	0.01	0.01
C4	5.71	5.71	5.79	0.01	0.01
C5	5.71	5.71	5.71	0.01	0.01
C7	0.49	0.49	0.61	0.01	0.01
C8	0.61	0.61	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.12	0.01
C10	5.71	5.71	5.91	5.98	0.46
C11	0.71	0.72	0.71	0.79	0.71
C12	0.68	0.72	0.68	0.99	0.68
C13	0.68	0.68	0.71	0.66	0.66
C14	0.61	0.67	0.61	0.90	0.61
C15	0.01	0.61	0.01	1.05	0.01
C16	5.94	5.95	5.95	0.64	0.01
C17	1.05	1.05	5.95	0.01	0.01
C6	0.70	0.70	5.70	0.43	0.43
C18	5.87	5.87	5.87	5.79	0.55
C19	0.01	0.55	0.01	5.73	0.01

Analysis begun on: Fri Jul 08 17:43:41 2016  
Analysis ended on: Fri Jul 08 17:43:42 2016  
Total elapsed time: 00:00:01

STATO ATTUALE

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

\*\*\*\*\*  
WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	65.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	40.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	



\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

\*\*\*\*\* Volume Depth

Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	1.460	70.176
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.341	16.400
Surface Runoff .....	1.093	52.557
Final Storage .....	0.026	1.238
Continuity Error (%) .....	-0.027	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.093	10.935
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.269	2.690
Flooding Loss .....	0.502	5.017
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.321	3.215
Continuity Error (%) .....	0.318	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.32%)  
Node J5 (3.18%)  
Node J17 (2.88%)  
Node J2 (2.25%)  
Node J9 (1.25%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (17.99%)  
Link C19 (17.99%)  
Link C6 (10.49%)  
Link C18 (4.51%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (15)  
Link C16 (4)  
Link C18 (3)  
Link C11 (2)  
Link C14 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.35 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.21  
Percent Not Converging : 1.75

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	70.18	0.00	0.00	12.52	56.38	0.16	0.05	0.803
S_02	70.18	0.00	0.00	12.60	56.31	0.26	0.08	0.802
S_03	70.18	0.00	0.00	13.00	55.90	0.45	0.15	0.797
S_04	70.18	0.00	0.00	13.23	55.66	0.69	0.22	0.793
S_05	70.18	0.00	0.00	13.40	55.48	0.32	0.10	0.791
S_06	70.18	0.00	0.00	12.70	56.20	0.54	0.17	0.801
S_07	70.18	0.00	0.00	12.88	56.02	0.34	0.11	0.798
S_08	70.18	0.00	0.00	13.65	55.23	0.42	0.14	0.787
S_09	70.18	0.00	0.00	12.91	55.99	0.25	0.08	0.798
S_10	70.18	0.00	0.00	12.87	56.03	0.14	0.05	0.798
S_11	70.18	0.00	0.00	24.25	45.14	0.27	0.10	0.643
S_12	70.18	0.00	0.00	12.49	56.42	0.12	0.04	0.804

S_13	70.18	0.00	0.00	13.66	55.22	0.56	0.18	0.787
S_14	70.18	0.00	0.00	41.43	28.75	0.40	0.19	0.410
S_15	70.18	0.00	0.00	3.85	64.33	0.06	0.02	0.917
S_monte	70.18	0.00	0.00	15.24	53.59	5.95	1.88	0.764

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.96	1.37	23.97	0 01:15	0.42
J2	JUNCTION	1.00	1.40	23.96	0 01:15	0.43
J3	JUNCTION	0.96	1.95	24.55	0 00:14	0.41
J4	JUNCTION	0.75	1.13	23.98	0 01:15	0.34
J5	JUNCTION	0.75	1.13	23.98	0 01:15	0.35
J6	JUNCTION	0.55	1.02	24.11	0 00:33	0.31
J7	JUNCTION	1.23	1.47	23.84	0 01:15	0.45
J8	JUNCTION	0.52	1.00	24.13	0 00:50	0.30
J9	JUNCTION	1.12	1.31	23.83	0 01:15	0.40
J10	JUNCTION	1.10	1.70	24.35	0 00:22	0.52
J11	JUNCTION	1.13	1.67	24.28	0 01:15	0.51
J12	JUNCTION	1.14	1.50	24.05	0 01:15	0.46
J13	JUNCTION	0.56	0.86	23.98	0 00:19	0.26
J14	JUNCTION	1.17	1.39	23.87	0 01:15	0.42
J17	JUNCTION	0.70	1.02	23.94	0 01:15	0.31
J18	JUNCTION	1.08	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.08	1.34	23.86	0 01:15	0.41
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.03	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.052	0.056	0 00:11	0.162	0.175	7.890
J2	JUNCTION	0.082	0.201	0 01:15	0.257	1.8	2.302
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00576	2038.510
J4	JUNCTION	0.179	0.262	0 01:15	0.557	2.02	1.306
J5	JUNCTION	0.000	0.107	0 00:33	0	0.364	3.290
J6	JUNCTION	0.146	0.146	0 01:15	0.454	0.458	1.069
J7	JUNCTION	0.000	0.413	0 00:08	0	3.78	0.688
J8	JUNCTION	0.221	0.221	0 01:15	0.687	0.692	1.467
J9	JUNCTION	0.064	0.897	0 00:01	0.204	5.99	1.270
J10	JUNCTION	2.056	2.056	0 01:15	6.5	6.53	0.227
J11	JUNCTION	0.213	0.854	0 01:21	0.661	3.8	1.095
J12	JUNCTION	0.136	0.952	0 01:15	0.423	4.29	1.182
J13	JUNCTION	0.098	0.200	0 01:15	0.273	0.578	0.988
J14	JUNCTION	0.079	0.930	0 01:14	0.246	4.29	1.045
J17	JUNCTION	0.000	0.200	0 00:51	0	0.683	2.966
J18	JUNCTION	0.038	0.281	0 01:15	0.117	0.92	0.758
J19	JUNCTION	0.000	0.195	0 01:15	0	1.73	0.608
J16	OUTFALL	0.000	0.897	0 00:01	0	5.5	0.000
J20	OUTFALL	0.000	0.201	0 01:15	0	1.74	0.000
J15	STORAGE	0.185	0.478	0 01:15	0.395	2.82	-49.945

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.767	0.373
J2	JUNCTION	0.98	0.286	0.514
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	1.15	0.377	0.353
J5	JUNCTION	5.70	0.534	0.236
J6	JUNCTION	5.69	0.620	0.000
J7	JUNCTION	5.69	0.393	0.387
J8	JUNCTION	0.88	0.250	0.000
J9	JUNCTION	1.04	0.106	0.734

J10	JUNCTION	1.14	0.500	0.000
J11	JUNCTION	1.13	0.450	0.010
J12	JUNCTION	1.11	0.255	0.195
J13	JUNCTION	1.52	0.360	0.000
J14	JUNCTION	1.09	0.139	0.631
J17	JUNCTION	1.04	0.269	0.361
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.69	0.386	0.414
J15	STORAGE	5.91	0.644	0.456

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.72	0.063	0 01:15	0.105	0.000
J8	0.42	0.027	0 01:15	0.025	0.000
J10	0.99	1.452	0 01:15	3.432	0.000
J13	1.02	0.200	0 01:15	0.546	0.000
J18	1.09	0.281	0 01:15	0.909	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.928	24	0	0	2.817	35	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.295	0.897	5.505
J20	93.14	0.088	0.201	1.742
System	96.57	0.383	1.048	7.246

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.056	0 00:11	0.43	0.57	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.107	0 00:33	0.85	0.94	1.00
C5	CONDUIT	0.107	0 00:33	0.76	0.64	1.00
C7	CONDUIT	0.200	0 00:51	0.70	0.98	1.00
C8	CONDUIT	0.200	0 00:51	0.70	0.68	1.00
C9	CONDUIT	0.331	0 00:24	1.69	2.27	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.804	0 01:21	1.09	2.50	1.00
C12	CONDUIT	0.853	0 01:21	1.16	4.96	1.00
C13	CONDUIT	0.875	0 00:23	1.19	1.28	1.00
C14	CONDUIT	0.757	0 01:22	1.48	2.28	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.244	0 01:15	0.85	2.44	1.00
C17	CONDUIT	0.102	0 01:15	0.52	0.36	1.00
C6	CONDUIT	0.195	0 01:15	0.73	0.97	1.00
C18	CONDUIT	0.195	0 01:15	0.82	6.47	1.00
C19	CONDUIT	0.201	0 01:15	1.68	34.29	0.90

Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	----- Up		Fraction of		Time in Flow Class					
		Dry	Dry	Down	Sub	Sup	Up	Down	Norm	Inlet	
				Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl	
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	

\*\*\*\*\*  
Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	----- Both Ends		Hours Full		----- Above Full		Hours	
			Upstream	Dnstream	Normal Flow	Capacity	Limited	
C1	5.74	5.74	5.75	0.01	0.01			
C2	5.74	5.74	5.76	0.01	0.01			
C3	1.15	1.15	5.74	0.01	0.01			
C4	5.69	5.69	5.79	0.01	0.01			
C5	5.69	5.69	5.70	0.01	0.01			
C7	0.88	0.88	1.04	0.01	0.01			
C8	1.04	1.04	5.69	0.01	0.01			
C9	5.91	5.91	5.97	1.47	0.01			
C10	5.70	5.70	5.91	5.90	0.83			
C11	1.13	1.14	1.13	1.21	1.13			
C12	1.11	1.14	1.11	1.42	1.10			
C13	1.11	1.11	1.14	1.06	1.06			
C14	1.04	1.09	1.04	1.32	1.03			
C15	0.01	1.03	0.01	1.50	0.01			
C16	5.94	5.95	5.95	1.03	0.01			
C17	1.52	1.52	5.95	0.01	0.01			
C6	1.15	1.15	5.69	0.01	0.01			
C18	5.87	5.87	5.80	0.99				
C19	0.01	0.98	0.01	5.73	0.01			

Analysis begun on: Fri Jul 08 17:42:28 2016  
Analysis ended on: Fri Jul 08 17:42:29 2016  
Total elapsed time: 00:00:01

Progetto: Secondo Regolamento Urbanistico del Comune di Empoli - PUA 2.6 UMI 1 e UMI 2 - Verifica degli effetti della trasformazione sul sistema fognario in occasione di eventi pluviometrici intensi  
Elaborato: Relazione idrologica ed idraulica di verifica del sistema di fognatura bianca  
Ubicazione: Via Guido Reni, Via San Mamante - Comune di Empoli (FI)  
Data: Luglio 2016

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## **ALLEGATO 4. Risultati del modello SWMM stato di progetto**

STATO DI PROGETTO - CARATTERISTICHE E PARAMETRI DEL MODELLO

[TITLE]							
;;Project Title/Notes							
[OPTIONS]							
;;Option	Value						
FLOW_UNITS	CMS						
INFILTRATION	HORTON						
FLOW_ROUTING	DYNWAVE						
LINK_OFFSETS	DEPTH						
MIN_SLOPE	0						
ALLOW_PONDING	NO						
SKIP_STEADY_STATE	NO						
START_DATE	06/20/2016						
START_TIME	00:00:00						
REPORT_START_DATE	06/20/2016						
REPORT_START_TIME	00:00:00						
END_DATE	06/20/2016						
END_TIME	06:00:00						
SWEEP_START	01/01						
SWEEP_END	12/31						
DRY_DAYS	0						
REPORT_STEP	00:01:00						
WET_STEP	00:01:00						
DRY_STEP	00:01:00						
ROUTING_STEP	0:00:05						
INERTIAL DAMPING	PARTIAL						
NORMAL_FLOW_LIMITED	BOTH						
FORCE_MAIN_EQUATION	D-W						
VARIABLE_STEP	0.75						
LENGTHENING_STEP	0						
MIN_SURFAREA	1.14						
MAX_TRIALS	8						
HEAD_TOLERANCE	0.0015						
SYS_FLOW_TOL	5						
LAT_FLOW_TOL	5						
MINIMUM_STEP	0.5						
THREADS	1						
[EVAPORATION]							
;;Data Source	Parameters						
-----							
CONSTANT	0.0						
DRY_ONLY	NO						
[RAINGAGES]							
;;Name	Format	Interval	SCF	Source			
-----							
RG1	VOLUME	00:15	1.0	TIMESERIES icTR200TP01.00h			
[SUBCATCHMENTS]							
;;Name	Rain Gage	Outlet	Area	%Imperv	Width	%Slope	CurbLen
-----							
S_01	RG1	J1	0.2879	65	67	0.5	0
S_02	RG1	J2	0.4569	65	99	0.5	0
S_03	RG1	J6	0.8115	65	124	0.5	0
S_04	RG1	J8	1.2335	56	158	0.5	0
S_05	RG1	J11	0.5722	65	65	0.5	0
S_06	RG1	J10	0.9682	65	190	0.5	0
S_07	RG1	J11	0.6131	65	103	0.5	0
S_08	RG1	J12	0.7655	65	74	0.5	0
S_09	RG1	J14	0.4392	65	72	0.5	0
S_10	RG1	J9	0.2533	65	43	0.5	0
S_11	RG1	J13	0.6049	60	75	0.5	0
S_12	RG1	J18	0.2079	65	50	0.5	0
S_13	RG1	J4	1.0086	65	97	0.5	0
S_14	RG1	J15	1.3757	0	236	0.5	0
S_15	RG1	J9	0.097	90	3	0.5	0
S_monte	RG1	J10	11.1103	65	470	0.5	0
[SUBAREAS]							
;;Subcatchment	N-Imperv	N-Perv	S-Imperv	S-Perv	PctZero	RouteTo	PctRouted
-----							
S_01	0.011	0.13	2	3	0	OUTLET	
S_02	0.011	0.13	2	3	0	OUTLET	
S_03	0.011	0.13	2	3	0	OUTLET	
S_04	0.011	0.13	2	3	0	OUTLET	
S_05	0.011	0.13	2	3	0	OUTLET	
S_06	0.011	0.13	2	3	0	OUTLET	
S_07	0.011	0.13	2	3	0	OUTLET	
S_08	0.011	0.13	2	3	0	OUTLET	
S_09	0.011	0.13	2	3	0	OUTLET	
S_10	0.011	0.13	2	3	0	OUTLET	

S_11	0.011	0.13	2	3	0	OUTLET		
S_12	0.011	0.13	2	3	0	OUTLET		
S_13	0.011	0.13	2	3	0	OUTLET		
S_14	0.011	0.13	2	3	0	OUTLET		
S_15	0.011	0.13	2	3	0	OUTLET		
S_monte	0.011	0.13	2	3	0	OUTLET		
[INFILTRATION]								
;;Subcatchment	MaxRate	MinRate	Decay	DryTime	MaxInfil			
-----								
S_01	76	13	4.14	7	0			
S_02	76	13	4.14	7	0			
S_03	76	13	4.14	7	0			
S_04	76	13	4.14	7	0			
S_05	76	13	4.14	7	0			
S_06	76	13	4.14	7	0			
S_07	76	13	4.14	7	0			
S_08	76	13	4.14	7	0			
S_09	76	13	4.14	7	0			
S_10	76	13	4.14	7	0			
S_11	76	13	4.14	7	0			
S_12	76	13	4.14	7	0			
S_13	76	13	4.14	7	0			
S_14	76	13	4.14	7	0			
S_15	76	13	4.14	7	0			
S_monte	76	13	4.14	7	0			
[JUNCTIONS]								
;;Name	Elevation	MaxDepth	InitDepth	SurDepth	Aponded			
-----								
J1	22.6	1.74	0	0	0			
J2	22.56	1.91	0	0	0			
J3	22.6	1.95	0	0	0			
J4	22.85	1.48	0	0	0			
J5	22.85	1.37	0	0	0			
J6	23.09	1.02	0	0	0			
J7	22.37	1.86	0	0	0			
J8	23.13	1	0	0	0			
J9	22.52	2.04	0	0	0			
J10	22.65	1.7	0	0	0			
J11	22.61	1.68	0	0	0			
J12	22.55	1.7	0	0	0			
J13	23.12	0.86	0	0	0			
J14	22.48	2.02	0	0	0			
J17	22.92	1.38	0	0	0			
J18	22.55	1.2	0	0	0			
J19	22.52	1.75	0	0	0			
[OUTFALLS]								
;;Name	Elevation	Type	Stage Data	Gated	Route To			
-----								
J16	22.42	FIXED	23.62	NO				
J20	22.56	FREE		NO				
[STORAGE]								
;;Name	Elev.	MaxDepth	InitDepth	Shape	Curve Name/Params	N/A	Fevap	Psi
-----								
Ksat	IMD							
-----								
J15	22.46	1.60	0	TABULAR	ZonaviaSanzio	0	0	
[CONDUITS]								
;;Name	From Node	To Node	Length	Roughness	InOffset	OutOffset	InitFlow	MaxFlow
-----								
C1	J1	J2	81.4	0.018	0	0	0	0
C2	J3	J2	74.5	0.014	0	0.31	0	0
C3	J2	J4	89.2	0.018	0	0	0	0
C4	J6	J5	69.1	0.014	0	0	0	0
C5	J5	J4	34.3	0.014	0	0.03	0	0
C7	J8	J17	97.9	0.018	0	0	0	0
C8	J17	J7	49.3	0.018	0	0.33	0	0
C9	J7	J15	31.5	0.018	0	0	0	0
C10	J7	J9	89.9	0.018	0.15	0	0	0
C11	J10	J11	45.8	0.018	0	0.02	0	0
C12	J11	J12	80.2	0.018	0	0.05	0	0
C13	J12	J14	61	0.018	0.05	0	0	0
C14	J14	J9	21.5	0.018	0.05	0	0	0
C15	J9	J16	72.1	0.018	0	0.08	0	0
C16	J18	J14	38.7	0.018	0	0.05	0	0
C17	J13	J12	53.8	0.018	0	0	0	0
C6	J4	J19	61.6	0.018	0	0.2	0	0
C18	J19	J7	6.5	0.018	0	0.15	0	0
C19	J2	J20	20	0.018	0.71	0.71	0	0
[XSECTIONS]								
;;Link	Shape	Geom1	Geom2	Geom3	Geom4	Barrels	Culvert	
-----								

C1	CIRCULAR	0.6	0	0	0	1
C2	CIRCULAR	0.4	0	0	0	1
C3	EGG	0.75	0	0	0	1
C4	CIRCULAR	0.4	0	0	0	1
C5	CIRCULAR	0.6	0	0	0	1
C7	EGG	0.75	0	0	0	1
C8	EGG	0.75	0	0	0	1
C9	CIRCULAR	0.5	0	0	0	1
C10	EGG	0.9	0	0	0	1
C11	EGG	1.2	0	0	0	1
C12	EGG	1.2	0	0	0	1
C13	EGG	1.2	0	0	0	1
C14	EGG	1.2	0	0	0	1
C15	EGG	1.2	0	0	0	1
C16	EGG	0.75	0	0	0	1
C17	CIRCULAR	0.5	0	0	0	1
C6	EGG	0.75	0	0	0	1
C18	EGG	0.75	0	0	0	1
C19	CIRCULAR	0.4	0	0	0	1

[CURVES]			
;;Name	Type	X-Value	Y-Value
;-----			
ZonaviaSanzio	Storage	0	0
ZonaviaSanzio		0.2	55
ZonaviaSanzio		0.4	145
ZonaviaSanzio		0.6	255
ZonaviaSanzio		0.8	1285
ZonaviaSanzio		1	9875
ZonaviaSanzio		1.2	10965
ZonaviaSanzio		1.4	11115
ZonaviaSanzio		1.6	12565

[TIMESERIES]			
;;Name	Date	Time	Value
;-----			
;TR 20 anni, durata di pioggia 15 minuti			
icTR20TP00.25h		00:00	0
icTR20TP00.25h		00:15	31.02
;			
;TR 20 anni pioggia 30 minuti			
icTR20TP00.50h		00:00	0
icTR20TP00.50h		00:15	20.785
icTR20TP00.50h		00:30	20.785
;			
;TR 20 anni pioggia 1 ora			
icTR20TP01.00h		00:00	0
icTR20TP01.00h		00:15	11.575
icTR20TP01.00h		00:30	11.575
icTR20TP01.00h		00:45	11.575
icTR20TP01.00h		01:00	11.575
;			
icTR200TP00.25h		00:00	0
icTR200TP00.25h		00:15	47.01
;			
icTR200TP00.50h		00:00	0
icTR200TP00.50h		00:15	31.474
icTR200TP00.50h		00:30	31.474
;			
icTR200TP01.00h		00:00	0
icTR200TP01.00h		00:15	17.544
icTR200TP01.00h		00:30	17.544
icTR200TP01.00h		00:45	17.544
icTR200TP01.00h		01:00	17.544

[REPORT]	
;;Reporting Options	
INPUT	YES
CONTROLS	NO
SUBCATCHMENTS	ALL
NODES	ALL
LINKS	ALL

## STATO DI PROGETTO

## TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 15 MINUTI

## CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary

Name	Data Source	Data Type	Recording Interval
-----			
RG1	icTR20TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
-----						
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
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J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	0.645	31.020
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.215	10.324
Surface Runoff .....	0.406	19.502
Final Storage .....	0.026	1.232
Continuity Error (%) .....	-0.123	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.405	4.054
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.249	2.490
Flooding Loss .....	0.152	1.523
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.031
Continuity Error (%) .....	0.236	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (58.33%)  
Node J2 (4.78%)  
Node J17 (1.46%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C18 (46.34%)  
Link C14 (5.83%)  
Link C19 (2.12%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C16 (3)  
Link C2 (3)  
Link C1 (2)  
Link C18 (2)  
Link C5 (1)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 3.54 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.19  
Percent Not Converging : 1.31

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	31.02	0.00	0.00	7.85	21.94	0.06	0.08	0.707
S_02	31.02	0.00	0.00	7.92	21.87	0.10	0.13	0.705
S_03	31.02	0.00	0.00	8.27	21.50	0.17	0.22	0.693
S_04	31.02	0.00	0.00	10.92	19.02	0.23	0.29	0.613
S_05	31.02	0.00	0.00	8.58	21.18	0.12	0.15	0.683
S_06	31.02	0.00	0.00	8.02	21.76	0.21	0.27	0.702
S_07	31.02	0.00	0.00	8.18	21.60	0.13	0.17	0.696
S_08	31.02	0.00	0.00	8.74	21.01	0.16	0.20	0.677
S_09	31.02	0.00	0.00	8.20	21.57	0.09	0.12	0.695
S_10	31.02	0.00	0.00	8.17	21.61	0.05	0.07	0.697
S_11	31.02	0.00	0.00	9.86	20.01	0.12	0.15	0.645
S_12	31.02	0.00	0.00	7.82	21.97	0.05	0.06	0.708
S_13	31.02	0.00	0.00	8.75	21.00	0.21	0.26	0.677
S_14	31.02	0.00	0.00	26.32	4.71	0.06	0.09	0.152

S_15	31.02	0.00	0.00	2.47	26.61	0.03	0.02	0.858
S_monte	31.02	0.00	0.00	9.52	20.18	2.24	2.49	0.650

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.45	1.74	24.34	0 00:22	0.46
J2	JUNCTION	0.49	1.91	24.47	0 00:22	0.47
J3	JUNCTION	0.45	1.95	24.55	0 00:21	0.45
J4	JUNCTION	0.21	1.48	24.33	0 00:22	0.38
J5	JUNCTION	0.21	1.37	24.22	0 00:22	0.37
J6	JUNCTION	0.10	1.02	24.11	0 00:22	0.31
J7	JUNCTION	0.54	1.62	23.99	0 00:23	0.49
J8	JUNCTION	0.09	1.00	24.13	0 00:23	0.30
J9	JUNCTION	0.38	1.24	23.76	0 00:30	0.38
J10	JUNCTION	0.35	1.70	24.35	0 00:19	0.52
J11	JUNCTION	0.37	1.68	24.29	0 00:19	0.51
J12	JUNCTION	0.39	1.50	24.05	0 00:30	0.46
J13	JUNCTION	0.09	0.86	23.98	0 00:20	0.26
J14	JUNCTION	0.42	1.35	23.83	0 00:23	0.41
J17	JUNCTION	0.15	1.38	24.30	0 00:22	0.42
J18	JUNCTION	0.36	1.20	23.75	0 00:20	0.37
J19	JUNCTION	0.40	1.49	24.01	0 00:23	0.45
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.44	0.88	23.34	0 00:46	0.27

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.081	0.091	0 00:20	0.0631	0.0651	8.806
J2	JUNCTION	0.128	0.320	0 00:22	0.0998	0.219	5.019
J3	JUNCTION	0.000	0.135	0 00:21	0	0.00571	139.955
J4	JUNCTION	0.258	0.361	0 00:22	0.212	0.354	0.640
J5	JUNCTION	0.000	0.174	0 00:22	0	0.107	-0.262
J6	JUNCTION	0.219	0.219	0 00:30	0.174	0.174	-0.143
J7	JUNCTION	0.000	0.614	0 00:21	0	1.07	-0.116
J8	JUNCTION	0.293	0.293	0 00:30	0.235	0.234	-0.617
J9	JUNCTION	0.093	1.399	0 00:20	0.0805	2.43	0.222
J10	JUNCTION	2.753	2.753	0 00:30	2.45	2.45	0.274
J11	JUNCTION	0.317	1.231	0 00:20	0.253	1.54	0.299
J12	JUNCTION	0.196	1.335	0 00:20	0.161	1.72	0.151
J13	JUNCTION	0.151	0.251	0 00:30	0.121	0.172	-0.510
J14	JUNCTION	0.119	1.400	0 00:20	0.0947	1.78	0.006
J17	JUNCTION	0.000	0.230	0 00:22	0	0.21	1.483
J18	JUNCTION	0.059	0.257	0 00:30	0.0457	0.142	-0.202
J19	JUNCTION	0.000	0.281	0 00:30	0	0.294	-0.912
J16	OUTFALL	0.000	1.082	0 00:30	0	2.33	0.000
J20	OUTFALL	0.000	0.241	0 00:22	0	0.165	0.000
J15	STORAGE	0.094	0.479	0 00:23	0.0648	0.473	-0.496

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	0.85	1.140	0.000
J2	JUNCTION	0.17	0.800	0.000
J3	JUNCTION	1.53	1.550	0.000
J4	JUNCTION	0.22	0.730	0.000
J5	JUNCTION	0.31	0.770	0.000
J6	JUNCTION	0.32	0.620	0.000
J7	JUNCTION	0.31	0.540	0.240
J8	JUNCTION	0.14	0.250	0.000
J9	JUNCTION	0.13	0.044	0.796
J10	JUNCTION	0.32	0.500	0.000
J11	JUNCTION	0.31	0.460	0.000

J12	JUNCTION	0.28	0.254	0.196
J13	JUNCTION	0.33	0.360	0.000
J14	JUNCTION	0.21	0.100	0.670
J17	JUNCTION	0.17	0.630	0.000
J18	JUNCTION	0.47	0.450	0.000
J19	JUNCTION	0.29	0.543	0.257
J15	STORAGE	1.51	0.381	0.719

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.01	0.018	0 00:22	0.000	0.000
J2	0.01	0.183	0 00:22	0.001	0.000
J3	0.01	0.117	0 00:21	0.001	0.000
J4	0.01	0.197	0 00:22	0.000	0.000
J5	0.01	0.022	0 00:22	0.000	0.000
J6	0.15	0.174	0 00:30	0.068	0.000
J8	0.13	0.118	0 00:23	0.026	0.000
J10	0.27	2.193	0 00:30	1.159	0.000
J11	0.07	0.082	0 00:19	0.004	0.000
J13	0.25	0.251	0 00:30	0.139	0.000
J17	0.01	0.175	0 00:22	0.001	0.000
J18	0.20	0.257	0 00:30	0.125	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.104	1	0	0	0.466	6	0 00:46	0.147

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.73	0.163	1.082	2.326
J20	9.94	0.107	0.241	0.165
System	53.34	0.270	1.313	2.490

\*\*\*\*\*  
Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.081	0 00:30	0.29	0.82	1.00
C2	CONDUIT	0.135	0 00:21	1.09	1.16	1.00
C3	CONDUIT	0.147	0 00:22	0.68	0.59	1.00
C4	CONDUIT	0.174	0 00:22	1.38	1.53	1.00
C5	CONDUIT	0.170	0 00:22	0.67	1.01	1.00
C7	CONDUIT	0.230	0 00:22	1.06	1.13	1.00
C8	CONDUIT	0.219	0 00:25	1.07	0.75	1.00
C9	CONDUIT	0.459	0 00:23	2.34	3.15	1.00
C10	CONDUIT	0.401	0 00:21	1.06	30.44	1.00
C11	CONDUIT	1.037	0 00:20	1.41	3.22	1.00
C12	CONDUIT	1.230	0 00:20	1.71	7.15	1.00
C13	CONDUIT	1.276	0 00:20	1.84	1.87	1.00
C14	CONDUIT	1.343	0 00:20	2.61	4.04	1.00
C15	CONDUIT	1.082	0 00:30	1.71	4.22	0.82
C16	CONDUIT	0.199	0 00:30	0.69	1.99	1.00
C17	CONDUIT	0.102	0 00:20	0.59	0.36	1.00
C6	CONDUIT	0.281	0 00:30	0.98	1.39	1.00
C18	CONDUIT	0.281	0 00:30	0.98	9.33	1.00



C19 CONDUIT 0.241 0 00:22 1.97 41.12 0.94

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Up		Down		Sub		Sup		in Flow Class		Norm Ltd	Inlet Ctrl
		Dry	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Crit	Crit		
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
C4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00
C5	1.00	0.03	0.00	0.00	0.86	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.63	0.00	0.00	0.00
C8	1.00	0.03	0.00	0.00	0.60	0.00	0.00	0.37	0.18	0.00	0.00	0.00	0.00
C9	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.42	0.00	0.00	0.00	0.00
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.82	0.00	0.00	0.00
C6	1.00	0.03	0.00	0.00	0.57	0.00	0.00	0.40	0.08	0.00	0.00	0.00	0.00
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.90	0.00	0.00	0.00	0.00	0.00	0.10	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full		Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow	
C1	0.85	0.85	1.05	0.01	0.01
C2	0.55	0.55	1.53	0.01	0.01
C3	0.22	0.22	0.45	0.01	0.01
C4	0.32	0.32	0.63	0.05	0.04
C5	0.29	0.29	0.31	0.01	0.01
C7	0.14	0.14	0.17	0.14	0.13
C8	0.17	0.17	0.31	0.01	0.01
C9	1.51	1.51	1.75	0.48	0.13
C10	0.32	0.33	0.34	2.02	0.16
C11	0.31	0.32	0.31	0.44	0.31
C12	0.28	0.32	0.28	0.56	0.28
C13	0.25	0.28	0.25	0.32	0.25
C14	0.13	0.21	0.13	0.45	0.13
C15	0.01	0.13	0.01	0.73	0.01
C16	0.47	0.47	0.49	0.14	0.01
C17	0.33	0.33	1.21	0.01	0.01
C6	0.22	0.22	0.29	0.15	0.15
C18	0.55	0.55	0.55	0.45	0.38
C19	0.01	0.17	0.01	0.37	0.01

Analysis begun on: Thu Sep 15 11:00:34 2016  
Analysis ended on: Thu Sep 15 11:00:35 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

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WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19  
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\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP00.50h	VOLUME	15 min.

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Subcatchment Summary  
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options  
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Flow Units ..... CMS  
Process Models:  
  Rainfall/Runoff ..... YES  
  RDII ..... NO  
  Snowmelt ..... NO  
  Groundwater ..... NO  
  Flow Routing ..... YES  
  Ponding Allowed ..... NO  
  Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	0.865	41.570
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.267	12.837
Surface Runoff .....	0.573	27.523
Final Storage .....	0.026	1.234
Continuity Error (%) .....	-0.059	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.572	5.725
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.367	3.672
Flooding Loss .....	0.202	2.017
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.032
Continuity Error (%) .....	0.063	

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Highest Continuity Errors  
\*\*\*\*\*  
Node J3 (61.24%)  
Node J2 (3.20%)

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Time-Step Critical Elements  
\*\*\*\*\*  
Link C18 (31.61%)  
Link C14 (18.04%)  
Link C19 (2.11%)

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Highest Flow Instability Indexes  
\*\*\*\*\*  
Link C16 (4)  
Link C18 (3)  
Link C2 (2)  
Link C1 (2)  
Link C5 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*  
Minimum Time Step : 0.50 sec  
Average Time Step : 3.58 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.18  
Percent Not Converging : 1.64

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	41.57	0.00	0.00	9.84	30.48	0.09	0.06	0.733
S_02	41.57	0.00	0.00	9.91	30.40	0.14	0.09	0.731
S_03	41.57	0.00	0.00	10.28	30.02	0.24	0.16	0.722
S_04	41.57	0.00	0.00	13.51	26.96	0.33	0.22	0.649
S_05	41.57	0.00	0.00	10.62	29.67	0.17	0.11	0.714
S_06	41.57	0.00	0.00	10.01	30.30	0.29	0.19	0.729
S_07	41.57	0.00	0.00	10.17	30.13	0.18	0.12	0.725
S_08	41.57	0.00	0.00	10.81	29.47	0.23	0.14	0.709
S_09	41.57	0.00	0.00	10.20	30.10	0.13	0.09	0.724
S_10	41.57	0.00	0.00	10.16	30.14	0.08	0.05	0.725
S_11	41.57	0.00	0.00	12.20	28.20	0.17	0.11	0.678
S_12	41.57	0.00	0.00	9.81	30.51	0.06	0.04	0.734
S_13	41.57	0.00	0.00	10.82	29.46	0.30	0.19	0.709
S_14	41.57	0.00	0.00	32.62	8.95	0.12	0.11	0.215
S_15	41.57	0.00	0.00	3.05	36.56	0.04	0.02	0.879

S\_monte 41.57 0.00 0.00 11.87 28.37 3.15 1.91 0.682

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.55	1.49	24.09	0 00:25	0.41
J2	JUNCTION	0.59	1.59	24.15	0 00:25	0.42
J3	JUNCTION	0.54	1.95	24.55	0 00:23	0.41
J4	JUNCTION	0.31	1.35	24.20	0 00:25	0.34
J5	JUNCTION	0.31	1.37	24.22	0 00:25	0.34
J6	JUNCTION	0.21	1.02	24.11	0 00:24	0.31
J7	JUNCTION	0.64	1.58	23.95	0 00:25	0.43
J8	JUNCTION	0.18	1.00	24.13	0 00:26	0.30
J9	JUNCTION	0.48	1.22	23.74	0 00:45	0.37
J10	JUNCTION	0.52	1.70	24.35	0 00:22	0.52
J11	JUNCTION	0.53	1.67	24.28	0 00:45	0.51
J12	JUNCTION	0.52	1.47	24.02	0 00:45	0.45
J13	JUNCTION	0.19	0.86	23.98	0 00:22	0.26
J14	JUNCTION	0.53	1.32	23.80	0 00:45	0.40
J17	JUNCTION	0.24	1.38	24.30	0 00:25	0.30
J18	JUNCTION	0.46	1.20	23.75	0 00:25	0.37
J19	JUNCTION	0.50	1.43	23.95	0 00:25	0.40
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.49	0.93	23.39	0 01:00	0.28

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.058	0.067	0 00:21	0.0877	0.0899	6.229
J2	JUNCTION	0.092	0.236	0 00:25	0.139	0.332	3.303
J3	JUNCTION	0.000	0.107	0 00:23	0	0.00566	158.031
J4	JUNCTION	0.189	0.279	0 00:45	0.297	0.532	0.375
J5	JUNCTION	0.000	0.118	0 00:25	0	0.199	-0.154
J6	JUNCTION	0.159	0.159	0 00:45	0.244	0.243	-0.127
J7	JUNCTION	0.000	0.529	0 00:23	0	1.61	-0.010
J8	JUNCTION	0.219	0.219	0 00:45	0.332	0.332	-0.455
J9	JUNCTION	0.070	1.256	0 00:23	0.112	3.51	0.128
J10	JUNCTION	2.100	2.100	0 00:45	3.45	3.44	0.119
J11	JUNCTION	0.230	1.058	0 00:22	0.354	2.24	0.143
J12	JUNCTION	0.144	1.212	0 00:22	0.226	2.5	0.016
J13	JUNCTION	0.111	0.189	0 00:45	0.171	0.247	-0.240
J14	JUNCTION	0.086	1.279	0 00:23	0.132	2.57	0.025
J17	JUNCTION	0.000	0.218	0 00:45	0	0.334	0.877
J18	JUNCTION	0.042	0.204	0 00:45	0.0634	0.224	-0.110
J19	JUNCTION	0.000	0.230	0 00:45	0	0.426	-0.520
J16	OUTFALL	0.000	1.053	0 00:45	0	3.39	0.000
J20	OUTFALL	0.000	0.198	0 00:45	0	0.28	0.000
J15	STORAGE	0.112	0.428	0 00:45	0.123	0.742	-0.336

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Node Surcharge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.31	0.894	0.246
J2	JUNCTION	0.37	0.480	0.320
J3	JUNCTION	2.12	1.550	0.000
J4	JUNCTION	0.43	0.597	0.133
J5	JUNCTION	0.53	0.770	0.000
J6	JUNCTION	0.50	0.620	0.000
J7	JUNCTION	0.51	0.501	0.279
J8	JUNCTION	0.32	0.250	0.000
J9	JUNCTION	0.13	0.018	0.822
J10	JUNCTION	0.53	0.500	0.000
J11	JUNCTION	0.52	0.445	0.015
J12	JUNCTION	0.49	0.224	0.226

J13	JUNCTION	0.55	0.360	0.000
J14	JUNCTION	0.40	0.073	0.697
J17	JUNCTION	0.37	0.630	0.000
J18	JUNCTION	0.73	0.450	0.000
J19	JUNCTION	0.50	0.477	0.323
J15	STORAGE	2.09	0.427	0.673

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.101	0 00:23	0.000	0.000
J5	0.01	0.025	0 00:25	0.000	0.000
J6	0.34	0.069	0 00:45	0.045	0.000
J8	0.01	0.042	0 00:26	0.000	0.000
J10	0.47	1.468	0 00:45	1.559	0.000
J13	0.44	0.188	0 00:45	0.207	0.000
J17	0.01	0.083	0 00:25	0.000	0.000
J18	0.39	0.204	0 00:45	0.206	0.000

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Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.151	2	0	0	0.726	9	0 01:00	0.170

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.58	0.274	1.053	3.392
J20	23.20	0.134	0.198	0.280
System	59.89	0.408	1.251	3.672

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Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.058	0 00:45	0.21	0.59	1.00
C2	CONDUIT	0.107	0 00:23	0.99	0.92	1.00
C3	CONDUIT	0.125	0 00:25	0.60	0.50	1.00
C4	CONDUIT	0.118	0 00:25	0.95	1.04	1.00
C5	CONDUIT	0.127	0 00:25	0.53	0.75	1.00
C7	CONDUIT	0.218	0 00:45	0.91	1.07	1.00
C8	CONDUIT	0.218	0 00:45	1.00	0.74	1.00
C9	CONDUIT	0.400	0 00:26	2.04	2.74	1.00
C10	CONDUIT	0.383	0 00:23	0.98	29.09	1.00
C11	CONDUIT	0.909	0 00:22	1.24	2.82	1.00
C12	CONDUIT	1.058	0 00:22	1.44	6.15	1.00
C13	CONDUIT	1.191	0 00:23	1.68	1.74	1.00
C14	CONDUIT	1.215	0 00:23	2.01	3.66	1.00
C15	CONDUIT	1.053	0 00:45	1.68	4.10	0.82
C16	CONDUIT	0.162	0 00:45	0.57	1.62	1.00
C17	CONDUIT	0.077	0 00:45	0.50	0.28	1.00
C6	CONDUIT	0.230	0 00:45	0.82	1.14	1.00
C18	CONDUIT	0.230	0 00:45	0.80	7.63	1.00
C19	CONDUIT	0.198	0 00:45	1.66	33.76	0.90

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Flow Classification Summary

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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ld	Inlet Ctrl	
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.64	0.00	
C5	1.00	0.03	0.00	0.00	0.93	0.00	0.04	0.00	0.00	0.00	
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.54	0.00	
C8	1.00	0.03	0.00	0.00	0.66	0.00	0.00	0.31	0.17	0.00	
C9	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C13	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.33	0.00	
C14	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	
C16	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.77	0.00	
C6	1.00	0.03	0.00	0.00	0.63	0.00	0.00	0.34	0.08	0.00	
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C19	1.00	0.76	0.00	0.00	0.00	0.00	0.00	0.24	0.00	0.00	

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Conduit Surcharge Summary  
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Conduit	Hours Full			Hours Above Full		Hours Capacity
	Both Ends	Upstream	Dnstream	Normal Flow	Limited	
C1	1.31	1.31	1.62	0.01		0.01
C2	0.86	0.86	2.12	0.01		0.01
C3	0.43	0.43	0.75	0.01		0.01
C4	0.50	0.50	0.95	0.04		0.05
C5	0.50	0.50	0.53	0.01		0.01
C7	0.32	0.32	0.37	0.08		0.09
C8	0.37	0.37	0.51	0.01		0.01
C9	2.09	2.09	2.33	1.31		0.76
C10	0.53	0.53	0.56	2.60		0.38
C11	0.52	0.53	0.52	0.67		0.52
C12	0.49	0.53	0.49	0.81		0.49
C13	0.45	0.49	0.45	0.54		0.45
C14	0.13	0.40	0.13	0.68		0.13
C15	0.01	0.13	0.01	1.02		0.01
C16	0.73	0.73	0.76	0.28		0.01
C17	0.55	0.55	1.76	0.01		0.01
C6	0.43	0.43	0.50	0.32		0.33
C18	0.86	0.86	0.86	0.64		0.58
C19	0.01	0.37	0.01	0.60		0.01

Analysis begun on: Thu Sep 15 11:00:52 2016  
Analysis ended on: Thu Sep 15 11:00:53 2016  
Total elapsed time: 00:00:01

## STATO DI PROGETTO

### TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 60 MINUTI

### CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
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Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

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Raingage Summary  
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Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP01.00h	VOLUME	15 min.

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Subcatchment Summary  
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
*****	-----	-----
Total Precipitation .....	0.963	46.300
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.315	15.144
Surface Runoff .....	0.623	29.929
Final Storage .....	0.026	1.238
Continuity Error (%) .....	-0.023	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.623	6.227
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.520	5.203
Flooding Loss .....	0.099	0.990
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.003	0.034
Continuity Error (%) .....	0.001	

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Highest Continuity Errors

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Node J3 (64.64%)  
Node J2 (2.68%)

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Time-Step Critical Elements

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Link C18 (30.81%)  
Link C14 (25.86%)

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Highest Flow Instability Indexes

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Link C16 (5)  
Link C2 (3)  
Link C1 (3)  
Link C18 (3)  
Link C5 (2)

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Routing Time Step Summary

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Minimum Time Step : 0.50 sec  
Average Time Step : 3.50 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.14  
Percent Not Converging : 0.91

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	46.30	0.00	0.00	12.06	32.96	0.09	0.03	0.712
S_02	46.30	0.00	0.00	12.12	32.90	0.15	0.05	0.711
S_03	46.30	0.00	0.00	12.43	32.58	0.26	0.09	0.704
S_04	46.30	0.00	0.00	16.13	29.05	0.36	0.13	0.628
S_05	46.30	0.00	0.00	12.72	32.28	0.18	0.06	0.697
S_06	46.30	0.00	0.00	12.20	32.81	0.32	0.11	0.709
S_07	46.30	0.00	0.00	12.34	32.67	0.20	0.07	0.706
S_08	46.30	0.00	0.00	12.89	32.11	0.25	0.08	0.693
S_09	46.30	0.00	0.00	12.36	32.65	0.14	0.05	0.705
S_10	46.30	0.00	0.00	12.33	32.68	0.08	0.03	0.706
S_11	46.30	0.00	0.00	14.59	30.51	0.18	0.06	0.659
S_12	46.30	0.00	0.00	12.03	32.99	0.07	0.02	0.712
S_13	46.30	0.00	0.00	12.89	32.10	0.32	0.11	0.693
S_14	46.30	0.00	0.00	38.34	7.96	0.11	0.07	0.172
S_15	46.30	0.00	0.00	3.65	40.66	0.04	0.01	0.878

S\_monte 46.30 0.00 0.00 13.82 31.13 3.46 1.10 0.672

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.59	1.43	24.03	0 00:28	0.35
J2	JUNCTION	0.62	1.18	23.74	0 01:15	0.36
J3	JUNCTION	0.58	1.95	24.55	0 00:27	0.35
J4	JUNCTION	0.35	0.91	23.76	0 01:15	0.28
J5	JUNCTION	0.35	0.91	23.76	0 01:15	0.28
J6	JUNCTION	0.22	1.02	24.11	0 00:30	0.25
J7	JUNCTION	0.72	1.31	23.68	0 01:15	0.40
J8	JUNCTION	0.19	0.66	23.79	0 01:15	0.20
J9	JUNCTION	0.55	1.16	23.68	0 01:15	0.35
J10	JUNCTION	0.64	1.70	24.35	0 00:32	0.52
J11	JUNCTION	0.64	1.63	24.24	0 01:15	0.50
J12	JUNCTION	0.62	1.43	23.98	0 01:15	0.44
J13	JUNCTION	0.24	0.86	23.98	0 00:32	0.26
J14	JUNCTION	0.62	1.28	23.76	0 01:15	0.39
J17	JUNCTION	0.28	0.80	23.72	0 01:15	0.24
J18	JUNCTION	0.55	1.20	23.75	0 00:44	0.37
J19	JUNCTION	0.58	1.17	23.69	0 01:15	0.36
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.57	0.96	23.42	0 01:26	0.29

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.032	0.046	0 00:28	0.0949	0.0975	5.694
J2	JUNCTION	0.051	0.138	0 01:15	0.15	0.412	2.757
J3	JUNCTION	0.000	0.071	0 00:27	0	0.00566	182.821
J4	JUNCTION	0.108	0.197	0 01:15	0.324	0.623	0.251
J5	JUNCTION	0.000	0.090	0 01:15	0	0.265	0.128
J6	JUNCTION	0.090	0.090	0 01:15	0.264	0.264	-0.165
J7	JUNCTION	0.000	0.340	0 00:27	0	2.12	0.032
J8	JUNCTION	0.126	0.126	0 01:15	0.358	0.358	-0.358
J9	JUNCTION	0.040	1.081	0 00:32	0.122	5.12	0.064
J10	JUNCTION	1.207	1.207	0 01:15	3.78	3.78	0.054
J11	JUNCTION	0.130	0.906	0 00:32	0.385	3.4	0.000
J12	JUNCTION	0.082	1.012	0 00:32	0.246	3.71	0.040
J13	JUNCTION	0.063	0.085	0 01:15	0.185	0.199	-0.162
J14	JUNCTION	0.049	1.065	0 00:32	0.143	3.87	0.034
J17	JUNCTION	0.000	0.125	0 01:15	0	0.36	0.748
J18	JUNCTION	0.023	0.086	0 01:15	0.0686	0.128	-0.127
J19	JUNCTION	0.000	0.143	0 01:15	0	0.456	-0.338
J16	OUTFALL	0.000	0.975	0 01:15	0	4.84	0.000
J20	OUTFALL	0.000	0.138	0 01:15	0	0.358	0.000
J15	STORAGE	0.074	0.329	0 01:15	0.11	1.03	-0.275

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Node Surge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.99	0.831	0.309
J2	JUNCTION	0.53	0.071	0.729
J3	JUNCTION	2.88	1.550	0.000
J4	JUNCTION	0.77	0.155	0.575
J5	JUNCTION	0.89	0.314	0.456
J6	JUNCTION	0.87	0.620	0.000
J7	JUNCTION	0.87	0.233	0.547
J10	JUNCTION	0.88	0.500	0.000
J11	JUNCTION	0.86	0.413	0.047
J12	JUNCTION	0.80	0.184	0.266
J13	JUNCTION	0.90	0.360	0.000
J14	JUNCTION	0.73	0.028	0.742

J17	JUNCTION	0.50	0.053	0.577
J18	JUNCTION	1.13	0.450	0.000
J19	JUNCTION	0.86	0.220	0.580
J15	STORAGE	2.85	0.465	0.635

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.061	0 00:27	0.000	0.000
J6	0.01	0.018	0 00:30	0.000	0.000
J10	0.76	0.461	0 01:15	0.759	0.000
J13	0.75	0.085	0 01:15	0.135	0.000
J18	0.56	0.086	0 01:15	0.095	0.000

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Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.269	3	0	0	1.013	13	0 01:26	0.185

\*\*\*\*\*  
Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.36	0.333	0.975	4.845
J20	30.26	0.099	0.138	0.358
System	63.31	0.432	1.113	5.203

\*\*\*\*\*  
Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.038	0 00:28	0.16	0.39	1.00
C2	CONDUIT	0.071	0 00:27	0.89	0.61	1.00
C3	CONDUIT	0.066	0 00:27	0.48	0.26	1.00
C4	CONDUIT	0.090	0 01:15	0.81	0.79	1.00
C5	CONDUIT	0.090	0 01:15	0.43	0.53	1.00
C7	CONDUIT	0.125	0 01:15	0.75	0.62	0.94
C8	CONDUIT	0.127	0 01:15	0.93	0.43	1.00
C9	CONDUIT	0.316	0 00:34	1.61	2.17	1.00
C10	CONDUIT	0.275	0 00:30	0.76	20.88	1.00
C11	CONDUIT	0.809	0 00:32	1.10	2.51	1.00
C12	CONDUIT	0.906	0 00:32	1.23	5.26	1.00
C13	CONDUIT	1.011	0 00:32	1.38	1.48	1.00
C14	CONDUIT	1.053	0 00:32	1.52	3.17	0.98
C15	CONDUIT	0.975	0 01:15	1.62	3.80	0.79
C16	CONDUIT	0.063	0 01:15	0.24	0.63	1.00
C17	CONDUIT	0.046	0 00:32	0.39	0.16	1.00
C6	CONDUIT	0.143	0 01:15	0.67	0.71	1.00
C18	CONDUIT	0.143	0 01:15	0.64	4.75	1.00
C19	CONDUIT	0.138	0 01:15	1.23	23.46	0.84

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Flow Classification Summary  
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Adjusted /Actual	----- Up	Fraction of Time in Flow Class Down Sub	Sup	Up	Down	Norm	Inlet
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Conduit	Length	Dry	Dry	Dry	Crit	Crit	Crit	Crit	Ltd	Ctrl
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00
C2	1.00	0.05	0.00	0.00	0.95	0.01	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.02	0.00
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.52	0.00
C5	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.42	0.00
C8	1.00	0.03	0.00	0.00	0.75	0.00	0.00	0.22	0.17	0.00
C9	1.00	0.04	0.01	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.95	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.20	0.00
C14	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.69	0.00
C6	1.00	0.03	0.00	0.00	0.72	0.00	0.00	0.24	0.07	0.00
C18	1.00	0.03	0.00	0.00	0.95	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.69	0.00	0.00	0.00	0.00	0.00	0.31	0.00	0.00

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Conduit Surge Summary  
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Conduit	Hours Full			Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow		
C1	1.99	1.99	2.36	0.01		0.01
C2	1.31	1.31	2.88	0.01		0.01
C3	0.77	0.77	1.17	0.01		0.01
C4	0.87	0.87	1.43	0.01		0.01
C5	0.86	0.86	0.89	0.01		0.01
C7	0.01	0.01	0.50	0.01		0.01
C8	0.50	0.50	0.87	0.01		0.01
C9	2.85	2.85	3.09	2.13		1.20
C10	0.89	0.91	0.91	3.23		0.29
C11	0.86	0.88	0.86	1.05		0.86
C12	0.80	0.87	0.80	1.22		0.80
C13	0.77	0.80	0.77	0.89		0.77
C14	0.01	0.73	0.01	1.07		0.01
C15	0.01	0.01	0.01	1.46		0.01
C16	1.13	1.13	1.16	0.01		0.01
C17	0.90	0.90	2.50	0.01		0.01
C6	0.77	0.77	0.86	0.01		0.01
C18	1.30	1.30	1.30	0.99		0.96
C19	0.01	0.53	0.01	1.01		0.01

Analysis begun on: Thu Sep 15 11:01:09 2016  
Analysis ended on: Thu Sep 15 11:01:10 2016  
Total elapsed time: 00:00:01

## STATO DI PROGETTO

## TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 15 MINUTI

## CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

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Element Count  
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Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

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Raingage Summary  
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Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.25h	VOLUME	15 min.

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Subcatchment Summary  
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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	0.978	47.010
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.246	11.837
Surface Runoff .....	0.708	34.014
Final Storage .....	0.026	1.232
Continuity Error (%) .....	-0.155	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.708	7.075
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.323	3.233
Flooding Loss .....	0.380	3.803
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.003	0.032
Continuity Error (%) .....	0.110	

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Highest Continuity Errors

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Node J3 (53.95%)  
Node J2 (3.20%)  
Node J17 (1.06%)  
Node J19 (-1.01%)

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Time-Step Critical Elements

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Link C18 (34.15%)  
Link C14 (7.27%)  
Link C19 (4.04%)

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Highest Flow Instability Indexes

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Link C16 (2)  
Link C18 (2)  
Link C2 (2)  
Link C5 (2)  
Link C14 (1)

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Routing Time Step Summary

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Minimum Time Step : 0.34 sec  
Average Time Step : 3.93 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.20  
Percent Not Converging : 1.51

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Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	47.01	0.00	0.00	8.34	37.51	0.11	0.13	0.798
S_02	47.01	0.00	0.00	8.44	37.41	0.17	0.21	0.796
S_03	47.01	0.00	0.00	8.96	36.86	0.30	0.37	0.784
S_04	47.01	0.00	0.00	12.11	33.88	0.42	0.50	0.721
S_05	47.01	0.00	0.00	9.44	36.35	0.21	0.25	0.773
S_06	47.01	0.00	0.00	8.58	37.26	0.36	0.45	0.793
S_07	47.01	0.00	0.00	8.81	37.01	0.23	0.28	0.787
S_08	47.01	0.00	0.00	9.72	36.06	0.28	0.33	0.767
S_09	47.01	0.00	0.00	8.85	36.97	0.16	0.20	0.786
S_10	47.01	0.00	0.00	8.80	37.03	0.09	0.12	0.788
S_11	47.01	0.00	0.00	10.88	35.02	0.21	0.26	0.745
S_12	47.01	0.00	0.00	8.29	37.56	0.08	0.10	0.799
S_13	47.01	0.00	0.00	9.73	36.05	0.36	0.43	0.767



S_14	47.01	0.00	0.00	30.26	16.77	0.23	0.27	0.357
S_15	47.01	0.00	0.00	2.72	42.36	0.04	0.04	0.901
S_monte	47.01	0.00	0.00	11.26	34.45	3.83	4.21	0.733

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.48	1.74	24.34	0 00:19	0.53
J2	JUNCTION	0.52	1.91	24.47	0 00:20	0.52
J3	JUNCTION	0.47	1.95	24.55	0 00:20	0.51
J4	JUNCTION	0.24	1.48	24.33	0 00:20	0.43
J5	JUNCTION	0.24	1.37	24.22	0 00:20	0.42
J6	JUNCTION	0.13	1.02	24.11	0 00:18	0.31
J7	JUNCTION	0.56	1.71	24.08	0 00:20	0.46
J8	JUNCTION	0.11	1.00	24.13	0 00:19	0.30
J9	JUNCTION	0.39	1.37	23.89	0 00:21	0.42
J10	JUNCTION	0.38	1.70	24.35	0 00:18	0.52
J11	JUNCTION	0.40	1.68	24.29	0 00:18	0.51
J12	JUNCTION	0.41	1.59	24.14	0 00:21	0.48
J13	JUNCTION	0.11	0.86	23.98	0 00:19	0.26
J14	JUNCTION	0.44	1.48	23.96	0 00:21	0.44
J17	JUNCTION	0.17	1.38	24.30	0 00:20	0.32
J18	JUNCTION	0.37	1.20	23.75	0 00:19	0.37
J19	JUNCTION	0.42	1.61	24.13	0 00:20	0.42
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.45	0.92	23.38	0 00:49	0.28

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.134	0.134	0 00:30	0.108	0.109	4.804
J2	JUNCTION	0.212	0.427	0 00:19	0.171	0.331	3.309
J3	JUNCTION	0.000	0.152	0 00:20	0	0.00579	117.154
J4	JUNCTION	0.432	0.499	0 00:30	0.364	0.507	0.664
J5	JUNCTION	0.000	0.206	0 00:19	0	0.143	-0.290
J6	JUNCTION	0.365	0.442	0 00:30	0.299	0.339	-0.113
J7	JUNCTION	0.000	0.747	0 00:20	0	1.45	-0.186
J8	JUNCTION	0.504	0.504	0 00:30	0.418	0.418	-0.209
J9	JUNCTION	0.157	1.554	0 00:19	0.135	3.07	0.204
J10	JUNCTION	4.654	4.654	0 00:30	4.19	4.19	0.190
J11	JUNCTION	0.528	1.448	0 00:18	0.435	1.94	0.324
J12	JUNCTION	0.328	1.495	0 00:18	0.276	2.07	0.001
J13	JUNCTION	0.255	0.390	0 00:30	0.212	0.305	-0.253
J14	JUNCTION	0.199	1.510	0 00:19	0.162	2.16	-0.014
J17	JUNCTION	0.000	0.346	0 00:20	0	0.263	1.069
J18	JUNCTION	0.097	0.365	0 00:30	0.0781	0.259	-0.243
J19	JUNCTION	0.000	0.334	0 00:24	0	0.384	-0.998
J16	OUTFALL	0.000	1.160	0 00:30	0	2.98	0.000
J20	OUTFALL	0.000	0.284	0 00:20	0	0.252	0.000
J15	STORAGE	0.267	0.631	0 00:30	0.231	0.72	-0.334

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Node Surge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.18	1.140	0.000
J2	JUNCTION	0.24	0.800	0.000
J3	JUNCTION	1.97	1.550	0.000
J4	JUNCTION	0.30	0.730	0.000
J5	JUNCTION	0.41	0.770	0.000
J6	JUNCTION	0.42	0.620	0.000
J7	JUNCTION	0.41	0.626	0.154
J8	JUNCTION	0.23	0.250	0.000
J9	JUNCTION	0.20	0.174	0.666
J10	JUNCTION	0.41	0.500	0.000

J11	JUNCTION	0.40	0.460	0.000
J12	JUNCTION	0.36	0.337	0.113
J13	JUNCTION	0.41	0.360	0.000
J14	JUNCTION	0.29	0.227	0.543
J17	JUNCTION	0.25	0.630	0.000
J18	JUNCTION	0.60	0.450	0.000
J19	JUNCTION	0.39	0.656	0.144
J15	STORAGE	1.94	0.423	0.677

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.05	0.086	0 00:19	0.002	0.000
J2	0.01	0.213	0 00:20	0.001	0.000
J3	0.01	0.148	0 00:20	0.001	0.000
J4	0.01	0.245	0 00:20	0.001	0.000
J5	0.12	0.092	0 00:30	0.022	0.000
J6	0.24	0.442	0 00:30	0.257	0.000
J8	0.19	0.318	0 00:30	0.155	0.000
J10	0.35	4.093	0 00:30	2.678	0.000
J11	0.20	0.414	0 00:18	0.167	0.000
J13	0.31	0.390	0 00:30	0.274	0.000
J17	0.01	0.210	0 00:20	0.001	0.000
J18	0.27	0.365	0 00:30	0.243	0.000

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Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.133	2	0	0	0.700	9	0 00:49	0.169

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.53	0.187	1.160	2.982
J20	14.65	0.119	0.284	0.252
System	55.59	0.306	1.433	3.233

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Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.131	0 00:28	0.46	1.33	1.00
C2	CONDUIT	0.152	0 00:20	1.21	1.30	1.00
C3	CONDUIT	0.177	0 00:19	0.77	0.70	1.00
C4	CONDUIT	0.206	0 00:19	1.64	1.81	1.00
C5	CONDUIT	0.196	0 00:19	0.93	1.16	1.00
C7	CONDUIT	0.346	0 00:20	1.29	1.70	1.00
C8	CONDUIT	0.237	0 00:20	1.14	0.81	1.00
C9	CONDUIT	0.533	0 00:20	2.79	3.66	1.00
C10	CONDUIT	0.405	0 00:20	1.05	30.77	1.00
C11	CONDUIT	1.206	0 00:18	1.64	3.74	1.00
C12	CONDUIT	1.339	0 00:18	1.89	7.78	1.00
C13	CONDUIT	1.330	0 00:19	1.95	1.95	1.00
C14	CONDUIT	1.471	0 00:19	2.98	4.43	1.00
C15	CONDUIT	1.160	0 00:30	1.81	4.52	0.83
C16	CONDUIT	0.268	0 00:30	0.93	2.68	1.00
C17	CONDUIT	0.135	0 00:30	0.69	0.48	1.00
C6	CONDUIT	0.334	0 00:24	1.16	1.65	1.00

C18 CONDUIT 0.334 0 00:24 1.16 11.09 1.00  
C19 CONDUIT 0.284 0 00:20 2.29 48.30 0.96

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	----- Dry	Up Dry	Fraction of Time Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.67	0.00
C5	1.00	0.03	0.00	0.00	0.89	0.00	0.07	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.58	0.00
C8	1.00	0.03	0.00	0.00	0.60	0.00	0.00	0.36	0.17	0.00
C9	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.36	0.00
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.80	0.00
C6	1.00	0.03	0.00	0.00	0.57	0.00	0.00	0.40	0.08	0.00
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00
C19	1.00	0.85	0.00	0.00	0.00	0.00	0.00	0.15	0.00	0.00

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Conduit Surchage Summary  
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Conduit	----- Both Ends	Hours Full Upstream	----- Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	1.17	1.18	1.47	0.17	0.17
C2	0.74	0.75	1.97	0.01	0.01
C3	0.30	0.30	0.63	0.01	0.01
C4	0.42	0.42	0.85	0.05	0.04
C5	0.39	0.39	0.41	0.03	0.02
C7	0.22	0.23	0.25	0.06	0.04
C8	0.25	0.25	0.41	0.01	0.01
C9	1.94	1.94	2.17	1.13	0.72
C10	0.42	0.43	0.43	2.44	0.24
C11	0.40	0.41	0.40	0.53	0.40
C12	0.36	0.40	0.36	0.68	0.36
C13	0.33	0.36	0.33	0.41	0.33
C14	0.20	0.29	0.20	0.55	0.20
C15	0.01	0.20	0.01	0.90	0.01
C16	0.60	0.60	0.63	0.21	0.01
C17	0.41	0.41	1.58	0.01	0.01
C6	0.30	0.30	0.39	0.21	0.20
C18	0.74	0.74	0.74	0.50	0.43
C19	0.01	0.24	0.01	0.48	0.01

Analysis begun on: Thu Sep 15 11:01:26 2016  
Analysis ended on: Thu Sep 15 11:01:27 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

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Element Count

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Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

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Raingage Summary

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Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.50h	VOLUME	15 min.

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Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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## Link Summary

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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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## Cross Section Summary

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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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## Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... DYNWAVE

Starting Date ..... JUN-20-2016 00:00:00

Ending Date ..... JUN-20-2016 06:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:01:00

Wet Time Step ..... 00:01:00

Dry Time Step ..... 00:01:00

Routing Time Step ..... 5.00 sec

Variable Time Step ..... YES

Maximum Trials ..... 8

Number of Threads ..... 1

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
*****	-----	-----
Total Precipitation .....	1.310	62.948
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.289	13.888
Surface Runoff .....	0.996	47.866
Final Storage .....	0.026	1.234
Continuity Error (%) .....	-0.065	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.996	9.956
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.471	4.711
Flooding Loss .....	0.521	5.207
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.000	0.000
Final Stored Volume .....	0.003	0.033
Continuity Error (%) .....	0.054	

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## Highest Continuity Errors

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Node J3 (58.84%)

Node J2 (2.24%)

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## Time-Step Critical Elements

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Link C18 (32.36%)

Link C14 (8.55%)

Link C19 (7.51%)

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## Highest Flow Instability Indexes

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Link C18 (3)

Link C16 (3)

Link C2 (2)

Link C5 (2)

Link C1 (1)

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## Routing Time Step Summary

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Minimum Time Step : 0.50 sec

Average Time Step : 3.89 sec

Maximum Time Step : 5.00 sec

Percent in Steady State : 0.00

Average Iterations per Step : 2.19

Percent Not Converging : 1.46

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## Subcatchment Runoff Summary

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Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	62.95	0.00	0.00	10.13	51.60	0.15	0.09	0.820
S_02	62.95	0.00	0.00	10.22	51.50	0.24	0.15	0.818
S_03	62.95	0.00	0.00	10.69	51.01	0.41	0.26	0.810
S_04	62.95	0.00	0.00	14.25	47.62	0.59	0.37	0.757
S_05	62.95	0.00	0.00	11.15	50.54	0.29	0.18	0.803
S_06	62.95	0.00	0.00	10.34	51.37	0.50	0.31	0.816
S_07	62.95	0.00	0.00	10.55	51.16	0.31	0.20	0.813
S_08	62.95	0.00	0.00	11.43	50.25	0.38	0.24	0.798
S_09	62.95	0.00	0.00	10.59	51.12	0.22	0.14	0.812
S_10	62.95	0.00	0.00	10.54	51.17	0.13	0.08	0.813
S_11	62.95	0.00	0.00	12.84	48.96	0.30	0.19	0.778
S_12	62.95	0.00	0.00	10.09	51.64	0.11	0.07	0.820
S_13	62.95	0.00	0.00	11.44	50.24	0.51	0.31	0.798
S_14	62.95	0.00	0.00	35.30	27.66	0.38	0.28	0.439

S\_15 62.95 0.00 0.00 3.21 57.79 0.06 0.03 0.918  
S\_monte 62.95 0.00 0.00 13.13 48.49 5.39 3.20 0.770

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Node Depth Summary  
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Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.55	1.74	24.34	0 00:22	0.48
J2	JUNCTION	0.58	1.91	24.47	0 00:22	0.48
J3	JUNCTION	0.54	1.95	24.55	0 00:21	0.47
J4	JUNCTION	0.31	1.48	24.33	0 00:22	0.39
J5	JUNCTION	0.31	1.37	24.22	0 00:22	0.39
J6	JUNCTION	0.18	1.02	24.11	0 00:22	0.31
J7	JUNCTION	0.65	1.58	23.95	0 00:22	0.45
J8	JUNCTION	0.16	1.00	24.13	0 00:23	0.30
J9	JUNCTION	0.47	1.27	23.79	0 00:45	0.39
J10	JUNCTION	0.48	1.70	24.35	0 00:19	0.52
J11	JUNCTION	0.50	1.68	24.29	0 00:19	0.51
J12	JUNCTION	0.50	1.52	24.07	0 00:45	0.46
J13	JUNCTION	0.15	0.86	23.98	0 00:20	0.26
J14	JUNCTION	0.53	1.37	23.85	0 00:45	0.42
J17	JUNCTION	0.23	1.38	24.30	0 00:22	0.31
J18	JUNCTION	0.45	1.20	23.75	0 00:20	0.37
J19	JUNCTION	0.51	1.45	23.97	0 00:22	0.41
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.53	0.97	23.43	0 01:04	0.30

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Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.093	0.093	0 00:45	0.149	0.15	3.699
J2	JUNCTION	0.148	0.326	0 00:22	0.235	0.467	2.290
J3	JUNCTION	0.000	0.136	0 00:21	0	0.00567	142.960
J4	JUNCTION	0.314	0.367	0 00:22	0.507	0.661	0.267
J5	JUNCTION	0.000	0.176	0 00:22	0	0.129	-0.190
J6	JUNCTION	0.260	0.285	0 00:45	0.414	0.421	-0.081
J7	JUNCTION	0.000	0.607	0 00:21	0	2.18	-0.061
J8	JUNCTION	0.375	0.375	0 00:45	0.587	0.587	-0.269
J9	JUNCTION	0.114	1.384	0 00:20	0.186	4.39	0.134
J10	JUNCTION	3.512	3.512	0 00:45	5.88	5.88	0.112
J11	JUNCTION	0.377	1.235	0 00:20	0.603	2.65	0.157
J12	JUNCTION	0.239	1.341	0 00:20	0.385	2.97	0.023
J13	JUNCTION	0.187	0.301	0 00:45	0.296	0.453	-0.132
J14	JUNCTION	0.141	1.394	0 00:20	0.224	3.05	0.009
J17	JUNCTION	0.000	0.233	0 00:22	0	0.428	0.660
J18	JUNCTION	0.067	0.294	0 00:45	0.107	0.418	-0.097
J19	JUNCTION	0.000	0.289	0 00:36	0	0.566	-0.507
J16	OUTFALL	0.000	0.113	0 00:45	0	4.29	0.000
J20	OUTFALL	0.000	0.244	0 00:22	0	0.417	0.000
J15	STORAGE	0.283	0.609	0 00:45	0.38	1.1	-0.239

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Node Surge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	1.83	1.140	0.000
J2	JUNCTION	0.45	0.800	0.000
J3	JUNCTION	2.71	1.550	0.000
J4	JUNCTION	0.53	0.730	0.000
J5	JUNCTION	0.65	0.770	0.000
J6	JUNCTION	0.65	0.620	0.000
J7	JUNCTION	0.65	0.503	0.277
J8	JUNCTION	0.42	0.250	0.000
J9	JUNCTION	0.40	0.069	0.771
J10	JUNCTION	0.64	0.500	0.000
J11	JUNCTION	0.63	0.460	0.000

J12	JUNCTION	0.59	0.274	0.176
J13	JUNCTION	0.65	0.360	0.000
J14	JUNCTION	0.51	0.123	0.647
J17	JUNCTION	0.47	0.630	0.000
J18	JUNCTION	0.89	0.450	0.000
J19	JUNCTION	0.63	0.504	0.296
J15	STORAGE	2.67	0.471	0.629

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.01	0.020	0 00:22	0.000	0.000
J2	0.01	0.191	0 00:22	0.001	0.000
J3	0.01	0.118	0 00:21	0.001	0.000
J4	0.01	0.198	0 00:22	0.000	0.000
J5	0.01	0.047	0 00:22	0.000	0.000
J6	0.42	0.285	0 00:45	0.299	0.000
J8	0.40	0.177	0 00:45	0.160	0.000
J10	0.58	2.953	0 00:45	3.831	0.000
J11	0.34	0.184	0 00:19	0.097	0.000
J13	0.54	0.301	0 00:45	0.417	0.000
J17	0.01	0.209	0 00:22	0.001	0.000
J18	0.49	0.294	0 00:45	0.401	0.000

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Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.252	3	0	0	1.070	13	0 01:04	0.188

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Outfall Loading Summary  
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Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.42	0.251	1.113	4.293
J20	20.57	0.127	0.244	0.417
System	58.50	0.378	1.355	4.711

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Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.093	0 00:45	0.33	0.95	1.00
C2	CONDUIT	0.136	0 00:21	1.10	1.17	1.00
C3	CONDUIT	0.150	0 00:22	0.69	0.60	1.00
C4	CONDUIT	0.176	0 00:22	1.40	1.55	1.00
C5	CONDUIT	0.174	0 00:22	0.67	1.03	1.00
C7	CONDUIT	0.233	0 00:22	1.07	1.14	1.00
C8	CONDUIT	0.219	0 00:24	1.07	0.74	1.00
C9	CONDUIT	0.459	0 00:22	2.34	3.15	1.00
C10	CONDUIT	0.399	0 00:21	1.04	30.32	1.00
C11	CONDUIT	1.039	0 00:20	1.41	3.23	1.00
C12	CONDUIT	1.235	0 00:20	1.72	7.18	1.00
C13	CONDUIT	1.267	0 00:20	1.82	1.85	1.00
C14	CONDUIT	1.327	0 00:20	2.61	3.99	1.00
C15	CONDUIT	1.113	0 00:45	1.75	4.34	0.82
C16	CONDUIT	0.227	0 00:45	0.79	2.27	1.00
C17	CONDUIT	0.114	0 00:45	0.59	0.40	1.00
C6	CONDUIT	0.289	0 00:36	1.01	1.43	1.00
C18	CONDUIT	0.289	0 00:36	1.01	9.60	1.00

C19 CONDUIT 0.244 0 00:22 1.99 41.55 0.94

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Up		Down		Sub		Sup		Down		Norm	Inlet
		Dry	Dry	Dry	Crit	Crit	Crit	Crit	Crit	Crit	Crit		
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
C4	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.54	0.00	0.00	0.00	0.00
C5	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.47	0.00	0.00	0.00
C8	1.00	0.03	0.00	0.00	0.70	0.00	0.00	0.00	0.27	0.16	0.00	0.00	0.00
C9	1.00	0.04	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00
C13	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.24	0.00	0.00	0.00	0.00
C14	1.00	0.03	0.00	0.00	0.96	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	0.00	0.00
C16	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.74	0.00	0.00	0.00
C6	1.00	0.03	0.00	0.00	0.67	0.00	0.00	0.30	0.07	0.00	0.00	0.00	0.00
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.78	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	----- Hours Full -----		Dnstream	Hours	Hours
	Both Ends	Upstream		Above Full	Capacity
				Normal Flow	Limited
C1	1.83	1.83	2.20	0.01	0.01
C2	1.11	1.11	2.71	0.01	0.01
C3	0.53	0.53	0.95	0.01	0.01
C4	0.65	0.65	1.26	0.05	0.04
C5	0.62	0.62	0.65	0.01	0.01
C7	0.42	0.42	0.47	0.22	0.21
C8	0.47	0.47	0.65	0.01	0.01
C9	2.67	2.67	2.90	1.92	1.30
C10	0.67	0.68	0.68	3.18	0.49
C11	0.63	0.64	0.63	0.79	0.63
C12	0.59	0.64	0.59	0.95	0.59
C13	0.55	0.59	0.55	0.64	0.55
C14	0.40	0.51	0.40	0.80	0.40
C15	0.01	0.40	0.01	1.24	0.01
C16	0.89	0.89	0.92	0.42	0.01
C17	0.65	0.65	2.29	0.01	0.01
C6	0.53	0.53	0.63	0.41	0.41
C18	1.11	1.11	1.11	0.67	0.62
C19	0.01	0.45	0.01	0.79	0.01

Analysis begun on: Thu Sep 15 11:01:56 2016  
Analysis ended on: Thu Sep 15 11:01:57 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FREE

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

\*\*\*\*\*  
WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	1.460	70.176
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.341	16.369
Surface Runoff .....	1.094	52.587
Final Storage .....	0.026	1.239
Continuity Error (%) .....	-0.027	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.094	10.940
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.664	6.637
Flooding Loss .....	0.427	4.265
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.000	0.000
Final Stored Volume .....	0.004	0.036
Continuity Error (%) .....	0.019	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*  
Node J3 (65.26%)  
Node J2 (1.71%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*  
Link C14 (28.74%)  
Link C18 (27.12%)  
Link C19 (5.24%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*  
Link C16 (3)  
Link C18 (3)  
Link C1 (2)  
Link C2 (2)  
Link C5 (1)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*  
Minimum Time Step : 0.50 sec  
Average Time Step : 3.25 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.16  
Percent Not Converging : 1.36

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	70.18	0.00	0.00	12.52	56.38	0.16	0.05	0.803
S_02	70.18	0.00	0.00	12.60	56.31	0.26	0.08	0.802
S_03	70.18	0.00	0.00	13.00	55.90	0.45	0.15	0.797
S_04	70.18	0.00	0.00	17.06	52.02	0.64	0.21	0.741
S_05	70.18	0.00	0.00	13.40	55.48	0.32	0.10	0.791
S_06	70.18	0.00	0.00	12.70	56.20	0.54	0.17	0.801
S_07	70.18	0.00	0.00	12.88	56.02	0.34	0.11	0.798
S_08	70.18	0.00	0.00	13.65	55.23	0.42	0.14	0.787
S_09	70.18	0.00	0.00	12.91	55.99	0.25	0.08	0.798
S_10	70.18	0.00	0.00	12.87	56.03	0.14	0.05	0.798
S_11	70.18	0.00	0.00	15.40	53.59	0.32	0.11	0.764
S_12	70.18	0.00	0.00	12.49	56.42	0.12	0.04	0.804
S_13	70.18	0.00	0.00	13.66	55.22	0.56	0.18	0.787
S_14	70.18	0.00	0.00	41.43	28.75	0.40	0.19	0.410
S_15	70.18	0.00	0.00	3.85	64.33	0.06	0.02	0.917

S\_monte 70.18 0.00 0.00 15.24 53.59 5.95 1.88 0.764

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.71	1.33	23.93	0 01:15	0.41
J2	JUNCTION	0.74	1.36	23.92	0 01:15	0.42
J3	JUNCTION	0.70	1.95	24.55	0 00:24	0.40
J4	JUNCTION	0.47	1.23	24.08	0 00:26	0.33
J5	JUNCTION	0.48	1.31	24.16	0 00:26	0.33
J6	JUNCTION	0.36	1.02	24.11	0 00:26	0.31
J7	JUNCTION	0.84	1.41	23.78	0 01:15	0.43
J8	JUNCTION	0.30	1.00	24.13	0 01:15	0.30
J9	JUNCTION	0.66	1.22	23.74	0 01:15	0.37
J10	JUNCTION	0.77	1.70	24.35	0 00:23	0.52
J11	JUNCTION	0.77	1.66	24.27	0 01:15	0.51
J12	JUNCTION	0.74	1.47	24.02	0 01:15	0.45
J13	JUNCTION	0.31	0.86	23.98	0 00:24	0.26
J14	JUNCTION	0.73	1.32	23.80	0 01:15	0.40
J17	JUNCTION	0.39	0.97	23.89	0 01:15	0.30
J18	JUNCTION	0.65	1.20	23.75	0 00:27	0.37
J19	JUNCTION	0.70	1.27	23.79	0 01:15	0.39
J16	OUTFALL	0.00	0.00	22.42	0 00:00	0.00
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	0.66	1.01	23.47	0 01:30	0.31

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.052	0.059	0 00:22	0.162	0.165	3.416
J2	JUNCTION	0.082	0.203	0 00:26	0.257	0.64	1.736
J3	JUNCTION	0.000	0.095	0 00:24	0	0.00573	187.822
J4	JUNCTION	0.179	0.273	0 01:15	0.557	0.969	0.170
J5	JUNCTION	0.000	0.117	0 00:38	0	0.379	0.049
J6	JUNCTION	0.146	0.146	0 01:15	0.454	0.453	-0.097
J7	JUNCTION	0.000	0.469	0 00:24	0	2.98	-0.001
J8	JUNCTION	0.214	0.214	0 01:15	0.642	0.641	-0.198
J9	JUNCTION	0.064	1.211	0 00:24	0.204	6.17	0.076
J10	JUNCTION	2.056	2.056	0 01:15	6.5	6.5	0.051
J11	JUNCTION	0.213	0.984	0 00:24	0.661	3.88	0.051
J12	JUNCTION	0.136	1.124	0 00:24	0.423	4.35	0.019
J13	JUNCTION	0.107	0.181	0 01:15	0.324	0.492	-0.084
J14	JUNCTION	0.079	1.201	0 00:24	0.246	4.44	0.027
J17	JUNCTION	0.000	0.214	0 01:15	0	0.643	0.482
J18	JUNCTION	0.038	0.198	0 01:15	0.117	0.484	-0.047
J19	JUNCTION	0.000	0.215	0 01:08	0	0.748	-0.244
J16	OUTFALL	0.000	1.053	0 01:15	0	6.05	0.000
J20	OUTFALL	0.000	0.193	0 01:15	0	0.59	0.000
J15	STORAGE	0.185	0.465	0 01:15	0.396	1.48	-0.225

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	2.65	0.735	0.405
J2	JUNCTION	0.84	0.253	0.547
J3	JUNCTION	3.56	1.550	0.000
J4	JUNCTION	0.93	0.476	0.254
J5	JUNCTION	1.06	0.708	0.062
J6	JUNCTION	1.02	0.620	0.000
J7	JUNCTION	1.06	0.327	0.453
J8	JUNCTION	0.62	0.247	0.003
J9	JUNCTION	0.37	0.018	0.822
J10	JUNCTION	1.04	0.500	0.000
J11	JUNCTION	1.02	0.439	0.021
J12	JUNCTION	0.98	0.220	0.230

J13	JUNCTION	1.06	0.360	0.000
J14	JUNCTION	0.89	0.072	0.698
J17	JUNCTION	0.85	0.225	0.405
J18	JUNCTION	1.31	0.450	0.000
J19	JUNCTION	1.02	0.323	0.477
J15	STORAGE	3.53	0.510	0.590

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.085	0 00:24	0.000	0.000
J6	0.62	0.052	0 01:15	0.075	0.000
J10	0.96	1.409	0 01:15	3.277	0.000
J13	0.92	0.181	0 01:15	0.447	0.000
J18	0.87	0.198	0 01:15	0.466	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Loss	Exfil Pent	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	0.413	5	0	0	1.439	18	0 01:30	0.202

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	96.81	0.433	1.053	6.047
J20	38.81	0.138	0.193	0.590
System	67.81	0.571	1.246	6.637

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.052	0 01:15	0.18	0.53	1.00
C2	CONDUIT	0.095	0 00:24	0.96	0.82	1.00
C3	CONDUIT	0.110	0 00:26	0.56	0.44	1.00
C4	CONDUIT	0.117	0 00:38	0.93	1.02	1.00
C5	CONDUIT	0.117	0 00:38	0.50	0.69	1.00
C7	CONDUIT	0.214	0 01:15	0.87	1.05	1.00
C8	CONDUIT	0.214	0 01:15	0.98	0.73	1.00
C9	CONDUIT	0.366	0 00:27	1.86	2.51	1.00
C10	CONDUIT	0.356	0 00:25	0.91	26.99	1.00
C11	CONDUIT	0.852	0 00:24	1.16	2.65	1.00
C12	CONDUIT	0.984	0 00:24	1.34	5.72	1.00
C13	CONDUIT	1.126	0 00:24	1.57	1.65	1.00
C14	CONDUIT	1.175	0 00:24	1.83	3.54	1.00
C15	CONDUIT	1.053	0 01:15	1.68	4.10	0.82
C16	CONDUIT	0.161	0 01:15	0.56	1.61	1.00
C17	CONDUIT	0.074	0 01:15	0.47	0.26	1.00
C6	CONDUIT	0.215	0 01:08	0.79	1.06	1.00
C18	CONDUIT	0.215	0 01:15	0.75	7.14	1.00
C19	CONDUIT	0.193	0 01:15	1.62	32.82	0.90

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Dry	Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl	
C1	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.01	0.00	
C2	1.00	0.04	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.02	0.00	
C4	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.40	0.00	
C5	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.33	0.00	
C8	1.00	0.03	0.00	0.00	0.84	0.00	0.00	0.13	0.16	0.00	
C9	1.00	0.03	0.01	0.00	0.96	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.03	0.00	0.00	0.96	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.01	0.00	0.00	
C12	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C13	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.09	0.00	
C14	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C15	1.00	0.03	0.00	0.00	0.00	0.00	0.00	0.97	0.00	0.00	
C16	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.03	0.00	0.00	0.97	0.00	0.00	0.00	0.64	0.00	
C6	1.00	0.03	0.00	0.00	0.81	0.00	0.00	0.16	0.07	0.00	
C18	1.00	0.03	0.00	0.00	0.96	0.00	0.00	0.01	0.00	0.00	
C19	1.00	0.60	0.00	0.00	0.00	0.00	0.00	0.40	0.00	0.00	

\*\*\*\*\*  
Conduit Surge Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
	Both Ends	Upstream	Dnstream		
C1	2.65	2.65	3.05	0.01	0.01
C2	1.63	1.63	3.56	0.01	0.01
C3	0.92	0.92	1.41	0.01	0.01
C4	1.01	1.01	1.84	0.07	0.08
C5	1.02	1.02	1.06	0.01	0.01
C7	0.62	0.62	0.85	0.23	0.23
C8	0.85	0.85	1.06	0.01	0.01
C9	3.53	3.53	3.76	2.82	1.81
C10	1.07	1.12	1.10	4.01	0.92
C11	1.02	1.04	1.02	1.20	1.02
C12	0.98	1.03	0.98	1.37	0.98
C13	0.94	0.98	0.94	1.04	0.94
C14	0.37	0.89	0.37	1.22	0.37
C15	0.01	0.37	0.01	1.71	0.01
C16	1.31	1.31	1.35	0.62	0.01
C17	1.05	1.05	3.15	0.01	0.01
C6	0.92	0.92	1.02	0.59	0.60
C18	1.64	1.64	1.64	1.05	0.99
C19	0.01	0.84	0.01	1.23	0.01

Analysis begun on: Thu Sep 15 11:02:16 2016  
Analysis ended on: Thu Sep 15 11:02:18 2016  
Total elapsed time: 00:00:02

## STATO DI PROGETTO

## TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 15 MINUTI

## CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count

\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary

Name	Data Source	Data Type	Recording Interval
-----			
RG1	icTR20TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
-----						
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10
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Node Summary

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
-----					
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	



J15                    STORAGE                    22.46                    1.60                    0.0

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	0.645	31.020
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.215	10.324
Surface Runoff .....	0.406	19.502
Final Storage .....	0.026	1.232
Continuity Error (%) .....	-0.123	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.406	4.058
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	-0.090	-0.900
Flooding Loss .....	0.188	1.876
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.002	0.021
Final Stored Volume .....	0.307	3.071
Continuity Error (%) .....	0.642	

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Highest Continuity Errors

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Node J3 (95.31%)  
Node J5 (12.02%)  
Node J17 (8.86%)  
Node J2 (2.89%)  
Node J12 (2.83%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (18.02%)  
Link C19 (5.36%)  
Link C18 (4.71%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (18)  
Link C16 (4)  
Link C1 (3)  
Link C14 (3)  
Link C13 (2)

\*\*\*\*\*

Routing Time Step Summary

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Minimum Time Step : 0.50 sec  
Average Time Step : 4.54 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.21  
Percent Not Converging : 1.60

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	31.02	0.00	0.00	7.85	21.94	0.06	0.08	0.707
S_02	31.02	0.00	0.00	7.92	21.87	0.10	0.13	0.705
S_03	31.02	0.00	0.00	8.27	21.50	0.17	0.22	0.693
S_04	31.02	0.00	0.00	10.92	19.02	0.23	0.29	0.613
S_05	31.02	0.00	0.00	8.58	21.18	0.12	0.15	0.683
S_06	31.02	0.00	0.00	8.02	21.76	0.21	0.27	0.702
S_07	31.02	0.00	0.00	8.18	21.60	0.13	0.17	0.696
S_08	31.02	0.00	0.00	8.74	21.01	0.16	0.20	0.677
S_09	31.02	0.00	0.00	8.20	21.57	0.09	0.12	0.695
S_10	31.02	0.00	0.00	8.17	21.61	0.05	0.07	0.697

S_11	31.02	0.00	0.00	9.86	20.01	0.12	0.15	0.645
S_12	31.02	0.00	0.00	7.82	21.97	0.05	0.06	0.708
S_13	31.02	0.00	0.00	8.75	21.00	0.21	0.26	0.677
S_14	31.02	0.00	0.00	26.32	4.71	0.06	0.09	0.152
S_15	31.02	0.00	0.00	2.47	26.61	0.03	0.02	0.858
S_monte	31.02	0.00	0.00	9.52	20.18	2.24	2.49	0.650

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.91	1.53	24.13	0 00:30	0.47
J2	JUNCTION	0.95	1.54	24.10	0 00:30	0.47
J3	JUNCTION	0.90	1.95	24.55	0 00:14	0.46
J4	JUNCTION	0.69	1.25	24.10	0 00:30	0.38
J5	JUNCTION	0.69	1.25	24.10	0 00:30	0.38
J6	JUNCTION	0.47	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.18	1.50	23.87	0 00:30	0.46
J8	JUNCTION	0.44	1.00	24.13	0 00:19	0.30
J9	JUNCTION	1.10	1.50	24.02	0 00:18	0.44
J10	JUNCTION	1.00	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.04	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.08	1.70	24.25	0 00:17	0.51
J13	JUNCTION	0.51	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.14	1.56	24.04	0 00:18	0.43
J17	JUNCTION	0.64	1.15	24.07	0 00:18	0.32
J18	JUNCTION	1.06	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.03	1.37	23.89	0 00:30	0.42
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.00	1.13	23.59	0 06:00	0.34

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.081	0.081	0 00:30	0.0632	0.0759	20.348
J2	JUNCTION	0.128	0.236	0 00:30	0.0999	1.38	2.977
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00579	2030.653
J4	JUNCTION	0.258	0.286	0 00:29	0.212	1.46	1.814
J5	JUNCTION	0.000	0.107	0 00:19	0	0.0979	13.657
J6	JUNCTION	0.219	0.219	0 00:30	0.174	0.178	2.739
J7	JUNCTION	0.000	0.445	0 00:30	0	3.89	0.665
J8	JUNCTION	0.293	0.293	0 00:30	0.235	0.241	3.764
J9	JUNCTION	0.093	0.897	0 00:01	0.0805	4.8	1.582
J10	JUNCTION	2.753	2.753	0 00:30	2.45	2.48	0.588
J11	JUNCTION	0.317	0.874	0 00:30	0.254	1.56	2.714
J12	JUNCTION	0.196	0.978	0 00:30	0.161	1.75	2.911
J13	JUNCTION	0.151	0.270	0 00:30	0.121	0.223	2.605
J14	JUNCTION	0.119	0.977	0 00:30	0.0947	1.8	2.527
J17	JUNCTION	0.000	0.199	0 00:30	0	0.218	9.715
J18	JUNCTION	0.059	0.328	0 00:30	0.0457	0.304	2.301
J19	JUNCTION	0.000	0.258	0 00:30	0	1.37	0.774
J16	OUTFALL	0.000	0.897	0 00:01	0	4.36	0.000
J20	OUTFALL	0.000	0.236	0 00:30	0	1.32	0.000
J15	STORAGE	0.094	0.446	0 00:30	0.0648	2.68	-49.942

\*\*\*\*\*  
Node Surge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.927	0.213
J2	JUNCTION	0.26	0.429	0.371
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.36	0.502	0.228
J5	JUNCTION	5.71	0.651	0.119
J6	JUNCTION	5.71	0.620	0.000
J7	JUNCTION	5.70	0.417	0.363

J8	JUNCTION	0.21	0.250	0.000
J9	JUNCTION	0.31	0.298	0.542
J10	JUNCTION	0.38	0.500	0.000
J11	JUNCTION	0.38	0.460	0.000
J12	JUNCTION	0.36	0.450	0.000
J13	JUNCTION	0.60	0.360	0.003
J14	JUNCTION	0.35	0.312	0.458
J17	JUNCTION	0.29	0.401	0.229
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.419	0.381
J15	STORAGE	5.91	0.631	0.469

\*\*\*\*\*  
Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.22	0.191	0 00:30	0.090	0.000
J8	0.19	0.134	0 00:19	0.040	0.000
J10	0.30	2.193	0 00:30	1.222	0.000
J11	0.14	0.093	0 00:30	0.024	0.000
J12	0.01	0.242	0 00:17	0.001	0.000
J13	0.32	0.270	0 00:30	0.205	0.000
J18	0.35	0.328	0 00:30	0.293	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.610	20	0	0	2.674	33	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.235	0.897	4.355
J20	92.83	0.066	0.236	1.322
System	96.42	0.301	1.130	5.678

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.081	0 00:30	0.43	0.82	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.107	0 00:19	0.85	0.94	1.00
C5	CONDUIT	0.107	0 00:31	0.76	0.63	1.00
C7	CONDUIT	0.199	0 00:30	0.69	0.98	1.00
C8	CONDUIT	0.199	0 00:30	0.69	0.68	1.00
C9	CONDUIT	0.371	0 00:19	1.89	2.54	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.808	0 00:36	1.10	2.51	1.00
C12	CONDUIT	0.855	0 00:36	1.16	4.97	1.00
C13	CONDUIT	0.879	0 00:36	1.20	1.29	1.00
C14	CONDUIT	0.773	0 00:36	1.48	2.33	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.270	0 00:30	0.94	2.69	1.00
C17	CONDUIT	0.120	0 00:30	0.61	0.43	1.00
C6	CONDUIT	0.258	0 00:30	0.90	1.28	1.00
C18	CONDUIT	0.258	0 00:30	0.90	8.57	1.00

C19 CONDUIT 0.236 0 00:30 1.93 40.19 0.93

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	----- Up Down		Fraction of Time in Flow Class		Up Down		Norm Ltd	Inlet Ctrl
		Dry	Dry	Dry	Crit	Crit	Crit		
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.93	0.00	0.00

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Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	-----			Hours	Hours
	Both Ends	Full Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.36	0.36	5.74	0.01	0.01
C4	5.71	5.71	5.79	0.01	0.01
C5	5.71	5.71	5.71	0.01	0.01
C7	0.21	0.21	0.29	0.01	0.01
C8	0.29	0.29	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.62	0.01
C10	5.71	5.71	5.91	5.98	0.19
C11	0.38	0.38	0.38	0.44	0.38
C12	0.36	0.38	0.36	0.60	0.36
C13	0.36	0.36	0.38	0.34	0.34
C14	0.31	0.35	0.31	0.54	0.31
C15	0.01	0.31	0.01	0.70	0.01
C16	5.94	5.95	5.95	0.33	0.01
C17	0.60	0.60	5.95	0.01	0.01
C6	0.36	0.36	5.70	0.16	0.17
C18	5.87	5.87	5.87	5.78	0.27
C19	0.01	0.26	0.01	5.73	0.01

Analysis begun on: Thu Sep 15 10:58:44 2016  
Analysis ended on: Thu Sep 15 10:58:45 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

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WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19  
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\*\*\*\*\*  
Element Count  
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Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
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Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
Total Precipitation .....	0.865	41.570
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.267	12.837
Surface Runoff .....	0.573	27.523
Final Storage .....	0.026	1.234
Continuity Error (%) .....	-0.059	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.573	5.727
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.013	0.131
Flooding Loss .....	0.247	2.474
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume ....	0.002	0.021
Final Stored Volume .....	0.311	3.109
Continuity Error (%) .....	0.590	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.30%)  
Node J5 (5.86%)  
Node J17 (5.62%)  
Node J2 (2.68%)  
Node J12 (1.98%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (18.83%)  
Link C19 (9.03%)  
Link C18 (4.63%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (17)  
Link C16 (4)  
Link C14 (2)  
Link C18 (2)  
Link C1 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.47 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.22  
Percent Not Converging : 1.88

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	41.57	0.00	0.00	9.84	30.48	0.09	0.06	0.733
S_02	41.57	0.00	0.00	9.91	30.40	0.14	0.09	0.731
S_03	41.57	0.00	0.00	10.28	30.02	0.24	0.16	0.722
S_04	41.57	0.00	0.00	13.51	26.96	0.33	0.22	0.649
S_05	41.57	0.00	0.00	10.62	29.67	0.17	0.11	0.714
S_06	41.57	0.00	0.00	10.01	30.30	0.29	0.19	0.729
S_07	41.57	0.00	0.00	10.17	30.13	0.18	0.12	0.725
S_08	41.57	0.00	0.00	10.81	29.47	0.23	0.14	0.709
S_09	41.57	0.00	0.00	10.20	30.10	0.13	0.09	0.724
S_10	41.57	0.00	0.00	10.16	30.14	0.08	0.05	0.725
S_11	41.57	0.00	0.00	12.20	28.20	0.17	0.11	0.678
S_12	41.57	0.00	0.00	9.81	30.51	0.06	0.04	0.734

S_13	41.57	0.00	0.00	10.82	29.46	0.30	0.19	0.709
S_14	41.57	0.00	0.00	32.62	8.95	0.12	0.11	0.215
S_15	41.57	0.00	0.00	3.05	36.56	0.04	0.02	0.879
S_monte	41.57	0.00	0.00	11.87	28.37	3.15	1.91	0.682

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.92	1.39	23.99	0 00:45	0.42
J2	JUNCTION	0.96	1.42	23.98	0 00:45	0.43
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.42
J4	JUNCTION	0.71	1.14	23.99	0 00:45	0.35
J5	JUNCTION	0.71	1.15	24.00	0 00:45	0.35
J6	JUNCTION	0.49	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.20	1.47	23.84	0 00:45	0.45
J8	JUNCTION	0.46	1.00	24.13	0 00:20	0.30
J9	JUNCTION	1.10	1.35	23.87	0 00:19	0.40
J10	JUNCTION	1.04	1.70	24.35	0 00:19	0.52
J11	JUNCTION	1.07	1.68	24.29	0 00:19	0.51
J12	JUNCTION	1.10	1.70	24.25	0 00:19	0.46
J13	JUNCTION	0.53	0.86	23.98	0 00:19	0.26
J14	JUNCTION	1.15	1.42	23.90	0 00:19	0.42
J17	JUNCTION	0.65	1.02	23.94	0 00:45	0.31
J18	JUNCTION	1.07	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.05	1.33	23.85	0 00:45	0.41
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.00	1.13	23.59	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.058	0.058	0 00:45	0.0877	0.101	14.581
J2	JUNCTION	0.092	0.207	0 00:45	0.139	1.5	2.749
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00577	2027.288
J4	JUNCTION	0.189	0.267	0 00:45	0.297	1.62	1.623
J5	JUNCTION	0.000	0.109	0 00:23	0	0.198	6.228
J6	JUNCTION	0.159	0.159	0 00:45	0.244	0.248	1.960
J7	JUNCTION	0.000	0.413	0 00:08	0	3.86	0.673
J8	JUNCTION	0.219	0.219	0 00:45	0.333	0.339	2.912
J9	JUNCTION	0.070	0.897	0 00:01	0.112	5.16	1.473
J10	JUNCTION	2.100	2.100	0 00:45	3.45	3.47	0.424
J11	JUNCTION	0.230	0.855	0 00:50	0.355	2.23	1.884
J12	JUNCTION	0.144	0.960	0 00:45	0.226	2.51	2.023
J13	JUNCTION	0.111	0.215	0 00:45	0.171	0.324	1.795
J14	JUNCTION	0.086	0.942	0 00:45	0.132	2.55	1.770
J17	JUNCTION	0.000	0.199	0 00:39	0	0.35	5.952
J18	JUNCTION	0.042	0.288	0 00:45	0.0634	0.471	1.482
J19	JUNCTION	0.000	0.209	0 00:45	0	1.47	0.725
J16	OUTFALL	0.000	0.897	0 00:01	0	4.7	0.000
J20	OUTFALL	0.000	0.207	0 00:45	0	1.44	0.000
J15	STORAGE	0.112	0.436	0 00:45	0.123	2.72	-49.943

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.793	0.347
J2	JUNCTION	0.48	0.308	0.492
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.60	0.394	0.336
J5	JUNCTION	5.70	0.550	0.220
J6	JUNCTION	5.70	0.620	0.000
J7	JUNCTION	5.70	0.389	0.391
J8	JUNCTION	0.42	0.250	0.000
J9	JUNCTION	0.52	0.146	0.694

J10	JUNCTION	0.61	0.500	0.000
J11	JUNCTION	0.61	0.460	0.000
J12	JUNCTION	0.59	0.450	0.000
J13	JUNCTION	0.87	0.360	0.000
J14	JUNCTION	0.57	0.170	0.600
J17	JUNCTION	0.52	0.267	0.363
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.384	0.416
J15	STORAGE	5.91	0.634	0.466

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.38	0.081	0 00:45	0.062	0.000
J8	0.12	0.033	0 00:20	0.005	0.000
J10	0.50	1.512	0 00:45	1.648	0.000
J11	0.01	0.006	0 00:19	0.000	0.000
J12	0.01	0.086	0 00:19	0.000	0.000
J13	0.53	0.215	0 00:45	0.299	0.000
J18	0.57	0.288	0 00:45	0.461	0.000

\*\*\*\*\*  
Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.680	21	0	0	2.712	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.254	0.897	4.699
J20	92.95	0.073	0.207	1.440
System	96.48	0.326	1.055	6.139

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.058	0 00:45	0.43	0.59	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.109	0 00:23	0.87	0.95	1.00
C5	CONDUIT	0.109	0 00:23	0.76	0.64	1.00
C7	CONDUIT	0.199	0 00:39	0.69	0.97	1.00
C8	CONDUIT	0.199	0 00:39	0.69	0.68	1.00
C9	CONDUIT	0.347	0 00:21	1.77	2.38	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.802	0 00:50	1.09	2.49	1.00
C12	CONDUIT	0.854	0 00:50	1.16	4.97	1.00
C13	CONDUIT	0.875	0 00:50	1.19	1.28	1.00
C14	CONDUIT	0.764	0 00:51	1.48	2.30	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.246	0 00:45	0.86	2.46	1.00
C17	CONDUIT	0.104	0 00:45	0.53	0.37	1.00
C6	CONDUIT	0.209	0 00:45	0.73	1.03	1.00
C18	CONDUIT	0.209	0 00:45	0.82	6.94	1.00
C19	CONDUIT	0.207	0 00:45	1.73	35.26	0.91

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Crit	Inlet Ltd	Inlet Ctrl	
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	

\*\*\*\*\*  
Conduit Surge Summary  
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Conduit	Hours Full			Hours Above Full Normal Flow	Hours Capacity Limited
	Both Ends	Upstream	Dnstream		
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.60	0.60	5.74	0.01	0.01
C4	5.70	5.70	5.79	0.01	0.01
C5	5.70	5.70	5.70	0.01	0.01
C7	0.42	0.42	0.52	0.01	0.01
C8	0.52	0.52	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.41	0.01
C10	5.71	5.71	5.91	5.93	0.40
C11	0.61	0.61	0.61	0.67	0.61
C12	0.59	0.62	0.59	0.85	0.58
C13	0.59	0.59	0.61	0.55	0.56
C14	0.52	0.57	0.52	0.78	0.52
C15	0.01	0.52	0.01	0.95	0.01
C16	5.94	5.95	5.95	0.53	0.01
C17	0.87	0.87	5.95	0.01	0.01
C6	0.60	0.60	5.70	0.09	0.09
C18	5.87	5.87	5.87	5.77	0.50
C19	0.01	0.48	0.01	5.73	0.01

Analysis begun on: Thu Sep 15 10:59:04 2016  
Analysis ended on: Thu Sep 15 10:59:05 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 20 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count

\*\*\*\*\*  
Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary

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Name	Data Source	Data Type	Recording Interval
RG1	icTR20TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary

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Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary

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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	JUNCTION	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
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Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

	Volume	Depth
Runoff Quantity Continuity	hectare-m	mm
*****	-----	-----
Total Precipitation .....	0.963	46.300
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.315	15.144
Surface Runoff .....	0.623	29.929
Final Storage .....	0.026	1.238
Continuity Error (%) .....	-0.023	

	Volume	Volume
Flow Routing Continuity	hectare-m	10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.623	6.227
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.136	1.361
Flooding Loss .....	0.171	1.711
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.002	0.021
Final Stored Volume .....	0.314	3.139
Continuity Error (%) .....	0.591	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.49%)  
Node J17 (5.24%)  
Node J5 (4.11%)  
Node J2 (2.60%)  
Node J12 (1.34%)

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Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (21.70%)  
Link C19 (13.61%)  
Link C18 (4.54%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (16)  
Link C16 (5)  
Link C18 (4)  
Link C1 (3)  
Link C14 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.38 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.21  
Percent Not Converging : 1.34

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	46.30	0.00	0.00	12.06	32.96	0.09	0.03	0.712
S_02	46.30	0.00	0.00	12.12	32.90	0.15	0.05	0.711
S_03	46.30	0.00	0.00	12.43	32.58	0.26	0.09	0.704
S_04	46.30	0.00	0.00	16.13	29.05	0.36	0.13	0.628
S_05	46.30	0.00	0.00	12.72	32.28	0.18	0.06	0.697
S_06	46.30	0.00	0.00	12.20	32.81	0.32	0.11	0.709
S_07	46.30	0.00	0.00	12.34	32.67	0.20	0.07	0.706
S_08	46.30	0.00	0.00	12.89	32.11	0.25	0.08	0.693
S_09	46.30	0.00	0.00	12.36	32.65	0.14	0.05	0.705
S_10	46.30	0.00	0.00	12.33	32.68	0.08	0.03	0.706
S_11	46.30	0.00	0.00	14.59	30.51	0.18	0.06	0.659

S_12	46.30	0.00	0.00	12.03	32.99	0.07	0.02	0.712
S_13	46.30	0.00	0.00	12.89	32.10	0.32	0.11	0.693
S_14	46.30	0.00	0.00	38.34	7.96	0.11	0.07	0.172
S_15	46.30	0.00	0.00	3.65	40.66	0.04	0.01	0.878
S_monte	46.30	0.00	0.00	13.82	31.13	3.46	1.10	0.672

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.93	1.21	23.81	0 01:15	0.37
J2	JUNCTION	0.97	1.24	23.80	0 01:15	0.38
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.37
J4	JUNCTION	0.71	0.98	23.83	0 01:15	0.30
J5	JUNCTION	0.71	0.99	23.84	0 01:15	0.30
J6	JUNCTION	0.50	0.89	23.98	0 01:15	0.27
J7	JUNCTION	1.21	1.40	23.77	0 01:15	0.43
J8	JUNCTION	0.46	0.76	23.89	0 01:15	0.23
J9	JUNCTION	1.11	1.25	23.77	0 01:15	0.38
J10	JUNCTION	1.08	1.70	24.35	0 00:30	0.52
J11	JUNCTION	1.10	1.64	24.25	0 01:15	0.50
J12	JUNCTION	1.12	1.46	24.01	0 01:15	0.45
J13	JUNCTION	0.55	0.86	23.98	0 00:27	0.26
J14	JUNCTION	1.16	1.34	23.82	0 01:15	0.41
J17	JUNCTION	0.66	0.89	23.81	0 01:15	0.27
J18	JUNCTION	1.08	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.06	1.26	23.78	0 01:15	0.38
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.00	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
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Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.032	0.056	0 00:11	0.0949	0.108	13.518
J2	JUNCTION	0.051	0.158	0 01:15	0.15	1.57	2.664
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00576	2117.008
J4	JUNCTION	0.108	0.197	0 01:15	0.324	1.67	1.582
J5	JUNCTION	0.000	0.090	0 01:15	0	0.281	4.288
J6	JUNCTION	0.090	0.090	0 01:15	0.264	0.269	1.819
J7	JUNCTION	0.000	0.413	0 00:08	0	3.78	0.704
J8	JUNCTION	0.126	0.126	0 01:15	0.358	0.365	2.769
J9	JUNCTION	0.040	0.897	0 00:01	0.122	5.85	1.294
J10	JUNCTION	1.207	1.207	0 01:15	3.78	3.81	0.404
J11	JUNCTION	0.130	0.855	0 00:33	0.385	3.41	1.231
J12	JUNCTION	0.082	0.926	0 01:15	0.246	3.73	1.363
J13	JUNCTION	0.063	0.129	0 01:15	0.185	0.34	1.724
J14	JUNCTION	0.049	0.918	0 00:30	0.143	3.78	1.193
J17	JUNCTION	0.000	0.125	0 01:15	0	0.381	5.526
J18	JUNCTION	0.023	0.212	0 01:15	0.0686	0.596	1.157
J19	JUNCTION	0.000	0.137	0 00:13	0	1.4	0.772
J16	OUTFALL	0.000	0.897	0 00:01	0	5.13	0.000
J20	OUTFALL	0.000	0.158	0 01:15	0	1.51	0.000
J15	STORAGE	0.074	0.351	0 01:15	0.109	2.75	-49.944

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Node Surcharge Summary  
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Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.607	0.533
J2	JUNCTION	0.86	0.132	0.668
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	1.02	0.227	0.503
J5	JUNCTION	5.69	0.386	0.384
J6	JUNCTION	5.67	0.495	0.125
J7	JUNCTION	5.69	0.324	0.456
J8	JUNCTION	0.09	0.014	0.236

J9	JUNCTION	0.87	0.054	0.786
J10	JUNCTION	0.99	0.500	0.000
J11	JUNCTION	0.98	0.425	0.035
J12	JUNCTION	0.95	0.211	0.239
J13	JUNCTION	1.31	0.360	0.000
J14	JUNCTION	0.94	0.092	0.674
J17	JUNCTION	0.90	0.144	0.486
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.67	0.309	0.491
J15	STORAGE	5.91	0.637	0.463

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J10	0.80	0.493	0 01:15	0.828	0.000
J13	0.85	0.129	0 01:15	0.301	0.000
J18	0.94	0.212	0 01:15	0.582	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.711	21	0	0	2.741	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.273	0.897	5.132
J20	93.08	0.075	0.158	1.508
System	96.54	0.348	0.897	6.640

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Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.056	0 00:11	0.43	0.57	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.090	0 01:15	0.71	0.79	1.00
C5	CONDUIT	0.090	0 01:15	0.76	0.53	1.00
C7	CONDUIT	0.125	0 01:15	0.44	0.62	1.00
C8	CONDUIT	0.126	0 01:15	0.44	0.43	1.00
C9	CONDUIT	0.301	0 00:30	1.53	2.07	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.789	0 01:17	1.07	2.45	1.00
C12	CONDUIT	0.855	0 00:33	1.16	4.97	1.00
C13	CONDUIT	0.883	0 00:30	1.20	1.29	1.00
C14	CONDUIT	0.767	0 00:30	1.48	2.31	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.189	0 01:15	0.84	1.88	1.00
C17	CONDUIT	0.066	0 01:15	0.36	0.23	1.00
C6	CONDUIT	0.135	0 00:13	0.73	0.67	1.00
C18	CONDUIT	0.137	0 00:13	0.82	4.53	1.00
C19	CONDUIT	0.158	0 01:15	1.37	26.83	0.86

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Flow Classification Summary



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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Up Dry	Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ld	Inlet Ctrl		
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00

\*\*\*\*\*  
Conduit Surcharge Summary  
\*\*\*\*\*

Conduit	Hours Full			Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow		
C1	5.74	5.74	5.75	0.01		0.01
C2	5.74	5.74	5.76	0.01		0.01
C3	1.02	1.02	5.74	0.01		0.01
C4	5.67	5.67	5.79	0.01		0.01
C5	5.67	5.67	5.69	0.01		0.01
C7	0.09	0.09	0.90	0.01		0.01
C8	0.90	0.90	5.69	0.01		0.01
C9	5.91	5.91	5.97	1.49		0.01
C10	5.70	5.70	5.91	5.99		0.01
C11	0.98	0.99	0.98	1.06		0.98
C12	0.95	0.99	0.95	1.26		0.95
C13	0.95	0.95	1.00	0.91		0.91
C14	0.87	0.94	0.87	1.19		0.87
C15	0.01	0.87	0.01	1.38		0.01
C16	5.94	5.95	5.95	0.87		0.01
C17	1.31	1.31	5.95	0.01		0.01
C6	1.02	1.02	5.67	0.01		0.01
C18	5.87	5.87	5.87	5.77		0.90
C19	0.01	0.86	0.01	5.72		0.01

Analysis begun on: Thu Sep 15 10:59:27 2016  
Analysis ended on: Thu Sep 15 10:59:27 2016  
Total elapsed time: < 1 sec

## STATO DI PROGETTO

### TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 15 MINUTI

### CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.25h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

\*\*\*\*\*  
Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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\*\*\*\*\*  
Analysis Options  
\*\*\*\*\*

Flow Units ..... CMS  
Process Models:  
Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO  
Infiltration Method ..... HORTON  
Flow Routing Method ..... DYNWAVE  
Starting Date ..... JUN-20-2016 00:00:00  
Ending Date ..... JUN-20-2016 06:00:00  
Antecedent Dry Days ..... 0.0  
Report Time Step ..... 00:01:00  
Wet Time Step ..... 00:01:00  
Dry Time Step ..... 00:01:00  
Routing Time Step ..... 5.00 sec  
Variable Time Step ..... YES  
Maximum Trials ..... 8  
Number of Threads ..... 1  
Head Tolerance ..... 0.001500 m

Runoff Quantity	Volume hectare-m	Depth mm
*****	-----	-----
Total Precipitation .....		47.010
Evaporation Loss .....	0.978	0.000
Infiltration Loss .....	0.246	11.837
Surface Runoff .....	0.708	34.014
Final Storage .....	0.026	1.232
Continuity Error (%) .....	-0.155	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.708	7.078
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	-0.028	-0.285
Flooding Loss .....	0.424	4.238
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.002	0.021
Final Stored Volume .....	0.312	3.116
Continuity Error (%) .....	0.401	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.04%)  
Node J5 (8.35%)  
Node J17 (7.72%)  
Node J2 (2.65%)  
Node J12 (2.37%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (17.64%)  
Link C19 (6.95%)  
Link C18 (4.65%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (16)  
Link C16 (3)  
Link C14 (3)  
Link C13 (2)  
Link C1 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.48 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.19  
Percent Not Converging : 1.33

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total 10^6 ltr	Peak Runoff CMS	Runoff Coeff
*****	-----	-----	-----	-----	-----	-----	-----	-----
S_01	47.01	0.00	0.00	8.34	37.51	0.11	0.13	0.798
S_02	47.01	0.00	0.00	8.44	37.41	0.17	0.21	0.796
S_03	47.01	0.00	0.00	8.96	36.86	0.30	0.37	0.784
S_04	47.01	0.00	0.00	12.11	33.88	0.42	0.50	0.721
S_05	47.01	0.00	0.00	9.44	36.35	0.21	0.25	0.773
S_06	47.01	0.00	0.00	8.58	37.26	0.36	0.45	0.793
S_07	47.01	0.00	0.00	8.81	37.01	0.23	0.28	0.787
S_08	47.01	0.00	0.00	9.72	36.06	0.28	0.33	0.767
S_09	47.01	0.00	0.00	8.85	36.97	0.16	0.20	0.786
S_10	47.01	0.00	0.00	8.80	37.03	0.09	0.12	0.788
S_11	47.01	0.00	0.00	10.88	35.02	0.21	0.26	0.745

S_12	47.01	0.00	0.00	8.29	37.56	0.08	0.10	0.799
S_13	47.01	0.00	0.00	9.73	36.05	0.36	0.43	0.767
S_14	47.01	0.00	0.00	30.26	16.77	0.23	0.27	0.357
S_15	47.01	0.00	0.00	2.72	42.36	0.04	0.04	0.901
S_monte	47.01	0.00	0.00	11.26	34.45	3.83	4.21	0.733

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.93	1.74	24.34	0 00:17	0.53
J2	JUNCTION	0.97	1.72	24.28	0 00:30	0.52
J3	JUNCTION	0.92	1.95	24.55	0 00:14	0.51
J4	JUNCTION	0.72	1.41	24.26	0 00:30	0.43
J5	JUNCTION	0.71	1.37	24.22	0 00:22	0.42
J6	JUNCTION	0.48	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.20	1.56	23.93	0 00:18	0.47
J8	JUNCTION	0.45	1.00	24.13	0 00:18	0.30
J9	JUNCTION	1.10	1.53	24.05	0 00:17	0.42
J10	JUNCTION	1.02	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.05	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.09	1.70	24.25	0 00:17	0.48
J13	JUNCTION	0.52	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.15	1.56	24.04	0 00:17	0.45
J17	JUNCTION	0.65	1.32	24.24	0 00:17	0.33
J18	JUNCTION	1.06	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.05	1.45	23.97	0 00:17	0.44
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.01	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.134	0.134	0 00:30	0.108	0.121	11.860
J2	JUNCTION	0.212	0.337	0 00:30	0.171	1.5	2.726
J3	JUNCTION	0.000	0.072	0 00:14	0	0.0058	1916.646
J4	JUNCTION	0.432	0.495	0 00:30	0.364	1.62	1.571
J5	JUNCTION	0.000	0.187	0 00:30	0	0.14	9.105
J6	JUNCTION	0.365	0.442	0 00:30	0.299	0.346	1.360
J7	JUNCTION	0.000	0.479	0 00:23	0	3.82	0.685
J8	JUNCTION	0.504	0.504	0 00:30	0.418	0.424	2.164
J9	JUNCTION	0.157	0.994	0 00:30	0.135	4.93	1.554
J10	JUNCTION	4.654	4.654	0 00:30	4.19	4.22	0.329
J11	JUNCTION	0.528	1.086	0 00:30	0.435	1.95	2.138
J12	JUNCTION	0.328	0.999	0 00:30	0.276	2.07	2.423
J13	JUNCTION	0.255	0.404	0 00:30	0.212	0.358	1.601
J14	JUNCTION	0.199	1.050	0 00:30	0.162	2.14	2.105
J17	JUNCTION	0.000	0.229	0 00:17	0	0.247	8.364
J18	JUNCTION	0.097	0.416	0 00:30	0.0781	0.428	1.622
J19	JUNCTION	0.000	0.308	0 00:30	0	1.48	0.718
J16	OUTFALL	0.000	0.994	0 00:30	0	4.46	0.000
J20	OUTFALL	0.000	0.274	0 00:30	0	1.42	0.000
J15	STORAGE	0.267	0.632	0 00:30	0.231	2.72	-49.943

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	1.140	0.000
J2	JUNCTION	0.32	0.607	0.193
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.44	0.659	0.071
J5	JUNCTION	5.72	0.770	0.000
J6	JUNCTION	5.72	0.620	0.000
J7	JUNCTION	5.71	0.478	0.302
J8	JUNCTION	0.26	0.250	0.000

J9	JUNCTION	0.38	0.334	0.506
J10	JUNCTION	0.47	0.500	0.000
J11	JUNCTION	0.46	0.460	0.000
J12	JUNCTION	0.44	0.450	0.000
J13	JUNCTION	0.73	0.360	0.000
J14	JUNCTION	0.42	0.308	0.462
J17	JUNCTION	0.36	0.566	0.064
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.71	0.503	0.297
J15	STORAGE	5.91	0.635	0.465

\*\*\*\*\*  
Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J1	0.05	0.017	0 00:17	0.001	0.000
J3	0.01	0.038	0 00:14	0.000	0.000
J5	0.13	0.110	0 00:30	0.031	0.000
J6	0.27	0.442	0 00:30	0.289	0.000
J8	0.24	0.339	0 00:30	0.192	0.000
J10	0.38	4.093	0 00:30	2.750	0.000
J11	0.23	0.415	0 00:30	0.215	0.000
J12	0.01	0.287	0 00:17	0.001	0.000
J13	0.39	0.403	0 00:30	0.339	0.000
J18	0.42	0.415	0 00:30	0.418	0.000

\*\*\*\*\*  
Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.706	21	0	0	2.719	34	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.247	0.994	4.459
J20	92.92	0.073	0.274	1.417
System	96.46	0.320	1.268	5.876

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.129	0 00:27	0.46	1.32	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.143	0 00:17	0.84	0.57	1.00
C4	CONDUIT	0.130	0 00:17	1.03	1.14	1.00
C5	CONDUIT	0.187	0 00:30	0.76	1.11	1.00
C7	CONDUIT	0.200	0 00:32	0.70	0.98	1.00
C8	CONDUIT	0.200	0 00:32	0.70	0.68	1.00
C9	CONDUIT	0.386	0 00:18	1.56	2.65	1.00
C10	CONDUIT	0.428	0 00:17	1.05	32.49	1.00
C11	CONDUIT	0.813	0 00:39	1.11	2.52	1.00
C12	CONDUIT	0.854	0 00:38	1.16	4.96	1.00
C13	CONDUIT	0.879	0 00:39	1.20	1.29	1.00
C14	CONDUIT	0.773	0 00:40	1.48	2.33	1.00
C15	CONDUIT	0.994	0 00:30	1.86	3.87	0.97
C16	CONDUIT	0.319	0 00:30	1.11	3.18	1.00
C17	CONDUIT	0.148	0 00:30	0.75	0.53	1.00
C6	CONDUIT	0.308	0 00:30	1.07	1.52	1.00

C18 CONDUIT 0.308 0 00:30 1.07 10.21 1.00  
C19 CONDUIT 0.274 0 00:30 2.21 46.62 0.96

\*\*\*\*\*  
Flow Classification Summary  
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Conduit	Adjusted /Actual Length	----- Dry	Up Dry	Fraction of Time Down Dry	Sub Crit	Sup Crit	Up Crit	Down Crit	Norm Ltd	Inlet Ctrl
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00

\*\*\*\*\*  
Conduit Surchage Summary  
\*\*\*\*\*

Conduit	----- Both Ends	Hours Full Upstream	----- Dnstream	Hours Above Full Normal Flow	Hours Capacity Limited
C1	5.74	5.74	5.75	0.18	0.19
C2	5.74	5.74	5.76	0.01	0.01
C3	0.44	0.44	5.74	0.01	0.01
C4	5.72	5.72	5.79	0.01	0.01
C5	5.71	5.71	5.72	0.04	0.05
C7	0.26	0.26	0.36	0.01	0.01
C8	0.36	0.36	5.71	0.01	0.01
C9	5.91	5.91	5.97	1.32	0.01
C10	5.72	5.72	5.91	5.98	0.24
C11	0.46	0.47	0.46	0.54	0.46
C12	0.44	0.47	0.44	0.71	0.44
C13	0.44	0.44	0.46	0.42	0.41
C14	0.38	0.42	0.38	0.63	0.38
C15	0.01	0.38	0.01	0.78	0.01
C16	5.94	5.95	5.95	0.40	0.01
C17	0.73	0.73	5.95	0.01	0.01
C6	0.44	0.44	5.71	0.23	0.24
C18	5.87	5.87	5.87	5.79	0.32
C19	0.01	0.32	0.01	5.73	0.01

Analysis begun on: Thu Sep 15 10:58:22 2016  
Analysis ended on: Thu Sep 15 10:58:23 2016  
Total elapsed time: 00:00:01

## STATO DI PROGETTO

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 30 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP00.50h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

\*\*\*\*\*  
Link Summary  
\*\*\*\*\*

Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

\*\*\*\*\*  
NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES

RDII ..... NO

Snowmelt ..... NO

Groundwater ..... NO

Flow Routing ..... YES

Ponding Allowed ..... NO

Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... DYNWAVE

Starting Date ..... JUN-20-2016 00:00:00

Ending Date ..... JUN-20-2016 06:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:01:00

Wet Time Step ..... 00:01:00

Dry Time Step ..... 00:01:00

Routing Time Step ..... 5.00 sec

Variable Time Step ..... YES

Maximum Trials ..... 8

Number of Threads ..... 1

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
*****	-----	-----
Total Precipitation .....	1.310	62.948
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.289	13.888
Surface Runoff .....	0.996	47.866
Final Storage .....	0.026	1.234
Continuity Error (%) .....	-0.065	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	0.996	9.960
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.102	1.016
Flooding Loss .....	0.576	5.764
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.002	0.021
Final Stored Volume .....	0.317	3.173
Continuity Error (%) .....	0.291	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.10%)  
Node J5 (9.47%)  
Node J17 (4.65%)  
Node J2 (2.42%)  
Node J12 (1.66%)

\*\*\*\*\*  
Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (18.02%)  
Link C19 (11.43%)  
Link C18 (4.55%)  
Link C6 (1.77%)

\*\*\*\*\*  
Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (16)  
Link C16 (3)  
Link C14 (3)  
Link C13 (2)  
Link C18 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step	:	0.50 sec
Average Time Step	:	4.39 sec
Maximum Time Step	:	5.00 sec
Percent in Steady State	:	0.00
Average Iterations per Step	:	2.19
Percent Not Converging	:	1.50

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	62.95	0.00	0.00	10.13	51.60	0.15	0.09	0.820
S_02	62.95	0.00	0.00	10.22	51.50	0.24	0.15	0.818
S_03	62.95	0.00	0.00	10.69	51.01	0.41	0.26	0.810
S_04	62.95	0.00	0.00	14.25	47.62	0.59	0.37	0.757
S_05	62.95	0.00	0.00	11.15	50.54	0.29	0.18	0.803
S_06	62.95	0.00	0.00	10.34	51.37	0.50	0.31	0.816
S_07	62.95	0.00	0.00	10.55	51.16	0.31	0.20	0.813
S_08	62.95	0.00	0.00	11.43	50.25	0.38	0.24	0.798
S_09	62.95	0.00	0.00	10.59	51.12	0.22	0.14	0.812
S_10	62.95	0.00	0.00	10.54	51.17	0.13	0.08	0.813

S_11	62.95	0.00	0.00	12.84	48.96	0.30	0.19	0.778
S_12	62.95	0.00	0.00	10.09	51.64	0.11	0.07	0.820
S_13	62.95	0.00	0.00	11.44	50.24	0.51	0.31	0.798
S_14	62.95	0.00	0.00	35.30	27.66	0.38	0.28	0.439
S_15	62.95	0.00	0.00	3.21	57.79	0.06	0.03	0.918
S_monte	62.95	0.00	0.00	13.13	48.49	5.39	3.20	0.770

\*\*\*\*\*  
Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.95	1.58	24.18	0 00:45	0.48
J2	JUNCTION	0.99	1.59	24.15	0 00:45	0.48
J3	JUNCTION	0.95	1.95	24.55	0 00:14	0.47
J4	JUNCTION	0.74	1.30	24.15	0 00:45	0.39
J5	JUNCTION	0.74	1.29	24.14	0 00:45	0.39
J6	JUNCTION	0.51	1.02	24.11	0 00:17	0.31
J7	JUNCTION	1.21	1.52	23.89	0 00:45	0.46
J8	JUNCTION	0.49	1.00	24.13	0 00:19	0.30
J9	JUNCTION	1.11	1.78	24.30	0 00:17	0.47
J10	JUNCTION	1.06	1.70	24.35	0 00:17	0.52
J11	JUNCTION	1.09	1.68	24.29	0 00:17	0.51
J12	JUNCTION	1.12	1.70	24.25	0 00:17	0.48
J13	JUNCTION	0.54	0.86	23.98	0 00:17	0.26
J14	JUNCTION	1.16	1.56	24.04	0 00:18	0.46
J17	JUNCTION	0.67	1.10	24.02	0 00:18	0.32
J18	JUNCTION	1.07	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.07	1.40	23.92	0 00:45	0.43
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.02	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.093	0.093	0 00:45	0.149	0.161	8.622
J2	JUNCTION	0.148	0.246	0 00:45	0.235	1.64	2.480
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00578	1942.538
J4	JUNCTION	0.314	0.314	0 00:45	0.507	1.77	1.471
J5	JUNCTION	0.000	0.107	0 00:19	0	0.124	10.462
J6	JUNCTION	0.260	0.301	0 00:45	0.414	0.436	1.096
J7	JUNCTION	0.000	0.447	0 00:32	0	3.79	0.679
J8	JUNCTION	0.375	0.375	0 00:45	0.587	0.594	1.509
J9	JUNCTION	0.114	0.932	0 00:45	0.186	5.32	1.425
J10	JUNCTION	3.512	3.512	0 00:45	5.89	5.92	0.239
J11	JUNCTION	0.377	0.935	0 00:45	0.603	2.66	1.559
J12	JUNCTION	0.239	0.984	0 00:45	0.385	2.94	1.691
J13	JUNCTION	0.187	0.317	0 00:45	0.296	0.525	1.086
J14	JUNCTION	0.141	0.995	0 00:45	0.225	2.99	1.495
J17	JUNCTION	0.000	0.200	0 00:47	0	0.414	4.873
J18	JUNCTION	0.067	0.355	0 00:45	0.107	0.661	1.043
J19	JUNCTION	0.000	0.268	0 00:45	0	1.64	0.645
J16	OUTFALL	0.000	0.932	0 00:45	0	4.84	0.000
J20	OUTFALL	0.000	0.246	0 00:45	0	1.59	0.000
J15	STORAGE	0.283	0.617	0 00:45	0.381	2.78	-49.945

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.981	0.159
J2	JUNCTION	0.56	0.475	0.325
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	0.70	0.545	0.185
J5	JUNCTION	5.71	0.693	0.077
J6	JUNCTION	5.71	0.620	0.000
J7	JUNCTION	5.70	0.442	0.338

J8	JUNCTION	0.49	0.250	0.000
J9	JUNCTION	0.62	0.583	0.257
J10	JUNCTION	0.72	0.500	0.000
J11	JUNCTION	0.71	0.460	0.000
J12	JUNCTION	0.68	0.450	0.000
J13	JUNCTION	1.06	0.360	0.003
J14	JUNCTION	0.67	0.311	0.459
J17	JUNCTION	0.61	0.353	0.277
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.70	0.446	0.354
J15	STORAGE	5.91	0.640	0.460

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Node Flooding Summary  
\*\*\*\*\*

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.49	0.301	0 00:45	0.341	0.000
J8	0.46	0.197	0 00:45	0.196	0.000
J10	0.61	2.952	0 00:45	3.899	0.000
J11	0.40	0.190	0 00:45	0.171	0.000
J12	0.01	0.193	0 00:17	0.001	0.000
J13	0.63	0.317	0 00:45	0.504	0.000
J18	0.66	0.355	0 00:45	0.651	0.000

\*\*\*\*\*  
Storage Volume Summary  
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Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.830	23	0	0	2.775	35	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.271	0.932	4.842
J20	93.07	0.082	0.246	1.586
System	96.53	0.353	1.178	6.427

\*\*\*\*\*  
Link Flow Summary  
\*\*\*\*\*

Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.093	0 00:45	0.43	0.95	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.107	0 00:19	0.85	0.94	1.00
C5	CONDUIT	0.106	0 00:19	0.76	0.63	1.00
C7	CONDUIT	0.200	0 00:47	0.70	0.98	1.00
C8	CONDUIT	0.200	0 00:47	0.70	0.68	1.00
C9	CONDUIT	0.371	0 00:19	1.89	2.54	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.811	0 00:54	1.10	2.52	1.00
C12	CONDUIT	0.853	0 00:53	1.16	4.96	1.00
C13	CONDUIT	0.877	0 00:54	1.19	1.28	1.00
C14	CONDUIT	0.767	0 00:54	1.48	2.31	1.00
C15	CONDUIT	0.932	0 00:45	1.86	3.63	0.97
C16	CONDUIT	0.287	0 00:45	1.00	2.87	1.00
C17	CONDUIT	0.130	0 00:45	0.66	0.46	1.00
C6	CONDUIT	0.268	0 00:45	0.93	1.33	1.00
C18	CONDUIT	0.268	0 00:45	0.93	8.90	1.00

C19 CONDUIT 0.246 0 00:45 2.01 41.95 0.94

\*\*\*\*\*  
Flow Classification Summary  
\*\*\*\*\*

Conduit	Adjusted /Actual Length	Up		Down		Sub		Sup		Down		Norm	Inlet
		Dry	Dry	Dry	Crit	Crit	Crit	Crit	Crit	Crit	Crit		
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	0.00	0.00	0.00

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Conduit Surcharge Summary  
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Conduit	Hours Full		Hours Above Full		Hours Capacity Limited
	Both Ends	Upstream	Dnstream	Normal Flow	
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	0.70	0.70	5.74	0.01	0.01
C4	5.71	5.71	5.79	0.01	0.01
C5	5.71	5.71	5.71	0.01	0.01
C7	0.49	0.49	0.61	0.01	0.01
C8	0.61	0.61	5.70	0.01	0.01
C9	5.91	5.91	5.97	1.13	0.01
C10	5.71	5.71	5.91	5.98	0.46
C11	0.71	0.72	0.71	0.79	0.71
C12	0.68	0.72	0.68	0.99	0.68
C13	0.68	0.68	0.71	0.66	0.66
C14	0.62	0.67	0.62	0.89	0.62
C15	0.01	0.62	0.01	1.05	0.01
C16	5.94	5.95	5.95	0.64	0.01
C17	1.06	1.06	5.95	0.01	0.01
C6	0.70	0.70	5.70	0.43	0.43
C18	5.87	5.87	5.87	5.80	0.54
C19	0.01	0.56	0.01	5.73	0.01

Analysis begun on: Thu Sep 15 10:56:00 2016  
Analysis ended on: Thu Sep 15 10:56:01 2016  
Total elapsed time: 00:00:01

STATO DI PROGETTO

TEMPO DI RITORNO 200 ANNI - DURATA DI PIOGGIA 60 MINUTI

CONDIZIONE AL CONTORNO: FIXED

EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.010)

WARNING 04: minimum elevation drop used for Conduit C10  
WARNING 04: minimum elevation drop used for Conduit C18  
WARNING 04: minimum elevation drop used for Conduit C19

\*\*\*\*\*  
Element Count  
\*\*\*\*\*

Number of rain gages ..... 1  
Number of subcatchments ... 16  
Number of nodes ..... 20  
Number of links ..... 19  
Number of pollutants ..... 0  
Number of land uses ..... 0

\*\*\*\*\*  
Raingage Summary  
\*\*\*\*\*

Name	Data Source	Data Type	Recording Interval
RG1	icTR200TP01.00h	VOLUME	15 min.

\*\*\*\*\*  
Subcatchment Summary  
\*\*\*\*\*

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
S_01	0.29	67.00	65.00	0.5000	RG1	J1
S_02	0.46	99.00	65.00	0.5000	RG1	J2
S_03	0.81	124.00	65.00	0.5000	RG1	J6
S_04	1.23	158.00	56.00	0.5000	RG1	J8
S_05	0.57	65.00	65.00	0.5000	RG1	J11
S_06	0.97	190.00	65.00	0.5000	RG1	J10
S_07	0.61	103.00	65.00	0.5000	RG1	J11
S_08	0.77	74.00	65.00	0.5000	RG1	J12
S_09	0.44	72.00	65.00	0.5000	RG1	J14
S_10	0.25	43.00	65.00	0.5000	RG1	J9
S_11	0.60	75.00	60.00	0.5000	RG1	J13
S_12	0.21	50.00	65.00	0.5000	RG1	J18
S_13	1.01	97.00	65.00	0.5000	RG1	J4
S_14	1.38	236.00	0.00	0.5000	RG1	J15
S_15	0.10	3.00	90.00	0.5000	RG1	J9
S_monte	11.11	470.00	65.00	0.5000	RG1	J10

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Node Summary  
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Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
J1	JUNCTION	22.60	1.74	0.0	
J2	JUNCTION	22.56	1.91	0.0	
J3	JUNCTION	22.60	1.95	0.0	
J4	JUNCTION	22.85	1.48	0.0	
J5	JUNCTION	22.85	1.37	0.0	
J6	JUNCTION	23.09	1.02	0.0	
J7	JUNCTION	22.37	1.86	0.0	
J8	JUNCTION	23.13	1.00	0.0	
J9	JUNCTION	22.52	2.04	0.0	
J10	JUNCTION	22.65	1.70	0.0	
J11	JUNCTION	22.61	1.68	0.0	
J12	JUNCTION	22.55	1.70	0.0	
J13	JUNCTION	23.12	0.86	0.0	
J14	JUNCTION	22.48	2.02	0.0	
J17	JUNCTION	22.92	1.38	0.0	
J18	JUNCTION	22.55	1.20	0.0	
J19	JUNCTION	22.52	1.75	0.0	
J16	OUTFALL	22.42	1.28	0.0	
J20	OUTFALL	22.56	1.11	0.0	
J15	STORAGE	22.46	1.60	0.0	

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Link Summary  
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Name	From Node	To Node	Type	Length	%Slope	Roughness
C1	J1	J2	CONDUIT	81.4	0.0491	0.0180
C2	J3	J2	CONDUIT	74.5	-0.3624	0.0140
C3	J2	J4	CONDUIT	89.2	-0.3251	0.0180
C4	J6	J5	CONDUIT	69.1	0.3473	0.0140
C5	J5	J4	CONDUIT	34.3	-0.0875	0.0140
C7	J8	J17	CONDUIT	97.9	0.2145	0.0180
C8	J17	J7	CONDUIT	49.3	0.4463	0.0180
C9	J7	J15	CONDUIT	31.5	-0.2857	0.0180
C10	J7	J9	CONDUIT	89.9	0.0003	0.0180
C11	J10	J11	CONDUIT	45.8	0.0437	0.0180
C12	J11	J12	CONDUIT	80.2	0.0125	0.0180
C13	J12	J14	CONDUIT	61.0	0.1967	0.0180
C14	J14	J9	CONDUIT	21.5	0.0465	0.0180
C15	J9	J16	CONDUIT	72.1	0.0277	0.0180
C16	J18	J14	CONDUIT	38.7	0.0517	0.0180
C17	J13	J12	CONDUIT	53.8	1.0595	0.0180
C6	J4	J19	CONDUIT	61.6	0.2110	0.0180
C18	J19	J7	CONDUIT	6.5	0.0047	0.0180
C19	J2	J20	CONDUIT	20.0	0.0015	0.0180

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Cross Section Summary  
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Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
C1	CIRCULAR	0.60	0.28	0.15	0.60	1	0.10
C2	CIRCULAR	0.40	0.13	0.10	0.40	1	0.12
C3	EGG	0.75	0.29	0.14	0.50	1	0.25
C4	CIRCULAR	0.40	0.13	0.10	0.40	1	0.11
C5	CIRCULAR	0.60	0.28	0.15	0.60	1	0.17
C7	EGG	0.75	0.29	0.14	0.50	1	0.20
C8	EGG	0.75	0.29	0.14	0.50	1	0.29
C9	CIRCULAR	0.50	0.20	0.12	0.50	1	0.15
C10	EGG	0.90	0.41	0.17	0.60	1	0.01
C11	EGG	1.20	0.74	0.23	0.80	1	0.32
C12	EGG	1.20	0.74	0.23	0.80	1	0.17
C13	EGG	1.20	0.74	0.23	0.80	1	0.68
C14	EGG	1.20	0.74	0.23	0.80	1	0.33
C15	EGG	1.20	0.74	0.23	0.80	1	0.26
C16	EGG	0.75	0.29	0.14	0.50	1	0.10
C17	CIRCULAR	0.50	0.20	0.12	0.50	1	0.28
C6	EGG	0.75	0.29	0.14	0.50	1	0.20
C18	EGG	0.75	0.29	0.14	0.50	1	0.03
C19	CIRCULAR	0.40	0.13	0.10	0.40	1	0.01

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NOTE: The summary statistics displayed in this report are based on results found at every computational time step, not just on results from each reporting time step.  
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Analysis Options

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Flow Units ..... CMS

Process Models:

Rainfall/Runoff ..... YES  
RDII ..... NO  
Snowmelt ..... NO  
Groundwater ..... NO  
Flow Routing ..... YES  
Ponding Allowed ..... NO  
Water Quality ..... NO

Infiltration Method ..... HORTON

Flow Routing Method ..... DYNWAVE

Starting Date ..... JUN-20-2016 00:00:00

Ending Date ..... JUN-20-2016 06:00:00

Antecedent Dry Days ..... 0.0

Report Time Step ..... 00:01:00

Wet Time Step ..... 00:01:00

Dry Time Step ..... 00:01:00

Routing Time Step ..... 5.00 sec

Variable Time Step ..... YES

Maximum Trials ..... 8

Number of Threads ..... 1

Head Tolerance ..... 0.001500 m

Runoff Quantity Continuity	Volume hectare-m	Depth mm
*****	-----	-----
Total Precipitation .....	1.460	70.176
Evaporation Loss .....	0.000	0.000
Infiltration Loss .....	0.341	16.369
Surface Runoff .....	1.094	52.587
Final Storage .....	0.026	1.239
Continuity Error (%) .....	-0.027	

Flow Routing Continuity	Volume hectare-m	Volume 10^6 ltr
*****	-----	-----
Dry Weather Inflow .....	0.000	0.000
Wet Weather Inflow .....	1.094	10.941
Groundwater Inflow .....	0.000	0.000
RDII Inflow .....	0.000	0.000
External Inflow .....	0.000	0.000
External Outflow .....	0.267	2.667
Flooding Loss .....	0.505	5.046
Evaporation Loss .....	0.000	0.000
Exfiltration Loss .....	0.000	0.000
Initial Stored Volume .....	0.002	0.021
Final Stored Volume .....	0.321	3.214
Continuity Error (%) .....	0.322	

\*\*\*\*\*  
Highest Continuity Errors  
\*\*\*\*\*

Node J3 (95.34%)  
Node J5 (3.18%)  
Node J17 (3.05%)  
Node J2 (2.25%)  
Node J9 (1.25%)

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Time-Step Critical Elements  
\*\*\*\*\*

Link C14 (17.99%)  
Link C19 (17.93%)  
Link C6 (10.37%)  
Link C18 (4.51%)

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Highest Flow Instability Indexes  
\*\*\*\*\*

Link C2 (15)  
Link C16 (4)  
Link C18 (3)  
Link C14 (2)  
Link C11 (2)

\*\*\*\*\*  
Routing Time Step Summary  
\*\*\*\*\*

Minimum Time Step : 0.50 sec  
Average Time Step : 4.35 sec  
Maximum Time Step : 5.00 sec  
Percent in Steady State : 0.00  
Average Iterations per Step : 2.21  
Percent Not Converging : 1.73

\*\*\*\*\*  
Subcatchment Runoff Summary  
\*\*\*\*\*

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
S_01	70.18	0.00	0.00	12.52	56.38	0.16	0.05	0.803
S_02	70.18	0.00	0.00	12.60	56.31	0.26	0.08	0.802
S_03	70.18	0.00	0.00	13.00	55.90	0.45	0.15	0.797
S_04	70.18	0.00	0.00	17.06	52.02	0.64	0.21	0.741
S_05	70.18	0.00	0.00	13.40	55.48	0.32	0.10	0.791
S_06	70.18	0.00	0.00	12.70	56.20	0.54	0.17	0.801
S_07	70.18	0.00	0.00	12.88	56.02	0.34	0.11	0.798
S_08	70.18	0.00	0.00	13.65	55.23	0.42	0.14	0.787
S_09	70.18	0.00	0.00	12.91	55.99	0.25	0.08	0.798
S_10	70.18	0.00	0.00	12.87	56.03	0.14	0.05	0.798



S_11	70.18	0.00	0.00	15.40	53.59	0.32	0.11	0.764
S_12	70.18	0.00	0.00	12.49	56.42	0.12	0.04	0.804
S_13	70.18	0.00	0.00	13.66	55.22	0.56	0.18	0.787
S_14	70.18	0.00	0.00	41.43	28.75	0.40	0.19	0.410
S_15	70.18	0.00	0.00	3.85	64.33	0.06	0.02	0.917
S_monte	70.18	0.00	0.00	15.24	53.59	5.95	1.88	0.764

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Node Depth Summary  
\*\*\*\*\*

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
J1	JUNCTION	0.96	1.37	23.97	0 01:15	0.42
J2	JUNCTION	1.00	1.40	23.96	0 01:15	0.43
J3	JUNCTION	0.96	1.95	24.55	0 00:14	0.41
J4	JUNCTION	0.75	1.13	23.98	0 01:15	0.34
J5	JUNCTION	0.75	1.13	23.98	0 01:15	0.35
J6	JUNCTION	0.55	1.02	24.11	0 00:33	0.31
J7	JUNCTION	1.23	1.47	23.84	0 01:15	0.45
J8	JUNCTION	0.51	1.00	24.13	0 00:57	0.30
J9	JUNCTION	1.12	1.31	23.83	0 01:15	0.40
J10	JUNCTION	1.10	1.70	24.35	0 00:22	0.52
J11	JUNCTION	1.12	1.67	24.28	0 01:15	0.51
J12	JUNCTION	1.14	1.50	24.05	0 01:15	0.46
J13	JUNCTION	0.56	0.86	23.98	0 00:19	0.26
J14	JUNCTION	1.17	1.39	23.87	0 01:15	0.42
J17	JUNCTION	0.69	1.02	23.94	0 01:15	0.31
J18	JUNCTION	1.08	1.20	23.75	0 00:03	0.37
J19	JUNCTION	1.08	1.34	23.86	0 01:15	0.41
J16	OUTFALL	1.20	1.20	23.62	0 00:00	0.37
J20	OUTFALL	0.00	0.00	22.56	0 00:00	0.00
J15	STORAGE	1.03	1.14	23.60	0 06:00	0.35

\*\*\*\*\*  
Node Inflow Summary  
\*\*\*\*\*

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
J1	JUNCTION	0.052	0.056	0 00:11	0.162	0.175	7.884
J2	JUNCTION	0.082	0.201	0 01:15	0.257	1.8	2.302
J3	JUNCTION	0.000	0.072	0 00:14	0	0.00576	2045.853
J4	JUNCTION	0.179	0.262	0 01:15	0.557	2.02	1.307
J5	JUNCTION	0.000	0.108	0 00:33	0	0.365	3.284
J6	JUNCTION	0.146	0.146	0 01:15	0.454	0.458	1.069
J7	JUNCTION	0.000	0.413	0 00:08	0	3.76	0.692
J8	JUNCTION	0.214	0.214	0 01:15	0.642	0.647	1.595
J9	JUNCTION	0.064	0.897	0 00:01	0.204	5.98	1.271
J10	JUNCTION	2.056	2.056	0 01:15	6.5	6.53	0.228
J11	JUNCTION	0.213	0.853	0 01:21	0.661	3.81	1.094
J12	JUNCTION	0.136	0.952	0 01:15	0.423	4.29	1.183
J13	JUNCTION	0.107	0.208	0 01:15	0.324	0.627	0.914
J14	JUNCTION	0.079	0.930	0 01:14	0.246	4.3	1.045
J17	JUNCTION	0.000	0.198	0 00:58	0	0.65	3.141
J18	JUNCTION	0.038	0.281	0 01:15	0.117	0.913	0.762
J19	JUNCTION	0.000	0.195	0 01:15	0	1.73	0.612
J16	OUTFALL	0.000	0.897	0 00:01	0	5.49	0.000
J20	OUTFALL	0.000	0.201	0 01:15	0	1.74	0.000
J15	STORAGE	0.185	0.478	0 01:15	0.395	2.82	-49.945

\*\*\*\*\*  
Node Surcharge Summary  
\*\*\*\*\*

Surcharging occurs when water rises above the top of the highest conduit.

Node	Type	Hours Surcharged	Max. Height Above Crown Meters	Min. Depth Below Rim Meters
J1	JUNCTION	5.74	0.767	0.373
J2	JUNCTION	0.98	0.286	0.514
J3	JUNCTION	5.76	1.550	0.000
J4	JUNCTION	1.15	0.377	0.353
J5	JUNCTION	5.70	0.534	0.236
J6	JUNCTION	5.69	0.620	0.000
J7	JUNCTION	5.69	0.393	0.387

J8	JUNCTION	0.86	0.250	0.000
J9	JUNCTION	1.03	0.106	0.734
J10	JUNCTION	1.14	0.500	0.000
J11	JUNCTION	1.13	0.450	0.010
J12	JUNCTION	1.10	0.255	0.195
J13	JUNCTION	1.52	0.360	0.003
J14	JUNCTION	1.08	0.139	0.631
J17	JUNCTION	1.05	0.269	0.361
J18	JUNCTION	5.95	0.450	0.000
J19	JUNCTION	5.69	0.386	0.414
J15	STORAGE	5.91	0.644	0.456

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Node Flooding Summary  
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Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Depth Meters
J3	0.01	0.038	0 00:14	0.000	0.000
J6	0.71	0.063	0 01:15	0.104	0.000
J8	0.30	0.020	0 01:15	0.012	0.000
J10	0.99	1.452	0 01:15	3.429	0.000
J13	1.02	0.208	0 01:15	0.598	0.000
J18	1.09	0.281	0 01:15	0.902	0.000

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Storage Volume Summary  
\*\*\*\*\*

Storage Unit	Average Volume 1000 m3	Avg Pent Full	Evap Pent Loss	Exfil Pent Loss	Maximum Volume 1000 m3	Max Pent Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
J15	1.926	24	0	0	2.817	35	0 06:00	0.000

\*\*\*\*\*  
Outfall Loading Summary  
\*\*\*\*\*

Outfall Node	Flow Freq Pent	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
J16	100.00	0.294	0.897	5.489
J20	93.13	0.088	0.201	1.740
System	96.57	0.382	1.048	7.228

\*\*\*\*\*  
Link Flow Summary  
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Link	Type	Maximum  Flow  CMS	Time of Max Occurrence days hr:min	Maximum  Veloc  m/sec	Max/ Full Flow	Max/ Full Depth
C1	CONDUIT	0.056	0 00:11	0.43	0.57	1.00
C2	CONDUIT	0.072	0 00:14	0.87	0.62	1.00
C3	CONDUIT	0.126	0 00:15	0.84	0.50	1.00
C4	CONDUIT	0.108	0 00:33	0.86	0.95	1.00
C5	CONDUIT	0.108	0 00:33	0.76	0.64	1.00
C7	CONDUIT	0.198	0 00:58	0.69	0.97	1.00
C8	CONDUIT	0.198	0 00:58	0.69	0.67	1.00
C9	CONDUIT	0.328	0 00:25	1.67	2.25	1.00
C10	CONDUIT	0.413	0 00:08	1.05	31.34	1.00
C11	CONDUIT	0.804	0 01:21	1.09	2.50	1.00
C12	CONDUIT	0.853	0 01:21	1.16	4.96	1.00
C13	CONDUIT	0.877	0 00:23	1.19	1.28	1.00
C14	CONDUIT	0.757	0 00:23	1.48	2.28	1.00
C15	CONDUIT	0.897	0 00:01	1.86	3.49	0.97
C16	CONDUIT	0.244	0 01:15	0.85	2.44	1.00
C17	CONDUIT	0.102	0 01:15	0.52	0.36	1.00
C6	CONDUIT	0.195	0 01:15	0.73	0.97	1.00
C18	CONDUIT	0.195	0 01:15	0.82	6.47	1.00
C19	CONDUIT	0.201	0 01:15	1.68	34.29	0.90

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Flow Classification Summary  
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Conduit	Adjusted /Actual Length	Fraction of Time in Flow Class									
		Up Dry	Down Dry	Sub Dry	Sup Crit	Up Crit	Down Crit	Norm Crit	Inlet Ltd	Inlet Ctrl	
C1	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C2	1.00	0.06	0.00	0.00	0.94	0.00	0.00	0.00	0.00	0.00	
C3	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.01	0.00	
C4	1.00	0.01	0.04	0.00	0.95	0.00	0.00	0.00	0.00	0.00	
C5	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C7	1.00	0.01	0.02	0.00	0.97	0.00	0.00	0.00	0.00	0.00	
C8	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C9	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C10	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C11	1.00	0.01	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C12	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C13	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C14	1.00	0.00	0.00	0.00	0.99	0.00	0.01	0.00	0.00	0.00	
C15	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C16	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C17	1.00	0.00	0.01	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C6	1.00	0.00	0.00	0.00	0.99	0.00	0.00	0.00	0.00	0.00	
C18	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00	0.00	0.00	
C19	1.00	0.07	0.00	0.00	0.00	0.00	0.00	0.93	0.00	0.00	

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Conduit Surcharge Summary  
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Conduit	Hours Full			Hours	
	Both Ends	Upstream	Dnstream	Above Full Normal Flow	Capacity Limited
C1	5.74	5.74	5.75	0.01	0.01
C2	5.74	5.74	5.76	0.01	0.01
C3	1.15	1.15	5.74	0.01	0.01
C4	5.69	5.69	5.79	0.01	0.01
C5	5.69	5.69	5.70	0.01	0.01
C7	0.86	0.86	1.05	0.01	0.01
C8	1.05	1.05	5.69	0.01	0.01
C9	5.91	5.91	5.97	1.48	0.01
C10	5.70	5.70	5.91	5.89	0.74
C11	1.13	1.14	1.13	1.21	1.13
C12	1.10	1.14	1.10	1.42	1.10
C13	1.10	1.10	1.14	1.06	1.06
C14	1.03	1.08	1.03	1.32	1.03
C15	0.01	1.03	0.01	1.50	0.01
C16	5.94	5.95	5.95	1.03	0.01
C17	1.52	1.52	5.95	0.01	0.01
C6	1.15	1.15	5.69	0.01	0.01
C18	5.87	5.87	5.80	5.80	0.99
C19	0.01	0.98	0.01	5.73	0.01

Analysis begun on: Thu Sep 15 10:58:04 2016  
Analysis ended on: Thu Sep 15 10:58:05 2016  
Total elapsed time: 00:00:01