TECHNICAL MEMORANDUM

To: Alex Nagy, City of Champaign
From: Clark Dietz Engineers
Date: November 3, 2009
Subject: West Washington Street Drainage Study Scenario Summary

The four scenarios chosen for the scenario comparison figure are:

Scenario 1
Scenario 1A
Scenario 3
Scenario 10

Scenario 10 is not in the current version of the West Washington Street Watershed Master Plan report and was developed based on the discussion we had with the Fountain Head Drainage District. This scenario involves either replacing the existing or constructing a parallel sewer along West Washington Street to increase peak flows to the Copper Slough in an attempt to reduce the frequency of the flooding in the watershed. Model results show that a 60-inch storm sewer would be adequate to convey peak flows from the 10-year storm event, with only minor flooding along the trunk sewer. The performance of the collector storm sewers and surface inlets may produce localized areas of flooding, but the trunk sewer would be able to limit surface flooding to about 6 inches during the 10-year storm event.

The Copper Slough would experience higher peak flows that would increase the water surface elevation at the West Washington Street outlet by about 7 inches and at the Mayes Ditch confluence by approximately 4 inches. The Copper Slough 100-year floodplain is contained within the channel through this reach and therefore would not increase flood damage to local residents. Further downstream would only increase the 100-year floodplain elevation by an inch or two and therefore would not greatly impact the floodplain boundaries. The backwater effect upstream of the storm sewer outlet would not be impacted by this higher water surface elevation since the railroad and channel flow area are controlling the water surface elevation upstream. IDNR and other regulating agencies would not require any special permitting and only City and Fountain Head Drainage District approval is required for the project.

The increased flows would increase the erosion rate in the channel and therefore would require stream bank stabilization projects to be implemented prior to the construction of this relief sewer to better equip the Copper Slough to accept the higher peak flows. The other drawback of this scenario is that the increased flows consume the channel conveyance capacity that was intended for the other storm trunk sewer improvement projects discussed in the Copper Slough Watershed Master Plan. By increasing peak flows from the West Washington Street watershed without stormwater detention, the channel would require additional stormwater detention elsewhere to lower the high water elevation and peak flows to obtain the hydraulic conditions necessary to implement the other stormwater trunk sewer improvements.

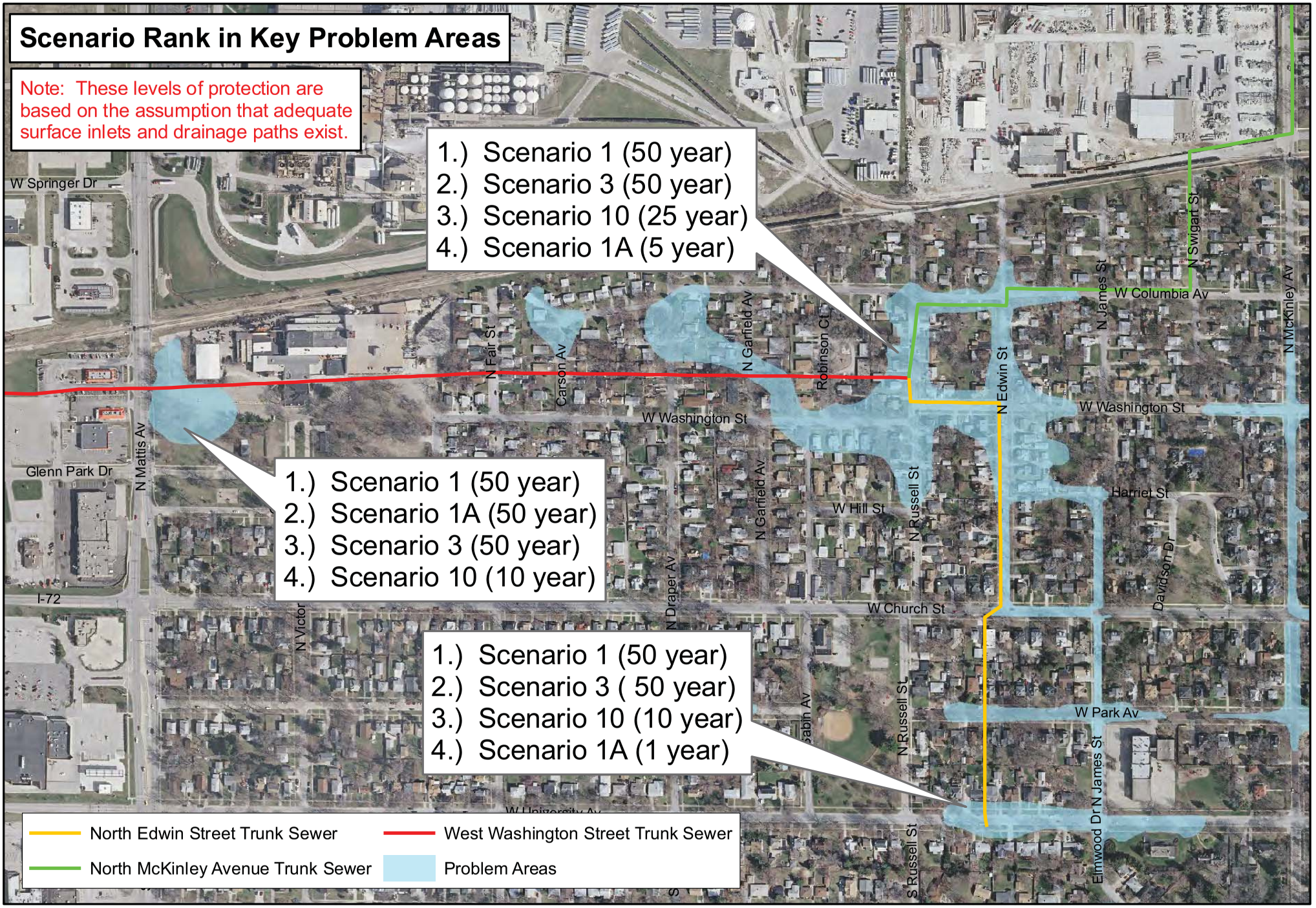
The other three scenarios were chosen based on the performance of these alternatives and from the input from the Steering Committee. If the City would like to consider a different scenario, please let us know which scenario should be replaced.

The attached figures include a figure containing a scenario rank figure, which identifies a comparison of the four scenarios at the three worst flooding areas. The other attached figure is a figure of Scenario 10.

The two attached tables include a table that displays the benefits and cost of the four scenarios, as requested by Roland, and the second table is an advantages/disadvantages summary table.

The detailed cost estimates are preliminary cost estimates for the four scenarios containing construction and land acquisition costs, as well as the channel improvement cost for Scenario 10.

If the City accepts these four scenarios as the four they wish to consider, then we would like to integrate this into the West Washington Street Watershed Master Plan.



Clark Dietz ENGINEERS

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West Washington Street Drainage Study

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West Washington Street Drainage Study
Washington Street Sewer and Edwin Street Sewer

N W E S

Scenario	Benefit	Cost
1. Alloy Casting Ponds, Robinson Court Pond, Edwin Street Storm Sewer, and Concrete Facility Pond	-Ponds are located at or near flood problem areas -Most of the ponds are located in open space -Minimal new sewer required for detention ponds -Utilizes existing infrastructure -Does not increase flows downstream -Edwin Street sewer could be relocated to City right-of-way -New sewer would work well with new ponds	$8,400,000
1A. Alloy Casting Ponds, Edwin Street Storm Sewer, Washington Street Storm Sewer, and Concrete Facility Pond	-Ponds are located at or near flood problem areas -Ponds are located in open space -Minimal new sewer required for detention ponds -Utilizes existing infrastructure -Does not increase flows downstream -New sewer could be relocated to City right-of-way -New sewer would work with new ponds	$9,700,000
3. Alloy Casting Ponds, Railroad Pond, and Edwin Street Storm Sewer	-Ponds are located at or near flood problem areas -Ponds are strategically located for optimum performance -Minimal new sewer required for detention ponds -Utilizes existing infrastructure -Does not increase flows downstream -New sewer could be relocated to City right-of-way	$8,200,000
10. 60-in West Washington Street Trunk Sewer, Edwin Street Storm Sewer, and Copper Slough Channel Improvements	-Moves runoff faster downstream -Locates sewer in City right-of-way -Replaces existing Washington Street trunk sewer -Eliminates or alleviates existing hydraulic restrictions	$10,600,000

Scenario	Advantages	Disadvantages
1. Alloy Casting Ponds, Robinson Court Pond, Edwin Street Storm Sewer, and Concrete Facility Pond **Cost:** **$8,400,000**	-Ponds are strategically located at or near flood problem areas -Most of the ponds are located in open space -Does not increase flows downstream and provides detention -Utilizes existing infrastructure	-Homes would need to be removed -Detention ponds located in residential areas -Relies on West Washington storm sewer -Hydraulic restrictions remain
1A. Alloy Casting Ponds, Edwin Street Storm Sewer, Washington Street Storm Sewer, and Concrete Facility Pond **Cost:** **$9,700,000**	-Ponds are strategically located in open space -New sewer could be relocated to City right-of-way -Does not increase flows downstream and provides detention -Utilizes existing infrastructure	-Detention ponds located near residential areas -May rely on West Washington storm sewer -Hydraulic restrictions may remain - Does not provide enough detention
3. Alloy Casting Ponds, Railroad Pond, and Edwin Street Storm Sewer **Cost:** **$8,200,000**	-Ponds are strategically located at or near flood problem areas -New sewer could be relocated to City right-of-way -Does not increase flows downstream and provides detention -Utilizes existing infrastructure	-Homes would need to be removed -Detention ponds located in residential areas -Relies on West Washington storm sewer -Hydraulic restrictions remain
10. 60-in West Washington Street Trunk Sewer, Edwin Street Storm Sewer, and Copper Slough Channel Stabilization Projects **Cost:** **$10,600,000**	-Moves runoff faster downstream -Locates sewer in City right-of-way -Replaces or parallels existing Washington Street trunk sewer -Eliminates or alleviates existing hydraulic restrictions	-Increases flows to the Copper Slough -No detention provided -May be difficult to integrate into existing infrastructure -Is not implementable in phases

	Quantity	Unit	Unit Price	Total (1)	Notes
Alloy Casting Detention Pond Excavation	47,000	cy	$ 17	$ 799,000	
Alloy Casting Detention Pond Underdrain System	1	ea	$ 20,000	$ 20,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 140,000	$ 140,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 70,000	$ 70,000	
Pond Inlet Structure	1	ea	$ 5,000	$ 5,000	
Pond Outlet Structure	1	ea	$ 12,000	$ 12,000	
Robinson Court Detention Pond Excavation	40,000	cy	$ 17	$ 680,000	
Robinson Court Detention Pond Underdrain System	1	ea	$ 10,000	$ 10,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 110,000	$ 110,000	
Reconnect Existing Sewers	2	ea	$ 2,000	$ 4,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 50,000	$ 50,000	
Pond Inlet Structure	1	ea	$ 5,000	$ 5,000	
Pond Outlet Structure	1	ea	$ 12,000	$ 12,000	
Concrete Pond Detention Pond Excavation	19,000	cy	$ 10	$ 190,000	
Concrete Pond Detention Pond Underdrain System	1	ea	$ 10,000	$ 10,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 80,000	$ 80,000	
Reconnect Existing Sewers	3	ea	$ 2,000	$ 6,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 40,000	$ 40,000	
Pond Inlet Structure	2	ea	$ 2,500	$ 5,000	
Pond Outlet Structure	1	ea	$ 3,000	$ 3,000	
8" Diameter RCP Sewer, Open Cut, BFM 4	483	lf	$ 67	$ 32,000	2
12" Diameter RCP Sewer, Open Cut, BFM 4	200	lf	$ 87	$ 17,000	2
18" Diameter RCP Sewer, Open Cut, BFM 4	660	lf	$ 99	$ 65,000	2
24" Diameter RCP Sewer, Open Cut, BFM 4	350	lf	$ 108	$ 38,000	2
27" Diameter RCP Sewer, Open Cut, BFM 4	420	lf	$ 114	$ 48,000	2
30" Diameter RCP Sewer, Open Cut, BFM 4	1,100	lf	$ 121	$ 133,000	2
36" Diameter RCP Sewer, Open Cut, BFM 4	1,100	lf	$ 137	$ 151,000	2
4' Diameter Manholes	5	ea	$ 2,800	$ 14,000	2
5' Diameter Manholes	4	ea	$ 3,200	$ 13,000	2
6' Diameter Manholes	18	ea	$ 3,800	$ 68,000	2
8' Diameter Manholes	10	ea	$ 6,500	$ 65,000	2
Surface Replacement, Pavement	3,530	lf	$ 250	$ 883,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 150,000	$ 150,000	
Mobilization, Demobilization, Traffic Control	1	ls	$ 354,000	$ 354,000	
Construction Subtotal				**$4,282,000**	
Contingency	20%			$856,000	
Construction Subtotal				**$5,138,000**	
Land Acquisition				$ 2,250,000	3
Design Engineering	10%			$514,000	
Construction Engineering	10%			$514,000	
Total Project Cost				**$8,416,000**	

Notes:

1. Line items have been rounded to the nearest $1000, subtotals have been rounded to the nearest $10,000. All costs are in 2009 dollars.
2. Assuming $5/lf for sewer removal and $500/ea for manhole removal. Assuming existing sewers can be temporarily plugged during removal and replacement of sewer and manholes and no bypass pumping is required. Approximately 3'-6' depth trench backfill.
3. Land acquisition cost estimate determined by the City.

City of Champaign, Illinois

SCENARIO 1A

	Quantity	Unit	Unit Price	Total (1)	Notes
Alloy Casting Detention Pond Excavation	70,000	cy	$ 17	$ 1,190,000	
Alloy Casting Detention Pond Underdrain System	1	ea	$ 20,000	$ 20,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 200,000	$ 200,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 70,000	$ 70,000	
Pond Inlet Structure	1	ea	$ 5,000	$ 5,000	
Pond Outlet Structure	1	ea	$ 12,000	$ 12,000	
Concrete Pond Detention Pond Excavation	19,000	cy	$ 10	$ 190,000	
Concrete Pond Detention Pond Underdrain System	1	ea	$ 10,000	$ 10,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 80,000	$ 80,000	
Reconnect Existing Sewers	3	ea	$ 2,000	$ 6,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 40,000	$ 40,000	
Pond Inlet Structure	2	ea	$ 2,500	$ 5,000	
Pond Outlet Structure	1	ea	$ 3,000	$ 3,000	
8" Diameter RCP Sewer, Open Cut, BFM 4	433	lf	$ 67	$ 29,000	2
12" Diameter RCP Sewer, Open Cut, BFM 4	450	lf	$ 87	$ 39,000	2
18" Diameter RCP Sewer, Open Cut, BFM 4	1,260	lf	$ 99	$ 125,000	2
24" Diameter RCP Sewer, Open Cut, BFM 4	350	lf	$ 108	$ 38,000	2
27" Diameter RCP Sewer, Open Cut, BFM 4	420	lf	$ 114	$ 48,000	2
30" Diameter RCP Sewer, Open Cut, BFM 4	4,000	lf	$ 121	$ 484,000	2
36" Diameter RCP Sewer, Open Cut, BFM 4	1,050	lf	$ 137	$ 144,000	2
4' Diameter Manholes	9	ea	$ 2,800	$ 25,000	2
5' Diameter Manholes	8	ea	$ 3,200	$ 26,000	2
6' Diameter Manholes	25	ea	$ 3,800	$ 95,000	2
8' Diameter Manholes	14	ea	$ 6,500	$ 91,000	2
Surface Replacement, Pavement	7,280	lf	$ 250	$ 1,820,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 350,000	$ 350,000	
Mobilization, Demobilization, Traffic Control	1	ls	$ 463,000	$ 463,000	
Construction Subtotal				**$5,608,000**	
Contingency	20%			$1,122,000	
Construction Subtotal				**$6,730,000**	
Land Acquisition			$ 1,600,000		3
Design Engineering	10%			$673,000	
Construction Engineering	10%			$673,000	
Total Project Cost				**$9,676,000**	

Notes:

1. Line items have been rounded to the nearest $1000, subtotals have been rounded to the nearest $10,000. All costs are in 2009 dollars.
2. Assuming $5/lf for sewer removal and $500/ea for manhole removal. Assuming existing sewers can be temporarily plugged during removal and replacement of sewer and manholes and no bypass pumping is required. Approximately 3'-6' depth trench backfill.
3. Land acquisition cost estimate determined by the City.

West Washington Street Drainage Study
City of Champaign, Illinois

SCENARIO 3

	Quantity	Unit	Unit Price	Total (1)	Notes
Alloy Casting Detention Pond Excavation	47,000	cy	$ 17	$ 799,000	
Alloy Casting Detention Pond Underdrain System	1	ea	$ 20,000	$ 20,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 140,000	$ 140,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 70,000	$ 70,000	
Pond Inlet Structure	1	ea	$ 5,000	$ 5,000	
Pond Outlet Structure	1	ea	$ 12,000	$ 12,000	
Railroad Detention Pond Excavation	45,000	cy	$ 17	$ 765,000	
Railroad Detention Pond Underdrain System	1	ea	$ 10,000	$ 10,000	
Detention Pond Surface Treatment and Stabilization	1	ls	$ 140,000	$ 140,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 70,000	$ 70,000	
Pond Inlet Structure	1	ea	$ 5,000	$ 5,000	
Pond Outlet Structure	1	ea	$ 12,000	$ 12,000	
8" Diameter RCP Sewer, Open Cut, BFM 4	433	lf	$ 67	$ 29,000	2
12" Diameter RCP Sewer, Open Cut, BFM 4	200	lf	$ 87	$ 17,000	2
18" Diameter RCP Sewer, Open Cut, BFM 4	660	lf	$ 99	$ 65,000	2
24" Diameter RCP Sewer, Open Cut, BFM 4	350	lf	$ 108	$ 38,000	2
27" Diameter RCP Sewer, Open Cut, BFM 4	420	lf	$ 114	$ 48,000	2
30" Diameter RCP Sewer, Open Cut, BFM 4	1,100	lf	$ 121	$ 133,000	2
36" Diameter RCP Sewer, Open Cut, BFM 4	1,050	lf	$ 137	$ 144,000	2
4' Diameter Manholes	5	ea	$ 2,800	$ 14,000	2
5' Diameter Manholes	4	ea	$ 3,200	$ 13,000	2
6' Diameter Manholes	16	ea	$ 3,800	$ 61,000	2
8' Diameter Manholes	10	ea	$ 6,500	$ 65,000	2
Surface Replacement, Pavement	3,530	lf	$ 250	$ 883,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 150,000	$ 150,000	
Mobilization, Demobilization, Traffic Control	1	ls	$ 334,000	$ 334,000	
Construction Subtotal				**$4,042,000**	
Contingency	20%			$808,000	
Construction Subtotal				**$4,850,000**	
Land Acquisition				$ 2,400,000	3
Design Engineering	10%			$485,000	
Construction Engineering	10%			$485,000	
Total Project Cost				**$8,220,000**	

Notes:

1. Line items have been rounded to the nearest $1000, subtotals have been rounded to the nearest $10,000. All costs are in 2009 dollars.
2. Assuming $5/lf for sewer removal and $500/ea for manhole removal. Assuming existing sewers can be temporarily plugged during removal and replacement of sewer and manholes and no bypass pumping is required. Approximately 3'-6' depth trench backfill.
3. Land acquisition cost estimate determined by the City.

City of Champaign, Illinois

SCENARIO 10

	Quantity	Unit	Unit Price	Total (1)	Notes
8" Diameter RCP Sewer, Open Cut, BFM 4	250	lf	$ 67	$ 17,000	2
12" Diameter RCP Sewer, Open Cut, BFM 4	200	lf	$ 87	$ 17,000	2
18" Diameter RCP Sewer, Open Cut, BFM 4	660	lf	$ 99	$ 65,000	2
24" Diameter RCP Sewer, Open Cut, BFM 4	350	lf	$ 108	$ 38,000	2
27" Diameter RCP Sewer, Open Cut, BFM 4	420	lf	$ 114	$ 48,000	2
30" Diameter RCP Sewer, Open Cut, BFM 4	1,100	lf	$ 121	$ 133,000	2
36" Diameter RCP Sewer, Open Cut, BFM 4	1,150	lf	$ 137	$ 158,000	2
60" Diameter RCP Sewer, Open Cut, BFM 4	5,500	lf	$ 240	$ 1,320,000	2
60" Diameter, Bore and Jack	600	lf	$ 650	$ 390,000	
4' Diameter Manholes	4	ea	$ 2,800	$ 11,000	2
5' Diameter Manholes	4	ea	$ 3,200	$ 13,000	2
6' Diameter Manholes	9	ea	$ 3,800	$ 34,000	2
8' Diameter Manholes	10	ea	$ 6,500	$ 65,000	2
10' Diameter Manholes	17	ea	$ 16,000	$ 272,000	2
Seeding and Surface Restoration	2,200	lf	$ 10	$ 22,000	
Surface Replacement, Pavement	8,030	lf	$ 250	$ 2,008,000	
Miscellaneous Inlet and Sewer Work	1	ls	$ 550,000	$ 550,000	
Mobilization, Demobilization, Traffic Control	1	ls	$ 464,000	$ 464,000	
Construction Subtotal				**$5,625,000**	
Contingency	20%			$1,125,000	
Construction Subtotal				**$6,750,000**	
Copper Slough Channel Stabilization Projects				$ 2,540,000	3
Design Engineering	10%			$675,000	
Construction Engineering	10%			$675,000	
Total Project Cost				**$10,640,000**	

Notes:

1. Line items have been rounded to the nearest $1000, subtotals have been rounded to the nearest $10,000. All costs are in 2009 dollars.
2. Assuming $5/lf for sewer removal and $500/ea for manhole removal. Assuming existing sewers can be temporarily plugged during removal and replacement of sewer and manholes and no bypass pumping is required. Approximately 3'-6' depth trench backfill.
3. From the Copper Slough Watershed Master Plan. This cost includes the stream bank stabilization projects for the critical problem areas. This channel improvement is recommended since the larger storm sewer will increase flows to the Copper Slough and increase erosion at the critical problem areas. Other channel improvements may not be required since the floodplain is contained within the stream banks for the immediate downstream portions of the channel.
4. Scenario 10 includes replacing the existing West Washington Street trunk sewer with a 60-inch sewer from the intersection of Washington and Russell to the Copper Slough. This would also require a parallel North Edwin Street trunk sewer, but would not include any detention. Local detention ponds could be implemented at a later date to reduce the flows to the Copper Slough during larger precipitation events. Variations of this scenario may include constructing a new sewer parallel to the existing West Washington Street storm sewer and connecting to the existing trunk sewer at various points to reduce the required sewer work to the local storm sewer network.