CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Basin 1, Pond O - Existing Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 65.32 ft

(crown of 29"x45" cross drain @ 465+00)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 19.18 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	431+50
Baseline	
Offset (ft)	
Elevation (ft)	65.42

(seasonal high in Pond O = 67.51)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 0.10 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 2350 ft

pond inflow station 455+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	19.18	ac
Q =	136.66	cfs

Manning's n =	0.012	
Sum K =	0	(assume none for now)
V =	1.74	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 0.14 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 10 ft

120 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Basin 1, Pond 1B - Preferred Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 65.2 ft

(estimated 10 yr/72 hr storm)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 19.18 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	431+50
Baseline	
Offset (ft)	
Elevation (ft)	65.42

(seasonal high in Pond 1B = 65.10)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 0.22 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 450 ft

pond inflow station 436+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	19.18	ac
Q =	136.66	cfs

Manning's n =	0.012	
Sum K =	0	(assume none for now)
V =	4.12	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 0.26 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 6.5 ft

78 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Basin 2, Pond 2B - Preferred Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 63.7 ft

(crown of 2-48"x63" cross drain @ 529+00)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 10.48 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	533+00
Baseline	
Offset (ft)	
Elevation (ft)	66.07

(seasonal high in Pond 2B = 62.40)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 2.37 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 900 ft

pond inflow station 542+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	10.48	ac
Q =	74.67	cfs

Manning's n =	0.012	
Sum K =	0	(assume none for now)
V =	5.94	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 2.06 trial
n = Manning's n >actual HL - retry
L = Length (ft)
Q = Runoff (cfs)
D = Pipe Diameter (ft)
K = Coefficient for minor losses
V = Pipe velocity (fps)
g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 4 ft
48 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Basin 3, Pond A1 & A2 - Existing Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 64.82 ft

(crown of nearest cross drain)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 4.83 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	571+00
Baseline	
Offset (ft)	
Elevation (ft)	68.61

(seasonal high in Pond A1 = 65.02)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 3.79 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 300 ft

pond inflow station 574+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	4.83	ac
Q =	34.41375	cfs

Manning's n =	0.012	
Sum K =	0	(assume 0 for now)
V =	7.010717503	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 1.78 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 2.5 ft

30 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Pond 3B - Preferred Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 64.57 ft

(crown of 2-29"x45" cross drain @ 567+00)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 4.83 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	571+00
Baseline	
Offset (ft)	
Elevation (ft)	68.61

(seasonal high in Pond 3B = 64.85)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 4.04 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 1500 ft

pond inflow station 556+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	4.83	ac
Q =	34.41	cfs

Manning's n =	0.012	
Sum K =	0	(assume none for now)
V =	4.87	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 3.38 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 3 ft

36 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwate
will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Pond 5A - Preferred Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 64.05 ft

(crown of 2-43"x68" cross drain @ 690+00)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 7.83 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	679+50
Baseline	
Offset (ft)	
Elevation (ft)	67.56

(seasonal high in Pond 5A = 67.70)

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 3.51 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 750 ft

pond inflow station 672+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	7.83	ac
Q =	55.79	cfs

Manning's n =	0.012	
Sum K =	0	
V =	7.89	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 4.44 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 3 ft

36 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.

CONSOR ENGINEERS, LLC.

		DATE
MADE BY:	MSF	30-Apr-21
CHECK BY:	DAB	

PROJECT: **Poinciana Boulevard Widening**

LOCATION: **Pond 1 - Preferred Alternative**

DESCRIPTION: **Hydraulic Grade Line Clearance Calculations**

ESTIMATE TAILWATER ELEVATION IN THE POND (for preliminary storm sewer design) = 66.03 ft

(estimated 10 yr/72 hr storm)

CALCULATION OF POST DEVELOPMENT AREA FOR HGL CHECK:

Baseline	From Station	To Station	Length (ft)	Roadway Width (ft)	Area (ac)
				Total =	0

or see Basin Calcs 14.4 ac (roadway imp R/W only)

LOWEST GUTTER ELEVATION IN BASIN FOR HGL CHECK:

Station	702+12
Baseline	
Offset (ft)	
Elevation (ft)	67.50

ALLOWABLE HEAD LOSS = LOWEST GUTTER ELEV - EST. TAILWATER ELEV = 1.47 ft

PIPE LENGTH FROM POND TO LOWEST GUTTER POINT = 88 ft

pond inflow station 703+00

RATIONAL METHOD FOR CONTRIBUTING RUNOFF: Q = CiA

C =	0.95	
i =	7.5	in/hr
A =	14.4	ac
Q =	102.60	cfs

Manning's n =	0.012	
Sum K =	3.7	
V =	5.23	fps

ESTIMATION OF PIPE SIZE: $H_L = [4.61*(n^2)*L*(Q^2)]/(D^{5.33}) + K*(V^2/2*g)$

HL = Allowable Head Loss (ft) 1.68 trial

n = Manning's n >actual HL - retry

L = Length (ft)

Q = Runoff (cfs)

D = Pipe Diameter (ft)

K = Coefficient for minor losses

V = Pipe velocity (fps)

g = gravitational constant (32.2 fps)

ESTIMATED PIPE DIAMTER TO SATISFY THE CONDITIONS = 5 ft

60 in

Increasing allowable head loss based on lowest roadway elevation and storm sewer tailwater will decrease pipe size.