



Finding & Fixing **Illicit** Connections in White Center

Pre-2009 to post-2012

(Photo of illicit stormwater connection from Michigan DOT website)

Presented by Jeanne Dorn, Stormwater Services, Nov 1 2012



The driving issue: Hicklin Lake water quality



Community news headline:

“Will Hicks Lake finally get county help? Meeting set”



“Neighbors led by **Dick Thurnau** have worked a long time to try to get the county to do something about Hicks Lake water quality...”

From White Center Now blog, March 11, 2011



**Hicklin Lake, May 2011 (during
alum treatment)**



Note: County had been working *years* before 2009 to figure out high fekes in Hicklin Lake....

...but using fekes alone it's hard to find out if they're due to:

Overland runoff
carrying:

Dog poop?



Geese grease?



Seagull turds?



OR

Direct stormwater connection carrying:

Human waste?





Finding suspected illicit connections:
a **COLLABORATION** between...



SCIENCE & TECHNICAL
SUPPORT FOLK

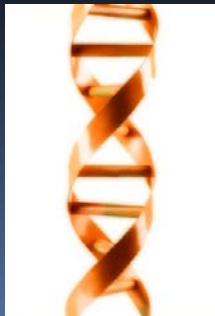


Sally



Chris

KING COUNTY ENVIRONMENTAL LAB
FOLK



Lori



Mark



Virgil

STORMWATER SERVICES
FOLK



Sabine



Candi



Cynthia



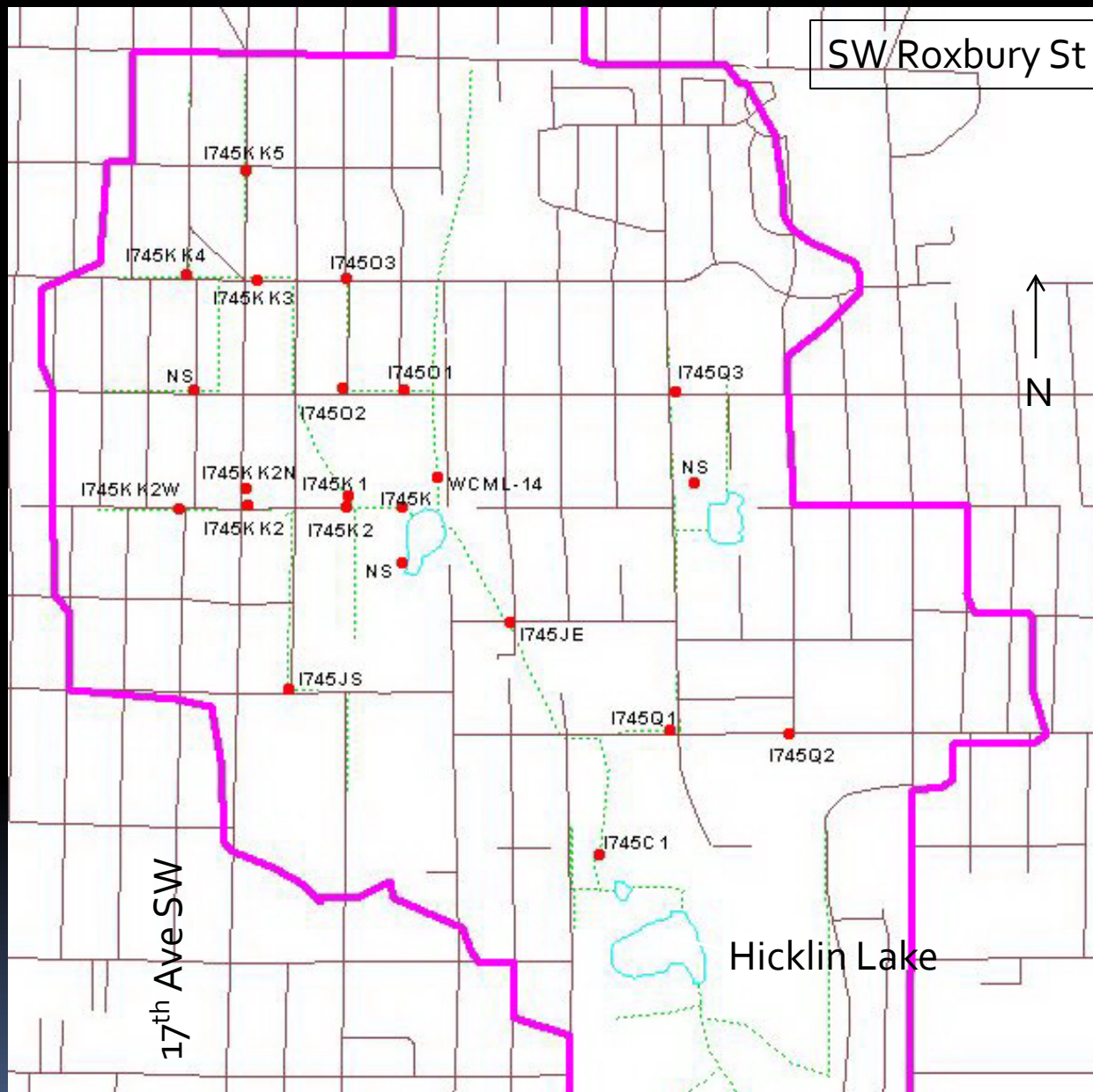
Jeanne

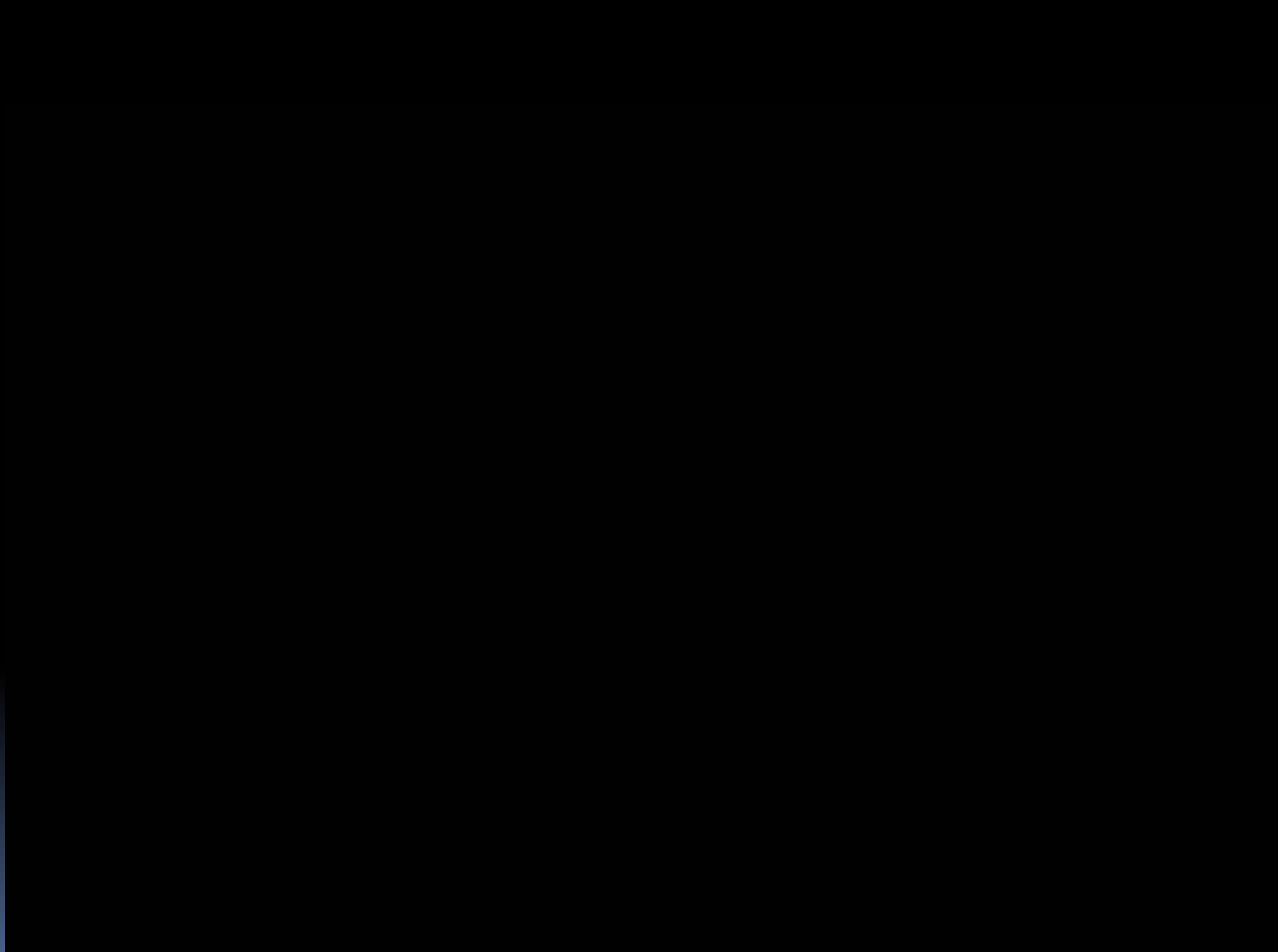


**What we're often dealing with:
Stormwater manhole 17th Ave
SW (previously sanitary & storm)**



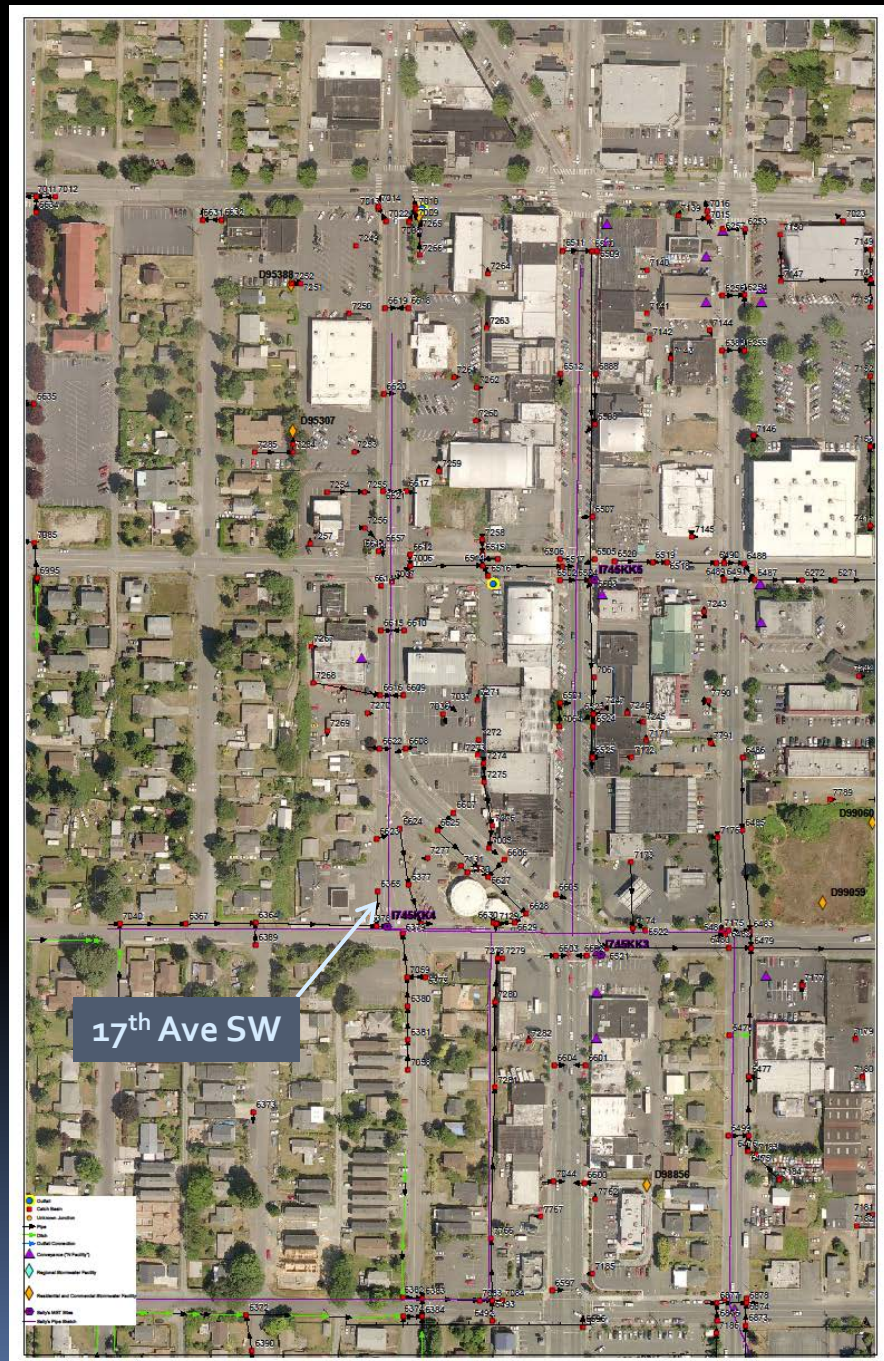
Stormwater manhole 17th Ave
SW & SW 100th St (previously
san. & storm). VERY high
Bacteroides found by Abella et al

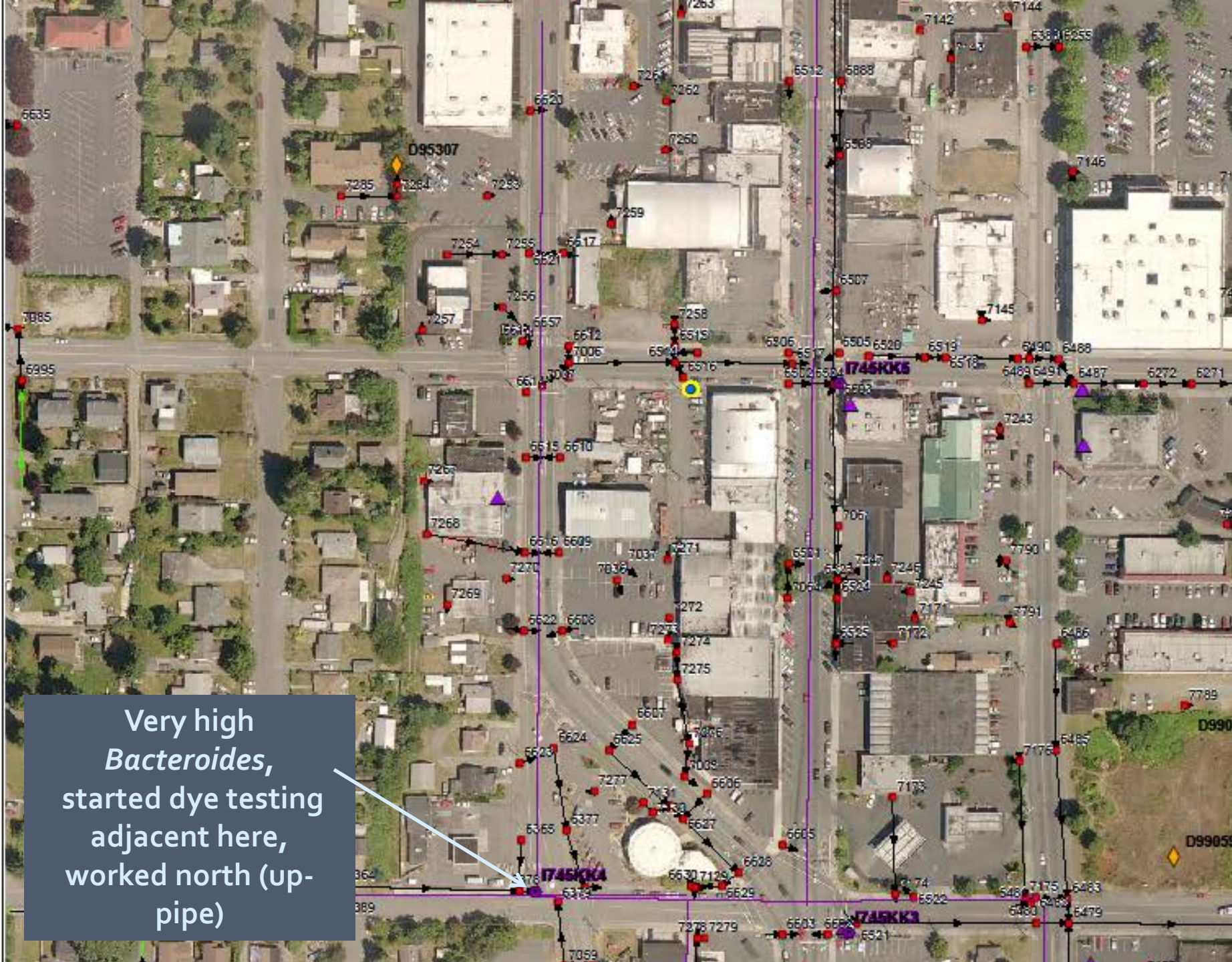




SW Roxbury St→

Northwest corner, White Center work area

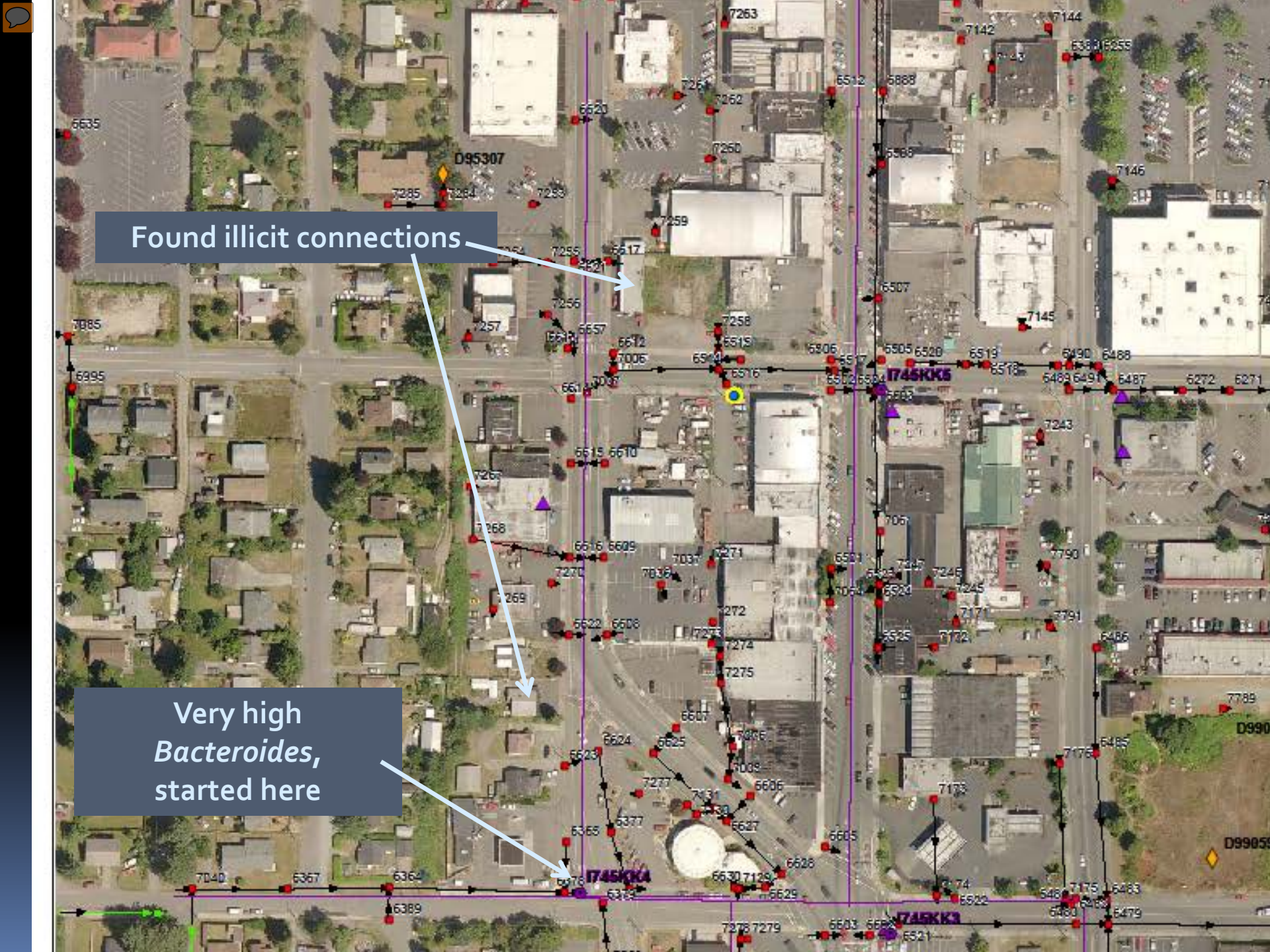




Very high
Bacteroides,
started dye testing
adjacent here,
worked north (up-
pipe)

Found illicit connections

Very high
Bacteroides,
started here



Fixing identified illicit connections:
a **COLLABORATION** between...

STORMWATER SERVICES

humbly notified....



LOCAL SEWER DISTRICT: SOUTHWEST SUBURBAN

Who came to the rescue.



"Dedicated to Preserving the Purity of Your Environment"

Southwest Suburban
Sewer District fixed the
illicit sewage-to-
stormwater connections.
No charge to King County
or to the property owners.





FOUR SAMPLE EVENTS (pending Bacteroides results Oct 2012)

LOCATOR	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	Location Description
A745B	1800	149	2300	ns	ns	ns	ns	ns	ns	600		750	Hicklin Lake (Lake Hicks)
I745C1	170	154	81	3500	1358	1200	ns	ns	30	6300		4600	Outfall from north drainage into Hicks parking lot
I745JE	ns	ns	ns	ns	ns	ns	1800	12	1100	27000		19000	11th Ave SW and SW 106th St
I745JS	ns	ns	ns	ns	ns	ns	ns	1544	110	330		600	15th Ave SW and SW 107th St
I745K	ns	ns	ns	ns	ns	ns	1		<MDL	ns	ns	ns	Inlet outfall just NW of Mallard lake at end of 10th St
I745K1	2300	372000	2100	3800	66038	3100	170	9212	100	2100		3600	Tightline in western ballfield of Steve Cox park
I745K2	ns	ns	ns	ns	ns	ns	ns	ns	<MDL	ns	ns	ns	
I745KK2	2700	5559	1700	2700	5936	1700	8	ns	16	720		5800	16th Ave SW and SW 104th St
I745KK2N	ns	ns	ns	ns	ns		ns	ns	9	ns	ns	ns	
I745KK2W	ns	ns	ns	ns	ns		ns	ns	2	ns	ns	ns	
I745KK3	2900	70	4200	7000	2834	2800	ns	ns	1	15000		17000	SW 100th St just east of 16th Ave SW in sidewalk
I745KK4	6900	342000	8400	2500	10544	3500	ns	ns	ns	ns	ns	ns	17th Ave SW and SW 100th St on NW corner
I745KK5	35	2390	32	4300	2512	4000	ns	ns	ns	3100		5600	S of SW 98th St on 16th Ave SW
I745L	320	350	120	130	357	170	ns	ns	ns	ns	ns	ns	Mallard Lake outlet
I745N	250	125	160	ns	ns	ns	ns	ns	ns	ns	ns	ns	SW 100th St between 12th and 13th Aves SW?
I745O1	160	1460	100	4400	800	4000	ns	ns	ns	9000		8800	13th Ave SW and SW 102nd St
I745O2	ns	ns	ns	ns	ns	ns	<MDL	ns	<MDL	2000		3400	14th Ave SW and SW 102nd St
I745Q1	5	577	1	21000	1040	11000	ns	ns	9	4400		12000	8th Ave SW and SW 108th St
I745Q2	ns	ns	ns	ns	ns	ns	ns	ns	4	ns	ns	ns	
I745Q3	3	ns	ns	3	ns	ns	3	ns	2	ns	ns	ns	
I745S	61	13	33	1800	53	2600	ns	ns	ns	ns	ns	ns	In Lakewood Park at SE shoreline of lake, directly
WCML-14	ns	ns	ns	ns	ns		<MDL	ns	<MDL	ns	ns	ns	

Sampled 4/27/2011

Sampled 6/1/2011

Sampled 5/15/2012

Sampled 10/15/2012

TABLE NOTES

Shading: indicates sampled 10/15/2012 for all 3 analytes (ekes, fekes and bacs)

Units: E. coli & fekes in colony forming units/100 mL;

Bacteroides in cells/100 mL.

Oct 15 2012 not enough flow in I745KK4 or I745S to obtain sample for analyses.

LOW BACTEROIDES, HIGH FEKES

Interpretation, mainly animal waste; human waste significance not obvious

LOCATOR	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	Location Description
A745B	1800	149	2300	ns	ns	ns	ns	ns	ns	600		750	Hicklin Lake (Lake Hicks)
I745C1	170	154	81	3500	1358	1200	ns	ns	30	6300		4600	Outfall from north drainage into Hicks park
I745JE	ns	ns	ns	ns	ns	ns	1800	12	1100	27000		19000	11th Ave SW and SW 106th St
I745JS	ns	ns	ns	ns	ns	ns	ns	1544	110	330		600	15th Ave SW and SW 107th St
I745K	ns	ns	ns	ns	ns	ns	1		<MDL	ns	ns	ns	Inlet outfall just NW of Mallard lake at end of 16th Ave SW
I745K1	2300	372000	2100	3800	66038	3100	170	9212	100	2100		3600	Tightline in western ballfield of Steve Cox Park
I745K2	ns	ns	ns	ns	ns	ns	ns	ns	<MDL	ns	ns	ns	
I745KK2	2700	5559	1700	2700	5936	1700	8	ns	16	720		5800	16th Ave SW and SW 104th St
I745KK2N	ns	ns	ns	ns	ns		ns	ns	9	ns	ns	ns	
I745KK2W	ns	ns	ns	ns	ns		ns	ns	2	ns	ns	ns	
I745KK3	2900	70	4200	7000	2834	2800	ns	ns	1	15000		17000	SW 100th St just east of 16th Ave SW in side of 16th Ave SW
I745KK4	6900	342000	8400	2500	10544	3500	ns	ns	ns	ns	ns	ns	17th Ave SW and SW 100th St on NW corner of 17th Ave SW
I745KK5	35	2390	32	4300	2512	4000	ns	ns	ns	3100		5600	S of SW 98th St on 16th Ave SW
I745L	320	350	120	130	357	170	ns	ns	ns	ns	ns	ns	Mallard Lake outlet
I745N	250	125	160	ns	ns	ns	ns	ns	ns	ns	ns	ns	SW 100th St between 12th and 13th Aves SW
I745O1	160	1460	100	4400	800	4000	ns	ns	ns	9000		8800	13th Ave SW and SW 102nd St
I745O2	ns	ns	ns	ns	ns	ns	<MDL	ns	<MDL	2000		3400	14th Ave SW and SW 102nd St
I745Q1	5	577	1	21000	1040	11000	ns	ns	9	4400		12000	8th Ave SW and SW 108th St
I745Q2	ns	ns	ns	ns	ns	ns	ns	ns	4	ns	ns	ns	
I745Q3	3	ns	ns	3	ns	ns	3	ns	2	ns	ns	ns	
I745S	61	13	33	1800	53	2600	ns	ns	ns	ns	ns	ns	In Lakewood Park at SE shoreline of lake
WCML-14	ns	ns	ns	ns	ns		<MDL	ns	<MDL				
	Sampled 4/27/2011			Sampled 6/1/2011			Sampled 5/15/2012			Sampled 10/15/2012			

TABLE NOTES

Shading: indicates sampled 10/15/2012 for all 3 analytes (ekes, fekes and bacs)

Units: E. coli & fekes in colony forming units/100 mL;
Bacteroides in cells/100 mL.

MS4 White Center data from:
2011 Abella-Science MST study
2012 Science/Stormwater collabora



	Sampled 4/27/2011	Sampled 6/1/2011	Sampled 5/15/2012	Sampled 10/15/2012
TABLE NOTES				
Shading:	indicates sampled 10/15/2012 for all 3 analytes (ekes, fekes and bacs)			
Units:	E. coli & fekes in colony forming units/100 mL;			
	Bacteroides in cells/100 mL.			
(from previous table:)				
Lo Bacs, hi fekes				
A745B				
A745B				

VERY HIGH BACTEROIDES, HIGH FEKES

Interpretation, definite human waste: Strong signal, nearby

LOCATOR	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	Location	Description
A745B	1800	149	2300	ns	ns	ns	ns	ns	ns	600		750	Hicklin Lake	Pipe pump outlet
I745C1	170	154	81	3500	1358	1200	ns	ns	30	6300		4600	Outfall from r	Corrugated ir In west parking lot feeding into
I745JE	ns	ns	ns	ns	ns	ns	1800	12	1100	27000		19000	11th Ave SW	SE corner
I745JS	ns	ns	ns	ns	ns	ns	ns	1544	110	330		600	15th Ave SW	NW corner
I745K	ns	ns	ns	ns	ns	ns	1		<MDL	ns	ns	ns	Inlet outfall j	Open ditch just east of the parking area for th
I745K1	2300	372000	2100	3800	66038	3100	170	9212	100	2100		3600	Tightline in w	Manhole cov Standpipe configuration; enter
I745K2	ns	ns	ns	ns	ns	ns	ns	ns	<MDL	ns	ns	ns		
I745KK2	2700	5559	1700	2700	5936	1700	8	ns	16	720		5800	16th Ave SW	NE corner cat In street right by fast food place
I745KK2N	ns	ns	ns	ns	ns		ns	ns	9	ns	ns	ns		
I745KK2W	ns	ns	ns	ns	ns		ns	ns	2	ns	ns	ns		
I745KK3	2900	70	4200	7000	2834	2800	ns	ns	1	15000		17000	SW 100th St j	Catchbasin - Off Autozone parking lot
I745KK4	6900	342000	8400	2500	10544	3500	ns	ns	ns	ns	ns	ns	17th Ave SW	Catchbasin - In road triangle. Need cones! V
I745KK5	35	2390	32	4300	2512	4000	ns	ns	ns	3100		5600	S of SW 98th	Catchbasin - on SE corner in sidewalk
I745L	320	350	120	130	357	170	ns	ns	ns	ns	ns	ns	Mallard Lake	Behind fence Have to either hop the fence or
I745N	250	125	160	ns	ns	ns	ns	ns	ns	ns	ns	ns	SW 100th St t	Outlet from c Sample in we -
I745O1	160	1460	100	4400	800	4000	ns	ns	ns	9000		8800	13th Ave SW	Ditch running Outfall just east of 13th
I745O2	ns	ns	ns	ns	ns	ns	<MDL	ns	<MDL	2000		3400	14th Ave SW	Manhole - NV In street across from church pa
I745Q1	5	577	1	21000	1040	11000	ns	ns	9	4400		12000	8th Ave SW a	Manhole - SW In street, need cones! Can be v
I745Q2	ns	ns	ns	ns	ns	ns	ns	ns	4	ns	ns	ns		
I745Q3	3	ns	ns	3	ns	ns	3	ns	2	ns	ns	ns		
I745S	61	13	33	1800	53	2600	ns	ns	ns	ns	ns	ns	In Lakewood	Ballfield pipe Very flashy.
WCML-14	ns	ns	ns	ns	ns		<MDL	ns	<MDL					
Sampled 4/27/2011				Sampled 6/1/2011				Sampled 5/15/2012				Sampled 10/15/2012		

TABLE NOTES

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Units: E. coli & fekes in colony forming units/100 mL;
Bacteroides in cells/100 mL.

(from previous tables:)

Non-human animal
waste runoff, prob.

A745B

I745JE

I745KK3

I745S

Poss human cont.

I745C1

I745KK2

I745KK3

I745KK5

I745Q1

Our smoking guns

I745K1

I745KK4

Chose I745KK4 to begin up-pipe
dye testing, as it bracketed NW
corner of Abella study area



HIGH LEVELS & QUESTIONS REMAIN

LOCATOR	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	E.coli	Bac	FC	Location Description	Description			
A745B	1800	149	2300	ns	ns	ns	ns	ns	ns	600		750	Hicklin Lake (Lake Hicks)	Pipe pump outlet			
I745C1	170	154	81	3500	1358	1200	ns	ns	30	6300		4600	Outfall from north drainage into Hicklin Lake	Corrugated iron pipe	In west parking lot for		
I745JE	ns	ns	ns	ns	ns	ns	1800	12	1100	27000		19000	11th Ave SW and SW 106th St	SE corner			
I745JS	ns	ns	ns	ns	ns	ns	ns	1544	110	330		600	15th Ave SW and SW 107th St	NW corner			
I745K	ns	ns	ns	ns	ns	ns	1		<MDL	ns	ns	ns	Inlet outfall just NW of Mallard Lake	Open ditch just east of the parking lot			
I745K1	2300	372000	2100	3800	66038	3100	170	9212	100	2100		3600	Tightline in western ballfield of Stevedore Park	Manhole cover	Standpipe configuration		
I745K2	ns	ns	ns	ns	ns	ns	ns	ns	<MDL	ns	ns	ns					
I745KK2	2700	5559	1700	2700	5936	1700	8	ns	16	720		5800	16th Ave SW and SW 104th St	NE corner catchbasin	In street right by fast		
I745KK2N	ns	ns	ns	ns	ns		ns	ns	9	ns	ns	ns					
I745KK2W	ns	ns	ns	ns	ns		ns	ns	2	ns	ns	ns					
I745KK3	2900	70	4200	7000	2834	2800	ns	ns	1	15000		17000	SW 100th St just east of 16th Ave SW	Catchbasin -	Off Autozone parking		
I745KK4	6900	342000	8400	2500	10544	3500	ns	ns	ns	ns	ns	ns	17th Ave SW and SW 100th St on NW	Catchbasin -	In road triangle. Need		
I745KK5	35	2390	32	4300	2512	4000	ns	ns	ns	3100		5600	S of SW 98th St on 16th Ave SW	Catchbasin -	on SE corner in sidev		
I745L	320	350	120	130	357	170	ns	ns	ns	ns	ns	ns	Mallard Lake outlet	Behind fence	Have to either hop t		
I745N	250	125	160	ns	ns	ns	ns	ns	ns	ns	ns	ns	SW 100th St between 12th and 13th	Outlet from c	Sample in we -		
I745O1	160	1460	100	4400	800	4000	ns	ns	ns	9000		8800	13th Ave SW and SW 102nd St	Ditch running	Outfall just east of 1		
I745O2	ns	ns	ns	ns	ns	ns	<MDL	ns	<MDL	2000		3400	14th Ave SW and SW 102nd St	Manhole - NW	In street across from		
I745Q1	5	577	1	21000	1040	11000	ns	ns	9	4400		12000	8th Ave SW and SW 108th St	Manhole - SW	In street, need cone		
I745Q2	ns	ns	ns	ns	ns	ns	ns	ns	4	ns	ns	ns					
I745Q3	3	ns	ns	3	ns	ns	3	ns	2	ns	ns	ns					
I745S	61	13	33	1800	53	2600	ns	ns	ns	ns	ns	ns	In Lakewood Park at SE shoreline of Stevedore Park	Ballfield pipe	Very flashy.		
WCML-14	ns	ns	ns	ns	ns		<MDL	ns	<MDL	ns	ns	ns					
	Sampled 4/27/2011			Sampled 6/1/2011			Sampled 5/15/2012			Sampled 10/15/2012							

TABLE NOTES

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Units: E. coli & fekes in colony forming units/100 mL;
Bacteroides in cells/100 mL.

High fekes, lo bacs
A745B
I745JE
I745KK3
I745S
Non-human animal
waste runoff, prob.

High fekes, hi bacs
I745C1
I745KK2
I745KK3
I745KK5
I745O1
I745Q1

High fekes,
very hi bacs
I745K1
I745KK4
Definite human waste
contamination

Enigmas/unresolved sites:
I745C1....not yet fully investigated
I745JS...why fairly high Bacs and low fekes? Dead Bacs?
I745K1...why fairly high Bacs and low fekes/lowish E coli? Dead Bacs?
I745Q1...not yet fully investigated



Finding & Fixing **Illicit** Connections in White Center

...AN ONGOING CONCERN, HERE AND ELSEWHERE....

King County Drainage & Water Quality
Complaint **Hotline**: 206 296 1900

Thanks for listening today!