

Sturgeon Bay Presence of Artificially-Placed Fill at Lots 92 & 100

presented by:

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Tetra Tech, Milwaukee, WI



Purpose: This presentation will characterize the subsurface beneath the site of Parcel 92 using accepted hydrogeologic methods.

Scope of Subsurface Site Characterization: A comprehensive set of figures, maps and documents were reviewed, including reports submitted to the WDNR by engineers retained by the City of Sturgeon Bay, as well as environmental assessments prepared and submitted to WDNR by the City's predecessors in title; the primary emphasis was on the former Phase Is, Phase IIs, the remedy implementation work plan, and NR716 investigation report and Sanborn maps.

Conclusion: Multiple site investigations (involving analysis of soil borings) have indicated without a doubt that the subsurface of 92 East Maple Street and adjacent areas consist of artificially-placed fill which was deposited into (former) Sturgeon Bay. This fill overlies lake (lacustrine) deposits. This conclusion is supported in each of the reports through discussion of Sanborn Maps, boring logs, cross-sectional maps, and associated findings and conclusions.

Environmental and technical assessments which were reviewed, all of which support the conclusions that Lots 92 and 100 are underlain by artificially placed fill, include the following:

- Final Site Closure, Maritime Museum (2000) – WDNR BRRTS* database [02-15-000579]
- Phase I Environmental Site Assessment, Door County Co-op, 92 East Maple (2005)
prepared by STS Consultants for Door County Co-op
- Phase II Subsurface Assessment, Door County Co-op, 92 East Maple (2005)
prepared by STS Consultants for Door County Co-op
- Phase I Environmental Site Assessment Industrial/Municipal Properties, 92-100 East Maple (2013)
prepared by AECOM for City of Sturgeon Bay
- Phase II Environmental Site Assessment Sturgeon Bay West Waterfront Redevelopment (2013)
prepared by Ayres & Associates for City of Sturgeon Bay
- WDNR Approval for Management of Contaminated Soil, Door County Co-op, 92 East Maple (2015)
Closed Site: WDNR BRRTS* database [03-15-000659]

*Online database WDNR Bureau for Remediation and Redevelopment Tracking System

“fill”

The industry use of the term "fill" as applying to lands formed by artificially placed materials is consistent with the regulatory definition of "fill material" in the Environmental Protection Agency's regulations promulgated under the Clean Water Act in 40 CFR § 232.2 and 33 CFR § 323.2(f). EPA defines "fill material" as "material placed in waters of the United States where the material has the effect of:

- Replacing any portion of a water of the United States with dry land; or
- Changing the bottom elevation of any portion of a water of the United States.

Examples of such fill material include, but are not limited to: rock, sand, soil, clay, plastics, construction debris, wood chips, overburden from mining or other excavation activities, and materials used to create any structure or infrastructure in the waters of the United States."

Unified Soil Classification System

- Universal classification system
- Every field geologist uses the same system, which allows us all to interpret one another's data consistently
- Soil borings from these sites are provided through reports completed for Door County Coop, City of Sturgeon Bay, and others
- Most information evaluated was directly from City of Sturgeon Bay's consultant's reports
- All reports indicate fill material; artificially placed for the purpose of development

UNIFIED SOIL CLASSIFICATION SYSTEM					
Soils are visually classified for engineering purposes by the Unified Soil Classification System. Grain-size analyses and Atterberg Limits tests often are performed on selected samples to aid in classification. The classification system is briefly outlined on this chart. Graphic symbols are used on boring logs presented in this report. For a more detailed description of the system, see "Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)" ASTM Designation: 2488-84 and "Standard Test Method for Classification of Soils for Engineering Purposes" ASTM Designation: 2487-85.					
MAJOR DIVISIONS		GRAPHIC SYMBOL	GROUP SYMBOL	TYPICAL NAMES	
COARSE-GRAINED SOILS (Less than 50% passes No. 200 sieve)	GRAVELS (fraction passes No. 4 sieve)	CLEAN GRAVELS (Less than 5% passes No. 200 sieve)	GW	Well graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures	
			GP	Poorly graded gravels, gravel-sand mixtures, or sand-gravel-cobble mixtures	
		GRAVELS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart	GM	Silty gravels, gravel-sand-silt mixtures
			Limits plot above "A" line & hatched zone on plasticity chart	GC	Clayey gravels, gravel-sand-clay mixtures
	SANDS (50% or more of coarse fraction passes No. 4 sieve)	CLEAN SANDS (Less than 5% passes No. 200 sieve)	SW	Well graded sands, gravelly sands	
			SP	Poorly graded sands, gravelly sands	
		SANDS WITH FINES (More than 12% passes No. 200 sieve)	Limits plot below "A" line & hatched zone on plasticity chart	SM	Silty sands, sand-silt mixtures
			Limits plot above "A" line & hatched zone on plasticity chart	SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more passes No. 200 sieve)	SILTS (Limits plot below "A" line & hatched zone on plasticity chart)	ML	Inorganic silts, clayey silts of low to medium plasticity		
		MH	Inorganic silts, micaceous or diatomaceous silty soils, elastic silts		
	CLAYS (Limits plot above "A" line & hatched zone on plasticity chart)	CL	Inorganic clays of low to medium plasticity, gravelly, sandy, and silty clays		
		CH	Inorganic clays of high plasticity, fat clays, sandy clays of high plasticity		
	ORGANIC SILTS AND CLAYS	OL	Organic silts and clays of low to medium plasticity, sandy organic silts and clays		
		OH	Organic silts and clays of high plasticity, sandy organic silts and clays		
ORGANIC SOILS	PT	Peat			

NOTE: Coarse-grained soils with between 5% and 12% passing the No. 200 sieve and fine-grained soils with limits plotting in the hatched zone on the plasticity chart have dual classifications.

PLASTICITY CHART

The chart plots Plasticity Index (PI) on the y-axis (0 to 60) against Liquid Limit (LL) on the x-axis (0 to 100). Key lines include the A-line (PI = LL - 0.73), U-line (PI = LL - 0.075), and O-line (PI = LL - 0.9). Regions are labeled for soil types: CL or OL, ML or OL, CH or OH, MH or OH, and CL or OH.

DEFINITION OF SOIL FRACTIONS

SOIL COMPONENT	PARTICLE SIZE RANGE
Boulders	Above 12 in.
Cobbles	12 in. to 3 in.
Gravel	3 in. to No. 4 sieve
Coarse gravel	3 in. to 3/4 in.
Fine gravel	3/4 in. to No. 4 sieve
Sand	No. 4 to No. 200 sieve
Coarse sand	No. 4 to No. 10 sieve
Medium sand	No. 10 to No. 40 sieve
Fine sand	No. 40 to No. 200 sieve
Fines (silt and clay)	Less than No. 200 sieve

Route To: Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

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Facility/Project Name Door County Cooperative		License/Permit/Monitoring Number B-8		Boring Number B-8	
Boring Drilled By: Name of crew chief (first, last) and Firm STS Consultants Ltd. - R. Trembl - STS Project No. 29887XF		Date Drilling Started 10/3/2005	Date Drilling Completed 10/3/2005	Drilling Method solid stem auger	
WI Unique Well No.	DNR Well ID No. B-8	Common Well Name B-8	Final Static Water Level Feet MSL	Surface Elevation Feet MSL	Borehole Diameter 4.0 inches
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>	State Plane N, E S/C/N		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> S <input type="checkbox"/> E <input type="checkbox"/> W		
Facility ID		County Door	County Code 15	Civil Town/City/ or Village Sturgeon Bay	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Soil Properties										RQD/ Comments			
						Graphic Log	Well Diagram	PTD/ ID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200						
1 SS	18 14		5	Asphalt Fill: Brown fine to medium silty sand (SM) with fine gravel - trace cinders - trace clay - moist - no odor	SM														
2 SS	24 18		10	Fill: Brown fine to medium silty sand (SM) - trace wood - trace glass - moist - no odor	SM														
3 SS	24 17		12	Fill: Brown silty sand (SM) - trace gravel - trace cinders - trace clay - trace wood - moist to wet - no odor	SM														
4 SS	24 14		19	Dark grayish-brown silty fine sand (SM) - trace organics - trace wood - wet - no odor	SM														
				End of Boring. Boring advanced from 0.0 feet to 8.0 feet with solid-stem auger. Boring abandoned with hole plug.															

I hereby certify that the information on this form is true and correct to the best of my knowledge.
Signature: *Mal De* Firm: STS Consultants Ltd. 1035 Kepler Drive Green Bay, Wisconsin 54311
Tel: 920-468-978 Fax: 920-468-332

This form is authorized by Chapters 281, 283, 289, 291, 292, 293, 295, and 299, Wis. Stats. Completion of this form is mandatory. Failure to file this form may result in forfeiture of between \$10 and \$25,000, or imprisonment for up to one year, depending on the program and conduct involved. Personally identifiable information on this form is not intended to be used for any other purpose. NOTE: See instructions for more information, including where the completed form should be sent.

WDNR Soil Boring Log Information [Form 4400-122]

Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS
	Asphalt	
1.5	Fill: Brown fine to medium silty sand (SM) with fine gravel - trace cinders - trace clay - moist - no odor	SM
3.0	Fill: Brown fine to medium silty sand (SM) - trace wood - trace glass - moist - no odor	SM
4.5	Fill: Brown silty sand (SM) - trace gravel - trace cinders - trace clay - trace wood - moist to wet - no odor	SM
6.0	Dark grayish-brown silty fine sand (SM) - trace organics - trace wood - wet - no odor	SM
7.5	End of Boring. Boring advanced from 0.0 feet to 8.0 feet with solid-stem auger. Boring abandoned with hole plug.	

fill placed over lake deposits is documented in multiple soil borings

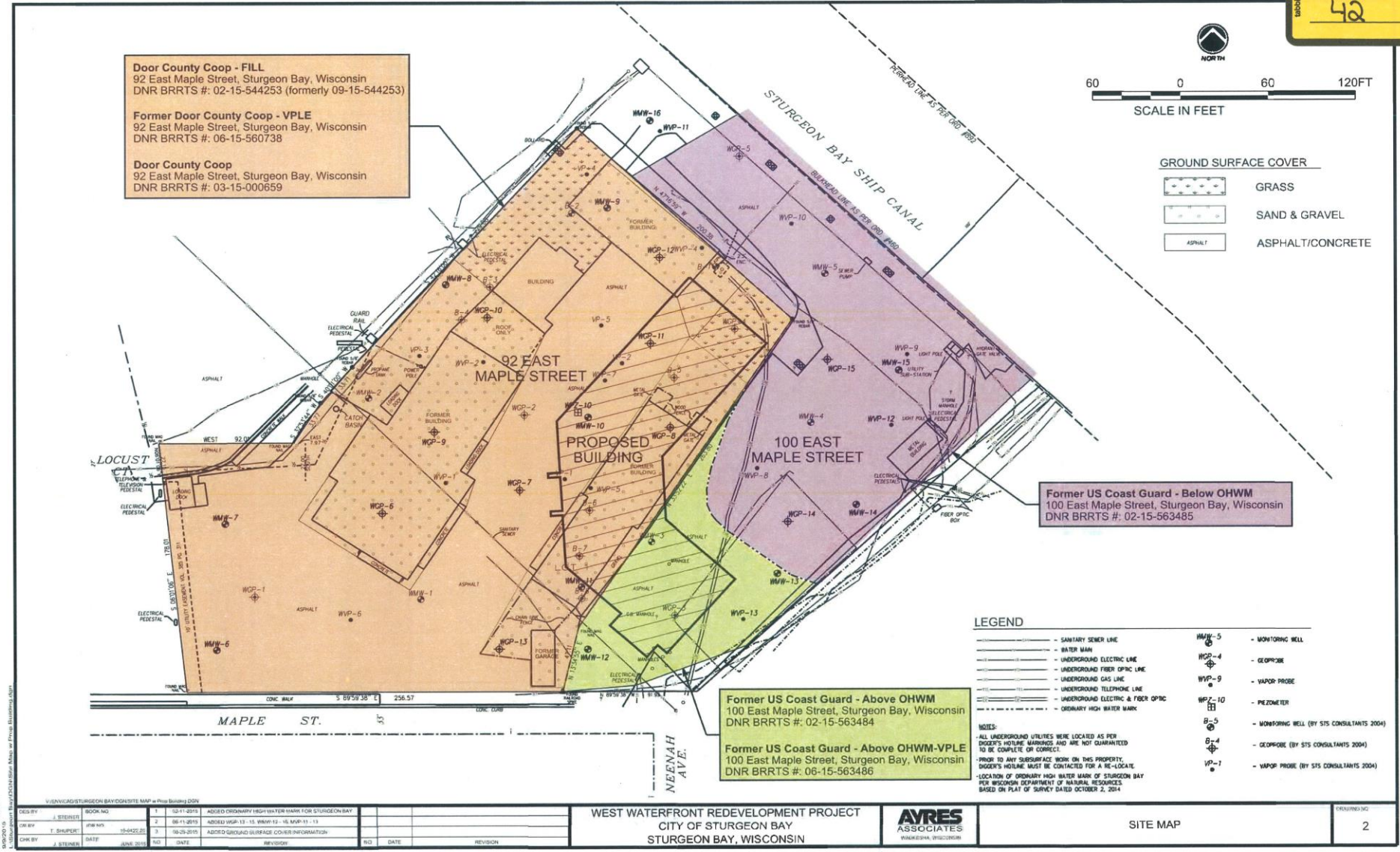
Illustrative examples of analysis of soil borings is provided in the following slides.

Characterization of the subsurface is based on location of the soil borings and the composition of each boring.

Conclusion is the presence of several feet of fill overlaying lacustrine (lake) sediments.

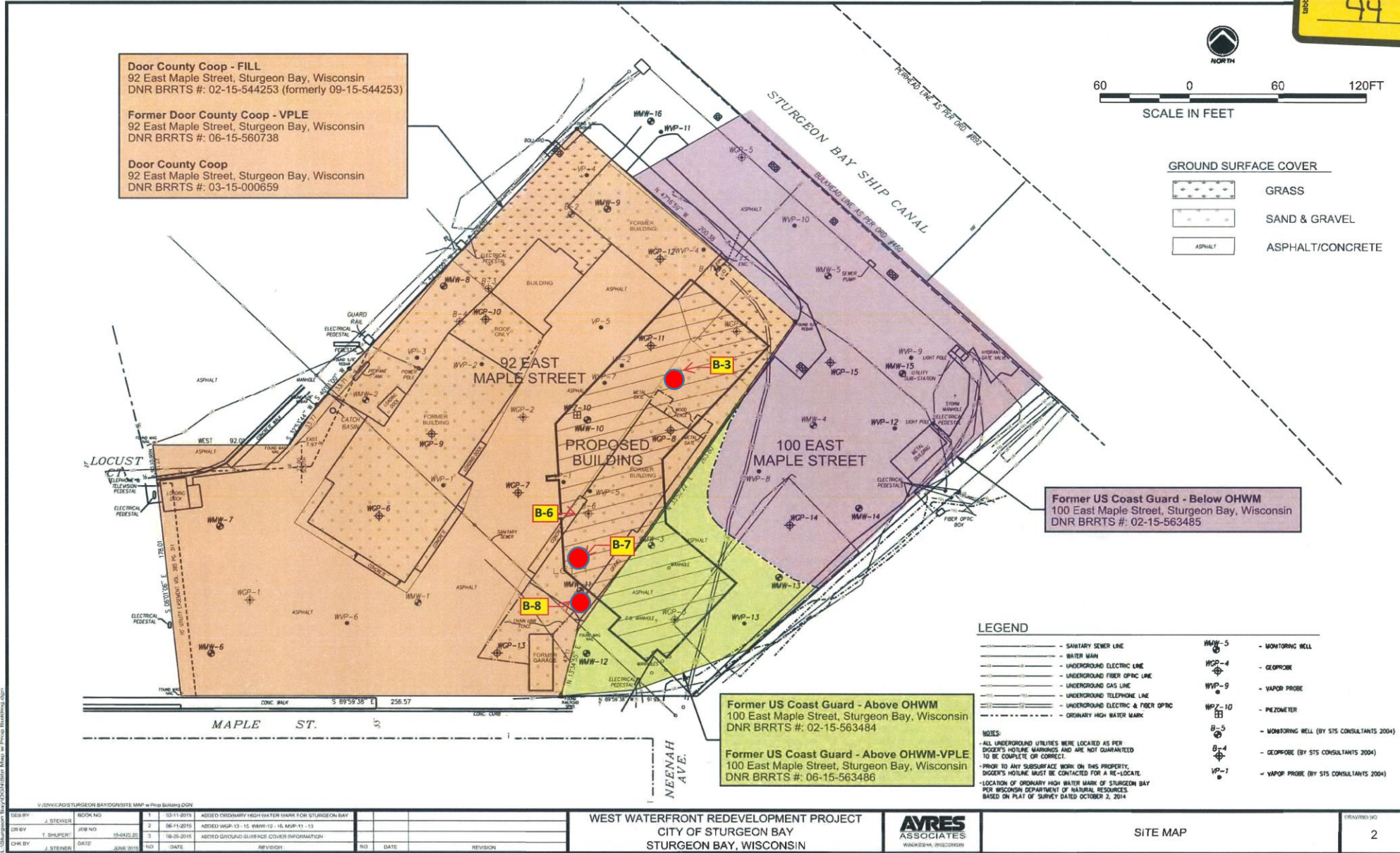
[source: Phase II ESA dated August 2013, prepared on behalf of the City of Sturgeon Bay by the engineering firm Ayres & Associates].

Site Map –
Parcels 92 &
100
note soil
boring and
monitor well
locations
throughout
the properties



Soil boring locations on both parcels (92 & 100)

EXHIBIT
44



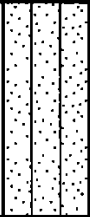
WI Unique Well No.	DNR Well ID No.	Common Well Name B-3	Final Static Water Level Feet MSL	Surface Elevation Feet MSL
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane		Local Grid Location <input type="checkbox"/>
1/4 of NE 1/4 of Section 7, T 27 N, R 26 E		Lat _____ ° _____ ' _____ "		Long _____ ° _____ ' _____ " <input type="checkbox"/>
Facility ID	County Door	County Code 15	Civil Town/City/ or Village Sturgeon Bay	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Pro		
									Compressive Strength	Moisture Content	Liquid Limit
1 SS	24 18	11	1.5	Fill: Silty sand (SM) - trace fine to coarse gravel - trace cinders - trace clay - moist - no odor	SM						
2 SS	24 22	8	3.0	Fill: Brown silty fine to coarse sand (SM) - trace gravel - moist - no odor	SM						
3 SS	24 14	13	4.5	Fill: Brown silty fine to coarse sand (SM) - trace gravel - moist to wet - no odor	SM						
4 SS	24 14	19	6.0 7.5	Brown silty coarse sand (SM) - trace small to large gravel - wet - no odor	SM						
				End of Boring. Boring advanced from 0.0 feet to 8.0 feet with solid-stem auger.							

Soil boring B-3

Fill consisting of brown silty sand to 6 feet below ground surface(bgs); containing cinders (to 2 feet bgs).

WI Unique Well No.	DNR Well ID No.	Common Well Name B-7	Final Static Water Level Feet MSL	Surface Elevation Feet MSL
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane N, E S/C/N		Local Grid Location Feet <input type="checkbox"/>
1/4 of NE 1/4 of Section 7, T 27 N, R 26 E		Lat _____ ' _____ "		Long _____ ' _____ "
Facility ID	County Door	County Code 15	Civil Town/City/ or Village Sturgeon Bay	

Sample		Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties		
Number and Type	Length Art. & Recovered (in)								Compressive Strength	Moisture Content	Liquid
			1 2	Fill: Brown silty sand (SM) - little fine to coarse gravel - moist - no odor	SM						
				End of Boring. Boring advanced from 0.0 feet to 2.0 feet with hand auger. Auger refusal at 2.0 feet. Boring abandoned with hole plug.							

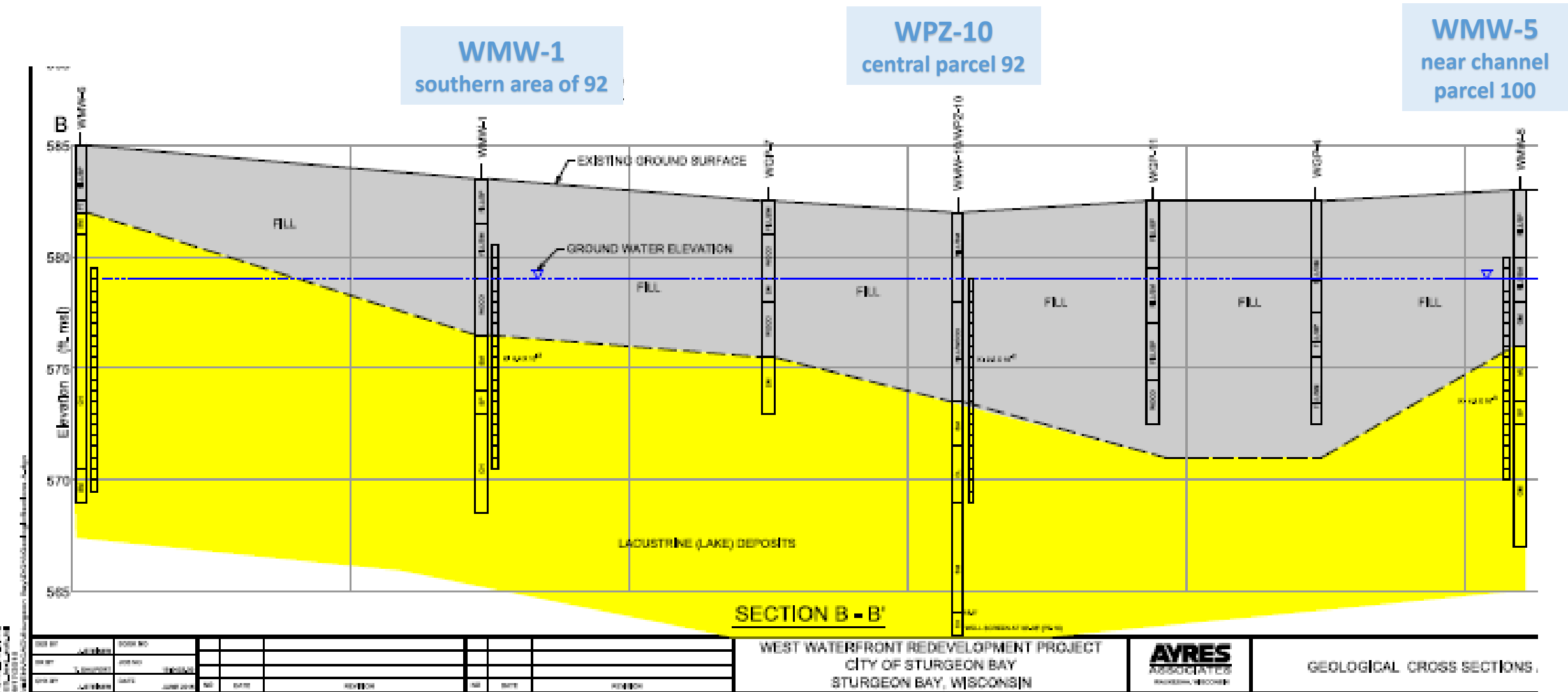
Soil boring B-7
 Fill; could not continue due to auger refusal at 2 feet below ground surface.

WI Unique Well No.	DNR Well ID No.	Common Well Name B-8	Final Static Water Level Feet MSL	Surface Elevation Feet MSL
Local Grid Origin <input type="checkbox"/> (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		State Plane N, E S/C/N		Local Grid Location <input type="checkbox"/> N <input type="checkbox"/> S
1/4 of NE 1/4 of Section 7, T 27 N, R 26 E		Lat _____ ° _____ ' _____ "		Long _____ ° _____ ' _____ "
Facility ID	County Door	County Code 15	Civil Town/City/ or Village Sturgeon Bay	

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID/FID	Soil Properties				
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity	
1 SS	18 14	5	0.0 - 1.5	Asphalt									
			1.5 - 3.0	Fill: Brown fine to medium silty sand (SM) with fine gravel - trace cinders - trace clay - moist - no odor	SM								
2 SS	24 18	10	3.0 - 4.5	Fill: Brown fine to medium silty sand (SM) - trace wood - trace glass - moist - no odor	SM								
3 SS	24 17	2	4.5 - 6.0	Fill: Brown silty sand (SM) - trace gravel - trace cinders - trace clay - trace wood - moist to wet - no odor	SM								
4 SS	24 14	9	6.0 - 7.5	Dark grayish-brown silty fine sand (SM) - trace organics - trace wood - wet - no odor	SM								
				End of Boring. Boring advanced from 0.0 feet to 8.0 feet with solid-stem auger. Boring abandoned with hole plug.									

Soil boring B-8
 Fill to 8 feet below ground surface, including significant observations of cinders, wood, and glass.

Cross-section across both parcels 92 & 100



Facility/Project Name West Waterfront Redevelopment Project			License/Permit/Monitoring Number			Boring Number WMW-1									
Boring Drilled By: Name of crew chief (first,last) and Firm First Name: Tony Last Name: Kapugi Firm: On_Site Environmental Drilling Inc.			Date Drilling Started 5/23/2013 M/D/Y		Date Drilling Completed 5/23/2013 M/D/Y		Drilling Method 4.25" ID Hollow Stem Auger								
WT Unique Well No.	DNR Well Id No.	Well Name WMW-1	Final Static Water Level 4.99		Surface Elevation		Borehole Dia. 8-inch								
Local Grid Origin L (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> State Plane _____ N, _____ E NE 1/4 of NE 1/4, of Section 7, T 27 N, R 26 E			Lat. _____ "		Local Grid Location (If applicable) <input type="checkbox"/> N <input type="checkbox"/> E <input type="checkbox"/> S <input type="checkbox"/> W										
Facility Id.		County Door	County Code 15		Civil Town/City/or Village City of Sturgeon Bay										
SAMPLE		Blow Counts	Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL PROPERTIES					RQD/Comments	
Number and Type	Length Alt. & Recovered (in)								Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200		
			-	Concrete (4")											
			-1	FILL, SAND, some gravel, trace silt, moist, medium grained, no odor, brown	FILL/SP			0.8		M					
			-2												
			-3	FILL, SAND, silty, some gravel, dry, fine grain, no odor, brown	FILL/SM			0.6		D					
			-4												
			-5	FILL, WOOD, wet, hydrocarbon odor	FILL/Wood			0		W					
			-6												
			-7												
			-8	SAND, silty, some gravel, wet, hydrocarbon odor, black	SM			0		W					
			-9	gray staining @ 10 ft., silty sand											
			-10	SAND, trace silt, some coarses gravel, wet, gray	SP										
			-11												
			-12	CLAY, silty, trace coarse sand, very stiff, wet, high plasticity, no odor, red	CH			1		W					
			-13												
			-14												
			-15												
			-16	EOB @ 15 feet bgs Well set @ 12.9 feet				0.2		W					
			-17												

WMW-1

fill to 7 feet below ground surface (bgs); includes wood particles, black sand, hydrocarbon odor, grey staining in silty sand at 10 ft bgs; likely also fill.

WI Unique Well No.		DNR Well Id No.		Well Name WPZ-10		Final Static Water Level 4.88		Surface Elevation 582		Borehole Dia. 8-inch				
Local Grid Origin L (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>						Lat. _____		Local Grid Location (If applicable)						
State Plane _____ N, _____ E						_____		<input type="checkbox"/> N <input type="checkbox"/> E						
NE 1/4 of NE 1/4, of Section 7, T 27 N, R 26 E						Long _____		Feet <input type="checkbox"/> S Feet <input type="checkbox"/> W						
Facility Id.			County Door			County Code 15		Civil Town/City/or Village City of Sturgeon Bay						
SAMPLE			SOIL PROPERTIES											
Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P. 200	RQD/Comments
			-1	Concrete (4") FILL, SAND, some silt, some gravel, moist no odor, gray/white	Fill/ SM			0		M				
			-4	FILL, woodchips, moist, no odor dk brown	Fill/ Wood			0		M				
			-5	SAND, some silt, wet, no odor, dk brown	SM			0		W				
			-9	CLAY, some gravel, wet, low plasticity, no odor, red/brown	CL			0		W				
			-14	SAND, some silt, some gravel, wet no odor, dk brown	SM			0		W				
			-20	CLAY, some gravel, wet, high plasticity no odor, red	CH					W				

WPZ-10

fill extends to 11 feet below ground surface; includes wood chips and dark brown silty sand.

DNR Well Id No.		Well Name WMW-5		Final Static Water Level 4.66		Surface Elevation		Borehole Dia. 8-inch			
Estimated: <input type="checkbox"/> or Boring Location <input type="checkbox"/>				Lat. _____		Local Grid Location (If applicable)					
_____ N, _____ E				_____ Long _____		Feet <input type="checkbox"/> N _____ Feet <input type="checkbox"/> E		Feet <input type="checkbox"/> S _____ Feet <input type="checkbox"/> W			
Section 7, T 27 N, R 26 E				County Code 15		Civil Town/City/or Village City of Sturgeon Bay					
County Door				County Code 15		Civil Town/City/or Village City of Sturgeon Bay					
Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL PROPERTIES					RQD/Comments
						Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200	
-1	Asphalt (4") FILL, SAND, some gravel and concrete, trace wood at 2.5 to 3 feet	FILL/SP			0.6		M				
-2											
-3											
-4	FILL, SAND, silty, moist, fine grained, black concrete at 5 feet	FILL/SM			0.2		M				
-5											
-6	GRAVEL, silty, some sand and cobble, wet, coarse grained, black	GM			0.2		W				
-7											
-8	SILT, some gravel and sand, trace organics, wet, non-plastic, no odor, black	ML			0		W				
-9											
-10	GRAVEL, silty, some sand, coarse grained, wet, no odor, black	GP			0		W				
-11											
-12											
-13											
-14											
-15											
-16	EOB @ 15 feet bgs Well set @ 12.8 feet				0.2		W				
-17											

WMW-5
fill to 5 feet below ground surface; includes wood (2.5 to 3 ') and concrete at 5 feet.

Cross section across both parcels

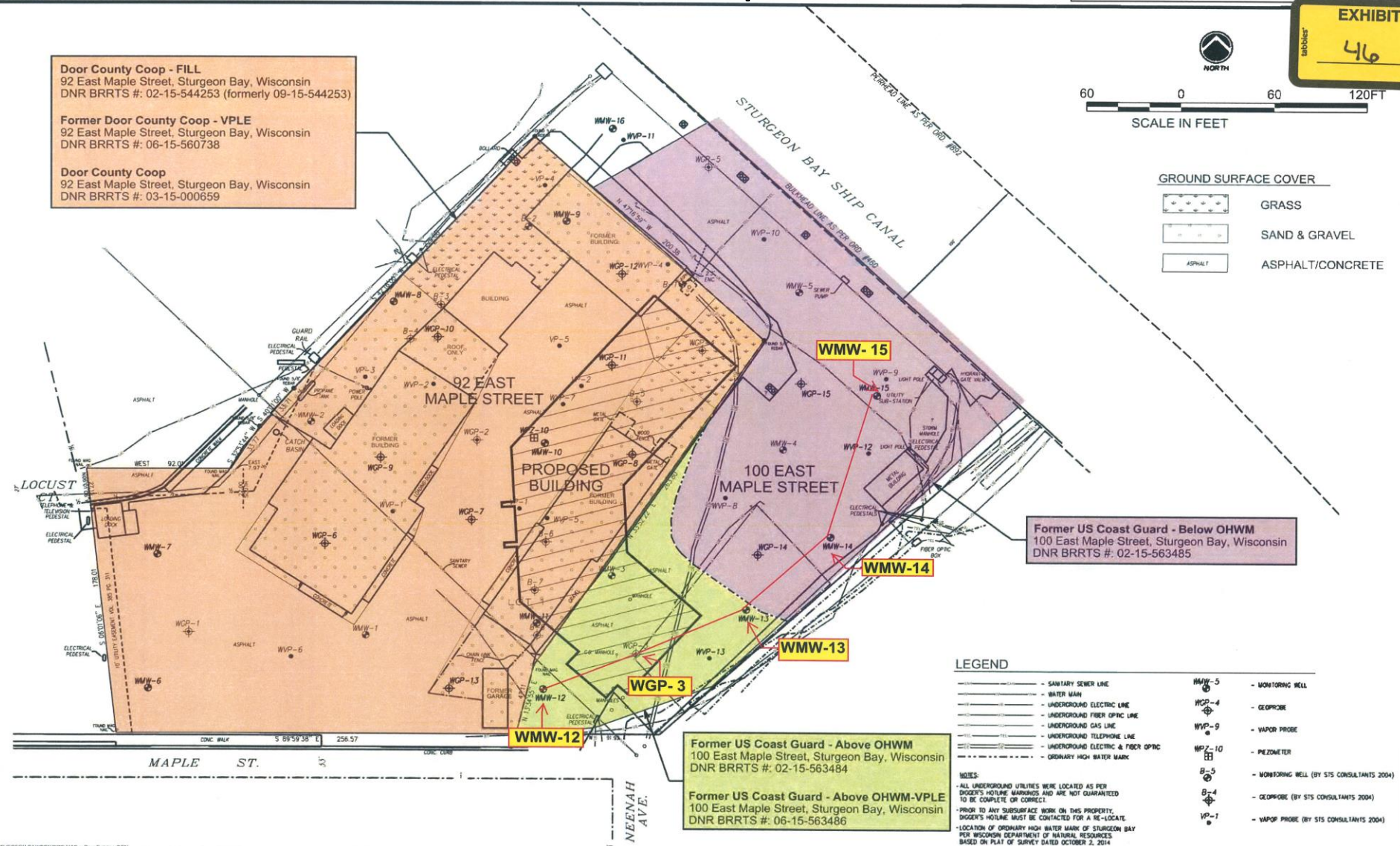
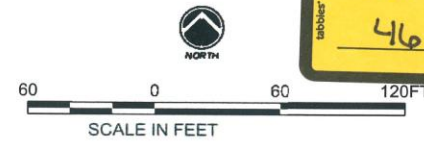
GEOLOGICAL CROSS SECTION C-C'

EXHIBIT
46

Door County Coop - FILL
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-544253 (formerly 09-15-544253)

Former Door County Coop - VPLE
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 06-15-560738

Door County Coop
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 03-15-000659



Former US Coast Guard - Below OHWM
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-563485

Former US Coast Guard - Above OHWM
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-563484

Former US Coast Guard - Above OHWM-VPLE
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 06-15-563486

- LEGEND**
- Sanitary Sewer Line
 - Water Main
 - Underground Electric Line
 - Underground Fiber Optic Line
 - Underground Gas Line
 - Underground Telephone Line
 - Underground Electric & Fiber Optic
 - Ordinary High Water Mark
 - Monitoring Well (WMW-5)
 - Geoprobe (WCP-4)
 - Vapor Probe (WVP-9)
 - Piezometer (WPT-10)
 - Monitoring Well (B-5)
 - Geoprobe (B-4)
 - Vapor Probe (VP-7)
- NOTES:**
- ALL UNDERGROUND UTILITIES WERE LOCATED AS PER DIGGER'S HOTLINE MARKINGS AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT.
 - PRIOR TO ANY SUBSURFACE WORK ON THIS PROPERTY, DIGGER'S HOTLINE MUST BE CONTACTED FOR A RE-LOCATE.
 - LOCATION OF ORDINARY HIGH WATER MARK OF STURGEON BAY PER WISCONSIN DEPARTMENT OF NATURAL RESOURCES BASED ON PLAT OF SURVEY DATED OCTOBER 2, 2014

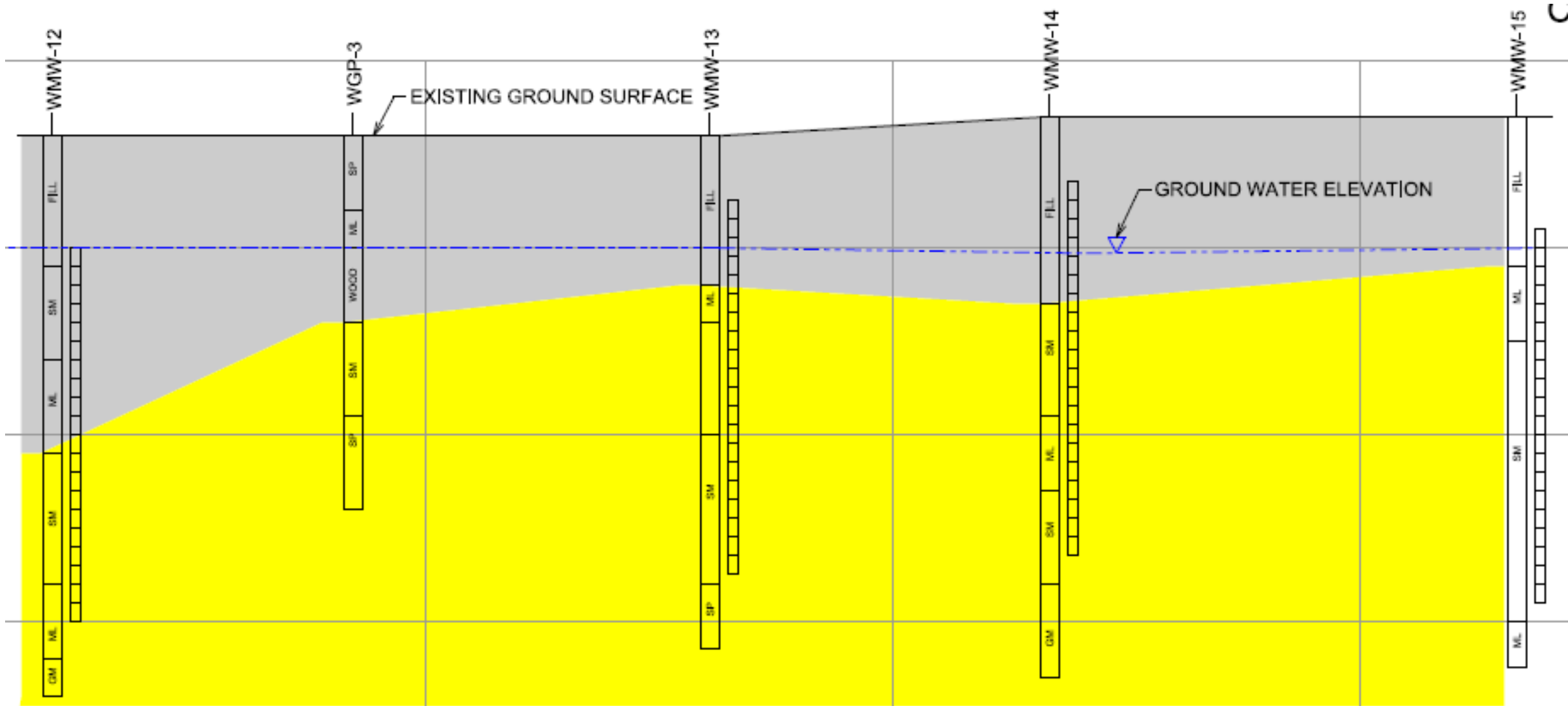
REV BY	NOOK NO	DATE	REVISION	NO	DATE	REVISION
J. STEINER	1	03-11-2015	ADDED ORDINARY HIGH WATER MARK FOR STURGEON BAY			
T. SHUPKER	2	06-11-2015	ADDED WCP-13 - 15, WMW-12 - 15, MWP-11 - 13			
J. STEINER	3	08-05-2015	ADDED GROUND SURFACE COVER INFORMATION			

WEST WATERFRONT REDEVELOPMENT PROJECT
CITY OF STURGEON BAY
STURGEON BAY, WISCONSIN



SITE MAP

2



Unique Well No.	DNR Well Id No.	Well Name WMW-12	Final Static Water Level 3.21	Surface Elevation 583	Bore 8-in
Grid Origin L (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/> Plane _____ N, _____ E '4 of NE 1/4, of Section 7, T 27 N, R 26 E			Lat. _____ " _____ "	Local Grid Location (If applicable) <input type="checkbox"/> N <input type="checkbox"/> S	
County Id.	County Door	County Code 15	Civil Town/City/or Village City of Sturgeon Bay		

SAMPLE	Length All & Recovered (in)	Blow Counts	Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL PROPERTIES			
									Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index
			-1	Paved Lot FILL, brick, gravel	FILL			0		M		
			-2									
			-3									
			-4	FILL, SAND, silty, trace clay, wet, medium gr no odor, dark brown	SM			1.2		W		
			-5									
			-6	FILL, SILT, trace wood, some organics, wet, course grained, no odor, black	ML			1.4		W		
			-7									
			-8									
			-9	SAND, silty, wet, med-course grained, wet, no odor, black	SM			1.5		W		
			-10									
			-11									
			-12	SILT, clayey, trace organics (peat), wet, slight plasticity, no odor, black	ML			1.2		W		
			-13									
			-14	GRAVEL and sand, silty, wet, med - v. course grained, no odor, brown	GM			1.1		W		
			-15									
			-16	EOB @ 15 feet bgs Well set @ 13 feet								
			-17									

WMW-12
fill extends to 8 feet below ground surface. Some organics; black silty sand at 8 feet.

Route to:
 Watershed/Wastewater Waste Management
 Remediation/Redevelopment Other

Facility/Project Name West Waterfront Redevelopment Project			License/Permit/Monitoring Number			Boring Number WMW-14								
Boring Drilled By: Name of crew chief (first,last) and Firm First Name: Dusty Last Name:			Date Drilling Started 5/15/2015 M/D/Y	Date Drilling Completed 5/15/2015 M/D/Y	Drilling Method 4.25" ID Hollow Stem Auger									
Firm: On Site Environmental Drilling Inc.			Final Static Water Level 3.65			Surface Elevation 583.5		Borehole Dia. 8-inch						
WI Unique Well No.	DNR Well Id No.	Well Name WMW-14	Local Grid Origin L (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>			Local Grid Location (If applicable)								
State Plane NE 1/4 of NE 1/4, of Section 7, T 27 N, R 26 E			Lat. _____	Long. _____		Feet <input type="checkbox"/> N <input type="checkbox"/> E Feet <input type="checkbox"/> S <input type="checkbox"/> W								
Facility Id.		County Door	County Code 15	Civil Town/City/or Village City of Sturgeon Bay										
SAMPLE			SOIL PROPERTIES					RQD/Comments						
Number and Type	Length Att. & Recovered (in)	Blew Counts	Depth in feet (below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram		PID/FID	Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P-200
			-1	Paved Lot FILL, silty sand, some gravel, dry, hydrocarbon odor, brown	FILL			8.7		D				
			-2					2.2		D				
			-5	SAND, silty, some gravel, wet, slight hydrocarbon odor, brown	SM			3.5		W				
			-8	SILT, trace clay, wet, non- plastic, no odor, black	ML			3.0		W				
			-10	SAND, silty, wet, fine-med grained, slight hydrocarbon odor, dk brown	SM			1.6		W				
			-13	Gravel, some sand, trace-some silt, wet, med-course grained sand, fine-med gravel, somewhat well graded, no odor, brown	GM			1.8		W				
			-16	EOB @ 15 feet bgs Well set @ 11.7 feet										

WMW-14
 (on the border of 92 & 100)
 silty sand and gravel fill to 5 feet below ground surface, hydrocarbon odor

No.	DNR Well Id No.	Well Name	Final Static Water Level	Surface Elevation	Borehole Dia.							
		WMW-14	3.65	583.5	8-inch							
n T (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>			Lat. _____	Local Grid Location (If applicable)								
N, _____ E 4, of Section 7, T 27 N, R 26 E			Long _____	<input type="checkbox"/> N <input type="checkbox"/> S	<input type="checkbox"/> E <input type="checkbox"/> W							
County		County Code	Civil Town/City/or Village									
Door		15	City of Sturgeon Bay									
Blow Counts	Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL PROPERTIES					ROD/Comments
							Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	p. 200	
	-1	Paved Lot	FILL			8.7		D				
	-2	FILL, silty sand, some gravel, dry, hydrocarbon odor, brown										
	-3											
	-4					2.2		D				
	-5	SAND, silty, some gravel, wet, slight hydrocarbon odor, brown	SM									
	-6											
	-7					3.5		W				
	-8	SILT, trace clay, wet, non- plastic, no odor, black	ML									
	-9											
	-10	SAND, silty, wet, fine-med grained, slight hydrocarbon odor, dk brown	SM									
	-11											
	-12					1.6		W				
	-13	Gravel, some sand, trace-some silt, wet, med-course grained sand, fine-med gravel, somewhat well graded, no odor, brown	GM									
	-14											
	-15					1.8		W				
	-16	EOB @ 15 feet bgs										
	-17	Well set @ 11.7 feet										

WMW-14
 silty sand and gravel fill to 5 feet below ground surface, noticeable hydrocarbon odor.

No.	DNR Well Id No.	Well Name WMW-15	Final Static Water Level 3.45	Surface Elevation 583.5
T (estimated: <input type="checkbox"/>) or Boring Location <input type="checkbox"/>		Lat. _____"	Local Grid Location (If applicable) <input type="checkbox"/> N	
N, _____ E		Long. _____"	Feet <input type="checkbox"/> S	
of Section 7, T 27 N, R 26 E		County Code 15	Civil Town/City/or Village City of Sturgeon Bay	
County Door				

Blow Counts	Depth in Feet (Below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL P	
							Compressive Strength	Moisture Content
-1	-2	Paved Lot FILL, silty sand, some gravel, moist, no odor, brown	FILL			2.6		M
-3	-4	SILT, trace gravel, trace clay, moist, slight plasticity, no odor, black	ML			1.9		M
-5	-6	SAND, silty, trace gravel, wet, med-course grained, oily appearance, moderate hydrocarbon odor, black	SM			17.5		W
-7	-8	Finer grained with depth	SM			43		W
-9	-10					6.4		W
-11	-12					2.1		W
-13	-14	SILT, trace clay and sand, wet, slight plasticity, no odor, black	ML					W
-15	-16	EOB @ 14.7 feet bgs Well set @ 12.7 feet						

WMW-15
 (located on parcel 100 near the edge of the ship canal)
 silty sand and gravel fill to nearly 4 ft bgs

Cross section across both parcels

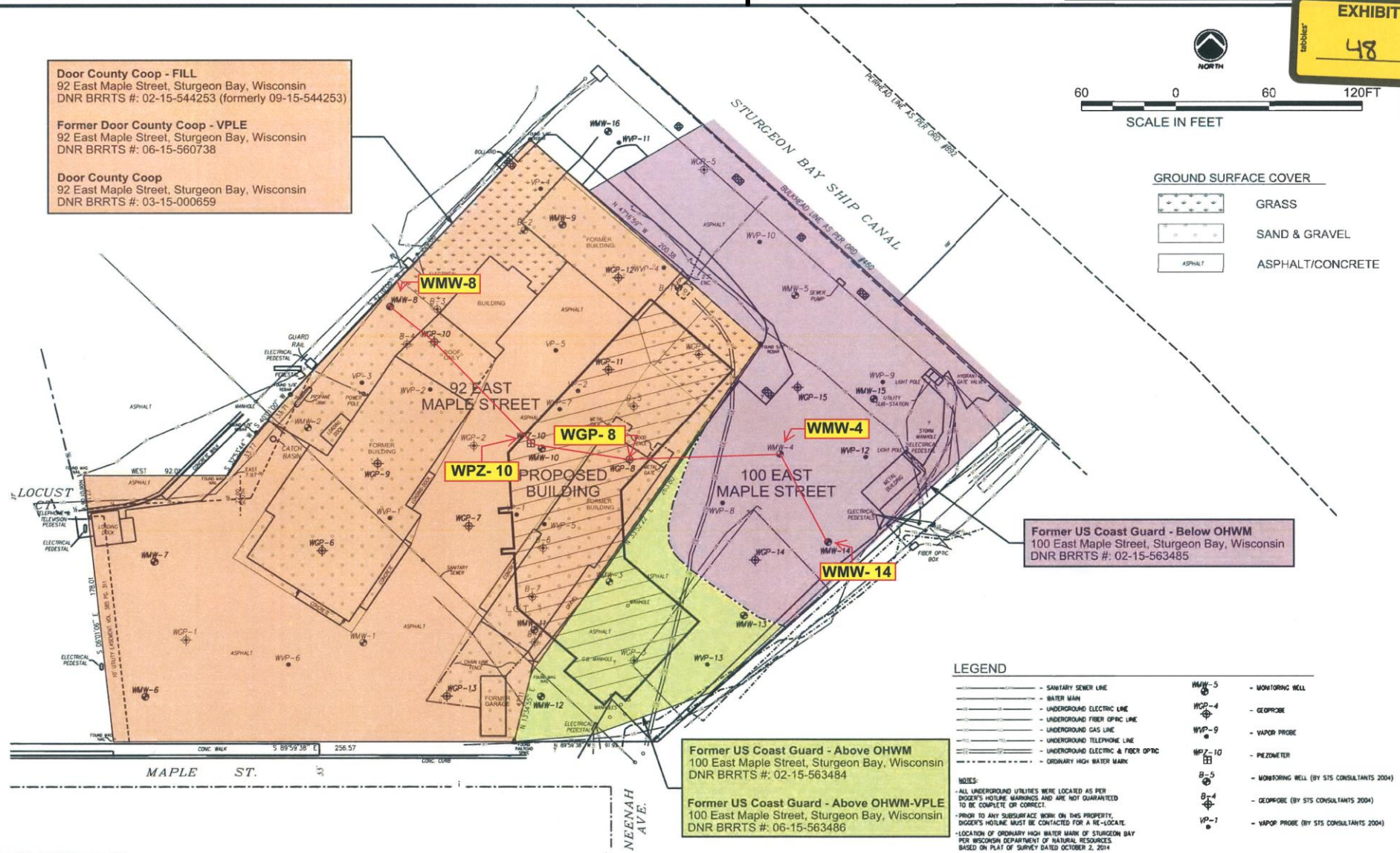
GEOLOGICAL CROSS SECTION E-E'

EXHIBIT
tabular
48

Door County Coop - FILL
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-544253 (formerly 09-15-544253)

Former Door County Coop - VPLE
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 06-15-560738

Door County Coop
92 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 03-15-000659



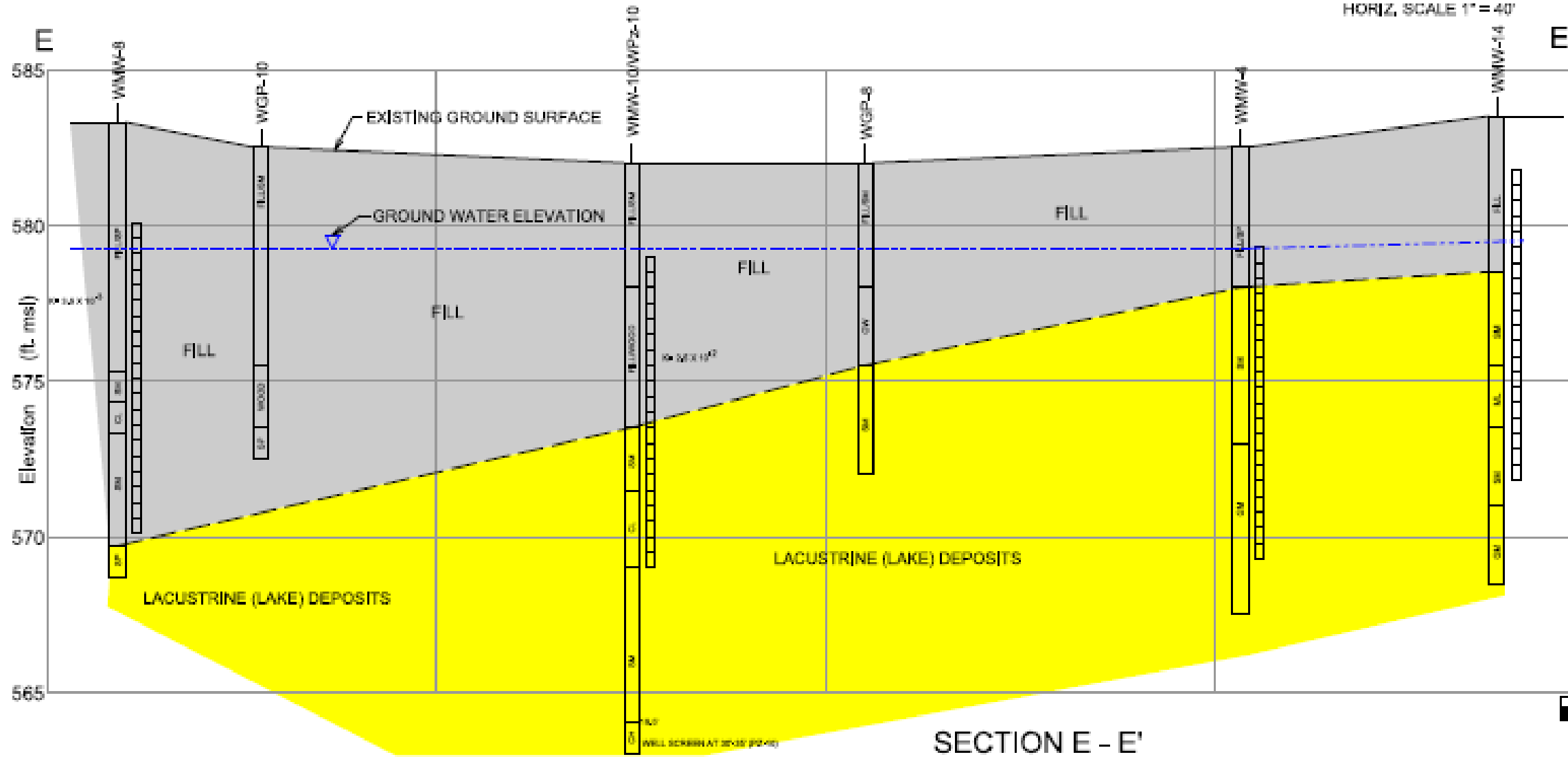
Former US Coast Guard - Below OHWM
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-563485

Former US Coast Guard - Above OHWM
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 02-15-563484

Former US Coast Guard - Above OHWM-VPLE
100 East Maple Street, Sturgeon Bay, Wisconsin
DNR BRRTS #: 06-15-563486

- LEGEND**
- SANITARY SEWER LINE
 - WATER MAIN
 - UNDERGROUND ELECTRIC LINE
 - UNDERGROUND FIBER OPTIC LINE
 - UNDERGROUND GAS LINE
 - UNDERGROUND TELEPHONE LINE
 - UNDERGROUND ELECTRIC & FIBER OPTIC
 - ORDINARY HIGH WATER MARK
- WMW-5 - MONITORING WELL
 - WGP-4 - GEOPROBE
 - WVP-9 - VAPOR PROBE
 - WPZ-10 - PEZIZOMETER
 - B-5 - MONITORING WELL (BY STS CONSULTANTS 2004)
 - B-4 - GEOPROBE (BY STS CONSULTANTS 2004)
 - VP-7 - VAPOR PROBE (BY STS CONSULTANTS 2004)
- NOTES:**
- ALL UNDERGROUND UTILITIES WERE LOCATED AS PER DIGGER'S HOTLINE WARNINGS AND ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT.
 - PRIOR TO ANY SUBSURFACE WORK ON THIS PROPERTY, DIGGER'S HOTLINE MUST BE CONTACTED FOR A RE-LOCATE.
 - LOCATION OF ORDINARY HIGH WATER MARK OF STURGEON BAY PER WISCONSIN DEPARTMENT OF NATURAL RESOURCES BASED ON PLAN OF SURVEY DATED OCTOBER 2, 2014

V:\ENR\CAD\STURGEON BAY\ON SITE MAP - Prop Building.dwg		WEST WATERFRONT REDEVELOPMENT PROJECT		AVRES ASSOCIATES		SITE MAP	
DESIGNER	J. STENGER	BOOK NO.	1	DATE	03-11-2015	ADDED ORDINARY HIGH WATER MARK FOR STURGEON BAY	
CHK BY	T. SHUPERT	JOB NO.	2	DATE	06-11-2015	ADDED WGP-13, 15, WMW-12, 16, WVP-11, 13	
DATE	JUNE 2015	DATE	06-28-2015	DATE	06-28-2015	ADDED GROUND SURFACE COVER INFORMATION	
NO.	10	DATE		NO.		REVISION	
				CITY OF STURGEON BAY		DRAWING NO.	
				STURGEON BAY, WISCONSIN		2	



SECTION E - E'

REVISION	BOOK NO.				
DESCRIPTION	JOB NO.	18-0122-00			
	DATE				

WEST WATERFRONT REDEVELOPMENT PROJECT
 CITY OF STURGEON BAY
 STURGEON BAY, WISCONSIN



DNR Well Id No.		Well Name WPZ-10		Final Static Water Level 4.88		Surface Elevation 582		Borehole Dia. 8-inch		
Estimated: <input type="checkbox"/> or Boring Location <input type="checkbox"/>				Lat. _____		Local Grid Location (If applicable)				
N, _____ E				Long _____		Feet <input type="checkbox"/> N		Feet <input type="checkbox"/> E		
Section 7, T 27 N, R 26 E						Feet <input type="checkbox"/> S		Feet <input type="checkbox"/> W		
County Door			County Code 15		Civil Town/City/or Village City of Sturgeon Bay					
Depth in Feet (below ground surface)	SOIL/ROCK DESCRIPTION AND GEOLOGIC ORIGIN FOR EACH MAJOR UNIT	USCS	Graphic Log	Well Diagram	PID/FID	SOIL PROPERTIES				
						Compressive Strength	Moisture Content	Liquid Limit	Plasticity Index	P 200
-1	Concrete (4") FILL, SAND, some silt, some gravel, moist no odor, gray/white	Fill/ SM			0		M			
-2					0		M			
-3					0		M			
-4	FILL, woodchips, moist, no odor dk brown	Fill/ Wood			0		M			
-5					0		M			
-6					0		M			
-7					0		M			
-8					0		M			
-9	SAND, some silt, wet, no odor, dk brown	SM			0		W			
-10					0		W			
-11	CLAY, some gravel, wet, low plasticity, no odor, red/brown	CL			0		W			
-12					0		W			
-13					0		W			
-14	SAND, some silt, some gravel, wet no odor, dk brown	SM			0		W			
-15					0		W			
-16					0		W			
-17					0		W			
-18					0		W			
-19					0		W			
-20	CLAY, some gravel, wet, high plasticity no odor, red	CH			0		W			
-21					0		W			
-22					0		W			
-23					0		W			
-24					0		W			
-25					0		W			

WPZ-10

(located center of parcel 92 beneath proposed hotel footprint)

Fill to nearly 9 feet below ground surface (bgs); sand and silty sand, wood chips extending nearly five feet (approximately 4'-9' bgs)

Soil, particularly fill, are described in the following documents:

- STS Phase I
- AECOM Phase I
- STS Phase II
- NR716 SIR June 2015
- RIWP October 2015

Remedy Implementation Work Plan - Soil and Groundwater Remediation

Prepared by:
Ayres Associates

Prepared for:
Martin Olejniczak, City of
Sturgeon Bay

October 2015

(page 14) Section 4.0 Closure Strategy

VPLE Approach and Certificate of Completion (COC)

“Based on results of the site assessment completed on the two properties, environmental conditions which must be addressed prior to receiving a COC consist of the following:

- **Historic fill across the two properties.**
- Contaminated soil across the two properties.
- Public health parameters in groundwater at concentrations exceeding their ES.
- The presence, accumulation and migration of methane in the unsaturated soil.”

Remedy
Implementation
Work Plan - Soil
and Groundwater
Remediation

Prepared by:
Ayres Associates

Prepared for:
Martin Olejniczak, City of
Sturgeon Bay

October 2015

(page 15) Section 4.0 Closure Strategy
VPLE Approach and Certificate of Completion (COC)

“We expect the **solid waste fill will be disturbed** during site redevelopment as building foundations, utilities, and other subgrade features are constructed in areas **within the limits of the historic fill**. When buildings and other site improvements are completed, the **historic fill will once again be covered.**”

Remedy Implementation Work Plan - Soil and Groundwater Remediation

Prepared by:

Ayres Associates

Prepared for:

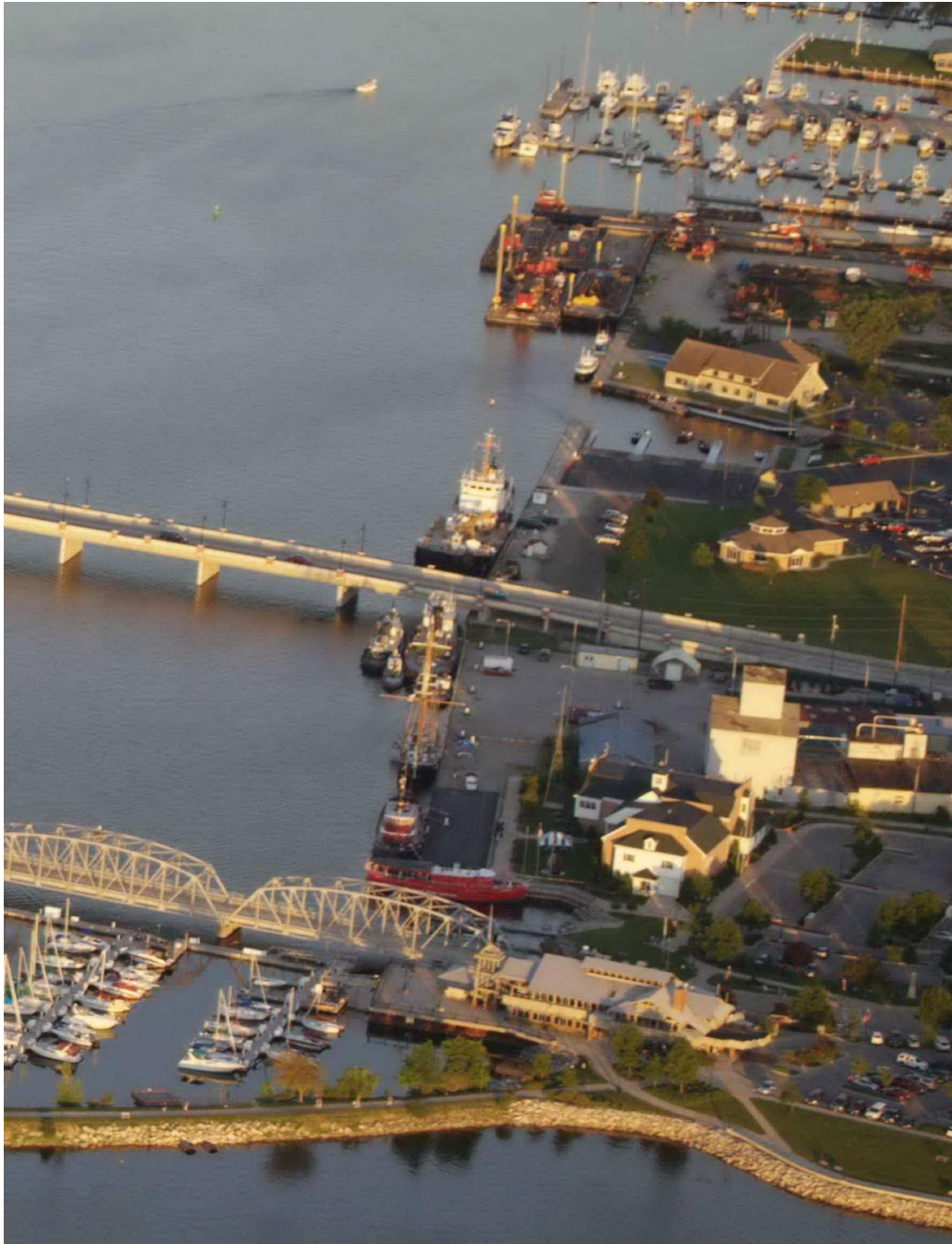
Martin Olejniczak, City of
Sturgeon Bay

October 2015

(page 21) *Historic Fill Exemption*

“Historic fill present across the site, as identified in the NR716 site investigation, includes bricks, blocks, cinders, concrete and wood debris and will be regulated as an historic fill site. Wisconsin solid waste regulations prohibit the placement of structures or other development on buried waste, including historic fill sites, without an exemption to Section NR 506.085, Wis Adm. Code.”

“Provided in Appendix C of this report is WDNR Form 4400-226, Development at Historic Fill Site Exemption Application... being submitted to request approval to proceed with proposed development within the designated historic fill site limits.”



Marine sediments along coastlines consist of silt and clay combined with organisms to form weak deposits of clay; these weak or compressible soils are not suited for engineering purposes. This area has been developed on fill which has been placed to allow for suitable foundations.