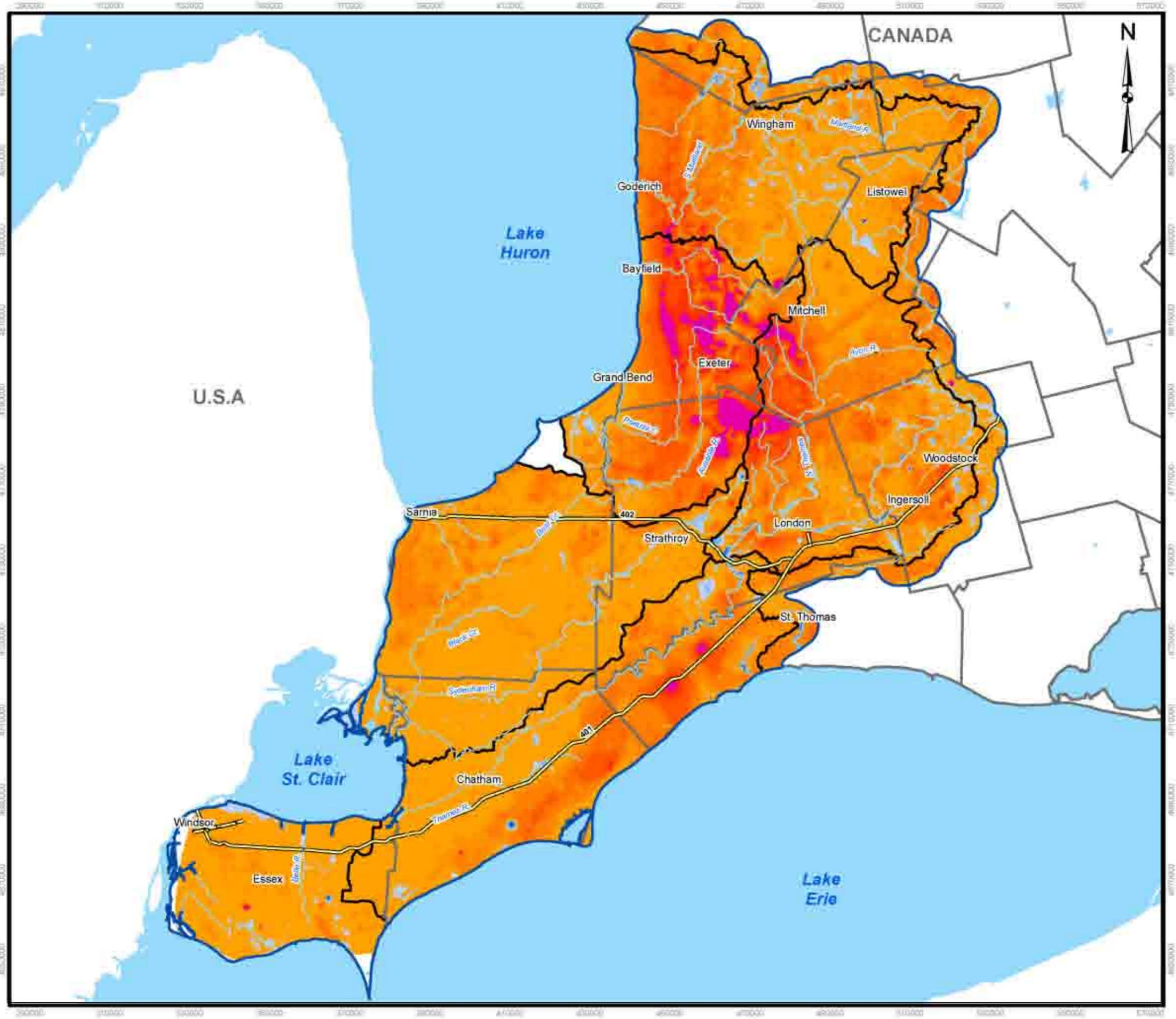


# Appendix A

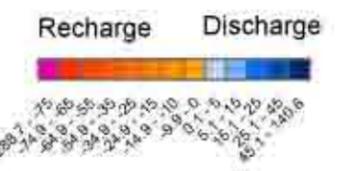
Estimated Zones of Potential  
Recharge and Discharge Areas



### Six Conservation Authorities Geological and Hydrogeological Model Project

#### Legend

- ▣ Conservation Area Boundaries
- ▣ County Boundaries
- ▣ Study Boundary
- Major Highways
- Major Rivers
- Lakes



Disclaimer: This map is intended for illustrative purposes only. Figure is to be read in conjunction with the Six Conservation Authorities FEFLCW model report.  
 Digital Mapping Sources: Base mapping features - Ministry of the Environment; Water well information - Ministry of the Environment.

Date: December, 2004



**Figure 24: Recharge/Discharge**

Map Projection: UTM NAD83 Zone 17

# Appendix B

## Assessment of Water Bodies and Distance to Project Components

Feature ID	Project Component (associated infrastructure)	Distance to Disturbance (m)	Meets O.Reg. 359/09 Definition of a Water Body	Reason if Not a Water Body
C10-A	Collection Line Buffer, Road Buffer	72.4	Yes	
C10-B	Collection Line Buffer	33	No	Grassed waterway, tile drained, no surface feature
C11	Collection Line Buffer	60.9	No	Grassed waterway, tile drained, no surface feature
C13	Road Crossing; Collection Line Crossing	0	Yes	
C18	Turbine 10, Road Buffer	42.6	Yes	
C19	Collection Line Crossing, Road Buffer	0	Yes	
C20	Collection Line Crossing	0	Yes	
C21	Collection Line Crossing	0	Yes	
C22	Turbine 33; Road Crossing	0	Yes	
C25	Collection Line Buffer; Substation and Laydown Area Buffer	20	Yes	
C26	Collection Line Crossing; Road Crossing; Turbines 25, 26, and 39	83	Yes	
C27	Collection Line Crossing	0	Yes	
C28	Collection Line Crossing; Road Crossing; Turbines 25, 26, and 39	65.3	Yes	
C3	Turbine 5, Road Buffer	60	Yes	
C30	Turbine 30; Road Crossing; Collection Line Crossing	43	Yes	
C32	Turbine 40; Road Crossing; Collection Line Crossing	0	Yes	
C33	Turbine 11; Collection Line Crossing, Road Buffer	33	Yes	
C34	Collection Line Crossing	0	Yes	
C35	Turbine 11, Road Buffer	78	Yes	
C36	Turbine 7; Collection Line Buffer, Road Buffer	70.9	Yes	
C40-A	Turbine 3, Road Buffer	33.8	Yes	
C40-B	Turbine 3, Road Buffer	N/A	No	Tile drained, no surface water
C41	Turbine 1; Road Buffer; Collection Line Buffer	111	Yes	
C42	Collection Line Crossing	0	Yes	
C44	Turbine 16 Buffer	56	Unknown	
C46	Road Crossing; Collection Line Crossing	0	Yes	
C48	Road Buffer	59.4	Yes	
C50	Road Buffer	110.8	Yes	
C51	Turbine 35, Road Buffer	117	Yes	

Feature ID	Project Component (associated infrastructure)	Distance to Disturbance (m)	Meets O.Reg. 359/09 Definition of a Water Body	Reason if Not a Water Body
C52	Collection Line Crossing	0	Yes	
C54	Collection Line Crossing	0	Yes	
C55	Collection Line Crossing	0	No	Tile drained, no channel
C56-A	Collection Line Crossing	0	Yes	
C56-B	Collection Line Crossing, Road Buffer	0	No	Tile drained, no channel
C66	Collection Line Crossing	0	Yes	
C7-A	Collection Line Crossing	43	Yes	
C7-B	Collection Line Crossing	N/A	No	Tile drained, ploughed and driven through
C71	Turbine 41; Road and Collection Line Buffer	56	Yes	
C72	Collection Line Crossing	0	Yes	
C83-A	Collection Line Crossing	0	Yes	
C83-B	Collection Line Crossing	0	No	Tile drained, no surface water, grassed waterway
C87	Collection Line Crossing; Road Buffer	0	Yes	
C88	Collection Line Buffer	48.5	Yes	
C99	Turbine 41, Road Buffer	100	Yes	
P1	Collection Line Buffer	N/A	Yes	**note:vernal pool
P2	Collection Line Buffer	N/A	Yes	**note: vernal pool
P3	Road Buffer	N/A	No	Man made dug out pond
P5	Collection Line Buffer	N/A	Unknown	
P6	Collection Line Buffer	N/A	No	Temporarily ponded area that is normally farmed
P7	Collection Line Buffer, Road Buffer	N/A	No	Temporarily ponded area that is normally farmed
P8	Road Buffer	N/A	No	Temporarily ponded area that is normally farmed
P10	Transmission Line Buffer	0	No	Man-made pond
T1	Transmission Line Crossing	0	Yes	
T2	Transmission Line Crossing	0	Yes	
T3	Transmission Line Crossing	0	Yes	
T4	Transmission Line Crossing	0	Yes	
T5	Transmission Line Crossing	0	Yes	
T6	Transmission Line Crossing	0	Yes	
T7	Transmission Line Crossing	0	Yes	
T8	Transmission Line Crossing	0	Yes	
T9	Transmission Line Crossing	0	Yes	
T10	Transmission Line Crossing	0	Yes	
T17	Transmission Line Crossing	0	Yes	
C100	Turbine 14	N/A	No	Grassed waterway
C101	Turbine 18	N/A	No	Ploughed and driven

Feature ID	Project Component (associated infrastructure)	Distance to Disturbance (m)	Meets O.Reg. 359/09 Definition of a Water Body	Reason if Not a Water Body
				through
C102	Road Buffer, Turbine 15	N/A	No	Grassed waterway
C103	Road Buffer	N/A	No	Ploughed and driven through
C104	Turbine 24	N/A	No	Swale, grassed waterway
C105	Turbine 38, Road and Collection Line Crossing	N/A	No	Swale, grassed waterway
C106	Turbine 16	N/A	No	Swale, grassed waterway
C107	Road Crossing, Collection Line Crossing	N/A	No	Swale, grassed waterway
C108	Collection Line Crossing	N/A	No	Swale, grassed waterway
C109	Turbine 41	N/A	No	
C110	Turbine 4	N/A	No	
C112	Collection Line Buffer	0	Yes	
C113	Collection Line Crossing, Road Crossing	0	Yes	
C114	Turbine 19	115	Yes	

# Appendix C

## Field Notes

**AECOM**

Field Crew SA, CB

DLWSMA 9

General Information  
 Study Area: Jericho Goshen Bluewater Land Parcel# 1091 Turbine# GE 169 + SM 9  
 UTM Co-ordinates: Easting: 0446882 Northing: 4817496

Date: July 5, 2011 Start time: 11:00 End Time: 12:30

Weather Conditions: Sunny, 20°C Field Notes By: SA

Site Location  
 water course divided into 2 land use areas - Forest, agriculture

Surrounding Landuse/Pollution Sources  
 Residential  Agriculture  Forest  Meadow Wetland   
 Type of Watercourse  
 Intermittent  Permanent  Ephemeral  Channelized  Natural Channel

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)  
F several small tribs feed into main channel

In-Situ Water Quality  
 WT (°C) 17 AT (°C) 20  
 pH 8.30 Cond (µS/cm) 0.58  
 Water Clarity: Clear  Turbid   
 Ground Water Indicators  
 Watercress  Bubbling  None   
 Iron Staining  Bank Seepage  Other

Notes:

Stream Morphology  
 Site Length (m):  
 Channel Dimensions (F) (A) (F) (A)  
 Mean Wetted Width (m): 0.50 N/A Mean Bankfull Width (m): 0.70 N/A  
 Mean Wetted Depth (m): 0.05 N/A Mean Bankfull Depth (m): 0.15 N/A  
 Bank Stability:  
 Stable Slightly unstable Moderately unstable Unstable  
 Left Bank      
 Right Bank

Notes: moderate gradient - stepping  
Pool - 0.15m  
Agri - some pooling in low lying areas - eventually enters natural channel & wetland features

Stream Morphology (continued)

Substrate (C = >)  
 Bo - Boulder  
 Co - Cobble  
 Gr - Gravel  
 Sa - Sand  
 Si - Silt  
 Cl - Clay  
 Other  
 Description: (F) Cl >> Si = Si > Gr > Co  
 Morphological Structure (%)  
 Pool Riffle Run Flat  
15 20 60  
 Notes: meandering, narrow water course  
several channels flow in

AECOM

Page 2 of 3

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation	Undercut Bank	Other:
0	15	0	20	25	0	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Grasses

## Canopy Cover (% closed cover)

100-90%

30-1%

80-60%

0%

60-30%

## Types of Cover (% cover)

30%

Trees

100%

Shrubs

3-A

Man-made structures

Gresses

Harbaceous

4-A

Other

## Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

## Drainage Features within Study Area

## Observations of Land Topography:

moderate gradient, ~~low~~ low flow - F  
 Agri - ~~no~~ no natural channel until wetland feature  
 - fed by tile drain  
 - water disappears between forest & wetland area

## Description:

debris (woody), low w/L  
 of chute features

Terrestrial features present:

No

## Other Comments:

Water feature → agri field drains towards feature west, but no flowing water, some pooling areas

## Photolog

Picture #	Description	Picture #	Description
7	From pavilion <del>at</del> facing E/S	15	View pp channel in agri field
8	From pavilion facing south towards stream	16	close up of channel
9	from pavilion facing south - valley features	17	facing west in agri field
10	from pavilion facing S/E view of valley features & Blusman's facing W/S	18	wetland
11	@ Blusman's facing W/S	19	wetland
12	@ Blusman's facing W/S	20	wetland
13	View of stream interface - forest & agri		
14			

July 5/11

AECOM

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Watercourse Sketch

Study Area:

Jericho

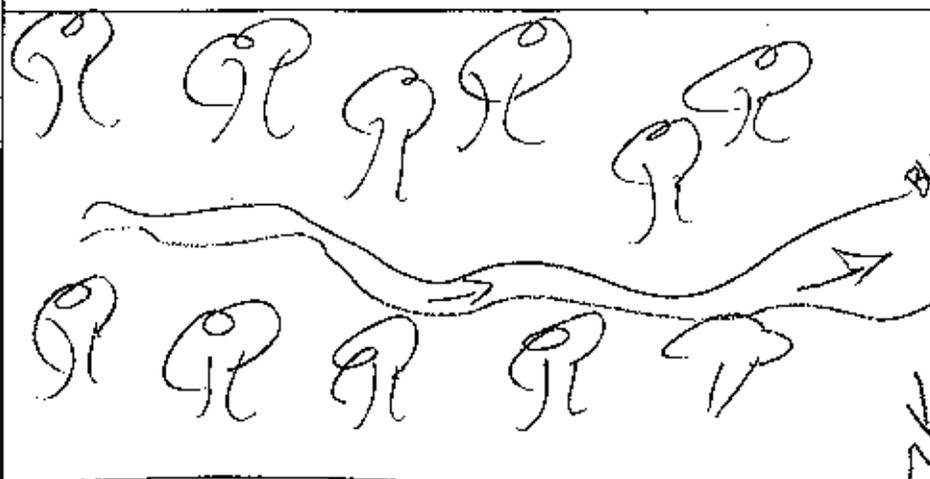
Goshen

Blauwater

Land Parcel# 1091

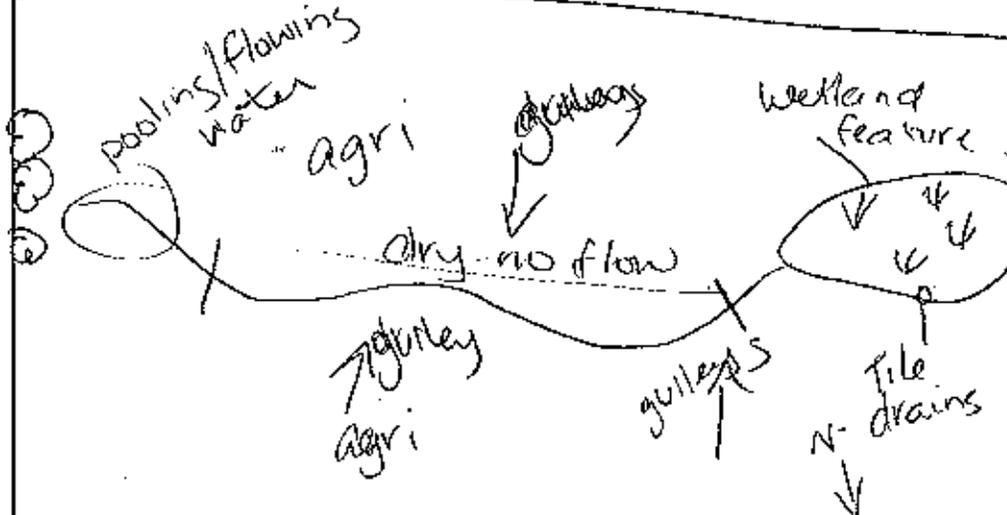
Turbine #

6216-9 SMV9

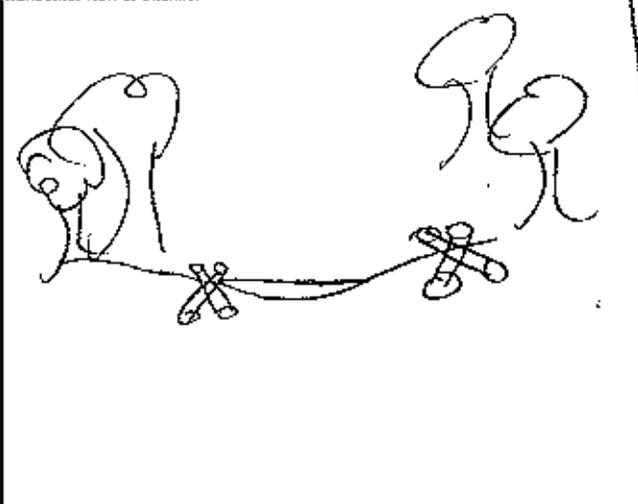


LEGEND

- 10d depth (cm)
- SW width
- RCB
- Run/Gate
- Pool
- Island/Bar
- Fine
- Gravel
- Substrate
- Cobble
- Boulder
- Debris
- CT Canal
- SWFV Submerged/Foal
- EV Emergent
- W Watercross
- Fa Iron Blasting
- HSB Eroded Bank
- xxx Riprap / Other
- Insloam
- Log/Tree
- Down/Weir
- Riparian Tree
- Scour/Spike
- Undercut Bank
- Barrier to Fish Movement
- Seasonal Barrier
- Fence
- Curvet



Horizontal View of Channel



C.18  
BWSMN10A  
Start

**AECOM**

Field Crew: SA CB

General Information

Study Area: Jericho Goshan Bluewater Land Parcel# 1031 Turbine # SMN10

UTM Co-ordinates: Easting: 0446954 Northing: 4816424

Date: July 5, 2011 Start time: 3:45 End Time: 4:51

Weather Conditions: clear skies, slight breeze

Field Notes By: SA

Site Location

between Bronson & Goshen Line north up Centennial Rd.

Surrounding Landuse/Pollution Sources

Residential  Agriculture  Forest  Meadow Wetland

Type of Watercourse

Intermittent  Permanent  Ephemeral  Channelized  Natural Channel

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

In-Situ Water Quality

WT (°C) 17 AT (°C) 20°C  
pH 7.93 Cond (µm/cm) 0.64

Water Clarity: Clear  Turbid

Ground Water Indicators

Watercress  Bubbling  None   
Iron Staining  Bank Seepage  Other

- done in  
val low flow  
at 8:00

Notes: Headwater area - permanent accounts for 50% of site  
- lots of we in ups reach

Stream Morphology

Site Length (m):

Bank Stability:

Channel Dimensions

Mean Wetted Width (m):	<u>0.60</u>	Mean Bankfull Width (m):	<u>1.00</u>
Mean Wetted Depth (m):	<u>0.10</u>	Mean Bankfull Depth (m):	<u>0.23</u>

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Notes: banks are steep, undercuts & meander

Stream Morphology (continued)

Substrate (<=>)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
Other

Description

Cl > Si > Sa > Gr.  
Some dumped boulders

Morphological Structure (%)

Pool	Riffle	Run	Fast
<u>30</u>		<u>70</u>	<u>3</u>

Notes:

AECOM

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Habitat						
Instream Cover (%) <u>70</u>						
None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				<u>20</u>		<u>Overhanging Veg 80</u>
*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)						
<u>Cattails</u> <u>Water cress</u>						
Canopy Cover (% closed cover):				Types of Cover (% cover)		
100-90%	<input type="checkbox"/>	30-1%	<input type="checkbox"/>	Trees	Shrubs	Man-made structures
90-80%	<input checked="" type="checkbox"/>	0%	<input type="checkbox"/>	Grasses <u>80</u>	Herbaceous	Other
60-30%	<input checked="" type="checkbox"/>			<u>Cattails 20</u>		
Notes:						
Obstructions to Fish Passage				Drainage Features within Study Area		
No Obstructions	<input type="checkbox"/>	Man-Made	<input checked="" type="checkbox"/>	Observations of Land Topography:		
Natural	<input checked="" type="checkbox"/>	<u>Boulders</u>		<u>Surface run off into channel.</u> <u>Small valley</u>		
Description:						
Terrestrial features present: <input type="checkbox"/> Yes <input type="checkbox"/> No						
Other Comments:						
<u>no flow-evidence of high flows from erosion</u> <u>&amp; under cut banks</u>						
Photolog						
Picture #	Description	Picture #	Description			
<u>21</u>	<u>Overview of site</u>	<u>29</u>	<u>Facing v/s</u>			
<u>22</u>	<u>Facing v/s @ plus/minus 10 ft</u>	<u>30</u>	<u>Facing v/s</u>			
<u>23</u>	<u>view of undercut banks</u>	<u>31</u>	<u>Facing v/s</u>			
<u>24</u>	<u>Facing v/s</u>	<u>32</u>	<u>Watercress</u>			
<u>25</u>	<u>pic of WC</u>					
<u>26</u>	<u>view of channel facing v/s</u>					
<u>27</u>	<u>view of cattails</u>					
<u>28</u>	<u>watercress</u>					

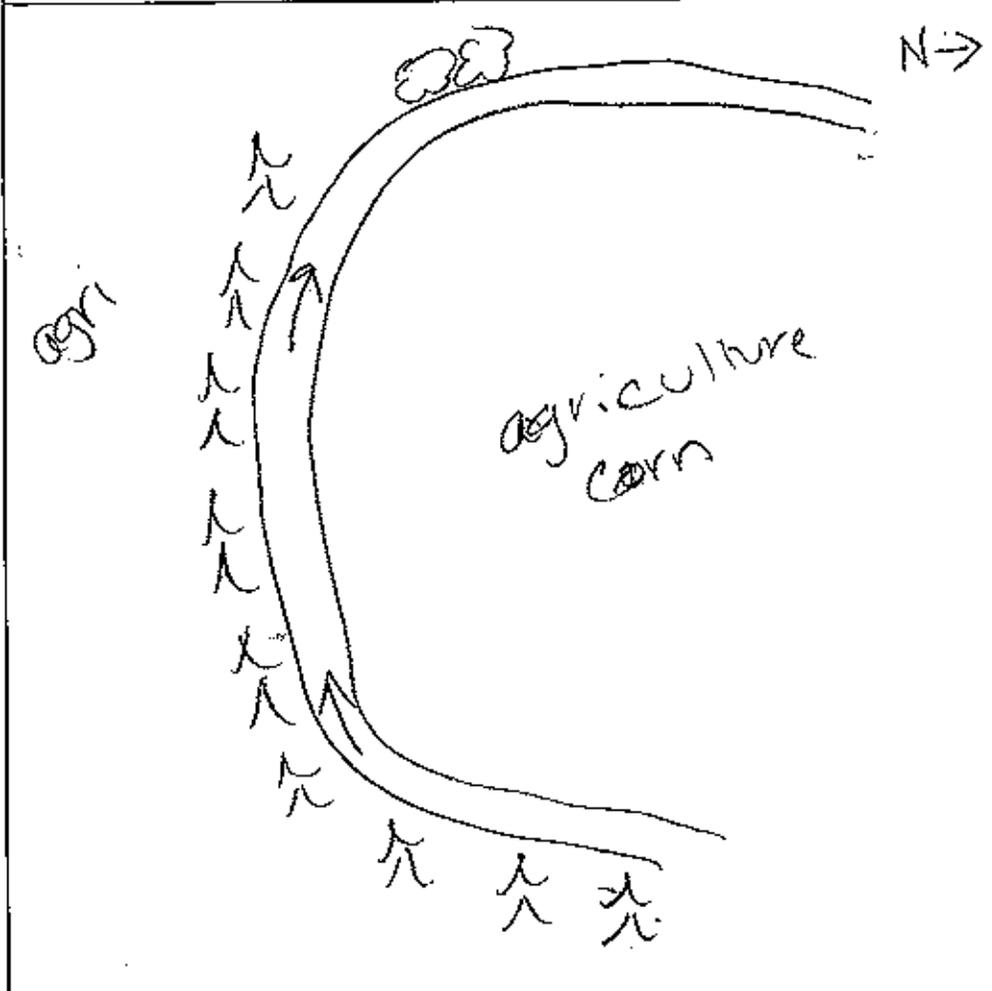
July 5/11

AECOM

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Watercourse Sketch

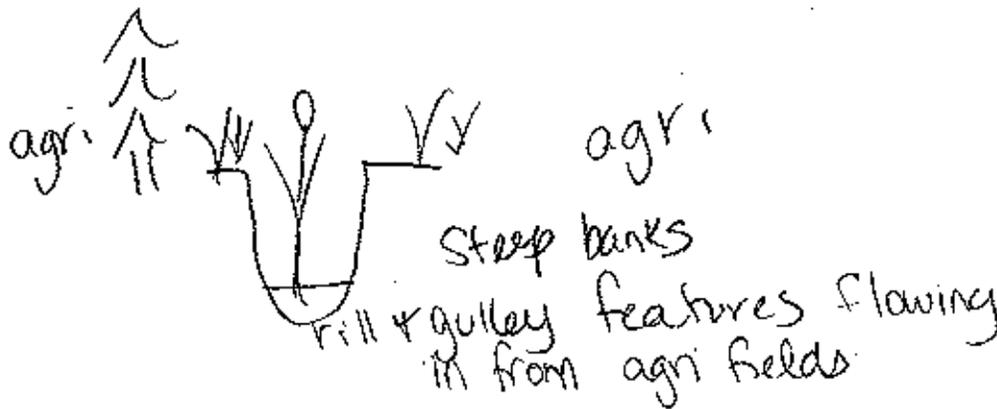
Study Area: Jericho Goshen Bluewater Land Parcel# 1031 Turbina# SMW10



**LEGEND**

- 10d depth (cm)
- Bw width
- Rock
- Run/Grade
- Pool
- Island/Bar
- Firm
- Gravel
- Substrate
- Cobble
- Boulder
- Debris
- Callus
- Submerged/Float
- Emergent
- Watercross
- Iron Staining
- Eroded Bank
- Riprap / Other
- Instream Log/Tree
- Dam/Weir
- Riparian Tree
- Seep/Spring
- Undercut Bank
- Barrier to Fish Movement
- Seasonal Barrier
- Fence
- Culvert

Horizontal View of Channel



<b>AECOM</b>		Field Crew: SA, CR			
<b>General Information</b>					
Study Area:	Jericho Goshen Bluewater	Land Parcel#	1065		
		Turbine #	MNS, GE16-5		
UTM Co-ordinates:	Easting: 0446325	Northing: 4826653	- BLUE-104		
Date:	July 15 2011	Start time:	8:30		
		End Time:	10:45		
Weather Conditions:	Sunny ~25°C	Field Notes By:	SA		
<b>Site Location</b>					
East of Bronson Line					
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>			
Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input type="checkbox"/>	Wetland <input checked="" type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>		
Forest <input type="checkbox"/>		Ephemeral <input type="checkbox"/>			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
Several small tributaries observed flowing into stream, several dry ephemeral pools + dry creek beds observed					
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>			
WT (°C)	17.5	AT (°C)			
pH	8.32	Cond (µS/cm)	0.65		
Water Clarity:	Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>			
		Watercress	<input checked="" type="checkbox"/>		
		Bubbling	<input type="checkbox"/>		
		Iron Staining	<input type="checkbox"/>		
		Bank Seepage	<input checked="" type="checkbox"/>		
		None	<input type="checkbox"/>		
		Other	<input type="checkbox"/>		
Notes: lots of bank seepage observed mostly along RB - slightly turbid watercourse					
<b>Stream Morphology</b>					
Site Length (m):	Bank Stability:				
Channel Dimensions	Stable	Slightly unstable	Moderately unstable		
Mean Wetted Width (m): 1.5	Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Mean Bankfull Width (m): 3.0	Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>		
Mean Wetted Depth (m): 0.15					
Mean Bankfull Depth (m): 0.30					
Notes: meandering stream to steep valley banks, undercut banks, sand & gravel bars					
<b>Stream Morphology (continued)</b>					
Substrate (<=>)	Description	Morphological Structure (%)			
Bo - Boulder		Pool	Riffle	Run	Flat
Co - Cobble	0-Sa-Si>Cl>Gr>Co>Bo	30	30	40	
Gr - Gravel					
Sa - Sand	N-Sa-Si>Cl>Gr>Co				
Si - Silt					
Cl - Clay					
Other					
Notes: meandering stream @ large deep pools					

40%

Habitat

Instream Cover (%)

None	Woody Debris ✓	Boulders ✓	Cobble ✓	Aquatic Vegetation*	Undercut Bank ✓	Other:
	15	5	5	0	15	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Canopy Cover (% closed cover):

100-90%	<input checked="" type="checkbox"/> P	30-1%	<input type="checkbox"/>
90-80%	<input checked="" type="checkbox"/> 11	0%	<input type="checkbox"/>
60-30%	<input type="checkbox"/>		

Types of Cover (% cover)

Trees	100	Shrubs	1	Man-made structures	
Grasses		Herbaceous	10	Other	

Notes:

Obstructions to Fish Passage

No Obstructions	<input checked="" type="checkbox"/>	Man-Made	<input type="checkbox"/>
Natural	<input type="checkbox"/>		

Drainage Features within Study Area

Observations of Land Topography:

rolling hills, some wetlands, some water

Description:

Terrestrial features present:

Yes  No

Other Comments:

Observed fish species: cypress

Photolog

Picture #	Description	Picture #	Description
1	looking up r/s	9	view of r/s of water body
2	pool	10	open area with water
3	bank slope	12	view of r/s of water body
4	bank slope	11	view of topography
5	undercut bank		
6	<del>looking up r/s</del>		
7	ups		
8	Forest riparian		

BLW

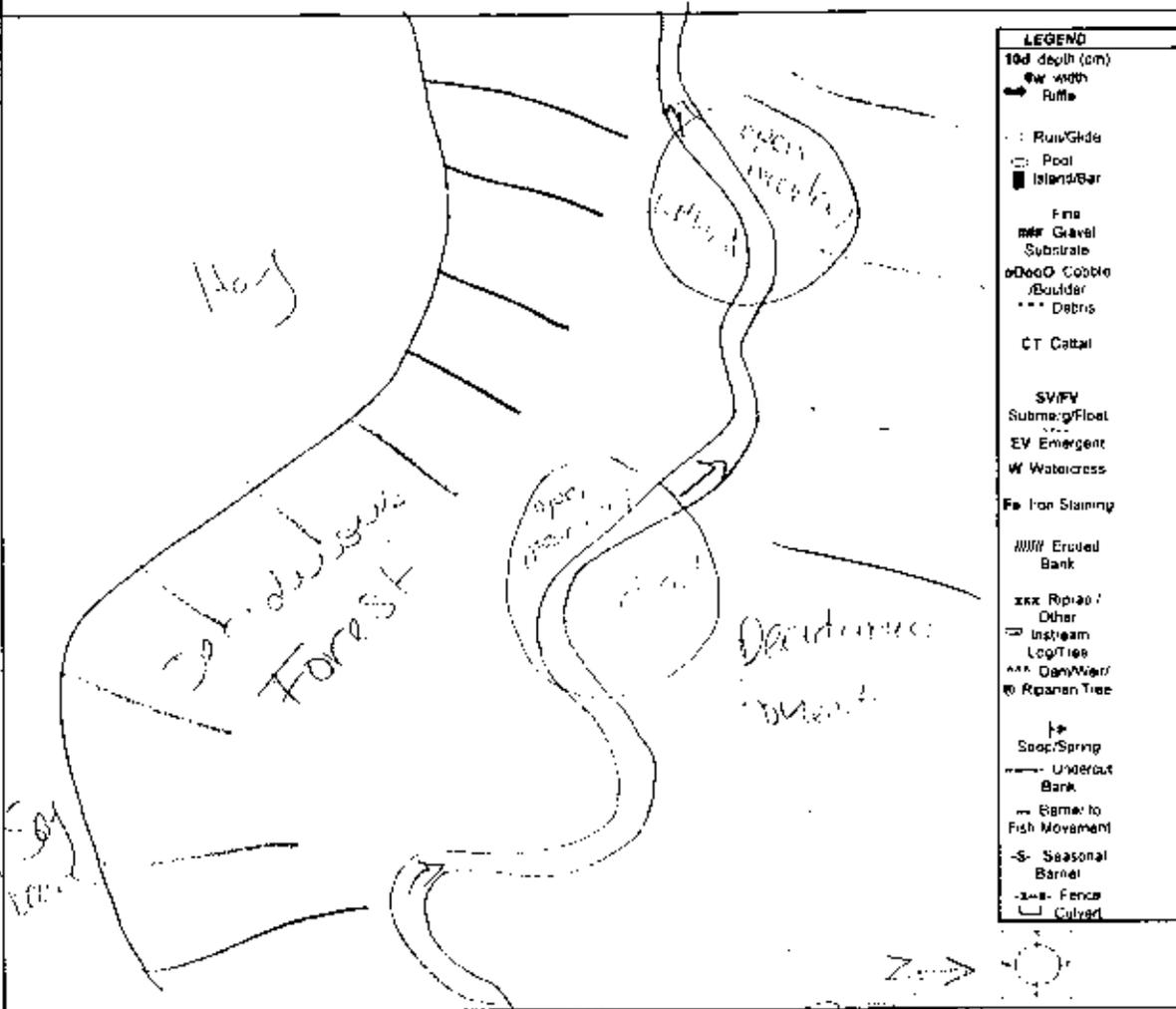
July 6/11

AECOM

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Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1665 Turbine # SMNS - 6016



**LEGEND**

- 10d depth (cm)
- W width
- Riffle
- Ruv/Glide
- Pool
- Island/Bar
- Fine
- Gravel
- Substrate
- Cobble
- Boulder
- Debris
- CT Cattail
- SVFV
- Submerg/Float
- EV Emergent
- W Watercress
- Fe Iron Slipping
- Eroded Bank
- Riprap / Other
- Instream Log/Tie
- Dam/Wall
- Riparian Tree
- Soap/Spring
- Undercut Bank
- Barrier to Fish Movement
- Seasonal Barrier
- Fence
- Culvert



AECOM		Page 1 of 4	
Field Crew: SA NL, JN		General Information	
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel# 1047	Turbine # GE16-8	
Date: July 12/2011	Start time: 9:10	End Time: 11:00	
Weather Conditions: Sunny, no clouds	Field Notes By: SA.		
Site Location			
enter from Bronson - line through soybean field			
UTM Co-ordinates			
Easting: 0446690	Northing: 4818551	Description: interface between wetland/forest	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuses/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/> W	Wetland <input checked="" type="checkbox"/> E	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/> N	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other: Cash crop			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
Cash crop soybean Wetland seepage into defined channel			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 18.2	AT (°C):	Watercreak <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 8.40	Cond (µs/cm): 0.69	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Subbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 1.00	Mean Bankfull Width (m): 3.10	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.10	Mean Bankfull Depth (m): 0.40	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description: low flow			
Notes: exposed tree roots, poorly vegetated, undercut banks, some slumping			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description:

Cl &gt;&gt; Gr &gt; Co &gt; Bo

## Morphological Structure (%)

Pool	Riffle	Run	Flat
5	15	70	

## Notes:

trickle flow to areas of disconnect

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	20	5	30	0	5	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%



30-1%



80-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

Herbaceous

Other

100

## Notes:

choked channel in wetland area

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



## Description:

low flow barriers

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

-agri field slopes towards wetland area

## Terrestrial features Present:

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 12/11 GE 168

Page 3 of 4

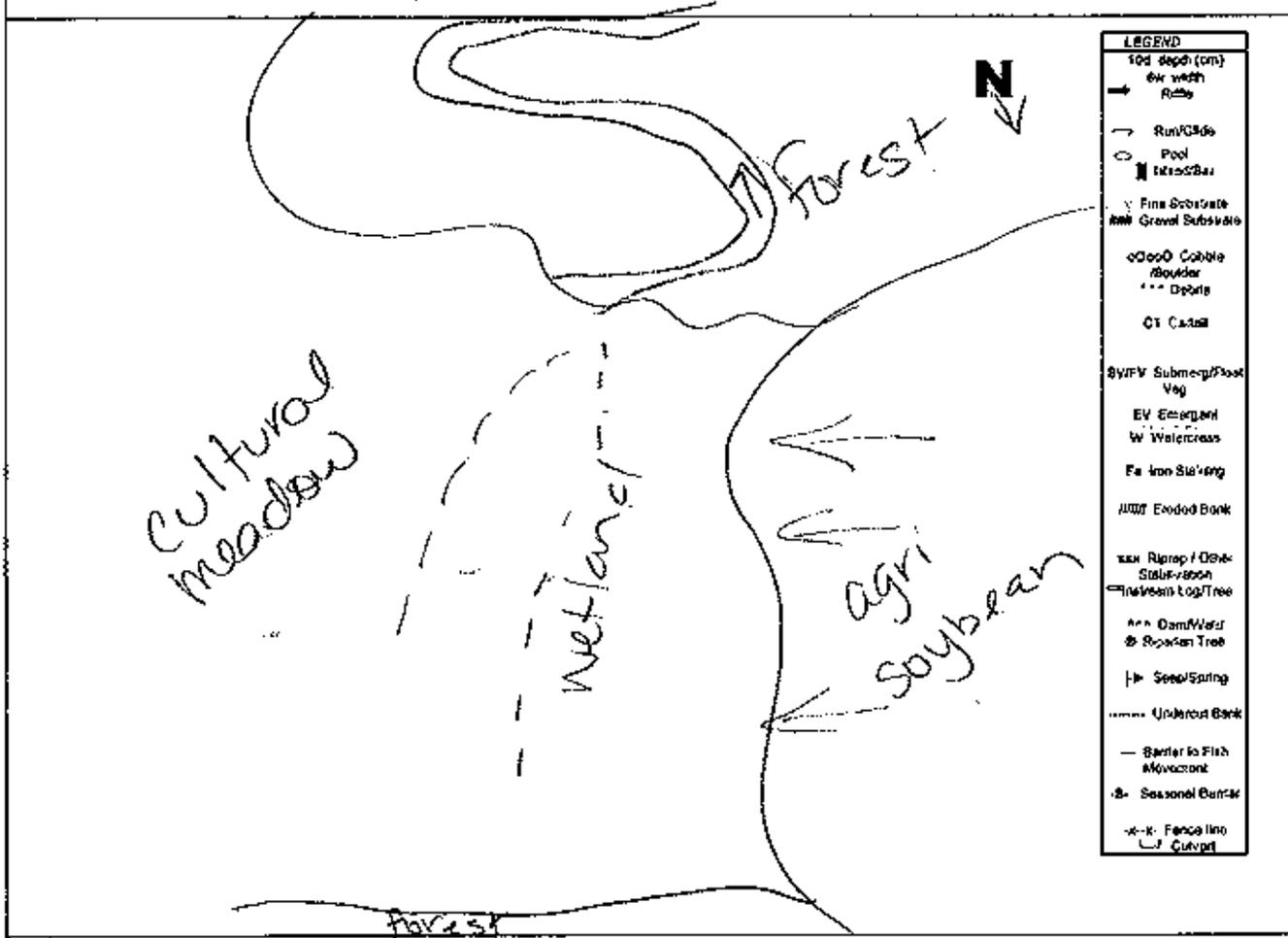
## Other General Comments Regarding the Study Area:

- trail running through wet area dividing channel
- assessment done in forest
- highly meandering channel, with obvious flashflooding due to unstable eroded banks and deposition
- no fish observed
- observed water striders, racoon prints

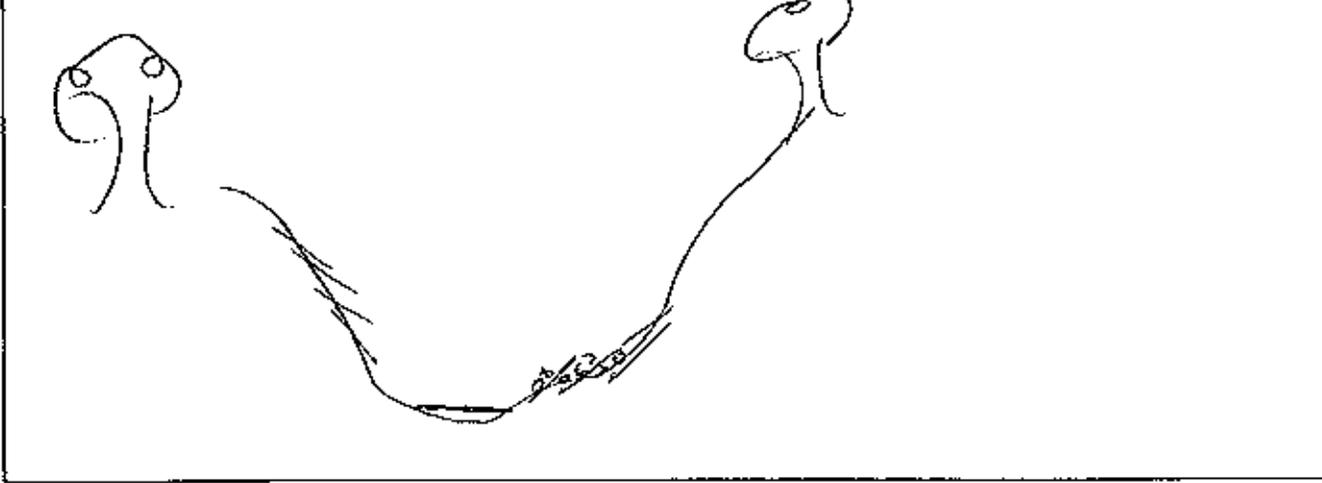
Photolog		Photolog	
Picture #	Description	Picture #	Description
1248	overview	1259	facing U/S
1249	overview	1260	facing d/s
1250	overview	1261	facing d/s at end of site
1251	facing d/s dry channel	<del>1262</del> 1262	facing u/s at end of site
1252	facing u/s dry channel	<del>1263</del> 1263	view of agri facing w
1253	view of substrates in wetland area	79 1264	view of agri gully facing E
1254	landscape	1265	view of gully feature in agri field
1255	disconnect from trail		
1256	overview of channel		
1257	interface wetland into channel facing u/s		
1258	facing d/s		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1047 Turbine # GTE168



Horizontal View of Channel



<b>AECOM</b>		Page 1 of 4			
Field Crew: SA, NL					
<b>General Information</b>					
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel#: 1069	Turbine #	601.01: 2.45 MW/24		
Date: 2/12/2011	Start time: 11:45	End Time:	12:30		
Weather Conditions: Sunny	Field Notes By: SA				
<b>Site Location</b>					
West off of Rt 2 (line through Green field)					
<b>UTM Co-ordinates</b>					
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/> W!!	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input checked="" type="checkbox"/> S	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>			
WT (°C): 21.4	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: 7.38	Cond (µs/cm): 0.67	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: lots of watercress.					
<b>Stream Morphology</b>					
Site Length (m):	Bank Stability:				
<b>Channel Dimensions</b>		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 0.60	Mean Bankfull Width (m): 1.0	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.12	Mean Bankfull Depth (m): 0.32	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: Moderate flow					
Notes: Well vegetated banks, channelized steep banks					

AECOM

Page 2 of 4

## Stream Morphology (Continued)

## Substrate (&lt; =&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Cl

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
		100	

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				80-90		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Watercress  
Grasses  
Nightshade  
filamentous algae.

## Canopy Cover (% closed cover):

100-90%

30-1%

80-60%

0%

80-30%

## Types of Cover (% cover)

Trees

Shrubs

15

Man-made structures

Grasses

5

Herbaceous

5

Other

Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

None observed

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Slope towards channel.

Terrestrial features Present

 Yes

No

Terrestrial Recon Form Filled out

Yes

 No

AECOM

Page 3 of 4

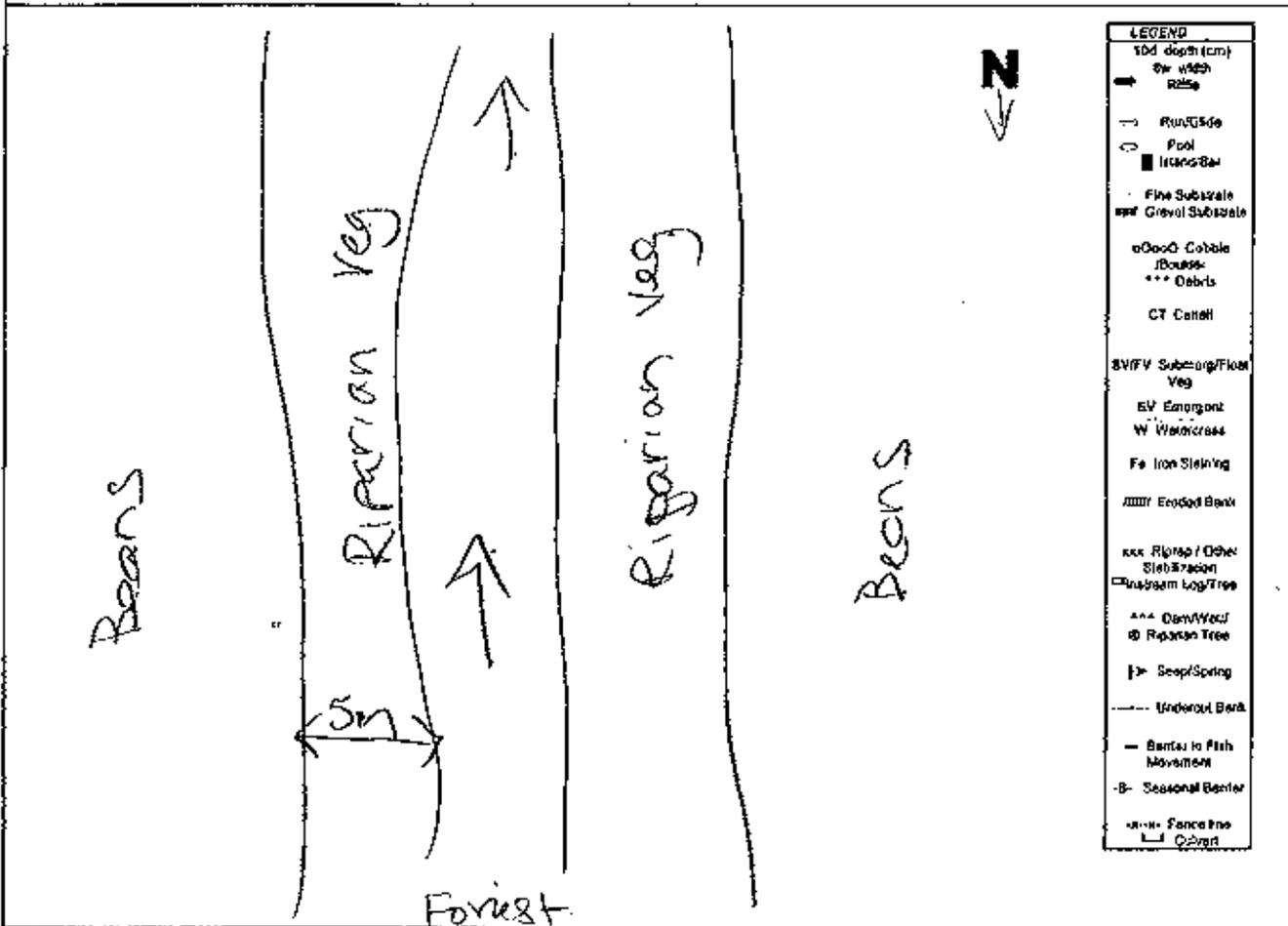
## Other General Comments Regarding the Study Area:

- agri channel fairly straight + uniform
- no evidence of gully drainage features
- topography relatively flat

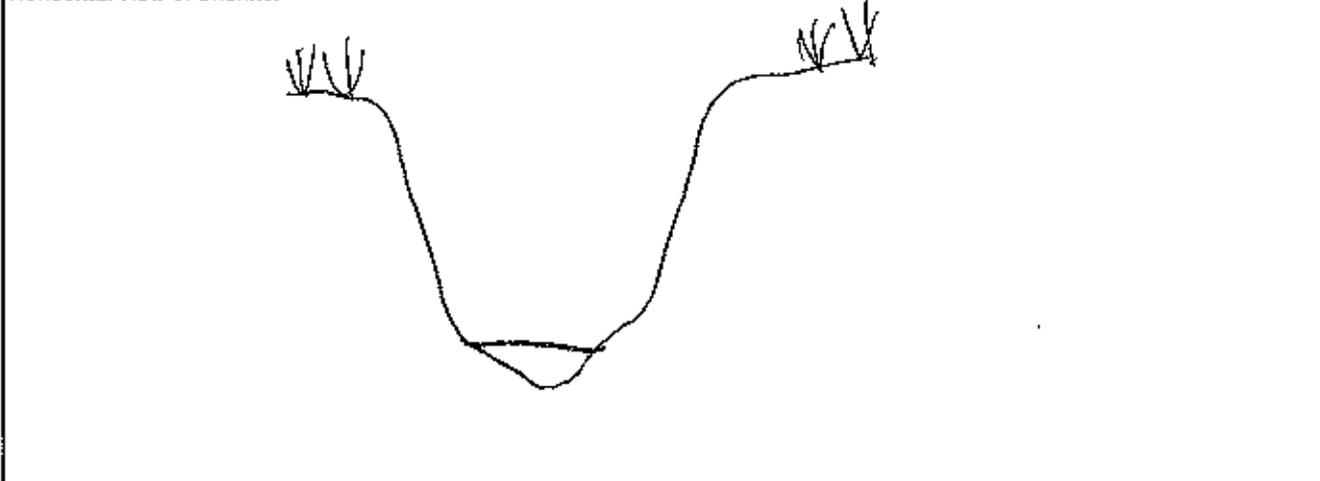
Photolog			
Picture #	Description	Picture #	Description
249	overview.		
250	facing d/s		
251	facing u/s		
252	view of watercross		

Watercourse Sketch

Study Area: Jericho Goshan Bluewater Land Parcel# 136A Turbine # GE16A112



Horizontal View of Channel



AECOM

Field Crew: SA, NH, JAG, NL

## General Information

Study Area: Jericho Goosep Bluewater Land Parcel# 1036 Turbine # EE 16-21  
 Date: 12<sup>th</sup> July 2011 Start time: 1434 End Time: 1515

Weather Conditions:

SUNNY, CLEAR, HOT

Field Notes By: NL

## Site Location

west off Babylon, South Centennial

## UTM Co-ordinates

Easting: Northing: Description:

Easting: Northing: Description:

Easting: Northing: Description:

Easting: Northing: Description:

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Other:

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

E - com field  
 W - decid. thicket woodlot

## In-Situ Water Quality

WT (°C): 30.72 AT (°C): 30  
 pH: 8.72 Cond (µs/cm): 0.63  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes: No fish observed

## Stream Morphology

Site Length (m):

Bank Stability:

## Channel Dimensions

Mean Wetted Width (m): 2 Mean Bankfull Width (m): 4.5  
 Mean Wetted Depth (m): 0.9 Mean Bankfull Depth (m): 60cm

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flow Description: MODERATE FLOW -- LOW FLOW CONDITIONS

Notes:

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

~~SA~~  
MK > Cl > DT

## Morphological Structure (%)

Pool	Riffle	Run	Flat
	5	95	

## Notes:

Sulphur-smell in muck

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5			5		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses, watercress, algae, greater duckweed, iris  
pickered weed

## Canopy Cover (% closed cover):

100-90%   
90-80%   
80-30%

30-1%   
0%

## Types of Cover (% cover)

Trees 70 Shubs 20 Man-made structures \_\_\_\_\_  
Grasses 10 Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

## Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

## Description:

## Drainage Features within Study Area

## Observations of Land Topography within 120 m buffer area:

Flat.  
No obvious signs of drainage.

## Terrestrial features Present:

Yes  No

## Terrestrial Recon Form Filled out

Yes  No

AECOM

July 12/11

GRE/b-21

Page 3 of 4

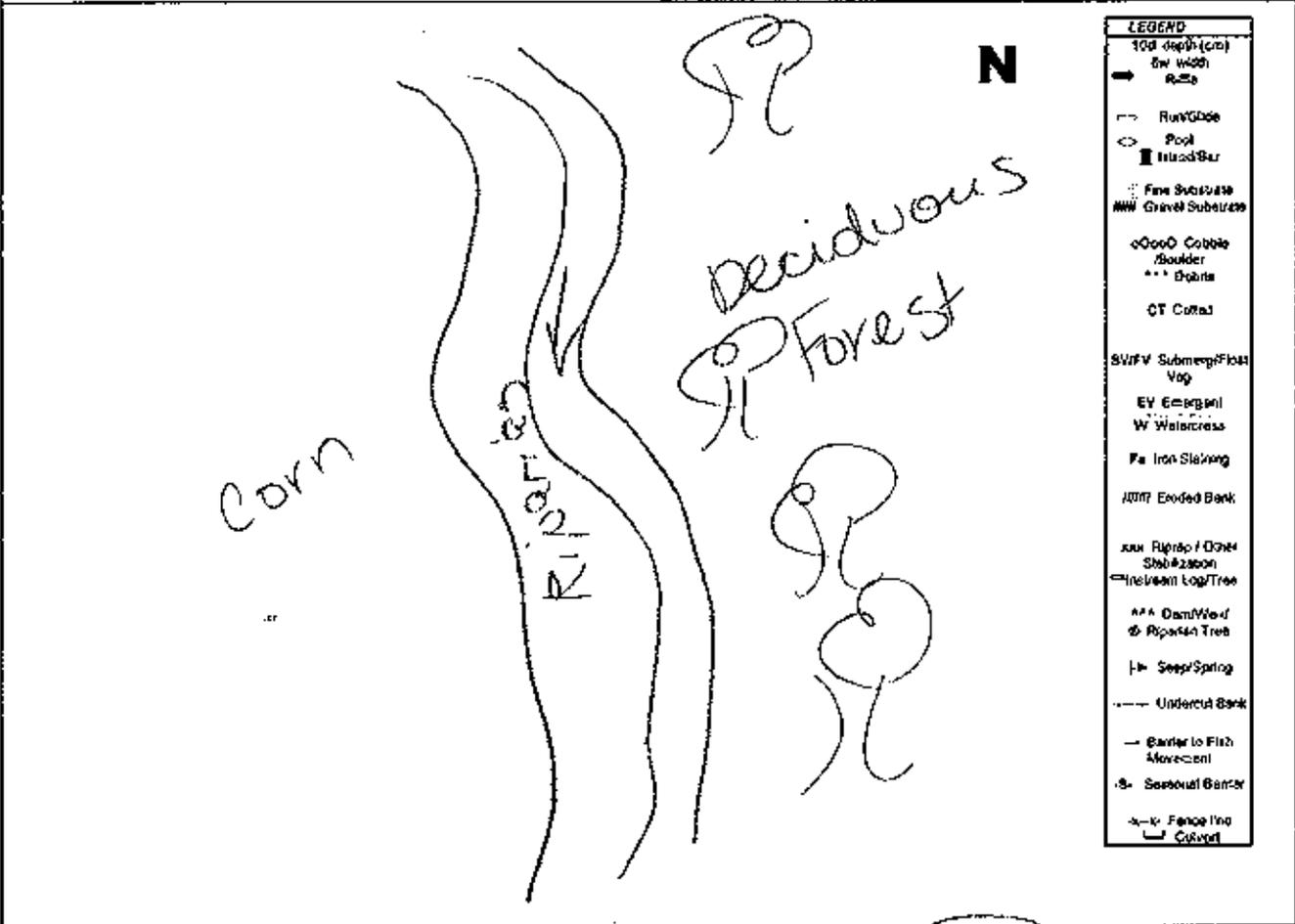
## Other General Comments Regarding the Study Area:

No fish  
 Very steep banks  
 Corn within 5m of top of bank/riparian  
 2.5m vertical bank height.  
 Raccoon prints

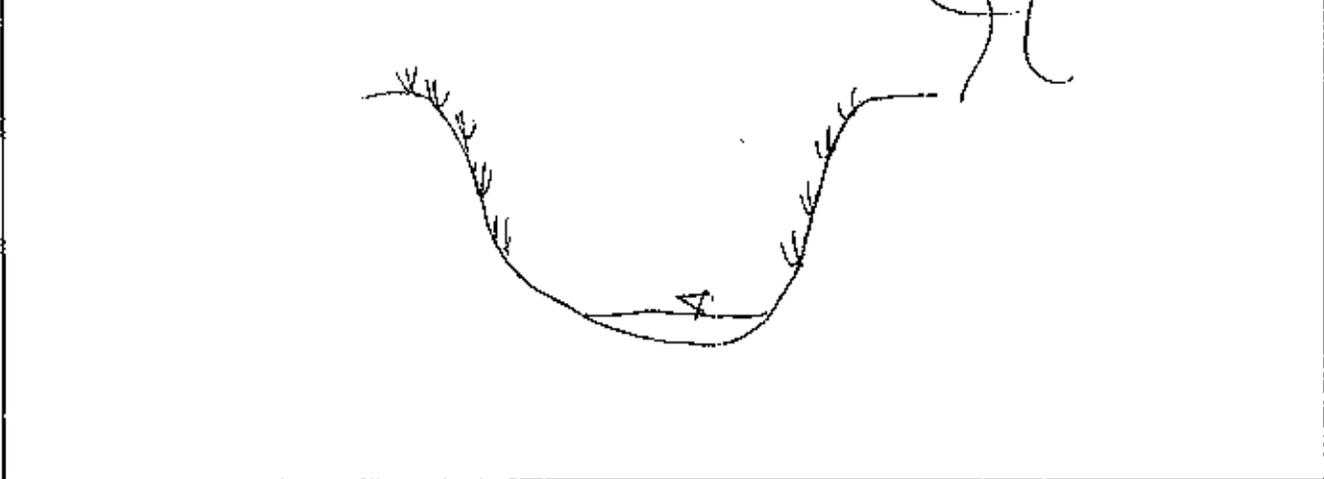
Photolog			
Picture #	Description	Picture #	Description
253	Looking upstream		
254	Downstream		
255	Watercross		
256	unknown plant		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1036 Turbine #



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: S.A. JN			
General Information			
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel# 1826	Turbine # 6E16-3	
Date: July 12/2011	Start time: 16:45	End Time: 17:55	
Weather Conditions: Sunny, slight breeze	Field Notes By: S.A.		
Site Location			
Entered south from Kippen Rd.			
UTM Co-ordinates			
Easting: 445753.	Northing: 4810416	Description: Start of site	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
receives tile drainage from adjacent fields			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	AT (°C):	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µ/cm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m):	Mean Bankfull Width (m):	Moderately unstable	Unstable
Mean Wetted Depth (m):	Mean Bankfull Depth (m):	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description:			
no flow, standing water			
Notes:			
steep well vegetated banks			

Stream Morphology (continued)

Substrate (< = >)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

SA = S

Morphological Structure (%)

Pool	Riffle	Run	Flat

Notes:

None

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				100		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Channel choked w/ cattails

Canopy Cover (% closed cover):

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

Types of Cover (% cover)

- Tree \_\_\_\_\_
- Grasses \_\_\_\_\_
- Shrubs \_\_\_\_\_
- Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other Cattails

Notes:

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

none observed  
- low flow barriers

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Fairly flat

**Terrestrial features Present**

- Yes No
- Yes No

**Terrestrial Recon Form Filled out**

AECOM

July 12/11

G1E16-3

Page 3 of 4

Other General Comments Regarding the Study Area:

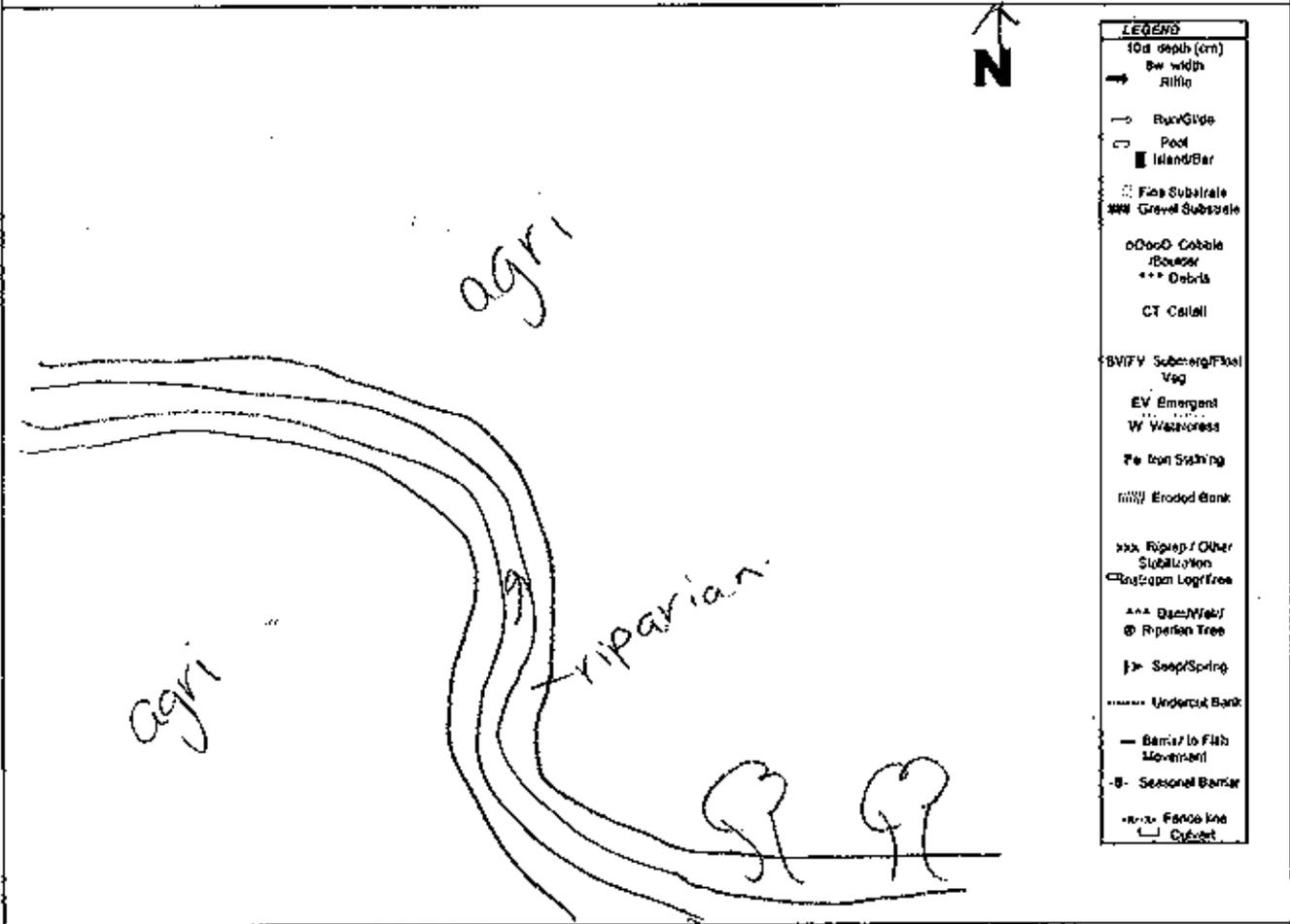
dry channel

## Photolog

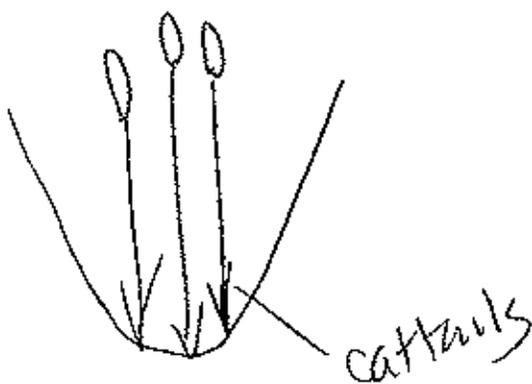
Picture #	Description	Picture #	Description
257	facing d/s		
258	facing u/s		
259	u/s area of reeds & cattails		
260	view of trees & shrubs		
261	facing W overview		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1824 Turbine # 61E 16-3



Horizontal View of Channel



C32

AECOM		Page 1 of 4	
Field Crew: SA, JN		General Information	
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel#: 1853	Turbine #: 6E 16-27	
Date: July 13/2011	Start time: 9:00	End Time: 9:50	
Weather Conditions: Sunny, slight breeze		Field Notes By: SA	
Site Location			
Entered south from Kippen Rd			
UTM Co-ordinates			
Easting: 449406	Northing: 481178	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) - cash crops either side			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 19.1	AT (°C): 16	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 8.2	Cond (µm/cm): 0.63	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: water is a yellow/brown with a sheen on top			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 3.00	Mean Bankfull Width (m): 5.5	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.40	Mean Bankfull Depth (m): 2.0	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: flowing very slow almost stagnant			
Notes: naturalized, channel to high steep banks			

**Stream Morphology (continued)**

**Substrate (< = >)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

**Description**

mk.

Morphological Structure (%)			
Pool	Riffle	Run	Flat
			100

**Notes:**

very slow moving  
lacking morphological structure

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			90			

**\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)**

duckweed

**Canopy Cover (% closed cover):**

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_
- Grasses 5%
- Shurbs \_\_\_\_\_
- Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

**Notes:**

open channel w/ overhanging grasses

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

**Description:**

none observed

**Drainage Features within Study Area**

**Observations of Land Topography within 120 m buffer area:**

fairly flat on both sides

**Terrestrial features Present**

Yes     No

**Terrestrial Recon Form Filled out**

Yes     No

AECOM

July 13/11

GC 16 27

Page 3 of 4

Other General Comments Regarding the Study Area:

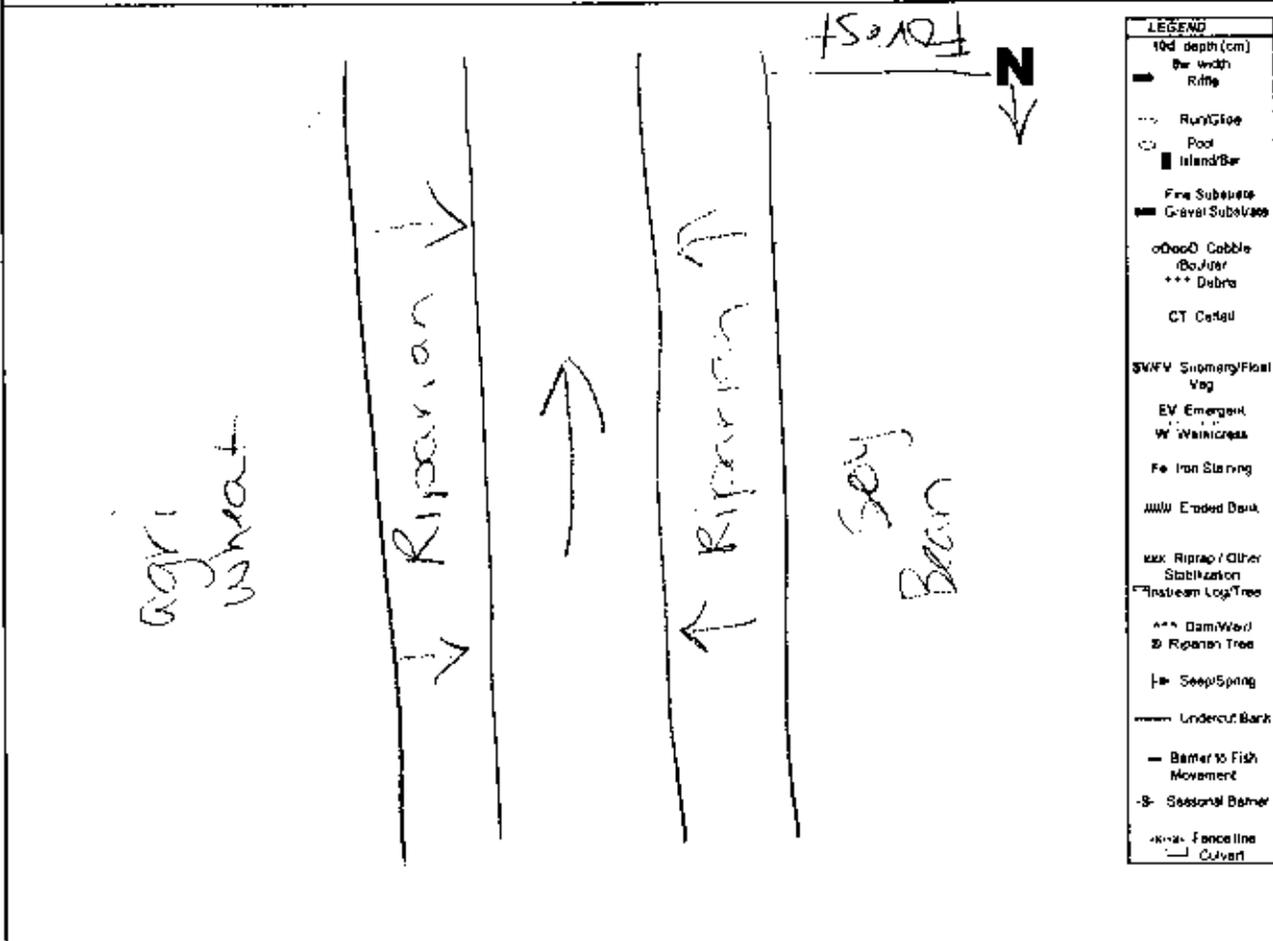
- observed toadpole & heard green frog
- riparian 5.4m wide - all herbaceous + grasses
- fairly straight and uniform

Photolog

Picture #	Description	Picture #	Description
1	overview from west side of stream		
2	facing ups		
3	facing ups		
4	pic of aquatic veg		
5	pool in middle of field - no rain - <sup>depression</sup>		observed lots of water on bank bottom 1.4 feet to 2.2 wet area 30m x 15m
6	view of wheat field where turbine will be		

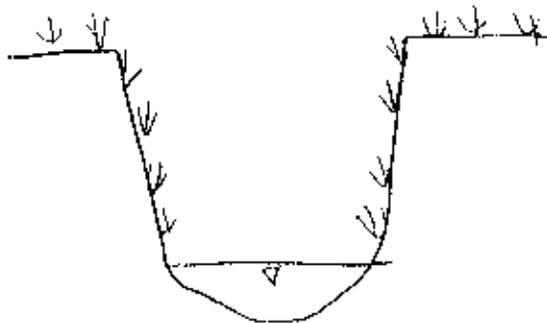
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1853 Turbine # GE16-27



LEGEND	
10d depth (cm)	Bar width
—	Ridge
---	Run/Glaze
○	Pool
■	Island/Bar
○	Fine Substrate
■	Gravel Substrate
○	Cobble Boulder
+	Debris
CT	Canal
SWV	Shoreline/Flot Veg
EV	Emergent
W	Walkcross
Fe	Iron Staking
	Eroded Bank
xxx	Riprap / Other Stabilization
—	Instream Log/Tree
***	Dam/Wall
⊗	Riparian Tree
⊥	Seep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
-S-	Seasonal Barrier
-x-x-	Fence line
□	Culvert

Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: SA, GJF		General Information	
Study Area: Jericho Goshen Bluewater	Land Parcel#: 1823, 1082	Turbine #: C32A	
Date: <del>Nov 3/11</del> Nov 4/11	Start time: 8:46	End Time: 9:07	
Weather Conditions: Sunny	Field Notes By: SA		
Site Location located south of Kippin Rd			
UTM Co-ordinates			
Easting: 449540	Northing: 4811894	Description: C32A	
Easting: 449411	Northing: 4811587	Description: C32B	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) tile drain. noted throughout			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 6°C	AT (°C): 3°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 7.78	Cond (µs/cm): 300	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: green colour cloudy			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 1.70	Mean Bankfull Width (m): 4.0	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.25	Mean Bankfull Depth (m): 0.80	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description: slow - normal flow small, narrow, through small meanders. 0.5m			
Notes: T <sub>0.3</sub> W = 2.5 - 3.0m T <sub>0.3</sub> H = 8m			

**AECOM**

**Stream Morphology (continued)**

**Substrate (< >)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- Mk - Muck
- DT - Detritus
- Other

**Description**

Sa Si

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
10	30	30	

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	/	/	15%	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses

**Canopy Cover (% closed cover):**

- 100-80%
- 90-80%
- 80-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees 1
- Grasses 30
- Shrubs 10
- Herbaceous 10
- Man-made structures 10
- Other \_\_\_\_\_

Notes:

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

none. obs removed

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

relatively flat

Terrrestrial features Present: Yes No

Terrrestrial Recon Form Filled out: Yes No



AECOM

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1853, 1082 Turbine # C32



LEGEND	
100 depth (cm)	
100 width	
R/A	
Run/Gide	
Pool	
Island/Bar	
Fine Substrate	
Graevl Substrate	
oOoo Cobble/Boulder	
*** Depns	
CT Canal	
Subm. Submerg. Plant	
EV Emergent	
W Watercress	
Fa Iron Steing	
mml Eroded Bank	
asa Riprap - Other	
Rebar/chain	
Rebar/Log/Tree	
*** Dam/Well	
o Riparian Tree	
W Sewer/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Bank	
Fence line	
Subject	

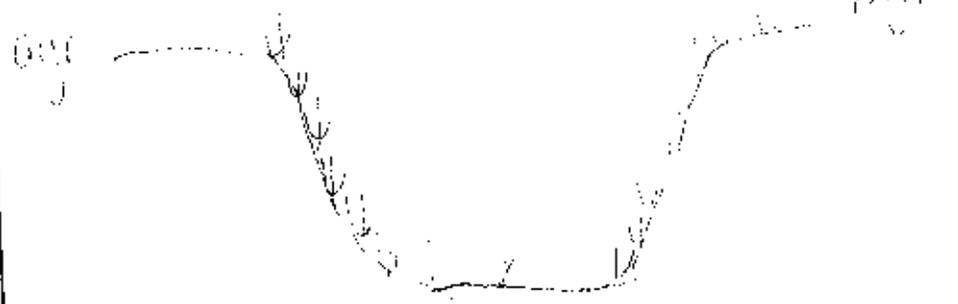
Kippen

agri

Riparian

agri

Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> and Parcel#	Turbine # <u>BLW-T1-North</u>	Date: <u>July 29/11</u>	Start time: <u>8:00</u> End Time:		
Weather Conditions: <u>Rain</u>	Field Notes By: <u>CB</u>				
Site Location					
<u>Centennial Rd - east of Babylon</u>					
UTM Co-ordinates					
Eastings: <u>1705917</u>	Northing: <u>4816211</u>	Description: <u>Culvert</u>			
Eastings:	Northing:	Description:			
Eastings:	Northing:	Description:			
Eastings:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u>- flowing at bank full</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C):	AT (°C):	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond (µs/cm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>w/g done on South side.</u>					
Stream Morphology					
Site Length (m): <u>100m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>2</u>	Mean Bankfull Width (m): <u>2</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.5</u>	Mean Bankfull Depth (m): <u>0.5</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description:					
<u>fast flowing, flowing at bank full due to rain event in morning</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

water  
-> too deep to observe substrate

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
		100	

## Instream Cover (%)

50

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	20			10	20	Shrubs - 50

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

80-30%

## Types of Cover (% cover)

Trees

Shrubs

100

Man-made structures

Grasses

Herbaceous

Other

Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

none - flat topography

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

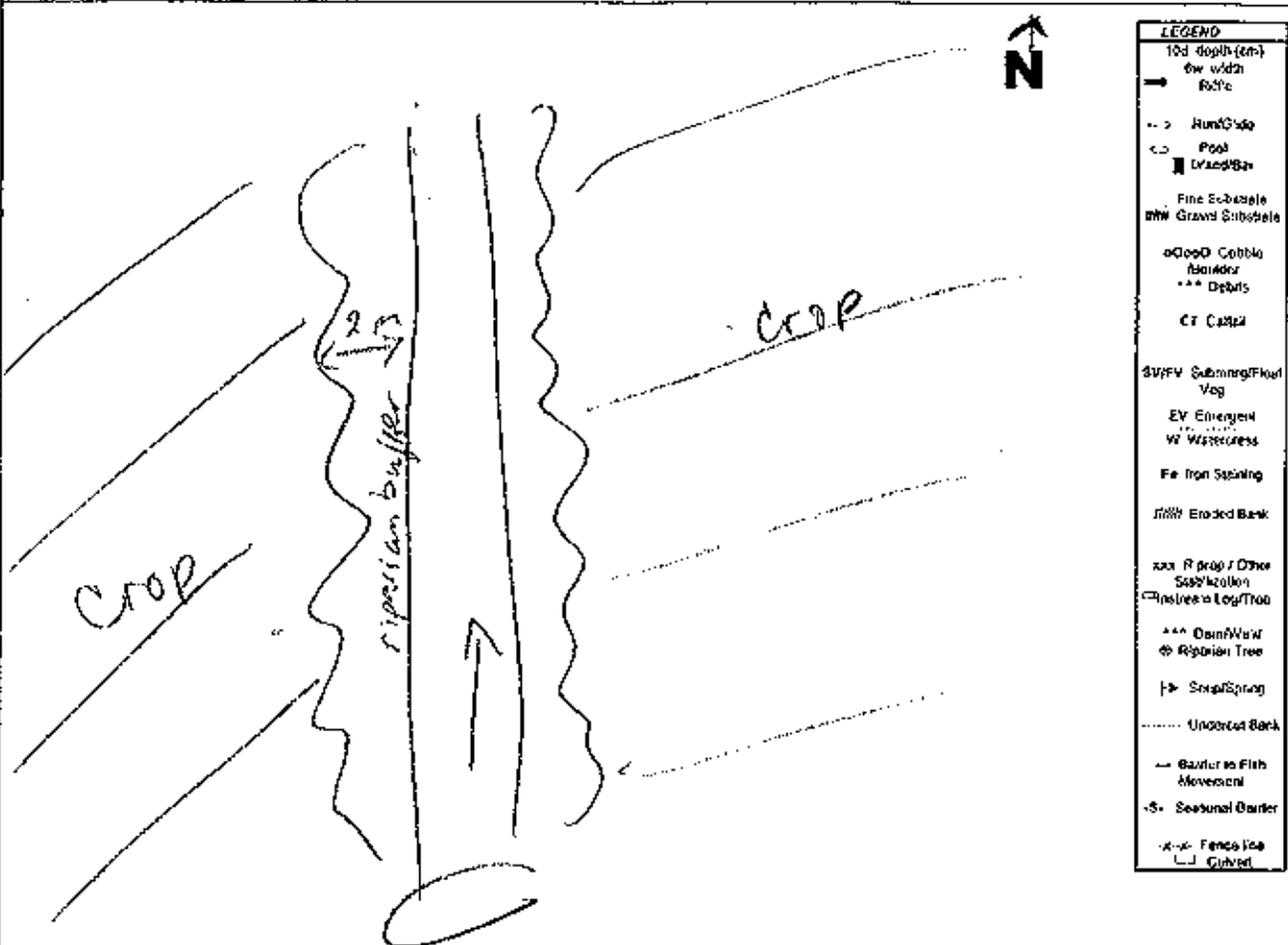
Yes

No

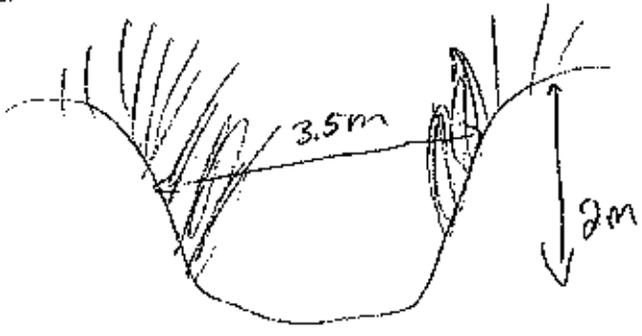


Watercourse Sketch

Study Area: Jericho Goshan Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW T1-North



Horizontal View of Channel





AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Transect# <u>BLWT7 - South</u>				
Date: <u>July 29/11</u>	Start time: <u>8:00</u>	End Time:			
Weather Conditions: <u>Overcast</u>	Field Notes By: <u>CB</u>				
Site Location <u>Centennial Ln east of Babylon</u>					
UTM Co-ordinates					
Easting: <u>0450917</u>	Northing: <u>4816211</u>	Description: <u>South culvert</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>- none noted.</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>21.1</u>	AT (°C):	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>7.59</u>	Cond (µs/cm): <u>0.38</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>brown, silty</u>					
Stream Morphology					
Site Length (m): <u>~40m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>2</u>	Mean Bankfull Width (m): <u>2</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.5</u>	Mean Bankfull Depth (m): <u>0.5</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>fast flow, flowing in bankfull due to large rain event in the morning</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

-- not possible  
→ water too high

Notes:

## Morphological Structure (%)

Pool	Rifle	Run	Flat
		100	

Instream Cover (%) **50** Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	30			10	<del>10</del>	Shrubs. 50

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

Shrubs

100

Man-made structures

Grasses

Herbaceous

Other

Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

None noted.

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 29/11

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## Other General Comments Regarding the Study Area:

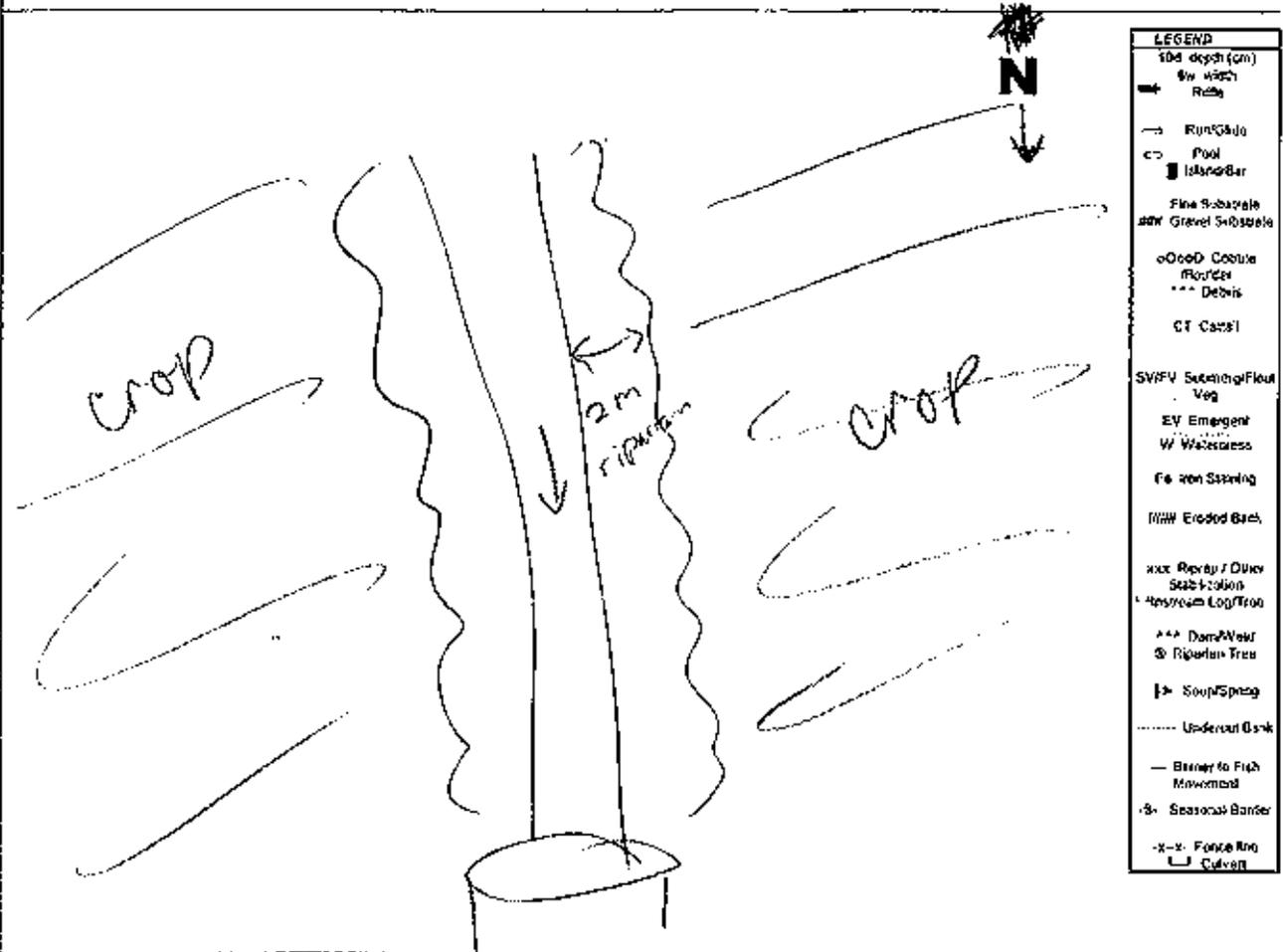
- 2m culvert → water flowing through - not a fish barrier
- frog noted

## Photo log

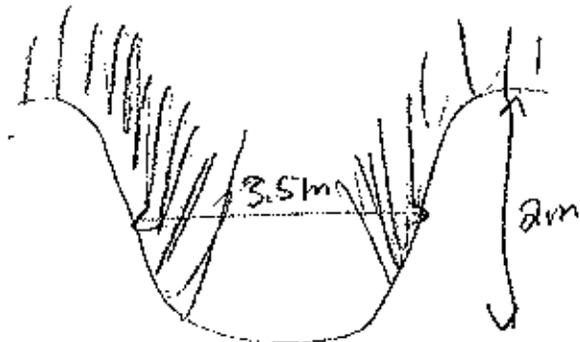
Picture #	Description	Picture #	Description
1	South - looking up/s		
2			
3	North - down/s		
4	v		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# \_\_\_\_\_ Turbine# BLW-TJ-South



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	TURKIN# BLW 02 - North				
Date: July 29/11	Start time: 8:32	End Time:			
Weather Conditions: Rain	Field Notes By: CB				
Site Location Centennial Rd. - west of Parr Ln.					
UTM Co-ordinates					
Eastings: 0451166	Northings: 4816242	Description: North culvert			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/> W	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>		
Forest <input checked="" type="checkbox"/> W	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
In-Situ Water Quality		Ground Water Indicators			
WT (°C):	AT (°C):	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond (scm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: brown, cloudy, w/p done on south side.					
Stream Morphology					
Site Length (m): 600m	Bank Stability:				
Channel Dimensions:		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 3.5	Mean Bankfull Width (m): 3.5	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.5	Mean Bankfull Depth (m): 0.5	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: -fast flowing, flowing at bankfull					
Notes:					
-well vegetated					

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MC - Muck
- DT - Detritus
- Other

Description  
- water too deep

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
		100	

Habitat

Instream Cover (%) 10

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				100		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- emergent grasses

Canopy Cover (% closed cover):

- 100-90%
- 30-1%
- 90-80%
- 0%
- 60-30%

Types of Cover (% cover)

- Trees 70
- Shrubs 20
- Grasses 10
- Herbaceous
- Man-made structures
- Other

Notes:

Obstructions to Fish Passage

- No Obstructions
- Man-Made
- Natural

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

none noted - flat topography

Terrestrial features Present

Yes

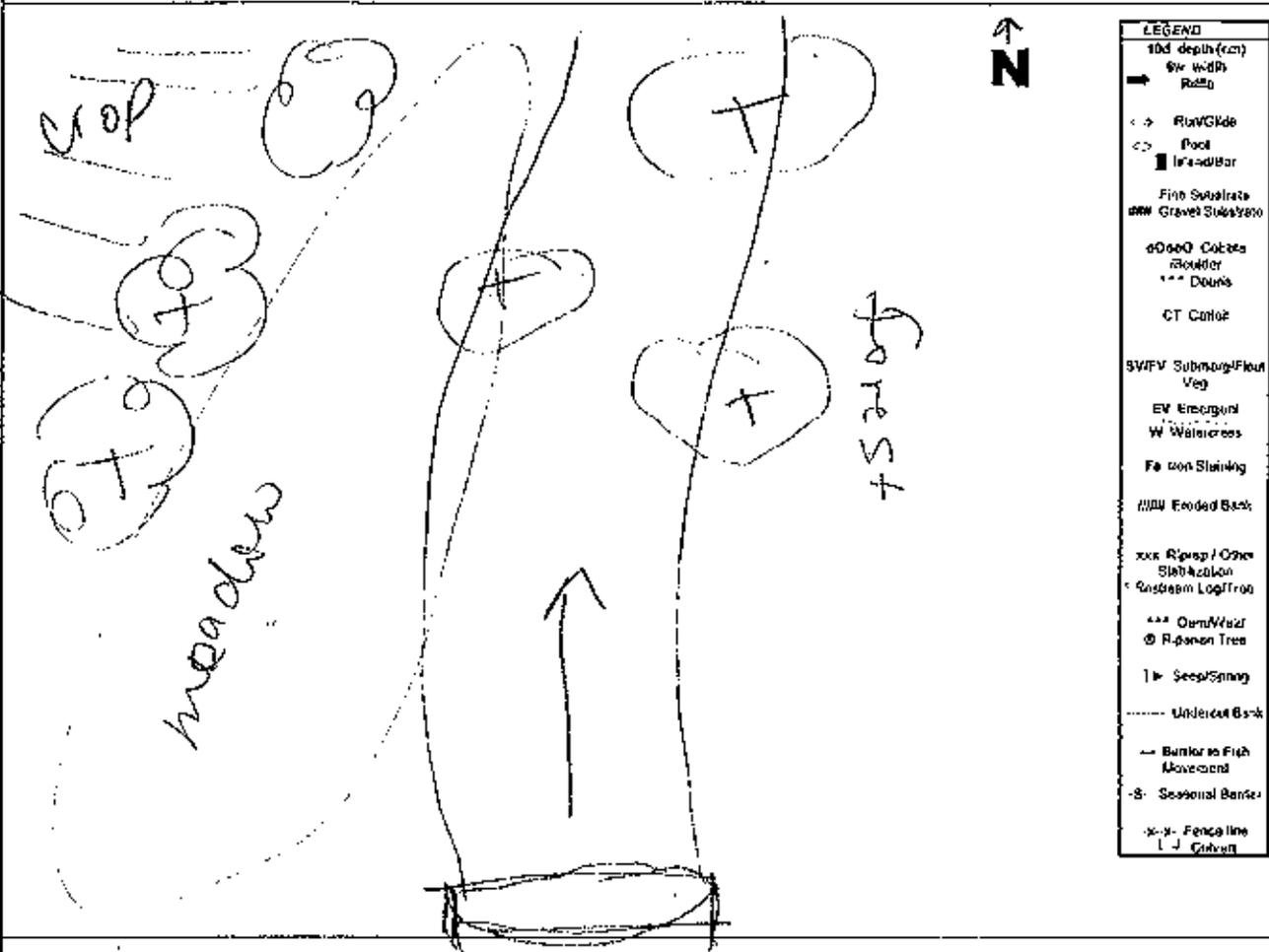
Terrestrial Recon Form filled out

Yes  No

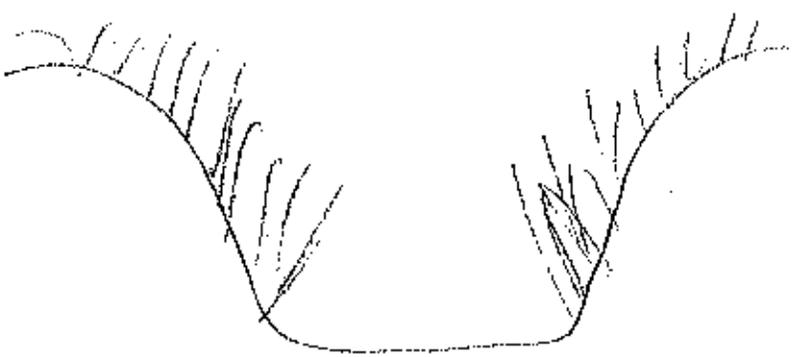


Watercourse Sketch

Study Area: Jericho Goshen Bluewater Band Parcel# Turbine # BW-72 North



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: <u>CR, AB</u>		General Information	
Study Area: <u>Jaricho Goshen Bluewater</u>	Land Parcel#	Turbine #	<u>BLW-T2 south</u>
Date: <u>July 29, 2011</u>	Start time: <u>8:32</u>	End Time:	
Weather Conditions: <u>rain, overcast</u>	Field Notes By: <u>A. Datt</u>		
Site Location <u>south of Centennial, east of Babylon</u>			
UTM Co-ordinates			
Eastings: <u>0451172</u>	Northings: <u>4816248</u>	Description: <u>From road</u>	
Eastings:	Northings:	Description:	
Eastings:	Northings:	Description:	
Eastings:	Northings:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>None observed.</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>20.3</u>	AT (°C): <u>18</u>	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>7.05</u>	Cond (µs/cm): <u>0.52</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: <u>Due to rain, water high &amp; turbid</u>			
Stream Morphology			
Site Length (m): <u>~80m visible from road</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>4.0</u>	Mean Bankfull Width (m): <u>4.0</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.67</u>	Mean Bankfull Depth (m): <u>0.67</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Fast flow @ bankfull width</u>			
Notes: <u>NO culvert, just concrete bridge</u> 			

AECOM

Page 2 of 4

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Due to high flow  
no data collected  
for substrate.

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Fiat
	100		

Habitat

Instream Cover (%)

20

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	15			5		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Emergent

Canopy Cover (% closed cover):

100-90%

30-1%

90-80%

0%

60-30%

Types of Cover (% cover)

Trees

40

Shrubs

60

Man-made structures

Grasses

Herbaceous

Other

Notes:

Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

flat crop field to west  
flat field to east

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

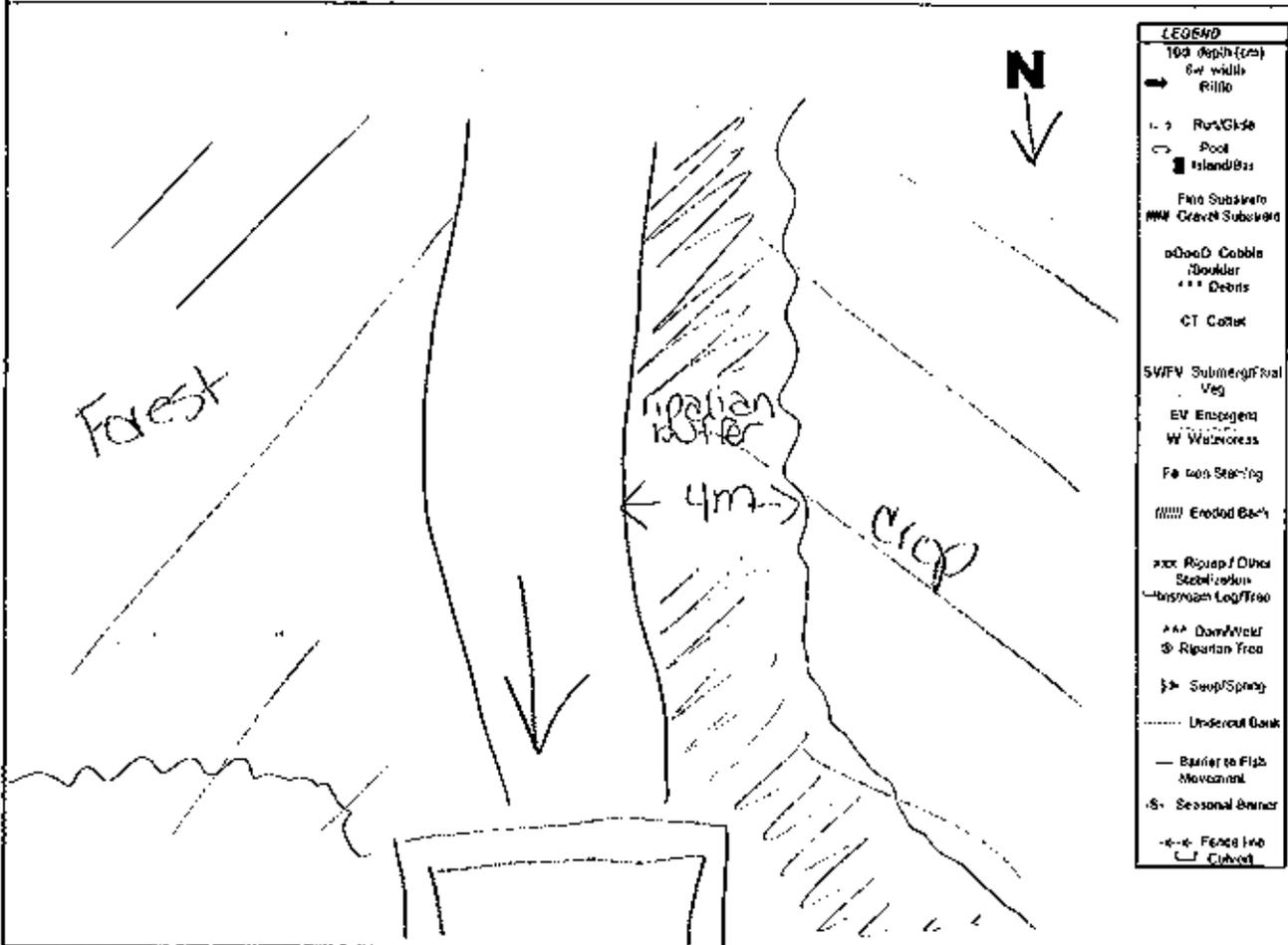
LLC completed



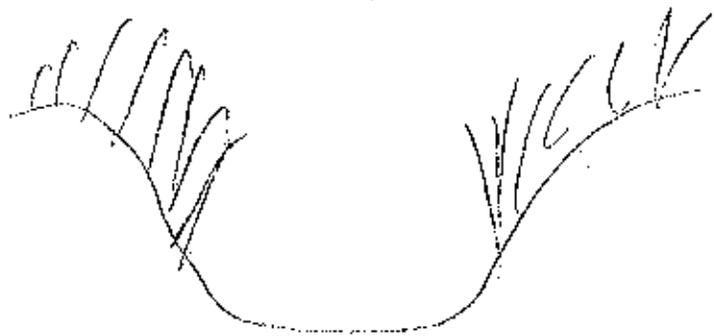
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BW12-South



Horizontal View of Channel





Stream Morphology (continued)

Substrate (<=>)

- Bb - Boulder
- Cb - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

- not possible

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
		100	

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobbles	Aquatic Vegetation*	Undercut Bank	Other:
	none noted				- none noted	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Note -> water too turbid to observe + too deep to enter stream

Canopy Cover (% closed cover):

- 100-90%  30-1%
- 90-80%  0%
- 60-30%

Types of Cover (% cover)

- Trees 50
- Shrubs 40
- Grasses
- Herbaceous 70
- Man-made structures
- Other

Notes:

Obstructions to Fish Passage

- No Obstructions  Man-Made
- Natural

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- flat but gullies noted

Terrestrial features Present

Yes  No

Terrestrial Recon Form Filled out

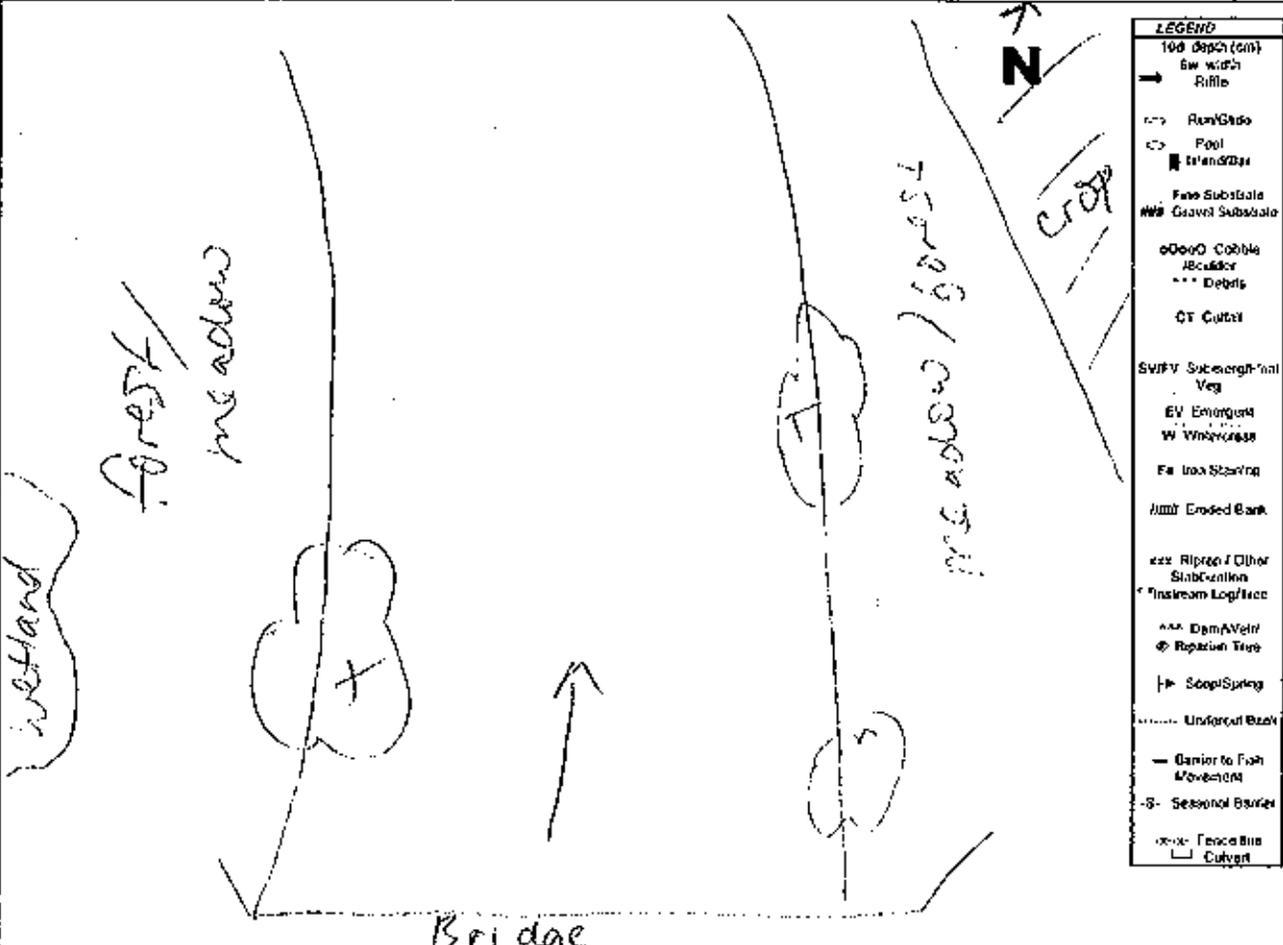
Yes  No



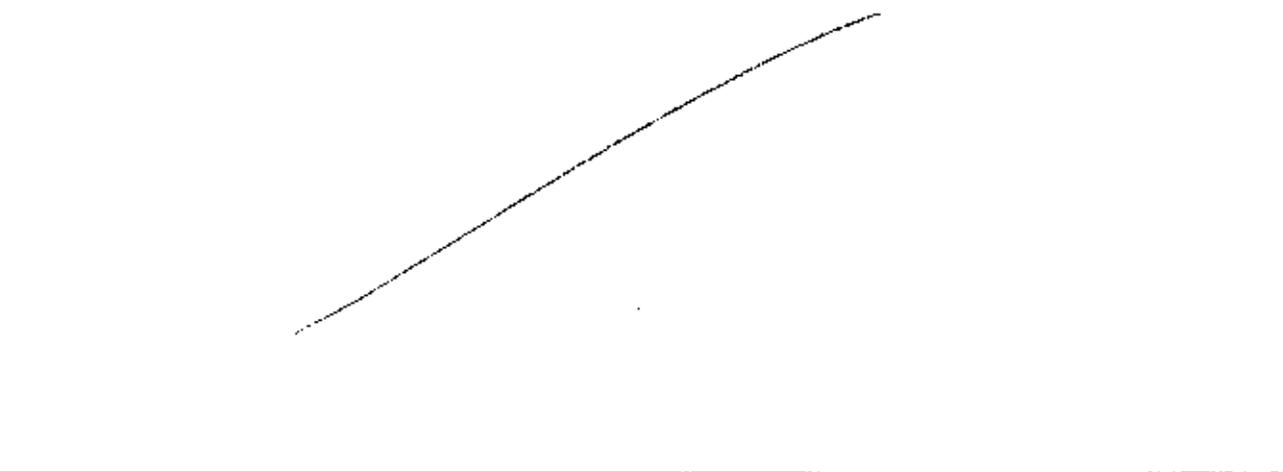
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW T3 North



Horizontal View of Channel



AECOM		Page 1 of 4	
		Field Crew:	
General Information			
Study Area:	Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine #	BW-T3 south
Date:	July 29, 2011 Start time: 8:52	End Time:	
Weather Conditions: rain + overcast		Field Notes By: A. Datt	
Site Location			
Centennial rd → east of Bannockburn rd.			
UTM Co-ordinates			
Eastings:	0454570	Northing:	4816725
Description:		Road	
Eastings:		Northing:	
Description:			
Eastings:		Northing:	
Description:			
Eastings:		Northing:	
Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
GW seeps on west/south side from ECC down road runoff under bridge			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	21.9	AT (°C):	18
pH:	7.1	Cond (µs/cm):	025
Water Clarity:	Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	
		Watercress <input type="checkbox"/>	
		Bank Seepage <input type="checkbox"/>	
		Iron Staining <input checked="" type="checkbox"/>	
		None <input type="checkbox"/>	
		Bubbling <input type="checkbox"/>	
		Other <input type="checkbox"/>	
Notes: Due to rain water level high + turbid.			
Stream Morphology			
Site Length (m):	100m visible from road		
Channel Dimensions		Bank Stability:	
Mean Wetted Width (m):	15	Mean Bankfull Width (m):	17
Mean Wetted Depth (m):	NA	Mean Bankfull Depth (m):	NA
		Left Bank	Stable <input checked="" type="checkbox"/> Slightly unstable <input type="checkbox"/> Moderately unstable <input type="checkbox"/> Unstable <input type="checkbox"/>
		Right Bank	Stable <input checked="" type="checkbox"/> Slightly unstable <input type="checkbox"/> Moderately unstable <input type="checkbox"/> Unstable <input type="checkbox"/>
Flow Description:			
fast flow almost bankfull width			
Notes:			
Bridge			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Debris  
Other

## Description

Due to rain,  
unable to observe

Notes:

## Morphological Structure (%)

Pool	Rifle	Run	Flat
		100	

## Instream Cover (%)

20

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10			10		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

water lilies, grasses, shrubs

## Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



60-30%



## Types of Cover (% cover)

0% 30% 10%

Trees

50

Shrubs

50

Grasses

Herbaceous

Man-made  
structures  
Other

Notes:

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Shallow slope west side  
Flat on east side in crop  
field, but steep slope  
near road on east side.

Terrestrial features Present

Yes

No

Terrestrial Recon Form filled out

Yes

No

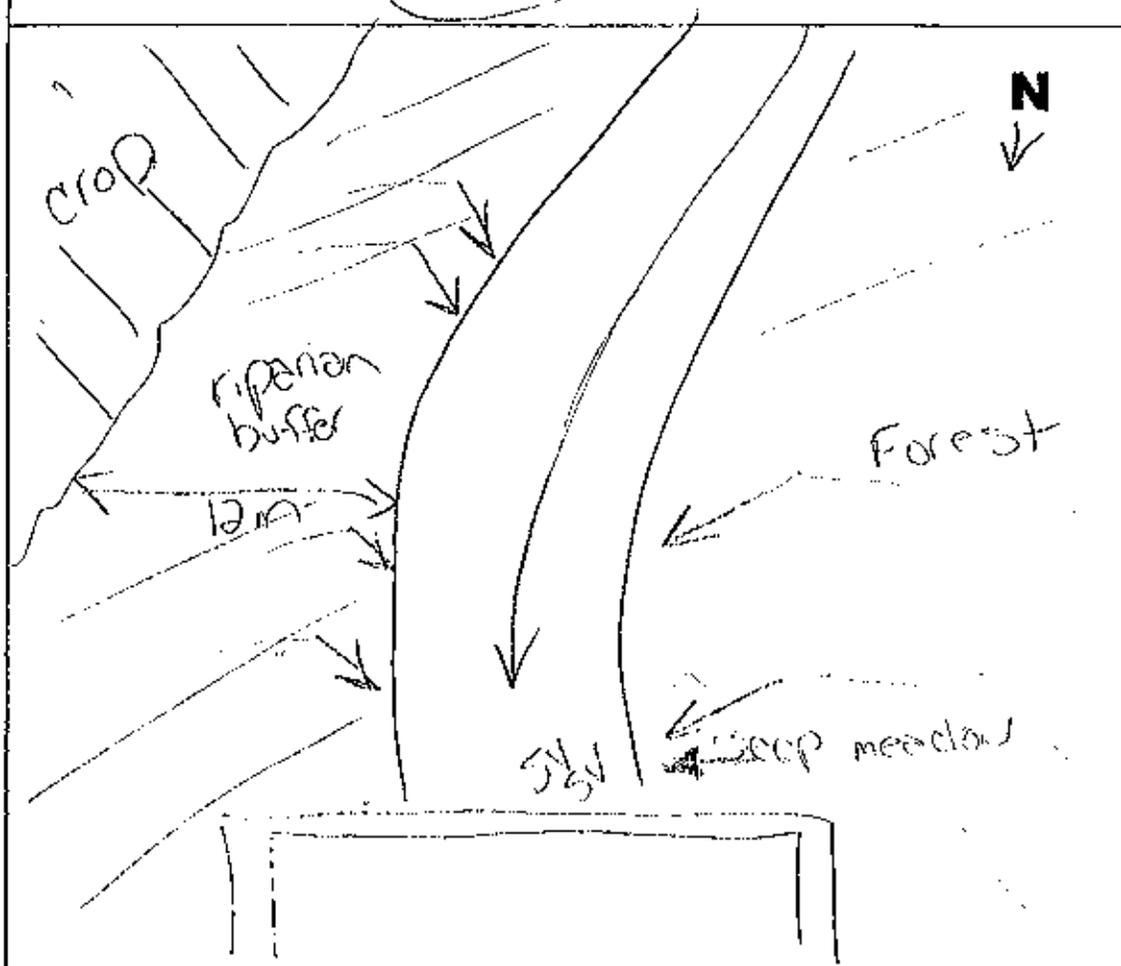
ETC completed



Watercourse Sketch

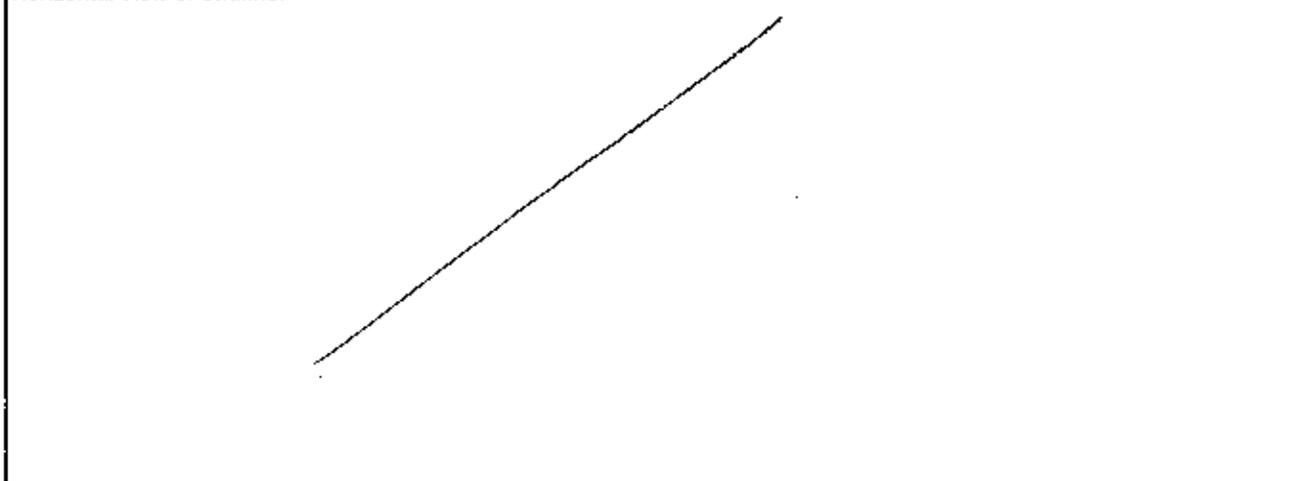
Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-10 SOUTH



LEGEND	
10d	depth (cm)
sw	width
—	Rillio
→	Run/Grade
○	Pool
■	Manure
—	Fine Substrate
—	Gravel Substrate
○	Cobble
—	Bar/ber
***	Debris
CT	Culvert
SWFV	Submerged/Vegetation
EV	Emergent
W	Wetland
Fe	Iron Staining
	Endog/Bra
xxx	Riprap / Other Substrate
—	Log/Trou
***	Down/Wall
○	Reproduction Tree
→	Deep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
-S-	Seasonal Barrier
—	Fence line
—	Culvert

Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AP		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BLW</u>	Date: <u>July 29/11</u> Start time: <u>9:15</u> End Time: <u>12:45</u>			
Weather Conditions: <u>Rain</u>	Field Notes By: <u>CB</u>	Site Location: <u>Conestoga - just east of London rd.</u>			
UTM Co-ordinates					
Easting: <u>0458898</u>	Northing: <u>4817358</u>	Description: <u>road side - mid-site of site</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other: <u>Road</u>					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u>road runoff - gullies noted at culverts</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>/</u>	AT (°C): <u>/</u>	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>/</u>	Cond ( $\mu$ cm): <u>/</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: <u>Clear</u> <input checked="" type="checkbox"/>	<u>Turbid</u> <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>w/b south side</u>		<u>(w) found throughout site</u>			
Stream Morphology					
Site Length (m): <u>150</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>0.5</u>	Mean Bankfull Width (m): <u>0.5</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.20</u>	Mean Bankfull Depth (m): <u>0.3</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>slow flow, flowing just below bankfull</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Cl, Si &gt; muck &gt; Co/Gr

Notes:

## Morphological Structure (%)

Pool	Rifle	Run	Flat
		100	

## Instream Cover (%)

65

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			20	80		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- grasses, cattails, sedges, etc

## Canopy Cover (% closed cover):

100-80%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

Herbaceous

Other

100

## Notes:

banks veg w grasses providing cover

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



## Description:

water flowing through culvert at the time

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- gutters @ culverts

## Terrestrial features Present

Yes

NO

## Terrestrial Recon Form filled out

Yes

NO

July 29/11

AECOM

BCW-74 N

Page 3 of 4

Other General Comments Regarding the Study Area:

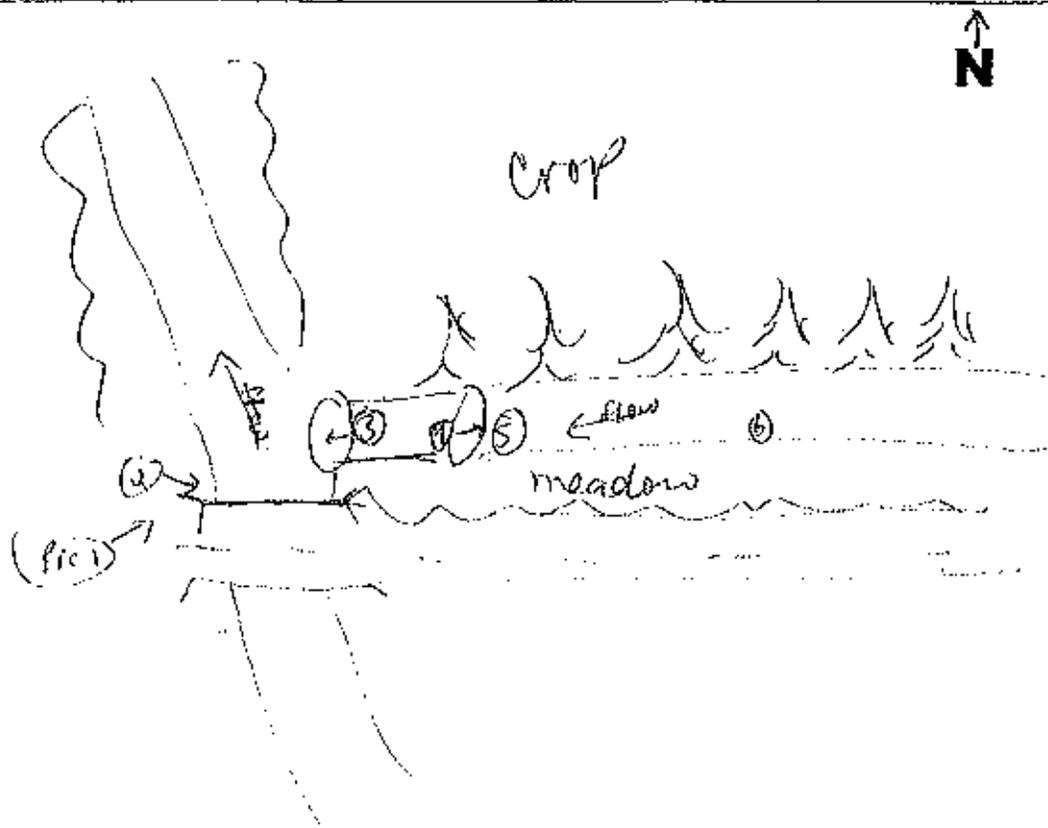
## Photo log

Picture #	Description	Picture #	Description
1	* See map		
2			
3			
4			
5			

Watercourse Sketch

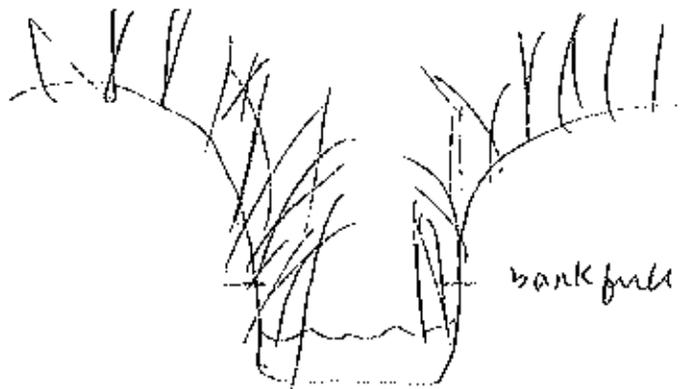
Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-T4 North



LEGEND	
10d depth (cm)	
5w width	
Flow	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Coarse Cobble	
Sandbar	
Drift	
CY Canal	
BWFW Submergible	
Vegetation	
EV Emergent	
W Watercress	
Fs Iron Staining	
Eroded Bank	
Rock Riprap / Other Stabilization	
Instream Log/Tree	
Deciduous	
Coniferous Tree	
Slope/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence line	
Culvert	

Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew:		General Information	
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BLW-T4 South</u>	Date: <u>July 29, 2011</u>	Start time: <u>9:15</u> End Time:
Weather Conditions: <u>light rain</u>	Field Notes By: <u>A. Dart</u>	Site Location	
<u>Centennial road, east of London.</u>			
UTM Co-ordinates			
Easting: <u>0158819</u>	Northing: <u>4817334</u>	Description: <u>road</u>	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>None observed. (drainages)</u> <u>WC on RB south side ~ 2-4m stretch</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>19.9</u>	AT (°C): <u>18</u>	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>7.04</u>	Cond (µm/cm): <u>0.45</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input checked="" type="checkbox"/>
Notes: <u>medium flow, turbid due to rain.</u>			
Site Length (m): <u>~50m</u>		Stream Morphology	
Channel Dimensions		Bank Stability:	
Mean Wetted Width (m): <u>~1.0m</u>	Mean Bankfull Width (m): <u>3.0m</u>	Stable	Slightly unstable
Mean Wetted Depth (m): <u>~0.50</u>	Mean Bankfull Depth (m): <u>~</u>	Moderately unstable	Unstable
Left Bank		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Right Bank		<input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description:			
<u>medium-flow, flow north</u>			
Notes:			
<u>Cement bridge in bad shape.</u>			

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Due to precip, unable to observe

Morphological Structure (%)

Pool	Riffle	Run	Flat
10		90	

Notes:

Pooling LB by food.

Instream Cover (%)

95

Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				95		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Arrowweed, watercress, grasses w/in channel

Canopy Cover (% closed cover):

- 100-90%
- 90-80%
- 80-70%

- 30-1%
- 0%

Types of Cover (% cover)

- Trees
- Grasses 90
- Shrubs 10
- Herbaceous

- Man-made structures
- Other

Notes:

grasses, shrubs

Obstructions to Fish Passage

- No Obstructions
- Natural

- Man-Made

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat crop land  
~45° slopes @ banks

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

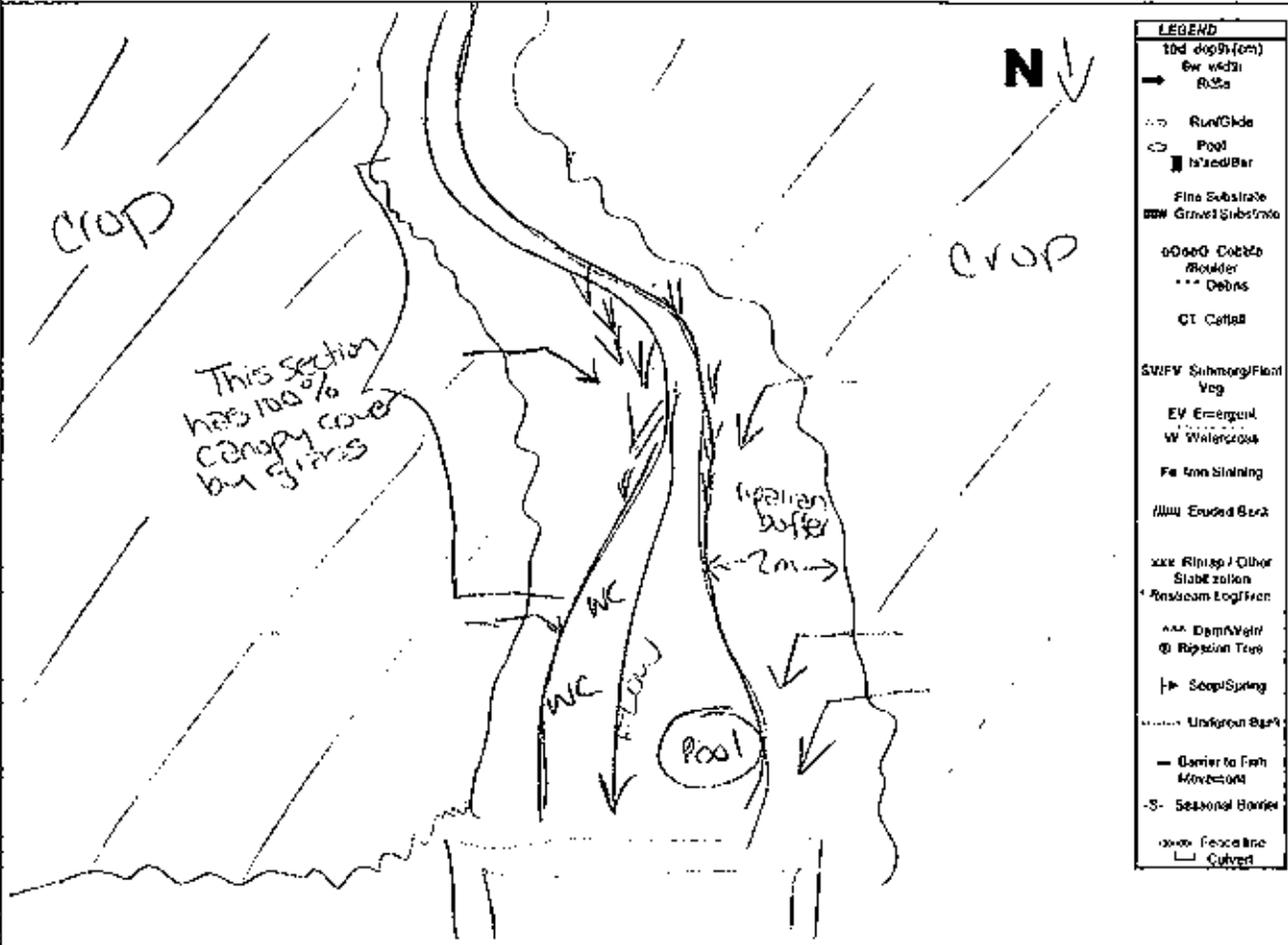
No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW 74 - South



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BLW 15 - NORTH</u>	Date: <u>July 29/11</u>	Start time: <u>9:45</u> End Time:		
Weather Conditions: <u>Rain</u>	Field Notes By: <u>CB</u>	Site Location			
<u>Centennial Rd - East of London Rd.</u>					
UTM Co-ordinates					
Easting: <u>0459645</u>	Northing: <u>4817469</u>	Description: <u>road side</u>			
Easting:	Northing:	Description:			
Easting:	Northing: <u>/</u>	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input checked="" type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u>- gullies next to culvert</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>20</u>	AT (°C): <u>18°</u>	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>7.05</u>	Cond (µs/cm): <u>0.53</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes:					
Stream Morphology					
Site Length (m): <u>50m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>2</u>	Mean Bankfull Width (m): <u>3</u>	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.15</u>	Mean Bankfull Depth (m): <u>0.25</u>	Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>fast flowing, flowing just below bankfull</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

g &gt; &gt;&gt; co &gt; cl, si

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
15	15	70	

## Habitat

Instream Cover (%) 50

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	30	<del>10</del> 10	20	40		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- grasses

## Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

90

Shrubs

10

Man-made structures

Grasses

Herbaceous

Other

Notes:

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:



Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

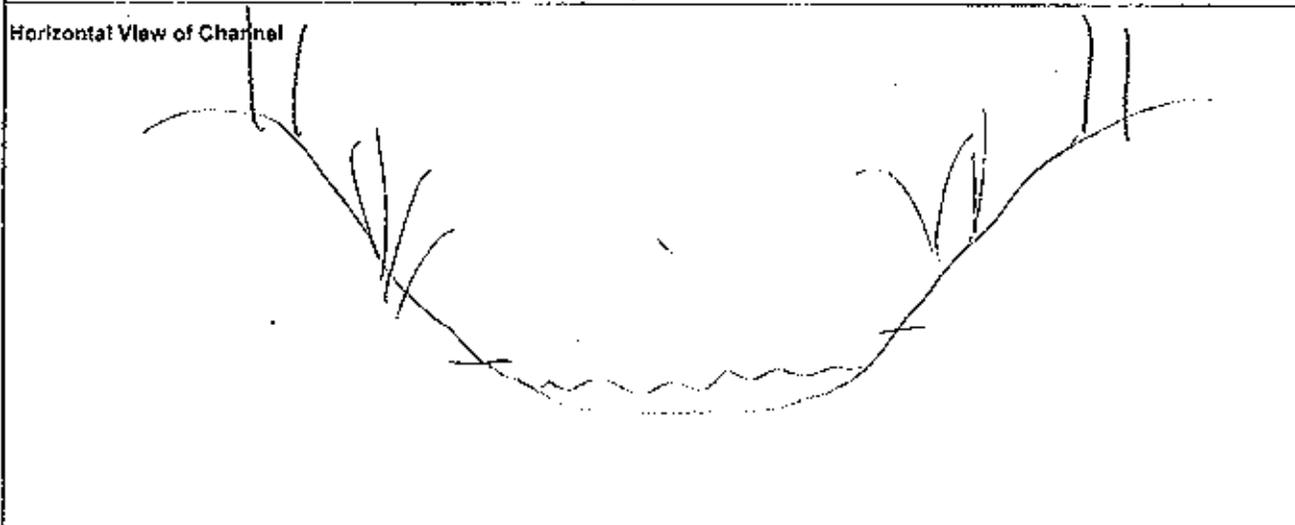
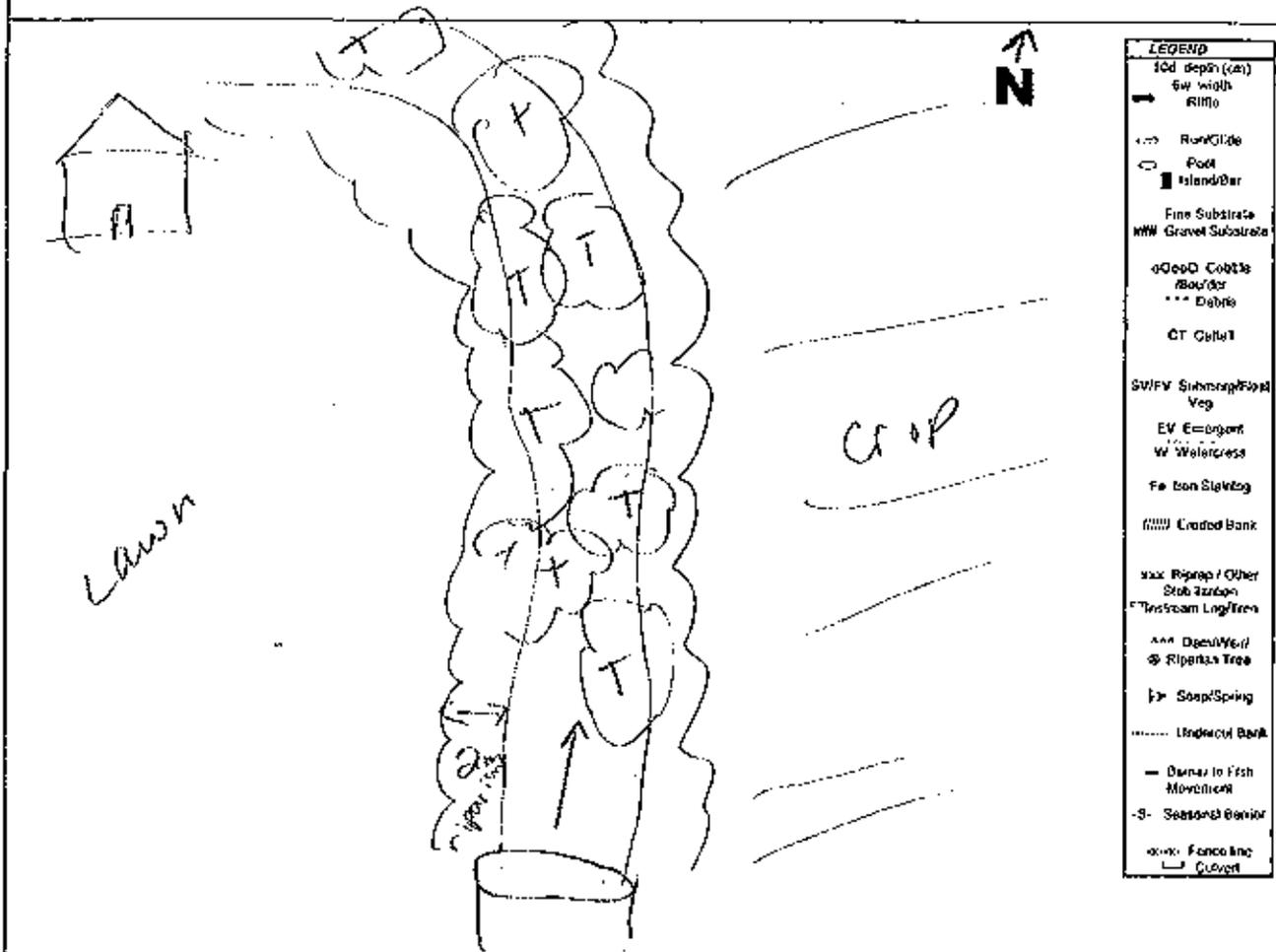
Yes

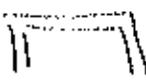
No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW T5 North



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel#	Turbine #	BLWTS - south		
Date: July 29, 2011	Start time: 9:45	End Time:			
Weather Conditions: rain this morning	Field Notes By: A. Dard				
Site Location					
East of London rd, on Centennial rd					
UTM Co-ordinates					
Easting: 0459667	Northing: 4817463	Description: Road			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
Channelized through farm field No inputs seen @ road Juncoweed on L.S. (west)					
In-Situ Water Quality		Ground Water Indicators			
WT (°C):	AT (°C): 20	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond (µscm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: * BLWTS - north sheet - water quality - Minnows observed					
Stream Morphology					
Site Length (m): ~50m	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 1.5	Mean Bankfull Width (m): 2.5	Left Bank <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.10	Mean Bankfull Depth (m): 0.30	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: Medium flow, slightly cloudy					
Notes: Concrete bridge  in bad shape, rebar protruding					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Gr &gt; Co &gt; Sa

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
10	10	40	40

## Instream Cover (%)

60

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10		40	10		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses with channel

## Canopy Cover (% closed cover):

100-80%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

70

Shrubs

10

Grasses

10

Herbaceous

10

Man-made structures

Other

## Notes:

Riparian buffer canopy cover (trees)

## Obstructions to Fish Passage

No Obstructions  
Natural

Man-Made



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat topography  
in field & forest  
bank slopes almost 90%

## Terrestrial features Present

Yes



No

Terrestrial Recon Form Filled out

Yes



No

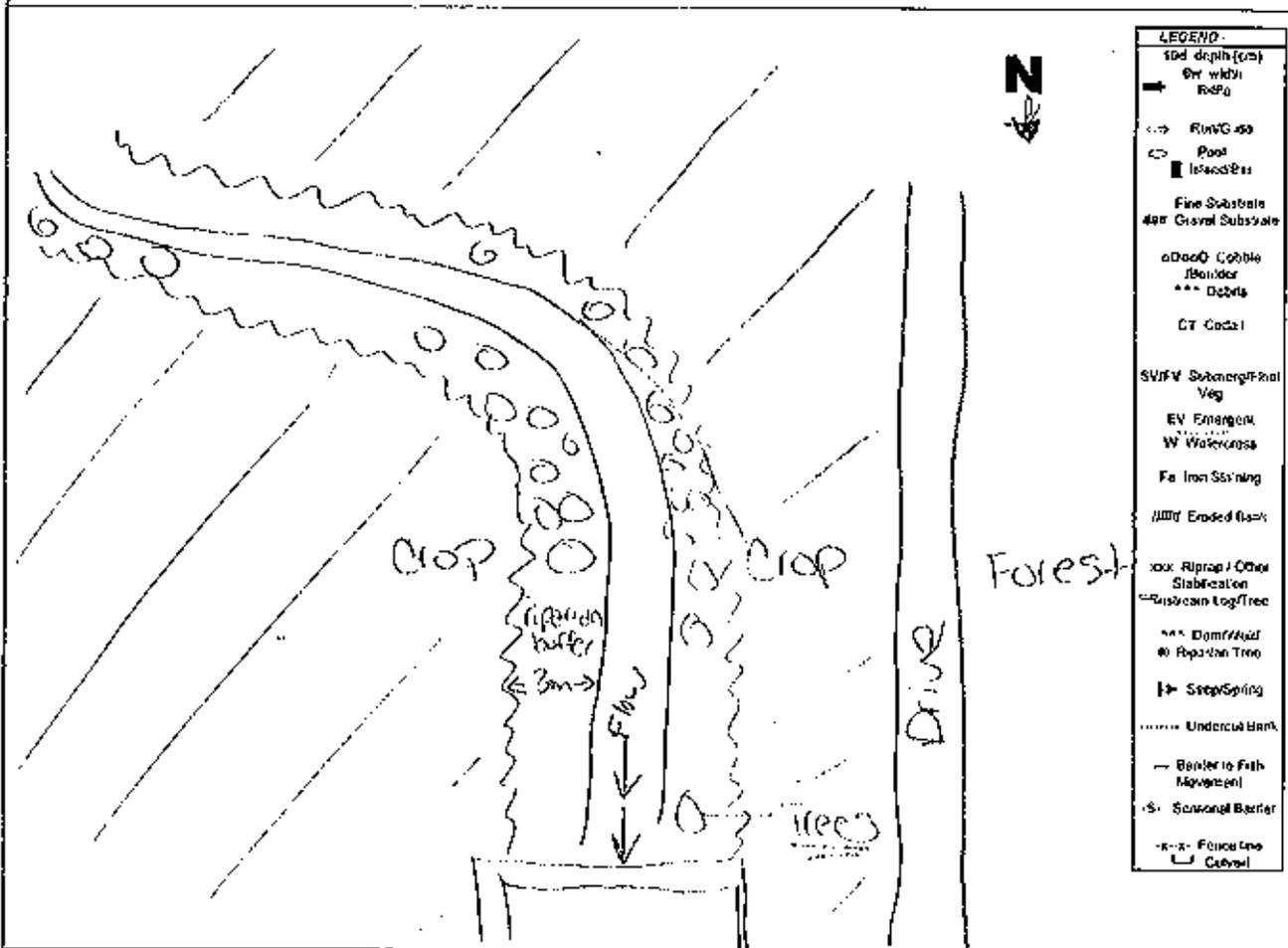
EIC conducted previously  
in forest to the west  
of channel



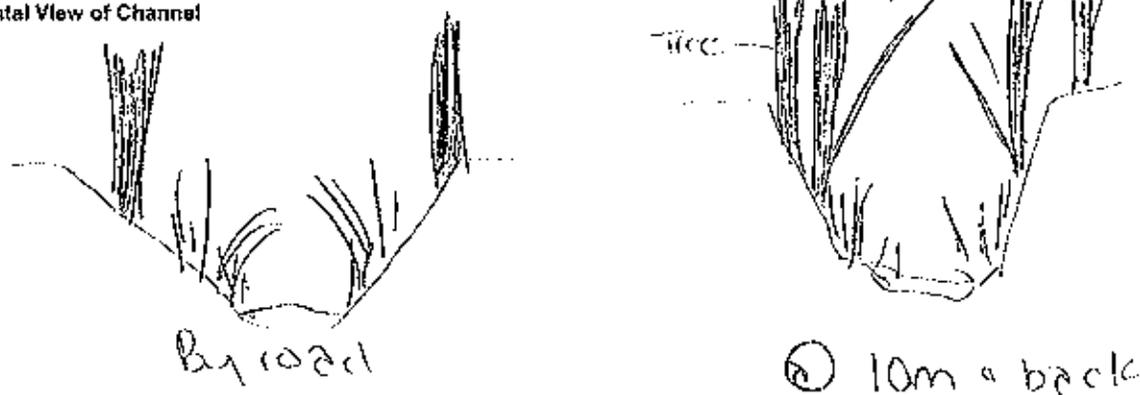
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-T5-South



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine #	BLW-TK-North			
Date: July 29/04	Start time: 10:11	End Time:			
Weather Conditions: Rain, 18°C	Field Notes By: CB				
Site Location Centennial + Division Rd.					
UTM Co-ordinates					
Easting: 0460325	Northing: 4817927	Description: stream bed - with side			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) - Road drainage.					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): 21.4	AT (°C): 22°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: 7.05	Cond (µs/cm): 0.47	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: Slightly turbid					
Stream Morphology					
Site Length (m): 50m	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 2	Mean Bankfull Width (m): 3	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.25	Mean Bankfull Depth (m): 0.4	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: moderate flow, just below bank full					
Notes:					

Stream Morphology (continued)

Substrate (<=>)

- Bs - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - S&L
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

nk > bs > sa, cl

~~bs > sa > cl~~

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
		100	

Habitat

Instream Cover (%)

40

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	100	possible	/	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

overhangs provide habitat cover

Canopy Cover (% closed cover):

100-90%

30-1%

90-80%

0%

60-30%

Types of Cover (% cover)

Trees

Shrubs

100

Man-made structures

Grasses

Herbaceous

Other

Notes:

well veg banks - shrubs + grasses

Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

/

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 29/11

BLW-T6-Nor<sup>th</sup> Page 3 of 4

Other General Comments Regarding the Study Area:

- fish skewed in culvert

- ~6m box culvert

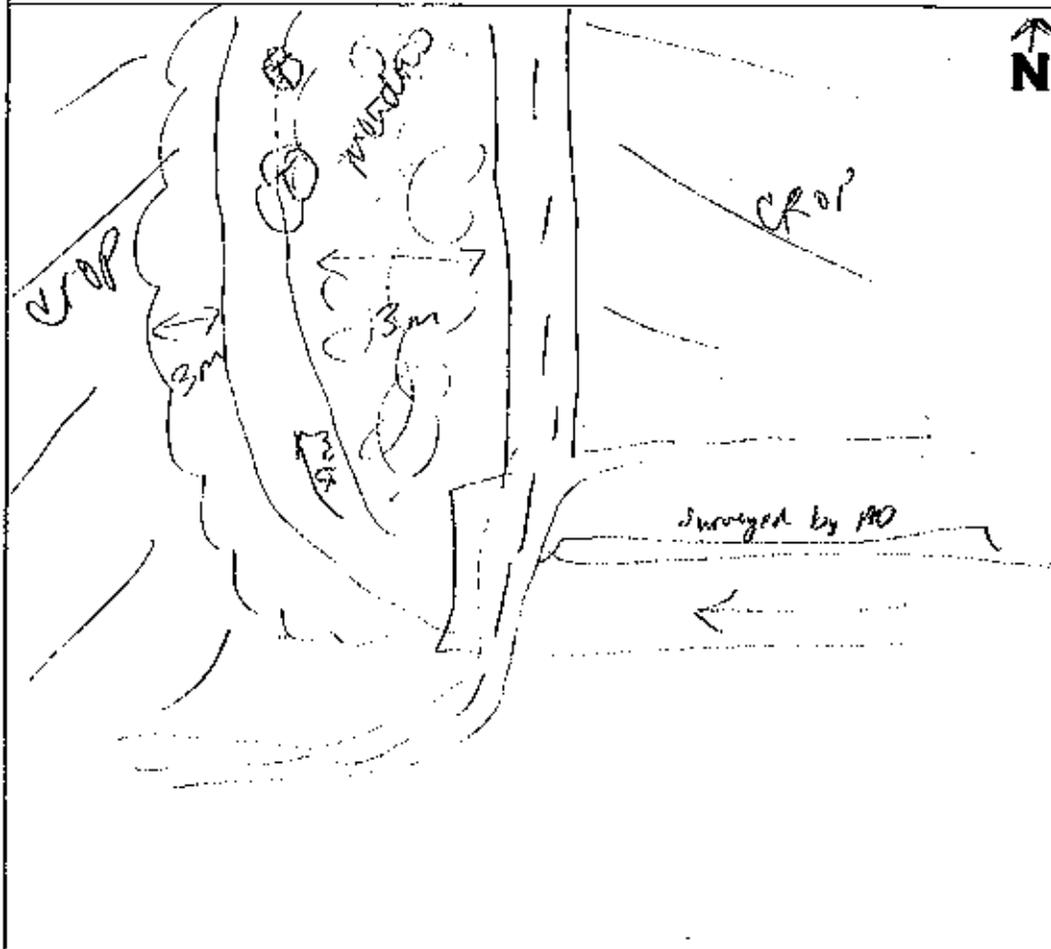
## Photo log

Picture #	Description	Picture #	Description
1	overview		
2	culvert		
3	in stream shot		
4	watercress		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW 7.6 - North



LEGEND	
100 (depth) (cm)	for width
→	Flow
→	Run/Glide
○	Pool
□	Island/Bar
—	Flow Substrate
---	General Substrate
○	Cobble
●	Boulder
***	Gravel
CT	Gravel
SV/FV	Submerged/Floral Veg
EV	Emergent
W	Watercress
Fe	Iron Staining
	Eroded Bank
xxx	Riprap / Dike
Stairwell	Stairwell
^	Upstream Log/Twig
^^^	Dam/Weir
⊙	Riparian Tree
↳	Seep/Spring
-----	Undercut Bank
—	Barrier to Fish Movement
-S-	Seasonal Barrier
-x-x-	Fence Line
1-1	Culvert

Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen Bluewater	Land Parcel#	Turbine #	BLW-T6 - South East		
Date: July 29, 2011	Start time: 10:10	End Time:			
Weather Conditions: Rain	Field Notes By: A. Dart				
Site Location On Division @ Centennial St in road					
UTM Co-ordinates					
Eastings: 0462514	Northings: 4817913 ± 7m	Description: Road			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input checked="" type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other: <input checked="" type="checkbox"/>					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) Residential, south side ~ 200m from channel No drainage observed @ road					
In-Situ Water Quality		Ground Water Indicators			
WT (°C):	AT (°C): 18	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond (µs/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: water quality on BLW-T6 north water slightly turbid WC on LB (south)					
Stream Morphology					
Site Length (m): ~ 150m	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 2.5	Mean Bankfull Width (m): 3.5	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.15	Mean Bankfull Depth (m): 0.30	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: Flow medium					
Notes: bridge concrete 					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Sa > Gr > MK > DT  
Cl > Sl > Bo

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Instream Cover (%)

20

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			10	10		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses

## Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

100

Herbaceous

Other

## Notes:

Riparian buffer ~ 6m south &amp; ~ 12m north

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat Topography  
Bank slopes 45°

## Terrestrial features Present

Yes



No

## Terrestrial Recon Form Filled out

Yes

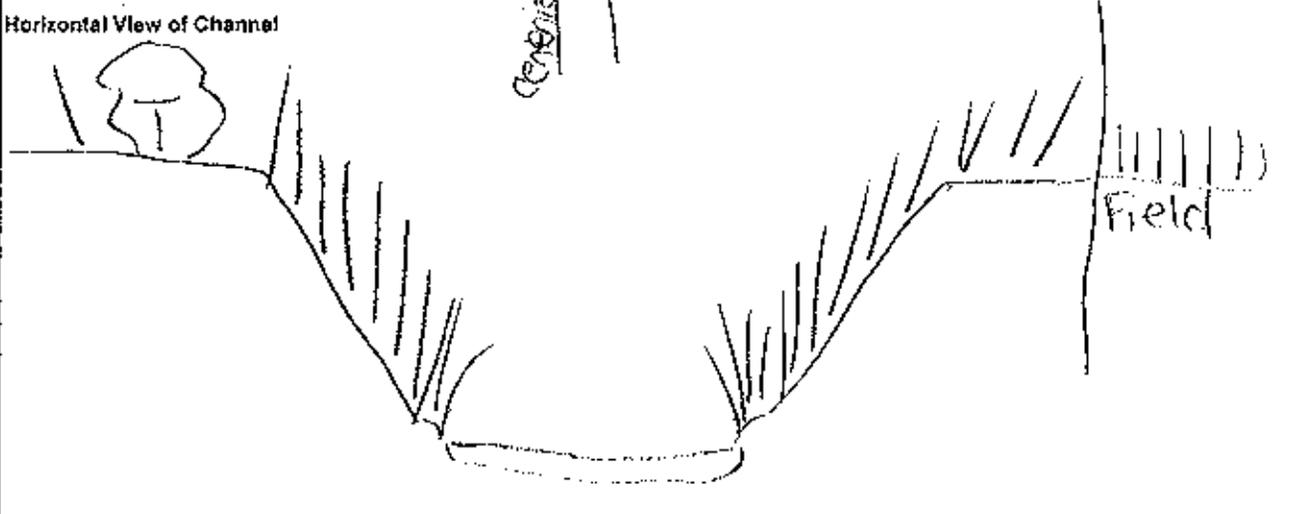
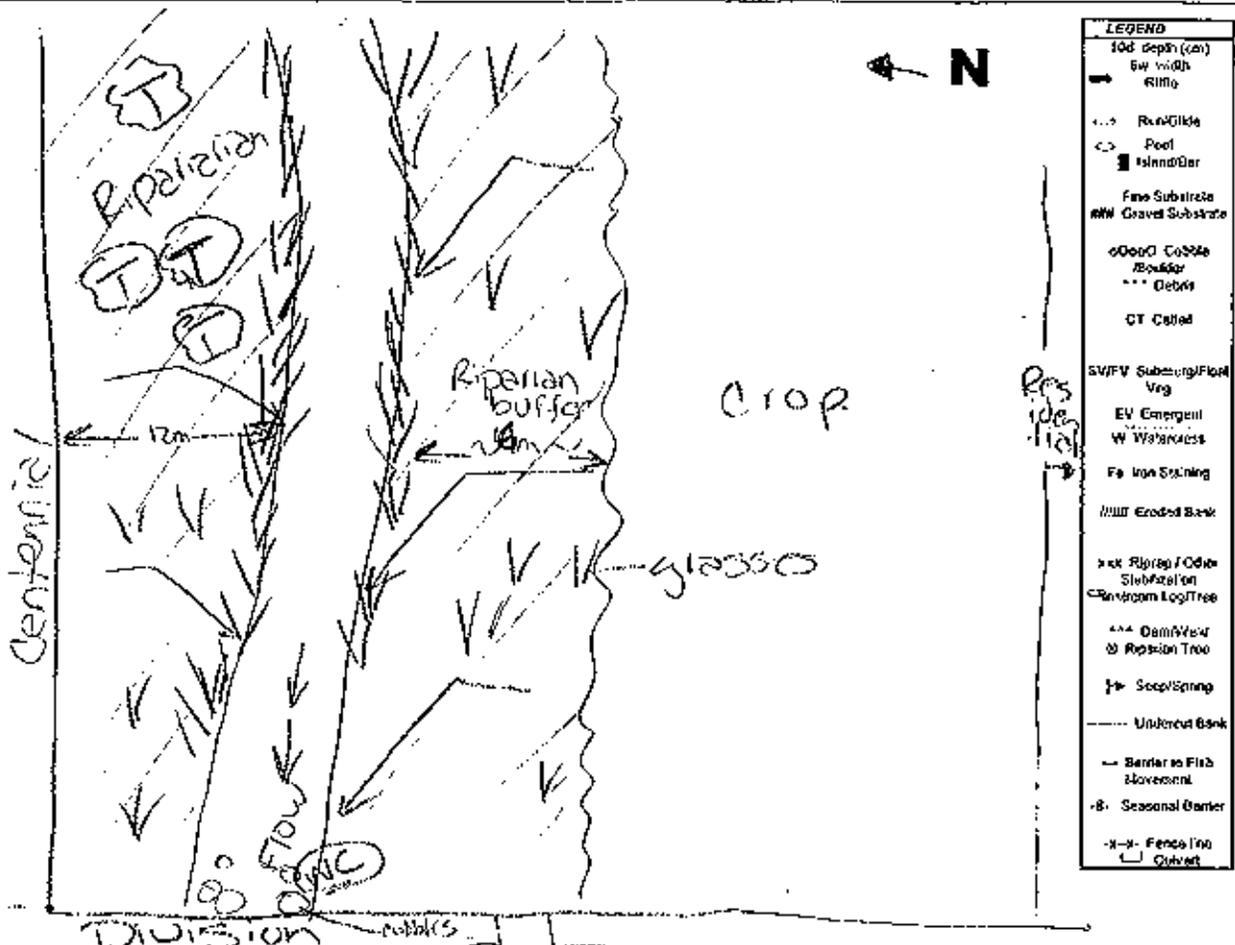


No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW-T6-30



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BLW-T7-North</u>				
Date: <u>July 29/11</u>	Start Time: <u>10:40</u>	End Time:			
Weather Conditions: <u>Overcast</u>	Field Notes By: <u>CB</u>				
Site Location					
<u>Centennial Rd - just east of Hamnah Rd.</u>					
UTM Co-ordinates					
Eastings: <u>0464134</u>	Northings: <u>4817632</u>	Description: <u>North Culvert</u>			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u><del>drainage</del> - drainage <sup>pipe</sup> noted on east side (~0.5m wide)</u> <u>↳ water flowing out - quickly + moderate amt.</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C):	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond ( $\mu$ S/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>w/g done on South side.</u>					
Stream Morphology					
Site Length (m): <u>60m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>3</u>	Mean Bankfull Width (m): <u>4</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.15</u>	Mean Bankfull Depth (m): <u>~0.25</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description:					
<u>- appears to have slow flow north of drainage <del>pipe</del> pipe</u> <u>↳ South of drainage <del>pipe</del> pipe stream becomes more confined + bank flowing into the road culvert</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Co &gt; mk &gt; sand + fines

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
		100	

## Habitat

Instream Cover (%) 70

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			30	70		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- algae, emergent grasses

## Canopy Cover (% closed cover):

100-90%  30-1%   
 80-60%  0%   
 60-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs 50  
 Grasses 50 Herbaceous \_\_\_\_\_  
 Man-made structures \_\_\_\_\_  
 Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
 Natural

Description:

~~\_\_\_\_\_~~  
 - box culvert - not  
 perched

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- drainage pipe on east side

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

Yes

No

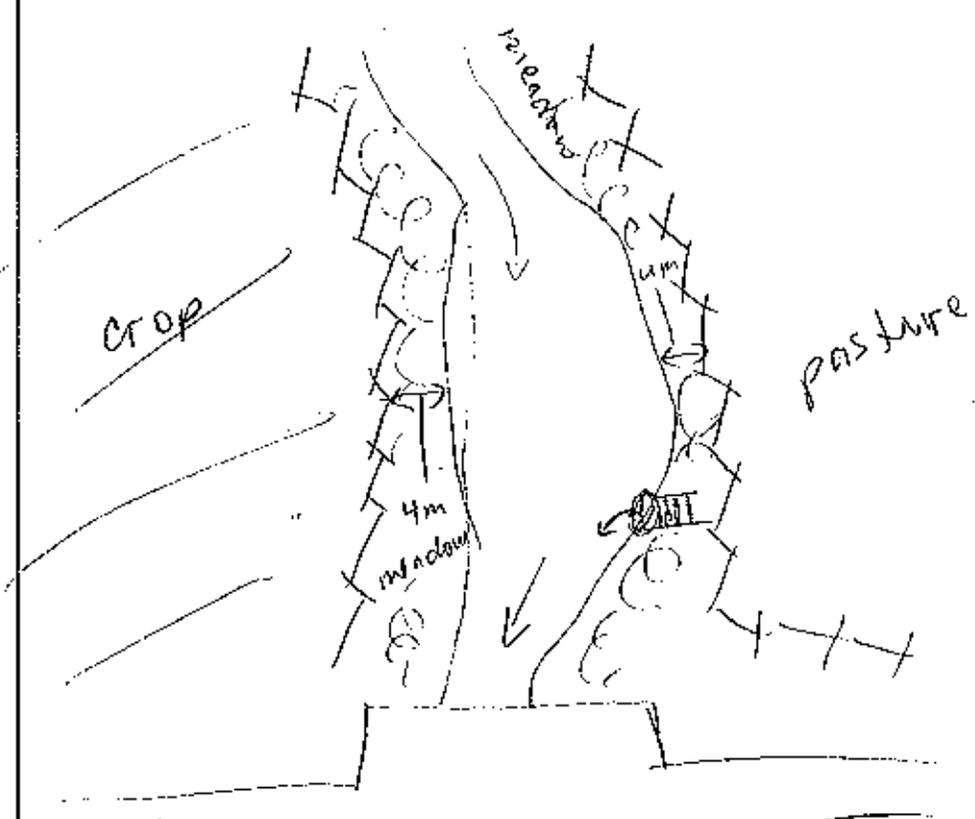


Watercourse Sketch

Study Area: Jaricho Goshen Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW T7-North



LEGEND	
100 depth (cm)	
→	Flow direction
○	Run/Grade
○	Pool
□	Island/Bar
—	Fine Substrate
---	Gravel Substrate
○	Cobble
○	Boulder
***	Debris
CT	Castor
SW/FV	Submerged/Pool Veg
EV	Emergent
W	Watercress
F	Fern Slaving
	Erodium Bank
xxx	Riprap / Other
Stab	Stabilization
Log/Tree	Log/Tree
▲▲▲	Open/Weed
⊗	Replant Tree
↳	Seep/Spring
.....	Unirrigated Bank
—	Barrier to Fish Movement
-S-	Seasonal Barrier
xxx	Fence Line
□	Culvert



Horizontal View of Channel



AECOM

Field Crew:

General Information			
Study Area:	Jericho	Goshen	Bluewater Land Parcel#
Date:	July 29, 2011	Start time:	10:37
Weather Conditions:	light rain, overcast.		Field Notes By:
			A. Dart

## Site Location

Centennial road, east of Hannah Line

## UTM Co-ordinates

Easting:	0464122	Northing:	4817628 ±5m	Description:	Road
Easting:		Northing:		Description:	
Easting:		Northing:		Description:	
Easting:		Northing:		Description:	

## Surrounding Landuse/Pollution Sources

Residential	<input type="checkbox"/>	Meadow	<input type="checkbox"/>
Agriculture	<input checked="" type="checkbox"/>	Wetland	<input type="checkbox"/>
Forest	<input type="checkbox"/>	Livestock	<input type="checkbox"/>

Other:

## Type of Watercourse

Intermittent	<input type="checkbox"/>	Channelized	<input checked="" type="checkbox"/>
Permanent	<input checked="" type="checkbox"/>	Natural Channel	<input type="checkbox"/>
Ephemeral	<input type="checkbox"/>		

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

None observed near road.

## In-Situ Water Quality

WT (°C):	21.5	AT (°C):	18
pH:	7.88	Cond (µm s/cm):	0.47
Water Clarity:	Clear	<input checked="" type="checkbox"/>	Turbid
		<input type="checkbox"/>	

## Ground Water Indicators

Watercress	<input checked="" type="checkbox"/>	Bank Seepage	<input type="checkbox"/>
Iron Staining	<input checked="" type="checkbox"/>	None	<input type="checkbox"/>
Bubbling	<input type="checkbox"/>	Other	<input type="checkbox"/>

Notes: water flow medium

## Stream Morphology

Site Length (m): ~150m

## Bank Stability:

## Channel Dimensions

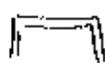
Mean Wetted Width (m):	1.5	Mean Bankfull Width (m):	~2.0
Mean Wetted Depth (m):	0.09	Mean Bankfull Depth (m):	~0.30

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Flow Description:

Medium flow

Notes:

@ Road there are undercut banks  
 cement bridge 

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Gr &gt; Co &gt; Sa

## Morphological Structure (%)

Pool	Riffle	Run	Flat
10	10		80

## Notes:

Pooling under bridge  
Riffle @ bridge by WC  
Flat through reach.

## Habitat

## Instream Cover (%)

70

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			55	10	5	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses, watercress, emergents

## Canopy Cover (% closed cover):

100-80%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

10

Man-made structures

Grasses

90

Herbaceous

Other

## Notes:

Riparian buffer mostly grasses overhanging channel

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat topography  
Bank slopes 30'

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

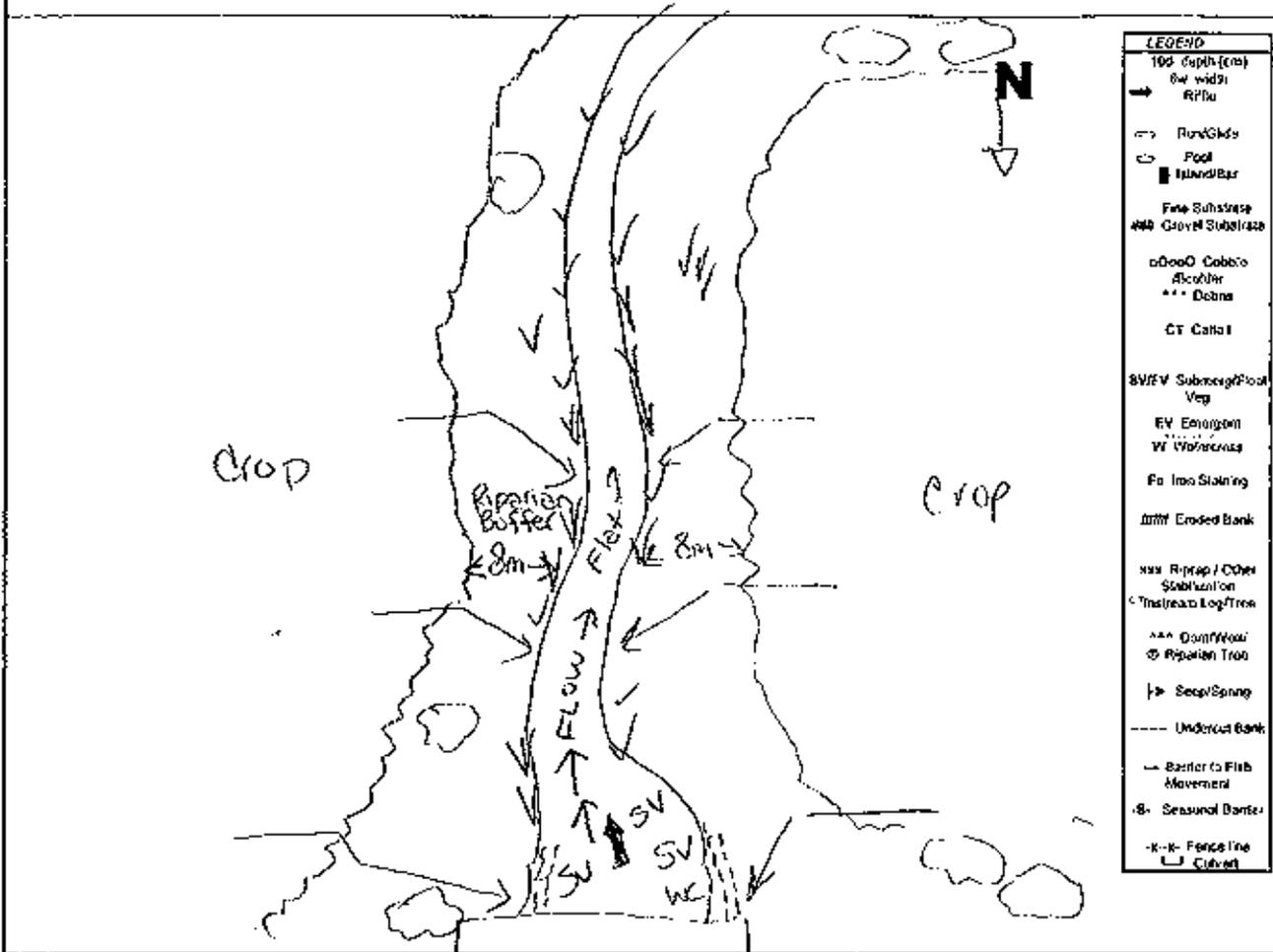
Yes

No

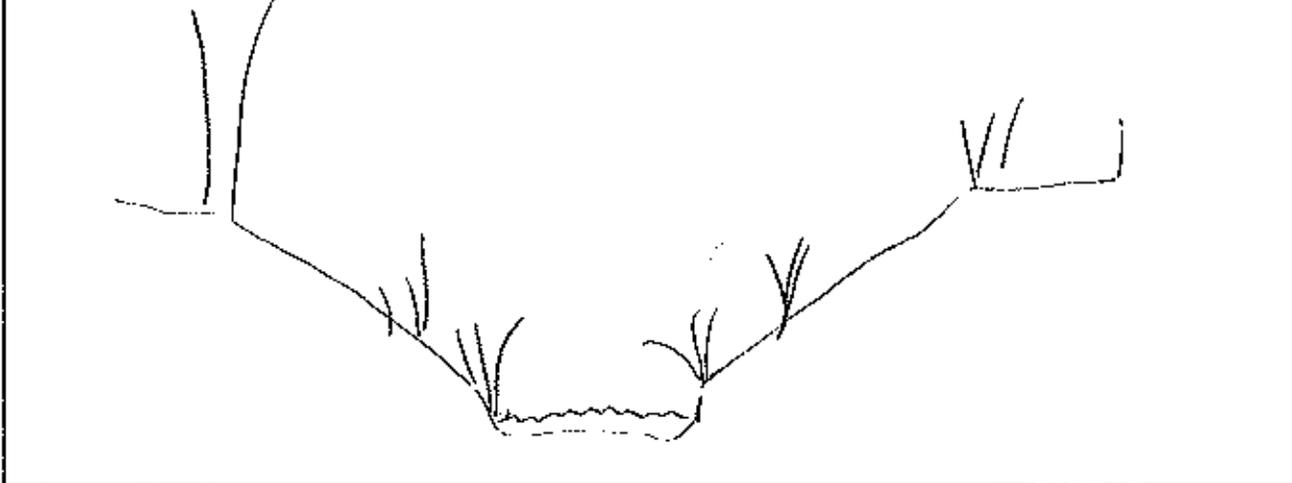


Watercourse Sketch

Study Area: Jaricho Goshen Bluewater Land Parcel# Turbine # BLWT7-South



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> and Parcel#	Turbine # <u>BLTP - North</u>				
Date: <u>July 29/11</u>	Start time: <u>11:00</u>	End Time:			
Weather Conditions: <u>Overcast</u>	Field Notes By: <u>CB</u>				
Site Location <u>Centennial - just east of Kippen</u>					
UTM Co-ordinates					
Easting: <u>466382</u>	Northing: <u>4816261</u>	Description: <u>Road</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>- drainage pipe on east side - no flow out of it</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>22.2</u>	AT (°C): <u>18°C</u>	* Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>7.73</u>	Cond (µm/cm): <u>12.55</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
		* abundant			
Notes:					
Stream Morphology					
Site Length (m): <u>60</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>2</u>	Mean Bankfull Width (m): <u>3.5</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.15</u>	Mean Bankfull Depth (m): <u>0.35</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>moderate flow, below bankfull</u>					
Notes:					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

gr &gt; co &gt; silt, clay &gt; mk

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
		100	

## Habitat

Instream Cover (%) 70

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	/	20	80	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- emergents &gt; grasses &gt; algae

## Canopy Cover (% closed cover):

100-80%  30-1%   
80-60%  0%   
60-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses 100 \_\_\_\_\_ Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

Notes:

↳ some overhanging providing cover

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- flat

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 29/11

BLW-T8-NR44

Page 3 of 4

Other General Comments Regarding the Study Area:

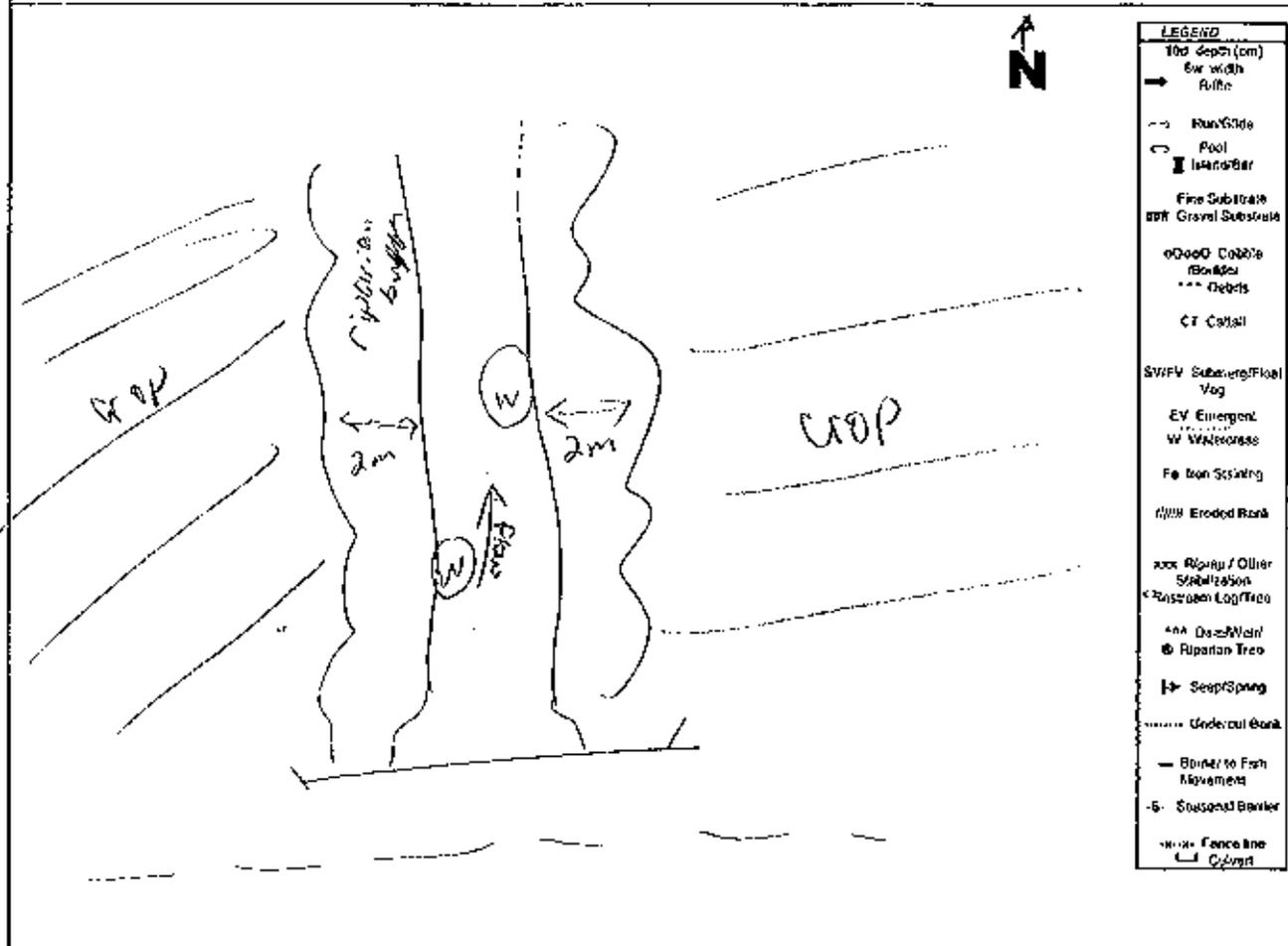
## Photo log

Picture #	Description	Picture #	Description
1 78	overall		
2 79	drainage pipe		
3 80	watercress - scale		
4 81			
5 82	1/11 stream		
6 83	culvert		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW T8-North



Horizontal View of Channel



AECOM

Field Crew:

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW-T8-South  
 Date: July 29, 2011 Start time: 11:00 End Time: \_\_\_\_\_

Weather Conditions:

Rain in A.M.  
Overcast

Field Notes By:

A. Dart

## Site Location

Centennial Road, East of Kippen.

## UTM Co-ordinates

Easting: 0466382 Northing: 4816261 ±5m Description: Road

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other: \_\_\_\_\_

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

None observed

## In-Situ Water Quality

WT (°C): — AT (°C): 18

pH: — Cond (µS/cm): —

Water Clarity: Clear  Turbid

## Ground Water Indicators

Tors Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes: water quality on BLW-T8 north sheet.  
water slightly cloudy.

## Stream Morphology

Site Length (m): 150m

Bank Stability:

## Channel Dimensions

Mean Wetted Width (m): ~1.5m Mean Bankfull Width (m): ~2.5

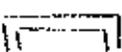
Mean Wetted Depth (m): ~0.15 Mean Bankfull Depth (m): ~1.0  
0.35

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flow Description:

Flow medium, not bankfull

Notes:

Cement bridge   
bank slopes are 60°

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Debris  
Other

## Description

Gr &gt; Sa &gt; Co

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Instream Cover (%)

95

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			5	90		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Watercress and emergent veg.

## Canopy Cover (% closed cover):

100-80%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

100

Herbaceous

Other

## Notes:

Emergent veg providing 90% of canopy cover, but outside canopy cover providing 20% due to grasses overhanging

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat farmland on either side

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

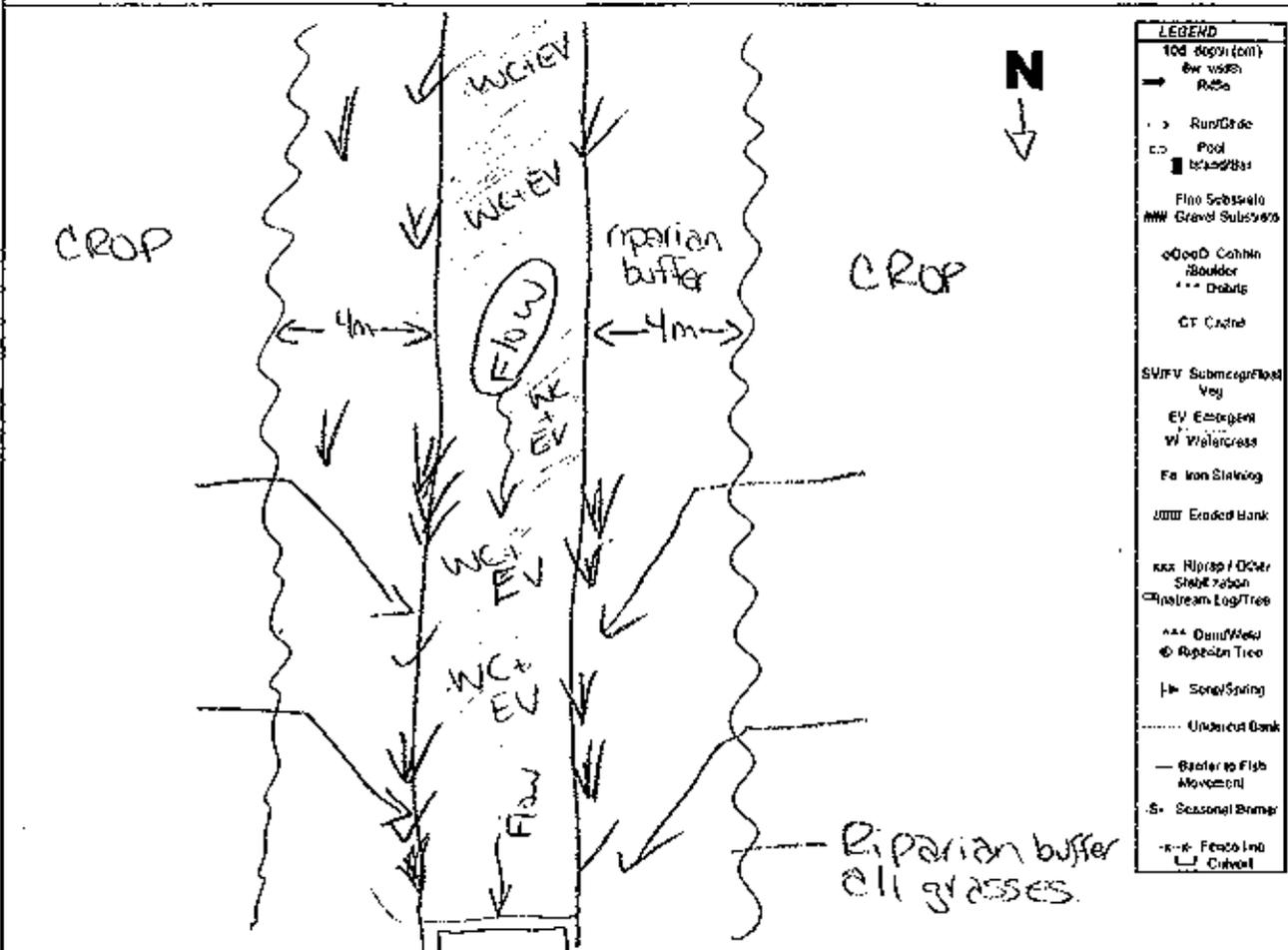
Yes

No

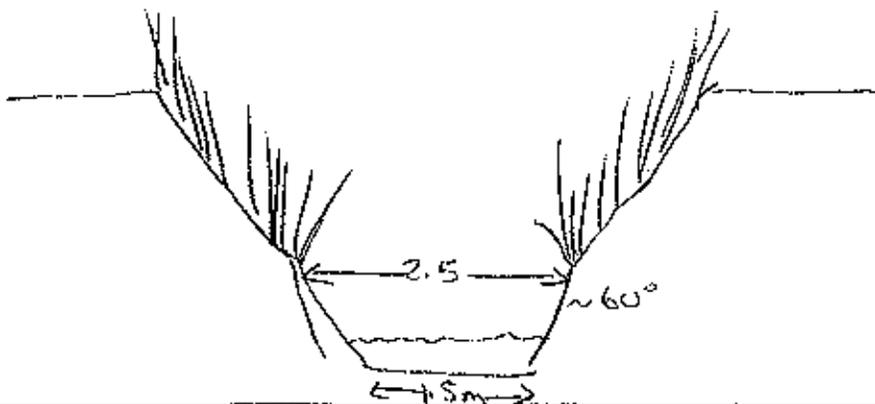


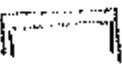
Watercourse Sketch

Study Area: Jericho Goshen Bigwater Land Parcel# Turbine # BLW T8-South



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: <u>CB, AD</u>					
General Information					
Study Area: Jericho Goshen <u>Bluewater Land Parcel#</u>	Turbine # <u>BLW-T9-East</u>				
Date: <u>July 29, 2011</u>	Start time: <u>11:26</u>	End Time:			
Weather Conditions: <u>Overcast Rain in A.M.</u>	Field Notes By: <u>A. Dard</u>				
Site Location					
<u>Hensall Rd, north of Tile Rd.</u>					
UTM Co-ordinates					
Easting: <u>0467879</u>	Northing: <u>4817892</u>	25m Description: <u>Road</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u>None observed by road, except one Black pipe entering channel under bridge on south side. Unsure of purpose.</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>23.3</u>	AT (°C): <u>18</u>	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>7.05</u>	Cond (µs/cm): <u>0.42</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>WC on both banks by road (tiny bit)</u>					
Stream Morphology					
Site Length (m): <u>~150m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>~4.5</u>	Mean Bankfull Width (m): <u>6.0</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.55</u>	Mean Bankfull Depth (m): <u>0.80</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Flow slow -illard to determine flow direction</u>					
Notes: <u>Cement Bridge  Bank slopes ~60°</u>					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Sa > MK > Gr

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			5	10		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Small Pondweed, cattail, grasses.

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

2

Shrubs

Man-made structures

Grasses

98

Herbaceous

Other

## Notes:

Riparian buffer mostly grasses + overhanging into channel

## Obstructions to Fish Passage

No Obstructions  
Natural

Man-Made

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat topography

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 29/11

Page 3 of 4

## Other General Comments Regarding the Study Area:

- Residential property (house) within 100m of channel
- Minnows observed

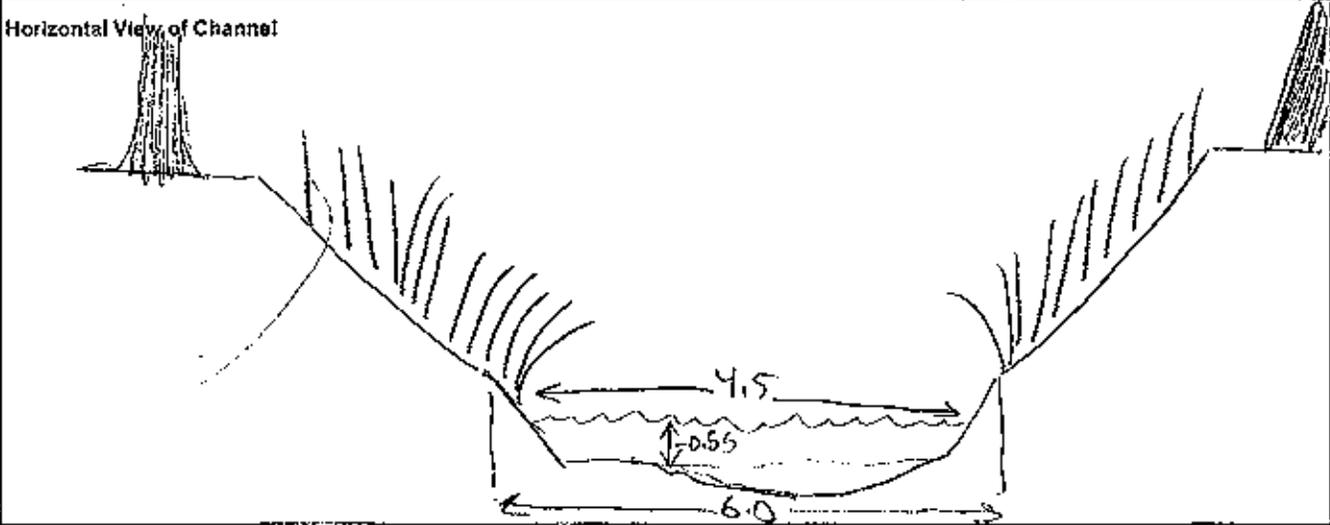
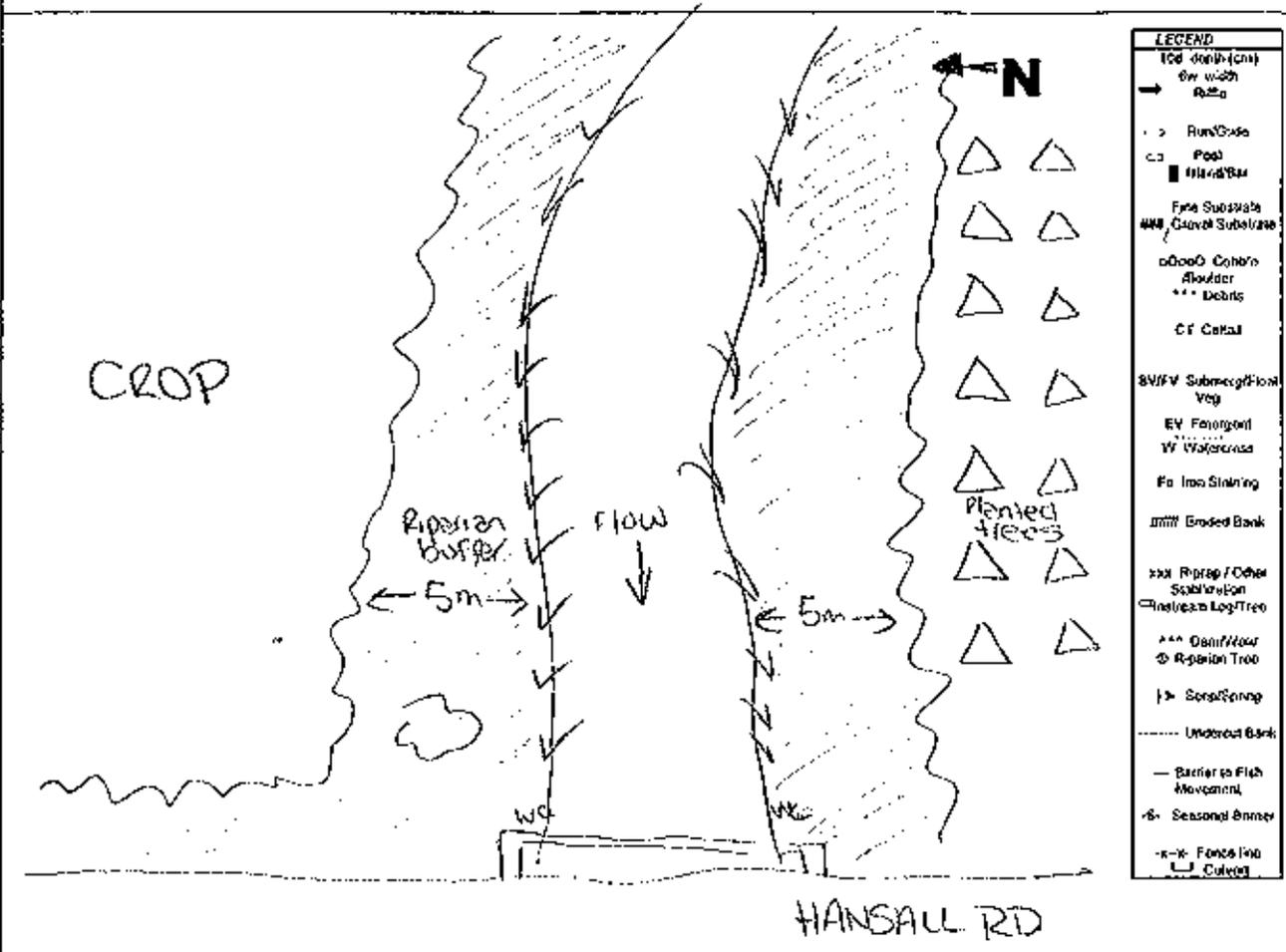
## Photo log

Picture #	Description	Picture #	Description
18	east side overview		
19	east side closeup		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-T9-EAST



AECOM		Page 1 of 4			
Field Crew: <u>CS, AD</u>		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BW-T9-West</u>				
Date: <u>July 29/11</u>	Start time: <u>11:30</u>	End Time:			
Weather Conditions: <u>Overcast</u>	Field Notes By: <u>CS</u>				
Site Location					
<u>Hensall Rd. - north of Tib. Rd.</u>					
UTM Co-ordinates					
Easting: <u>0467865</u>	Northing: <u>4817883</u>	Description: <u>West Culvert</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>		
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
<u>- no inputs noted</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>/</u>	AT (°C): <u>/</u>	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>/</u>	Cond (µs/cm): <u>/</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>w/g completed on east side.</u>					
Stream Morphology					
Site Length (m): <u>50 m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>4</u>	Mean Bankfull Width (m): <u>6</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>n/a</u>	Mean Bankfull Depth (m): <u>n/a</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description:					
<u>→ v.v. slow flow → could take a depth reading of 0.55m at 1m out from shore</u>					
Notes: <u>→ had to determine which way it was flowing</u>					
<u>- observations made from culvert</u>					

Stream Morphology (continued)

Substrate (< = >)

- Bb - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Sand > muck > gr

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Habitat

Instream Cover (%)

~~5%~~ 5%

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
/	100	/	/	/	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Note: v. turbid so hard to see. Too deep to enter.

Canopy Cover (% closed cover):

- 100-90%  30-1%
- 90-60%  0%
- 60-30%

Types of Cover (% cover)

- Trees 100 Shrubs \_\_\_\_\_
- Grasses \_\_\_\_\_ Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

Notes:

Complete canopy cover

Obstructions to Fish Passage

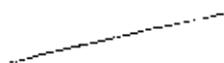
- No Obstructions  Man-Made
- Natural

Description:

- box culvert not present

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:



Terrestrial features Present

Yes  No

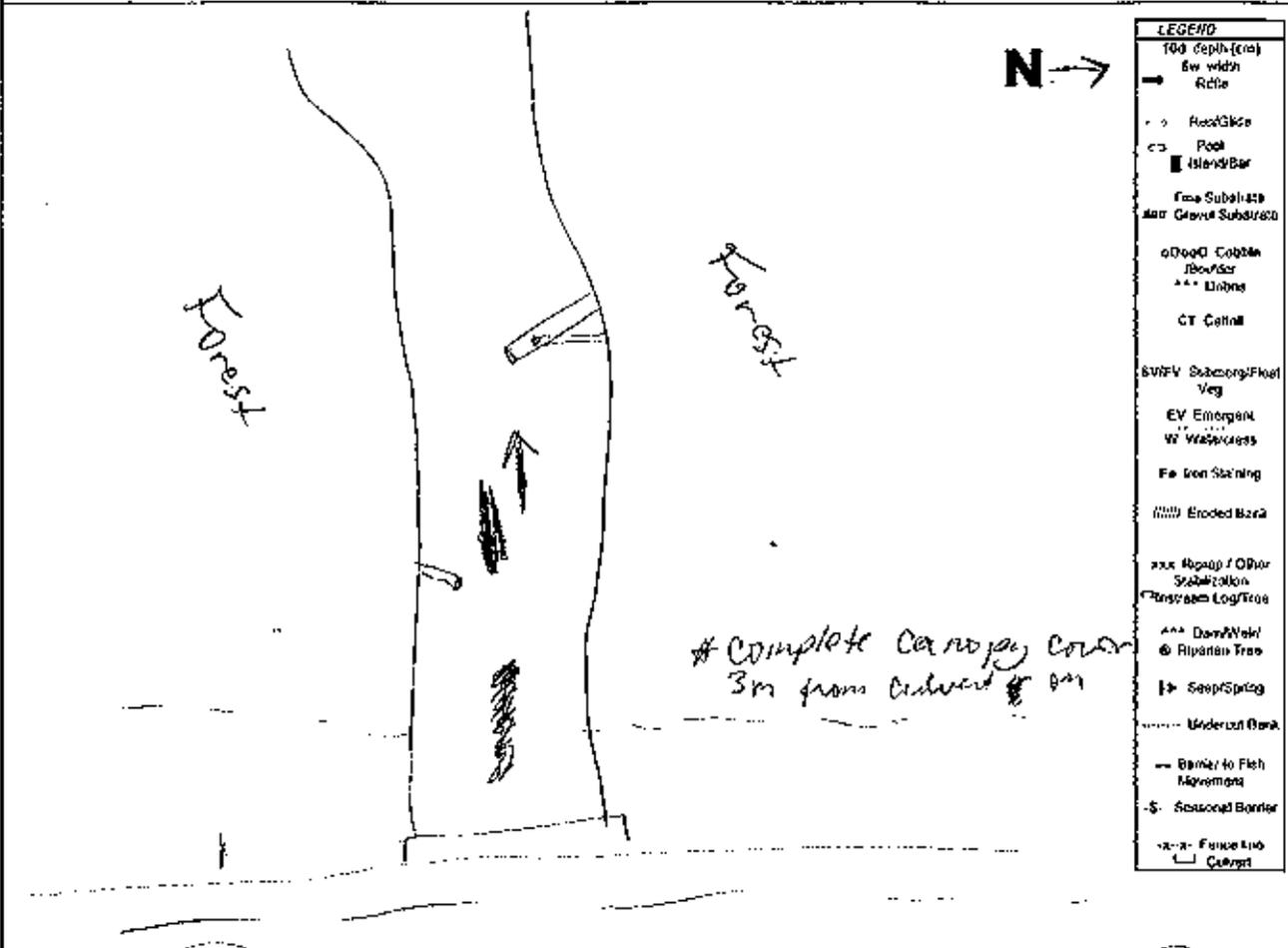
Terrestrial Recon Form Filled out

Yes  No

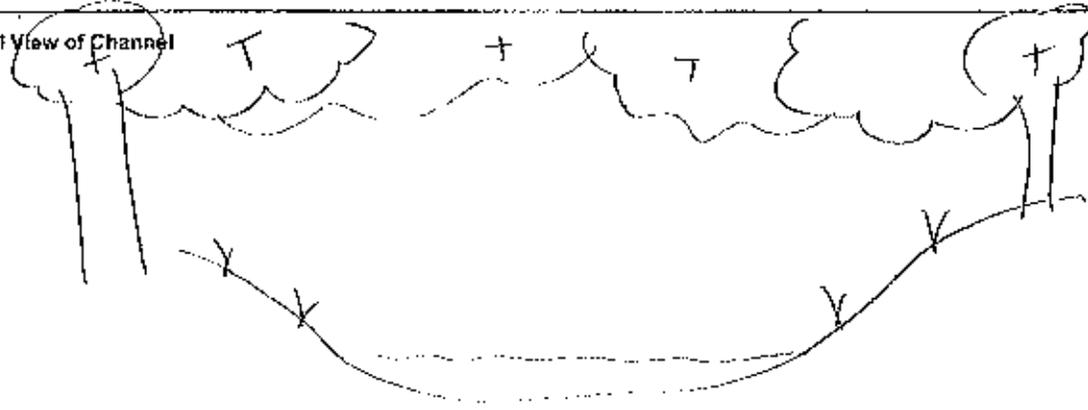


Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW-T9-West



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: <u>CB, AD</u>		General Information	
Study Area: <u>Jericho Goshon</u>	<u>Bluewater</u> Land Parcel#	Turbine # <u>BLW T10-West</u>	
Date:	Start time: <u>4:30</u>	End Time:	
Weather Conditions: <u>Overcast, 21°C</u>		Field Notes By: <u>CB</u>	
Site Location			
UTM Co-ordinates			
Easting: <u>04168142</u>	Northing: <u>4818333</u>	Description: <u>West side of bridge</u>	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input checked="" type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>- None noted</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>25</u>	AT (°C):	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>8.01</u>	Cond (m s/cm): <u>0.36</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: <u>Clear</u> <input type="checkbox"/>	<u>Turbid</u> <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m): <u>150 m</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>15</u>	Mean Bankfull Width (m): <u>16</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>n/a</u>	Mean Bankfull Depth (m): <u>n/a</u>	Left Bank	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
		Right Bank	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Flow Description: <u>v. low flow - hard to determine which way it was flowing</u>			
Notes: <u>Watercourse too wide + deep to determine MWW + MBW</u>			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Description

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

-- could not observe

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
		50	100

## Habitat

Instream Cover (%) 40

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				100		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- floating lily's, submergent, emergent.

Canopy Cover (% closed cover):

100-90%  30-1%

90-60%  0%

60-30%

Types of Cover (% cover)

Trees 30 Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_

Grasses 70 Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

Notes:

V. little canopy cover

## Obstructions to Fish Passage

No Obstructions  Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present

Yes  No 

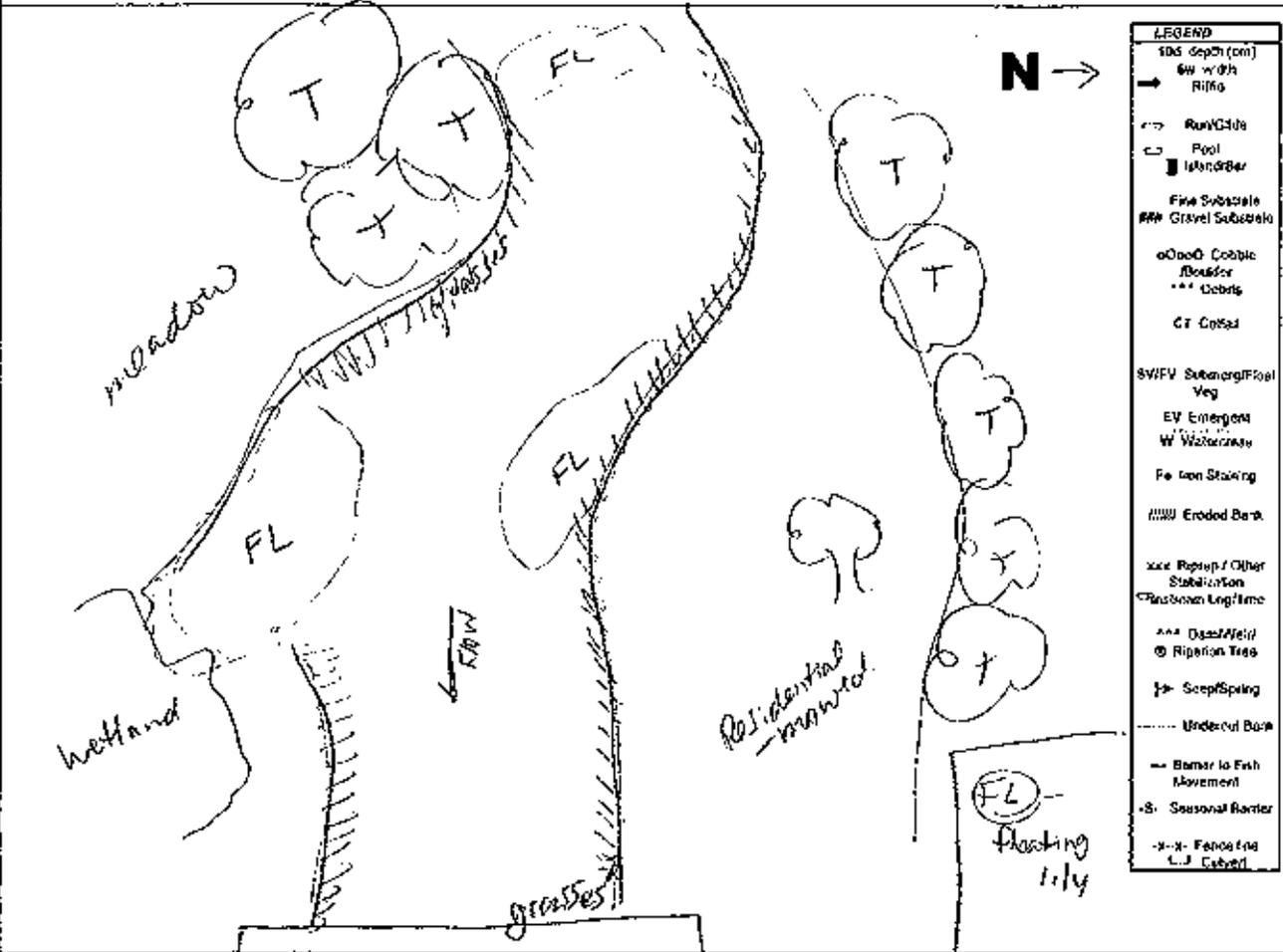
Terrestrial Recon Form Filled out

Yes  No

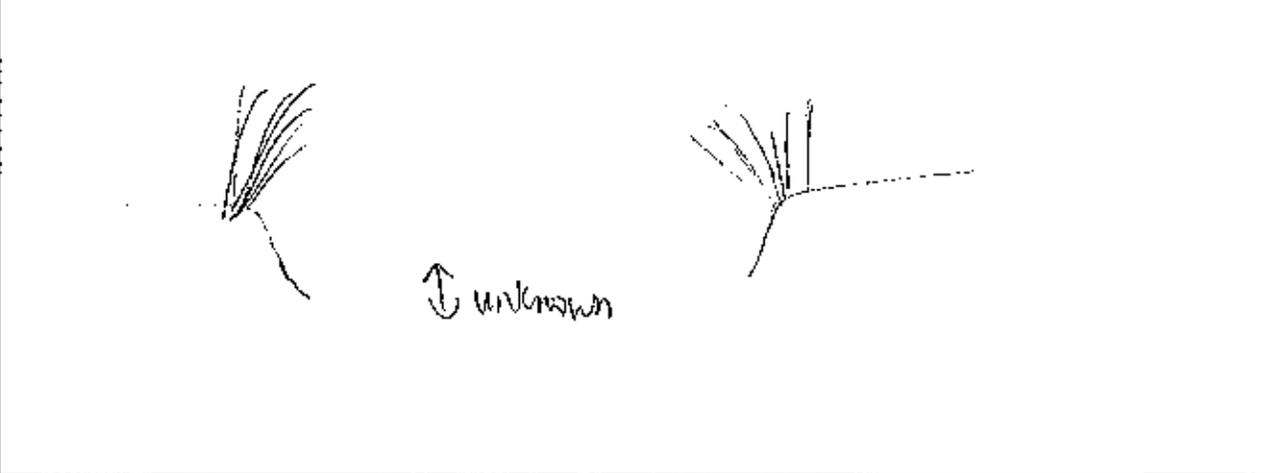


Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BW-T10-West



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: CB, AD		General Information	
Study Area: Jericho Goshen Bluewater	Land Parcel#	Turbine #	BLWT10-East.
Date: July 29, 2011	Start time: 6:30	End Time:	
Weather Conditions: overcast, windy Rain in A.M.	Field Notes By: A. Datt		
Site Location			
Mensall Rd, North of Tile rd			
UTM Co-ordinates			
Eastings: 0468152	Northings: 4818327	±6m	Description: Road
Eastings:	Northings:		Description:
Eastings:	Northings:		Description:
Eastings:	Northings:		Description:
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
None observed from road			
In-Site Water Quality		Ground Water Indicators	
WT (°C):	AT (°C): 18	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond ( $\mu$ scm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: Water Quality on BLWT10-west sheet.			
Stream Morphology			
Site Length (m): ~150m		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): ~13	Mean Bankfull Width (m): 14	Moderately unstable	Unstable
Mean Wetted Depth (m): NA	Mean Bankfull Depth (m): 0.70m	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: Slow Flow heading east - Flow hard to determine			
Notes: Bridge overpass			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
OT - Detritus  
Other

## Description

NA due to turbidity  
but could see some  
cobbles + Boulders

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobbles	Aquatic Vegetation*	Undercut Bank	Other:
		30	10	20		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Due to low visibility instream cover could be greater than noted.

- Yellow waterlilies, smart pondweed, downytail, grasses.  
- West side has more vegetated cover

## Canopy Cover (% closed cover):

100-80%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

100

Herbaceous

Other

Notes:

Riparian buffer grasses + shrubs.  
Meadow like on south side.

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat on north + south side  
but land to east of  
channel is elevated

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

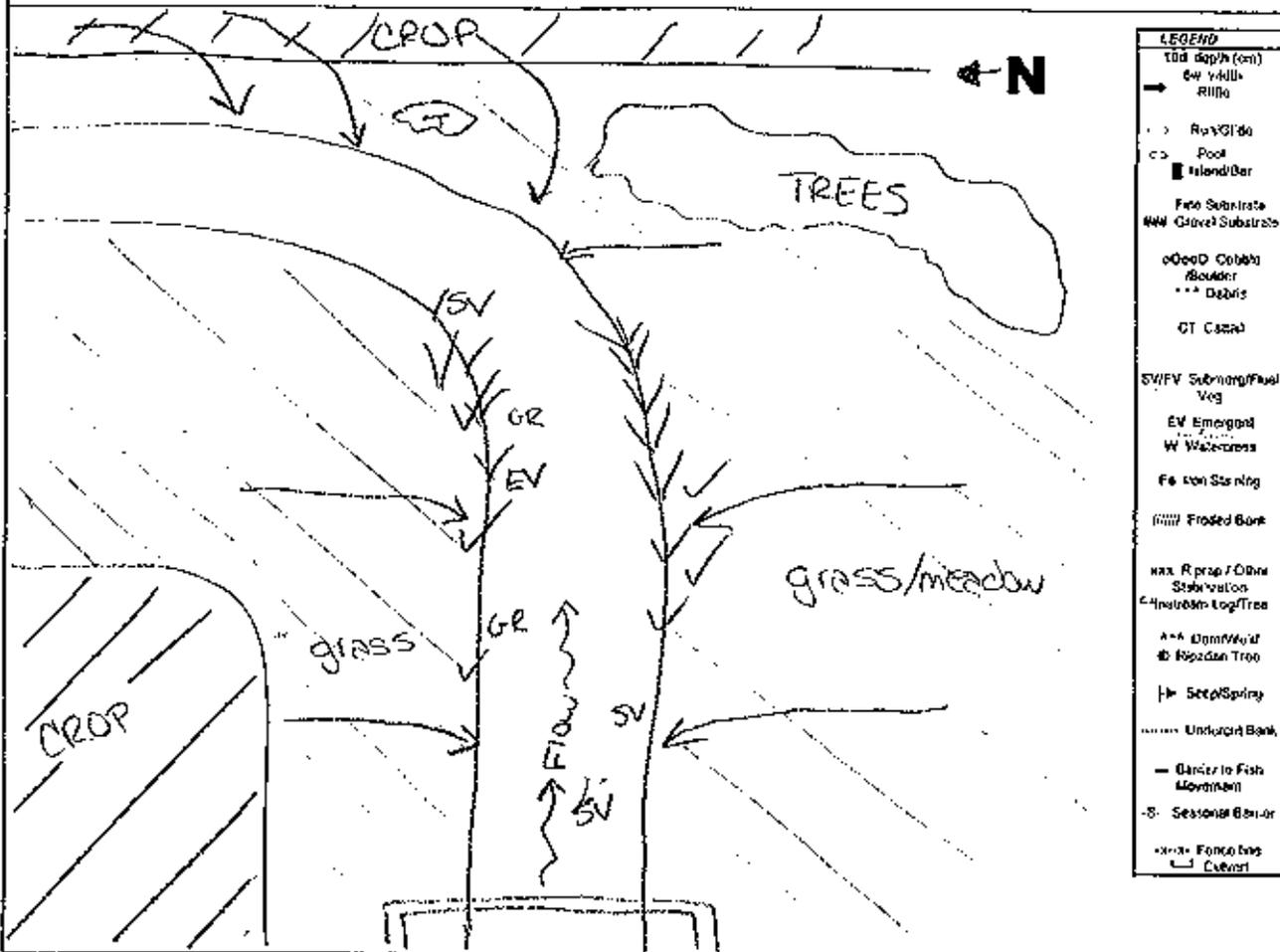
No



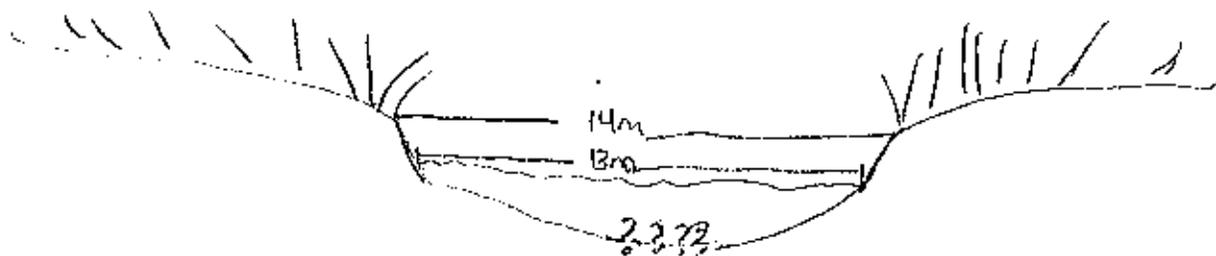
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-TD-E



Horizontal View of Channel



AECOM

Field Crew: CB, AP

## General Information

Study Area: Jericho Goshen Gluewater Land Parcel# Turbine # B6W-T17-West  
 Date: July 09/11 Start time: 12:30 End Time:

Weather Conditions:

Overcast, 82°C

Field Notes By:

CB

## Site Location

Centennial - just north of Front St.

## UTM Co-ordinates

Easting: 0469344 Northing: 4820285 Description: West Culvert  
 Easting: Northing: Description:  
 Easting: Northing: Description:  
 Easting: Northing: Description:

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other:

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

- drainage pipes on west + east ~ 3-4 m from road.

## In-Situ Water Quality

WT (°C): AT (°C): 22°C  
 pH: Cond (µscm):  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercross  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes: w/g on East side

## Stream Morphology

Site Length (m): 100m

Bank Stability:

## Channel Dimensions

Channel Dimensions		Bank Stability			
Mean Wetted Width (m):	Mean Bankfull Width (m):	Stable	Slightly unstable	Moderately unstable	Unstable
<u>1</u>	<u>1.5</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m):	Mean Bankfull Depth (m):	Left Bank	Right Bank		
<u>0.2</u>	<u>0.35</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flow Description:

moderate flow

Notes:

AECOM

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## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Sil  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

gr, sand &gt; rcb &gt; mk

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Habitat

Instream Cover (%) 60

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			10	50		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- emergent, grasses

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

100

Herbaceous

Other

Notes:

grasses overgrown providing canopy cover

## Obstructions to Fish Passage

No Obstructions  
Natural

Man-Made

Description:

- culvert not perched

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- flat

Terrestrial features Present?

Yes

No

Terrestrial Recon Form Filled out

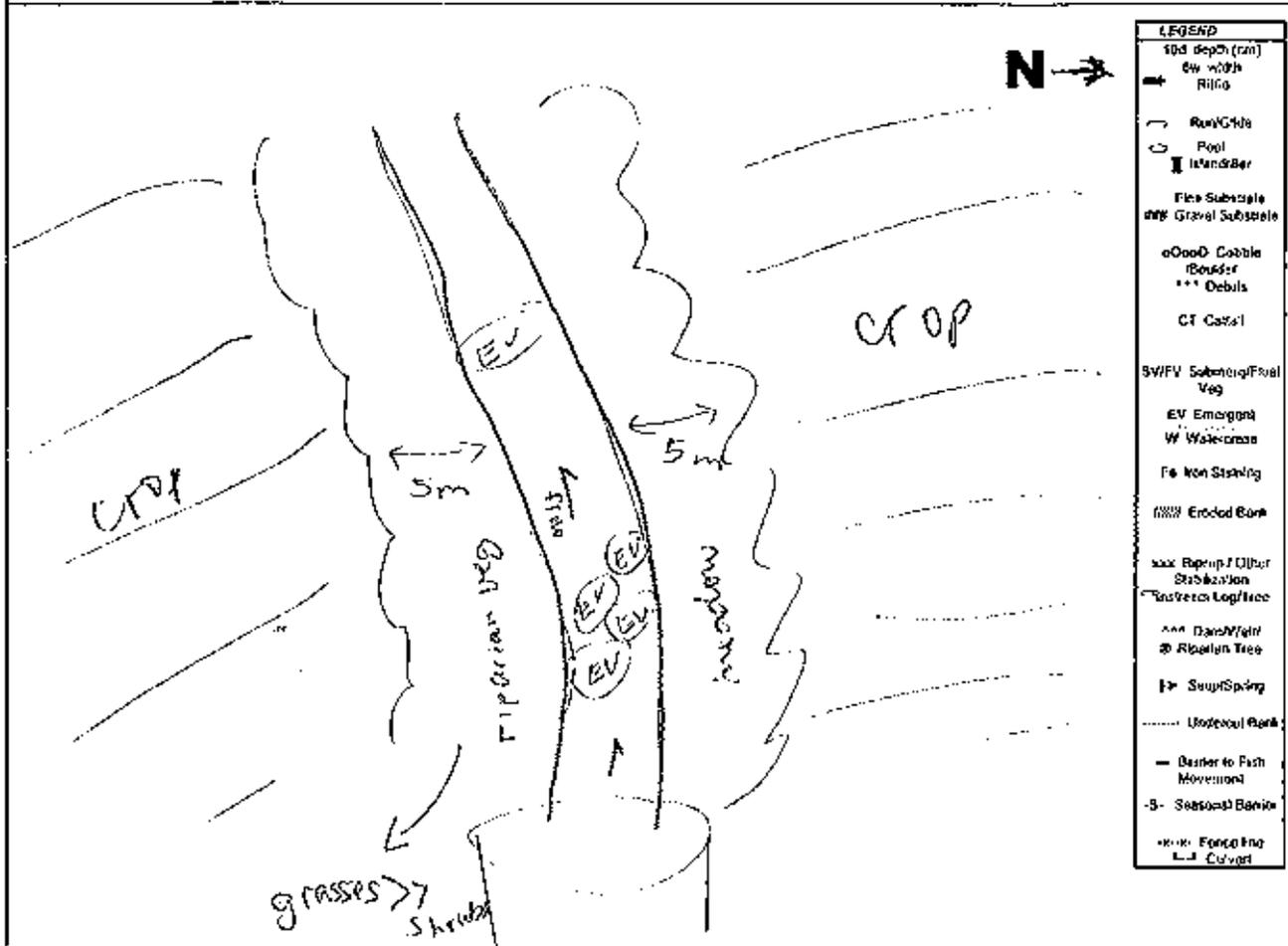
Yes

No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW-T17-West



Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#	Turbine # <u>BLW T17-East</u>				
Date: <u>July 29, 2011</u>	Start time: <u>12:10</u>	End Time:			
Weather Conditions: <u>overcast, windy</u> <u>Rain in A.M</u>	Field Notes By: <u>A. Datt</u>				
Site Location <u>Hensall rd, north of Front Rd</u>					
UTM Co-ordinates					
Easting: <u>0169355</u>	Northing: <u>4824282 ±5m</u>	Description: <u>Road</u>			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>None observed from road</u>					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>22.4</u>	AT (°C): <u>28</u>	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>7.98</u>	Cond (µm/cm): <u>0.52</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>Medium flow heading west</u> <u>algae on rocks, minnows + water striders observed</u>					
Stream Morphology					
Site Length (m): <u>150m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>0.20</u>	Mean Bankfull Width (m): <u>0.40</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>1.80</u>	Mean Bankfull Depth (m): <u>~2.5</u>	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Medium Flow - heading west</u>					
Notes: <u>3m corrugated culvert - not perched</u> <u>Bank Slopes ~ 45°</u>					

AECOM

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## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Gr &gt; Sa &gt; Co

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
10	10		80

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			10	70		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Grasses, watercress, emergents

## Canopy Cover (% closed cover):

100-80%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

Herbaceous

Other

100

## Notes:

Riparian buffer all grasses, which are over hanging into channel  
R.

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat

## Terrestrial features Present:

Yes

No

Terrestrial Recon Form Filled out

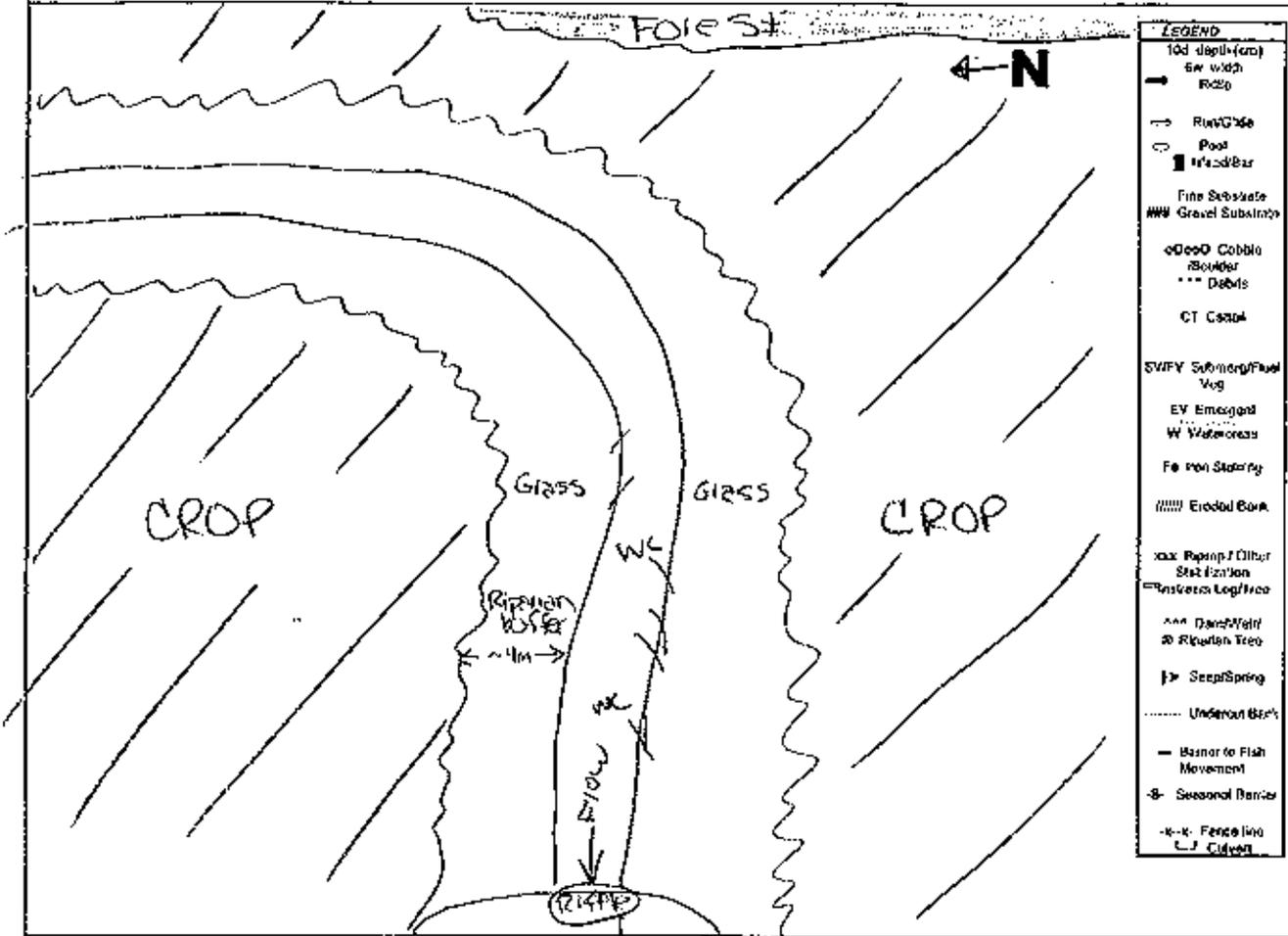
Yes

No



Watercourse Sketch

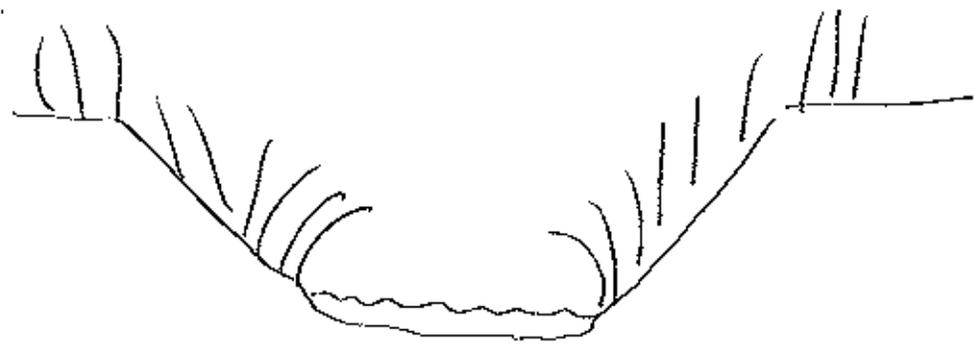
Study Area: Jericho Goshen Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW J17-EAST



LEGEND	
10d depth (cm)	SW width
→	Road
→	Runoff
○	Pool
■	Headbar
—	Fine Substrate
	Gravel Substrate
○	Cobble Boulder
...	Debris
CT	Channel
SWFY	Submerged Plant
Veg	Veg
EV	Emergent
W	Watercourse
F	Iron Structure
	Eroded Bank
xxx	Riprap / Other Structure
—	Station
—	Watercourse Log/Tree
---	Ditch/Wall
o	Riprap Tree
↳	Scrap Spring
.....	Undercut Bank
—	Barrier to Fish Movement
-S-	Seasonal Barrier
-x-x-	Fence line
—	Channel

Horizontal View of Channel

over corrugated culvert



AECOM		Page 1 of 4	
Field Crew: CB, AD		General Information	
Study Area: Jencho Goshen <u>Bluewater</u> Land Parcel#	Turbine # BLW TII - North		
Date: <u>July 29, 2011</u> Start time: <u>13:30</u>	End Time:		
Weather Conditions: <u>60% CC</u>	Field Notes By: <u>A. Dart</u>		
Site Location			
<u>Hensell rd, south of Centennial</u>			
UTM Co-ordinates			
Eastings: <u>0466464</u>	Northings: <u>4815624 ± 5m</u>	Description: <u>road</u>	
Eastings:	Northings:	Description:	
Eastings:	Northings:	Description:	
Eastings:	Northings:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>None observed by road.</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	AT (°C): <u>21</u>	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µs/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: <u>water quality on BLW TII south sheet</u> <u>WC on LBS by road (small amt.)</u>			
Stream Morphology			
Site Length (m): <u>80m</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>~2.5m</u>	Mean Bankfull Width (m): <u>3.0m</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.25</u>	Mean Bankfull Depth (m): <u>0.35</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Almost stagnant flow</u>			
Notes: <u>3m corrugated culvert - not perched</u> <u>Bank slopes ~ 85°</u>			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; =&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

MK > S<sub>2</sub>

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				40%		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

watercress, sedges, Duckweed,  
submergent veg

## Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

Shrubs

20

Man-made structures

Grasses

80

Herbaceous

Other

## Notes:

Riparian zone has grasses, shrubs, sedges, blue vervain  
dogwood.

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat Topography

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

Yes

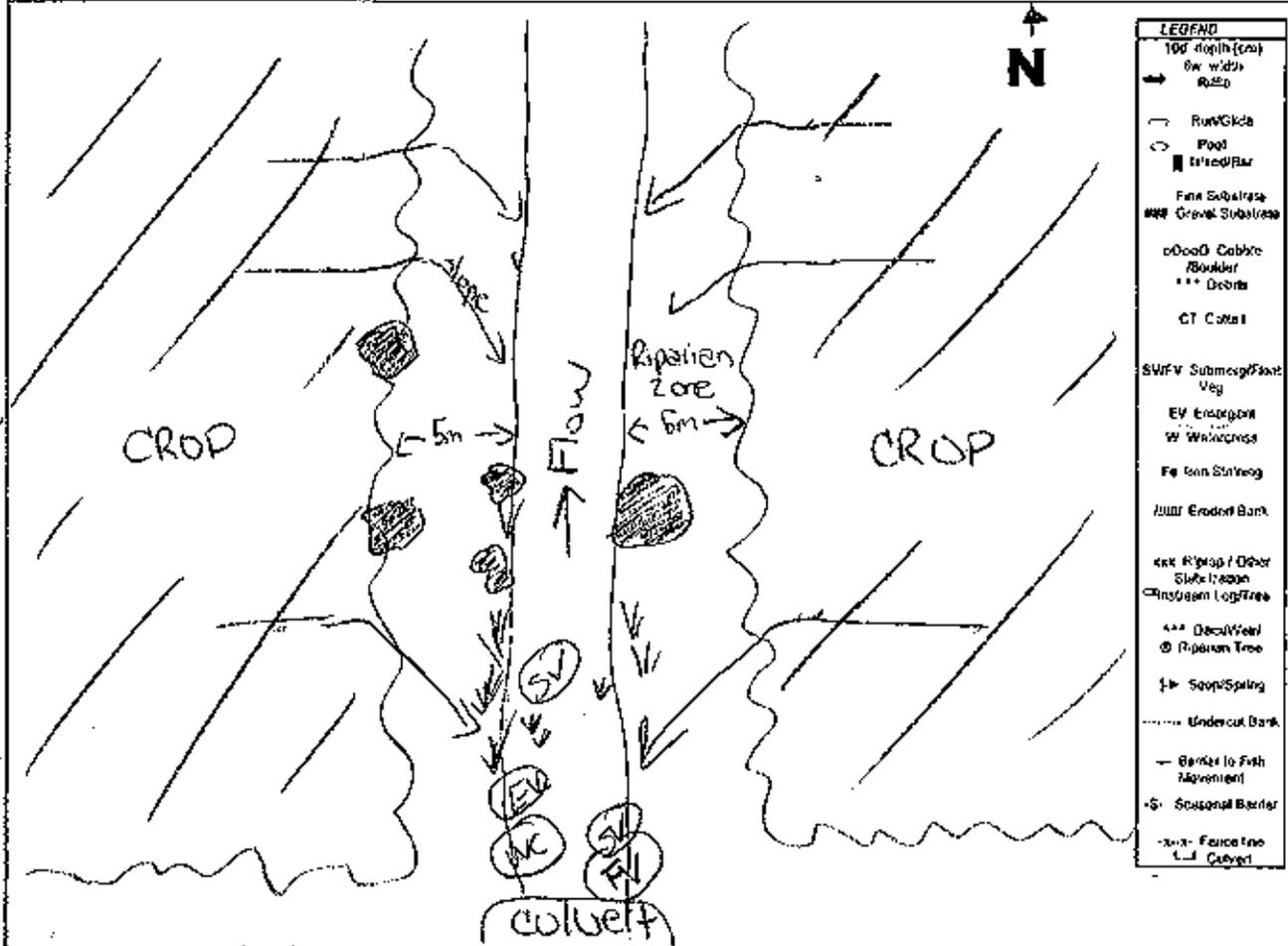
No



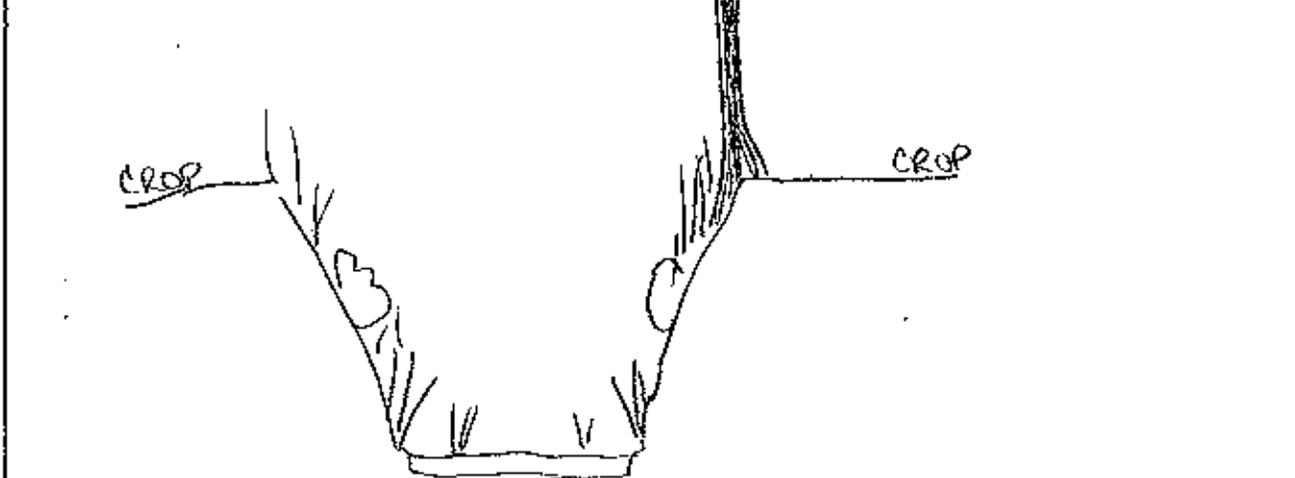
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW TII-N



Horizontal View of Channel



AECOM		Page 1 of 4	
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#		Field Crew: <u>CB, AO</u>	
Date: <u>July 29/11</u>	Start time: <u>13:30</u>	Turbine # <u>BLW-T11-South</u> End Time:	
Weather Conditions: <u>Sunny, 30°C</u>		Field Notes By: <u>CB</u>	
Site Location <u>Hensall Rd - west of Centennial</u>			
UTM Co-ordinates			
Easting: <u>0466467</u>	Northing: <u>4815627</u>	Description: <u>South side</u>	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>- drainage pipe ~ 5m from road - could hear the water fall</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>22.2</u>	AT (°C): <u>30°C</u>	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>7.81</u>	Cond (µs/cm): <u>0.44</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m): <u>100</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>3</u>	Mean Bankfull Width (m): <u>3</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.25</u>	Mean Bankfull Depth (m): <u>0.30</u>	Left Bank	Right Bank
		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>v. slow moving.</u>			
Notes:			

AECOM

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## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

cl, sl, mk noted by  
edge - low turbid  
to view further up/s

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Instream Cover (%)

40

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				100		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- floating, emergent + submergent  
(arrowhead, duckweed noted)  
grasses

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

Herbaceous

Other

90 10

Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- flat

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

July 29/11

BLW - TU

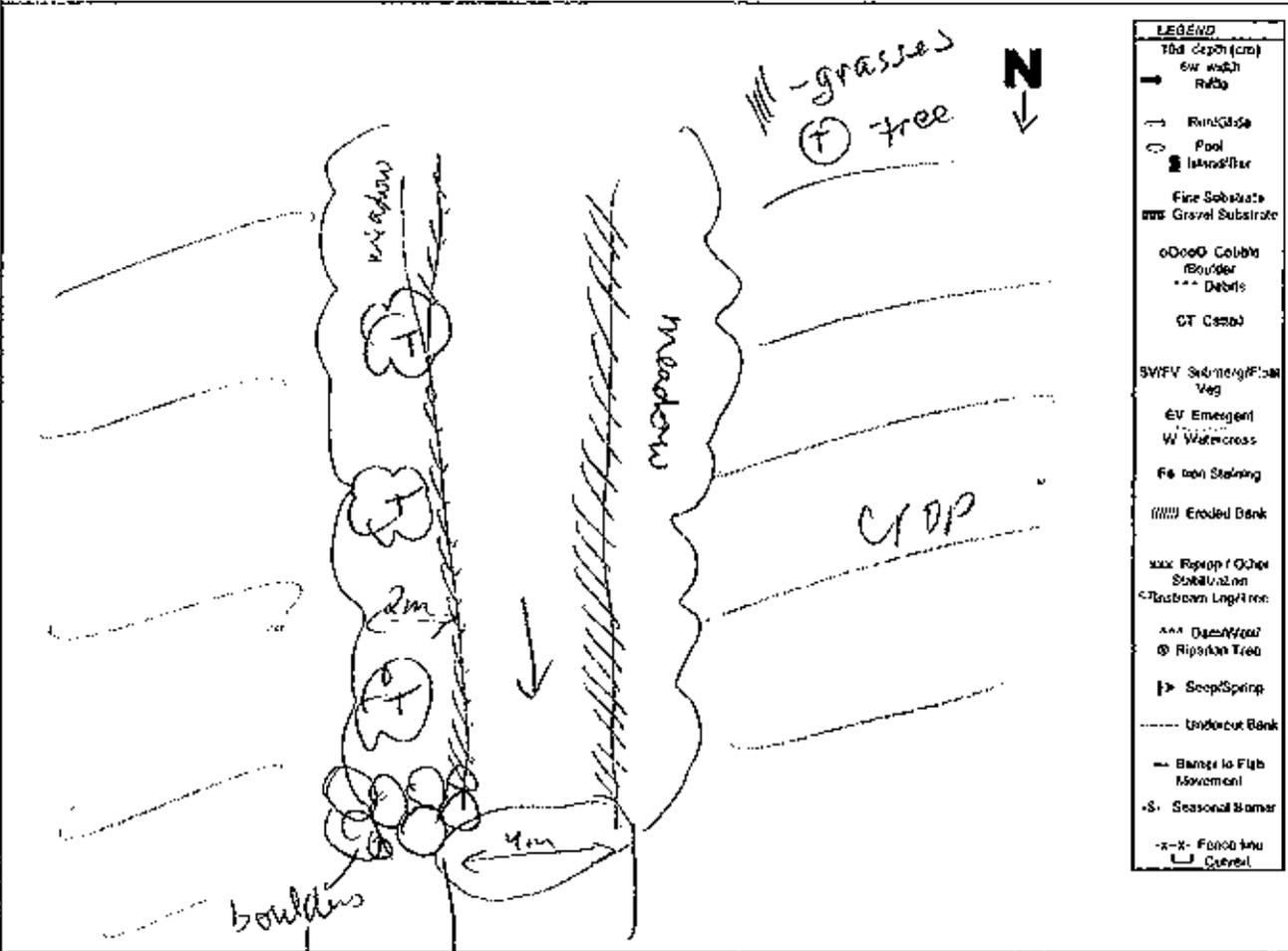
Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log			
Picture #	Description	Picture #	Description
1	overview		
2	"		
3	culvert.		

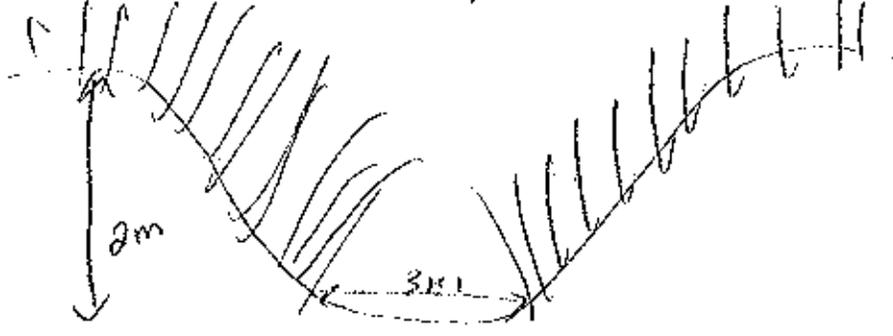
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW-T11-South



LEGEND	
--- (shaded)	Bed Depth (cm)
--- (dotted)	Sw. width
--- (solid)	Rubble
--- (dashed)	Bank/Glaze
○	Pool
□	Island/Bar
---	Fine Substrate
---	Gravel Substrate
○	Cobble
○	Boulder
---	Debris
○	OT Canal
---	SWFV Seeding/Plant
---	Veg
---	EV Emergent
---	W Watercross
---	Fa. top Staining
---	Eroded Bank
---	Reprop / Other Stabilization
---	Transect Long/Short
---	Dam/Wall
○	Riparian Tree
---	Seep/Spring
---	Undercut Bank
---	Barrier to Fish Movement
---	Seasonal Barrier
---	Flood Area
---	Channel

Horizontal View of Channel possible drainage from road



AECOM		Page 1 of 4			
Field Crew: CB, AD		General Information			
Study Area: Jericho Goshan <u>Bluewater</u> Land Parcel#	Turbine #	BLW T12-East			
Date: July 29, 2011	Start Time:	End Time:			
Weather Conditions: 80% cc, windy rain in A.M.	Field Notes By:	A. Daft			
Site Location					
Staffa rd, North of Kippen					
UTM Co-ordinates					
Eastings: 0463253	Northings: 4815774	Description: water quality location			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Eastings:	Northings:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)					
Erie drains from west side + south side and on southeast corner in bend. Only water coming out of south side drain.					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): 19.3	AT (°C): 22	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: 7.95	Cond (µs/cm): 1.21	Iron Staining <input checked="" type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: water clarity = rocky iron colour. water quality taken in side channel N-S direction					
Stream Morphology					
Site Length (m): ~150m	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 1.8	Mean Bankfull Width (m): <del>2.8</del> 3.0	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.18	Mean Bankfull Depth (m): <del>0.25</del> 0.50	Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: No flow - stagnant (or very little flow). Assume flowing NE					
Notes: Riparian buffer ~1m width					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

MK

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				97		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

watercress + submergent veg

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-60%  0%   
60-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses 100 Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

## Notes:

Most canopy cover outside channel is overhanging grass, but cover within channel (~97% of cover) is submergent veg

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description: culverts near tile drains are perched.

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

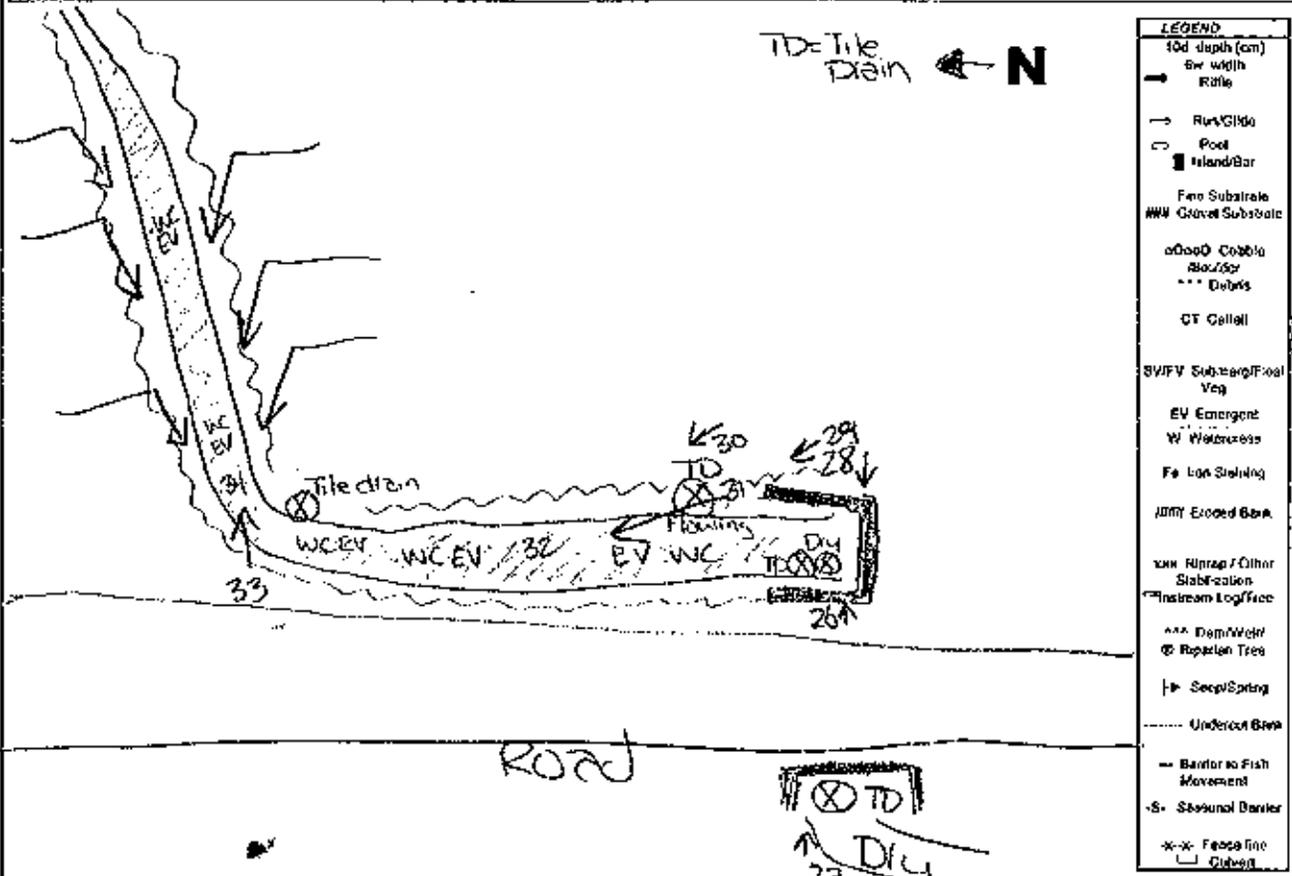
Yes

No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW T12 East



ROAD



Horizontal View of Channel



AECOM

Field Crew: CB, AD

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel# Turbine # BLW-T13-A  
 Date: July 29/11 Start time: 8:30 End Time:

Weather Conditions:

Sunny \*

Field Notes By:

CB

## Site Location

Staffa Rd. - west of Division Ln.

## UTM Co-ordinates

Easting: 0461160 Northing: 4815642 Description: ~~middle~~ middle of site.  
 Easting: Northing: Description:  
 Easting: Northing: Description:  
 Easting: Northing: Description:

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other:

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

- drainage pipe - west end of site

## In-Situ Water Quality

WT(°C): 20.3 AT(°C):  
 pH: 7.04 Cond (µs/cm): 9.54  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes:

↳ slightly turbid.

## Stream Morphology

Site Length (m): 6.0m

Bank Stability:

## Channel Dimensions

		Bank Stability			
		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m):	0.6	Mean Bankfull Width (m):	0.8	Left Bank	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Mean Wetted Depth (m):	0.15	Mean Bankfull Depth (m):	0.35	Right Bank	<input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>

Flow Description:

moderate flow

Notes:

**Stream Morphology (continued)**

**Substrate (< = >)**

- Ba - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

**Description**

MK > cl

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
		100	

**Habitat**

**Instream Cover (%)**

85

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				800		

**\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)**

grasses, emergents

**Canopy Cover (% closed cover):**

- 100-80%
- 90-60%
- 60-30%

- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_
- Grasses 100
- Shrubs \_\_\_\_\_
- Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

**Notes:**

- overhanging grasses

**Obstructions to Fish Passage**

No Obstructions

Natural

Man-Made

**Description:**

- perciled drain  
not inline

**Drainage Features within Study Area**

**Observations of Land Topography within 120 m buffer area:**

- flat

**Terrestrial features Present**

Yes

No

**Terrestrial Recon Form Filled out**

Yes

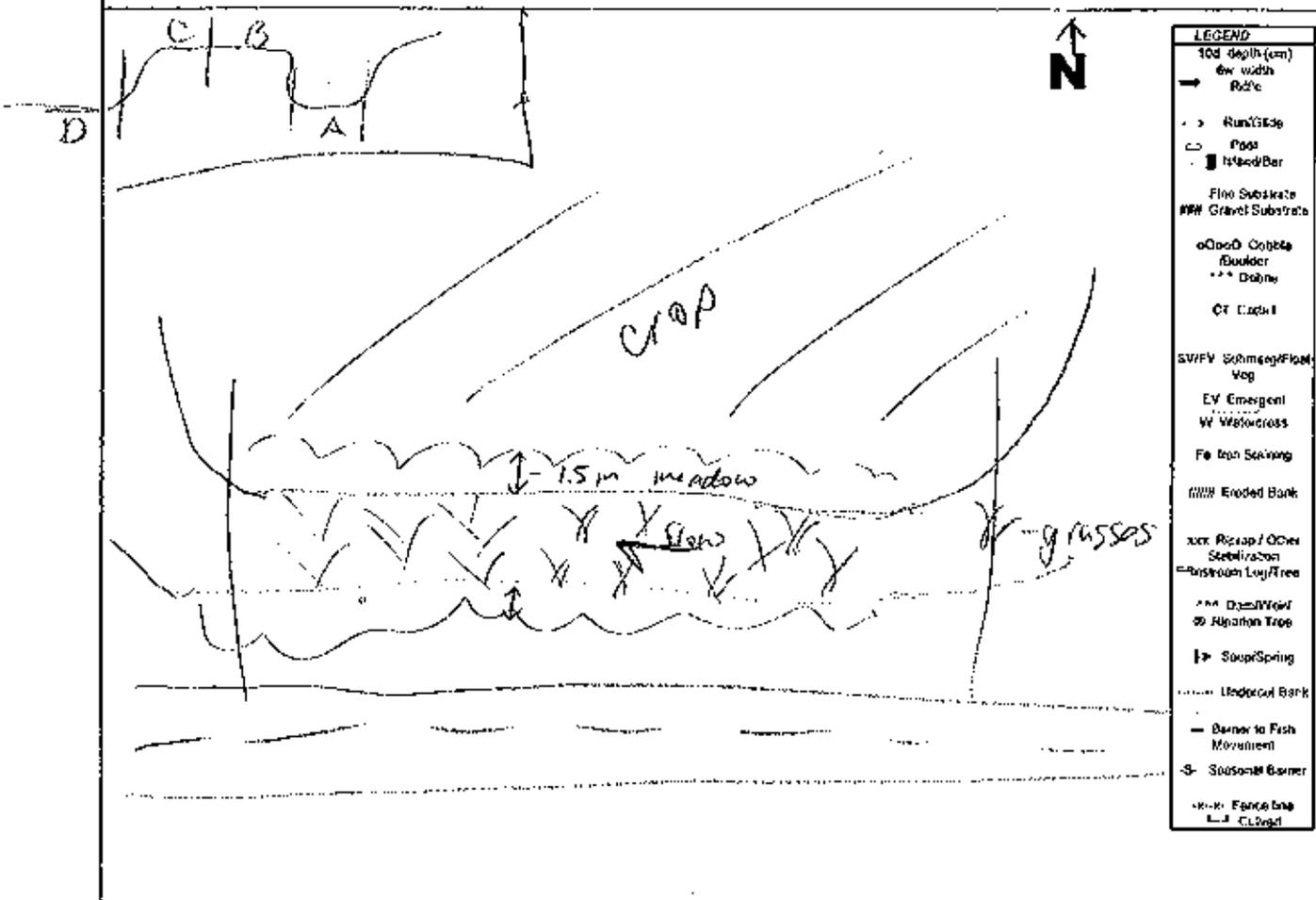
No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-T13-A



Horizontal View of Channel



AECOM

Field Crew: CB

## General Information

Study Area: Jericho Goshgob Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW-T13B  
 Date: Aug 9, 2011 Start time: 9:30 End Time: \_\_\_\_\_

Weather Conditions:

Overcast

Field Notes By:

CB

## Site Location

Morrison Line and Staffa Road.

## UTM Co-ordinates

Easting: 0460804 Northing: 4815684 Description: Roadside.

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other: \_\_\_\_\_

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

- tile drain pipe noted on North side (residential side)
- tile drain on South side (agri side) blowing - minimal

## In-Situ Water Quality

WT(°C): 20.07 AT(°C): 20°C  
 pH: 7.33 Cond (µs/cm): 0.599  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercross  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

-small patchNotes: rainfall early morning

## Stream Morphology

Site Length (m): ~50m

Bank Stability:

## Channel Dimensions

Mean Wetted Width (m):	<u>2.5</u>	Mean Bankfull Width (m):	<u>3.5</u>
Mean Wetted Depth (m):	<u>0.35</u>	Mean Bankfull Depth (m):	<u>0.65</u>

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flow Description:

no notable flow

Notes:

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Co &gt; bo &gt; gr &gt; sa &gt; si

## Notes:

large pool at base of culvert

## Morphological Structure (%)

Pool	Riffle	Run	Fat
10			90

## Instream Cover (%)

80

## Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		5	20	75		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- grasses, overgrown grasses

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Types of Cover (% cover)

Trees

2

Shrubs

Man-made structures

Grasses

~~2~~  
98

Herbaceous

Other

## Notes:

well veg banks.

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

flat topography in area

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

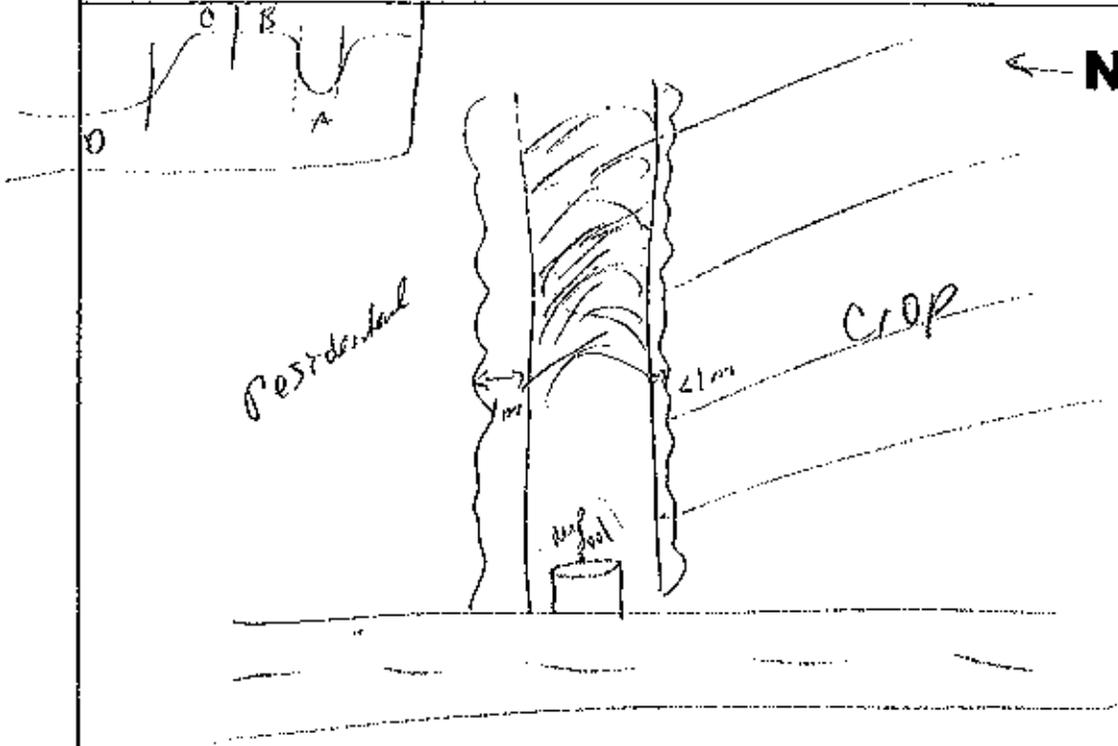
Yes

No



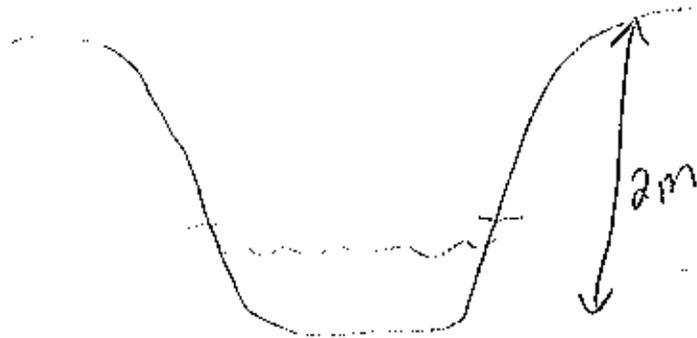
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# \_\_\_\_\_ Turbine # BLW-T.13.B



LEGEND	
Top (bottom)	Gr width
→	Flow
→	Runoff
□	Pool
▭	Structure
—	Fine Substrate
---	Gravel Substrate
○	Cobble
○	Boulder
***	Debris
CT	Canal
SV/FV	Submerged/Vegetation
EV	Emergent
W	Watercross
F	Iron Storing
	Eroded Bank
xxx	Barriers/Other Stabilization
	Instream Log/Tree
***	Open/Vegetation
⊗	Riparian Tree
→	Seep/Spring
---	Undercut Bank
—	Barrier to Fish Movement
- - -	Seasonal Barrier
- - -	Fence Line
—	Channel

Horizontal View of Channel



AECOM		Page 1 of 4	
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel#		Field Crew: <u>C. Bolos + A. Darr</u>	
Date: <u>Aug 9, 2011</u> Start time: <u>11:30</u>		Turbine # <u>BLW TTB-C</u> End Time: <u>11:50</u>	
Weather Conditions: <u>light rain, 15 C</u>		Field Notes By: <u>DART</u>	
Site Location: <u>Morrison Line north of Staffa rd.</u>			
UTM Co-ordinates			
Easting: <u>0460793</u> Northing: <u>94814684</u>		Description: <u>West from road</u>	
Easting: _____ Northing: _____		Description: _____	
Easting: _____ Northing: _____		Description: _____	
Easting: _____ Northing: _____		Description: _____	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other: _____			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>N/A</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>—</u>	AT (°C): <u>15</u>	Watercress <input checked="" type="checkbox"/> <u>RB</u>	Bank Seepage <input type="checkbox"/>
pH: <u>—</u>	Cond ( s/cm): <u>—</u>	Iron Staining <input type="checkbox"/>	Nona <input checked="" type="checkbox"/> <u>A.D.</u>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: <u>water quality taken @ BLW TTB-B - east side of road.</u>			
Stream Morphology			
Site Length (m): <u>~50</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>2.5</u>	Mean Bankfull Width (m): <u>3.0</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.40</u>	Mean Bankfull Depth (m): <u>0.60</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Stagnant - no visible flow</u>			
Notes: <u>Minnows observed.</u>			

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Gr > MK > Co

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
10			90

Instream Cover (%)

80%

Habitat

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			5	40		55% - overhanging grass + shrubs

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses + WC

Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

Types of Cover (% cover)

Trees

Shrubs

20

Man-made structures

Grasses

80

Herbaceous

Other

Notes:

farm drainage ditch - all grass cover

Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat.

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

RLW-T13C

Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log			
Picture #	Description	Picture #	Description
3	overview		
4	WC		
5	conduit - CSP		

Watercourse Sketch

Study Area:

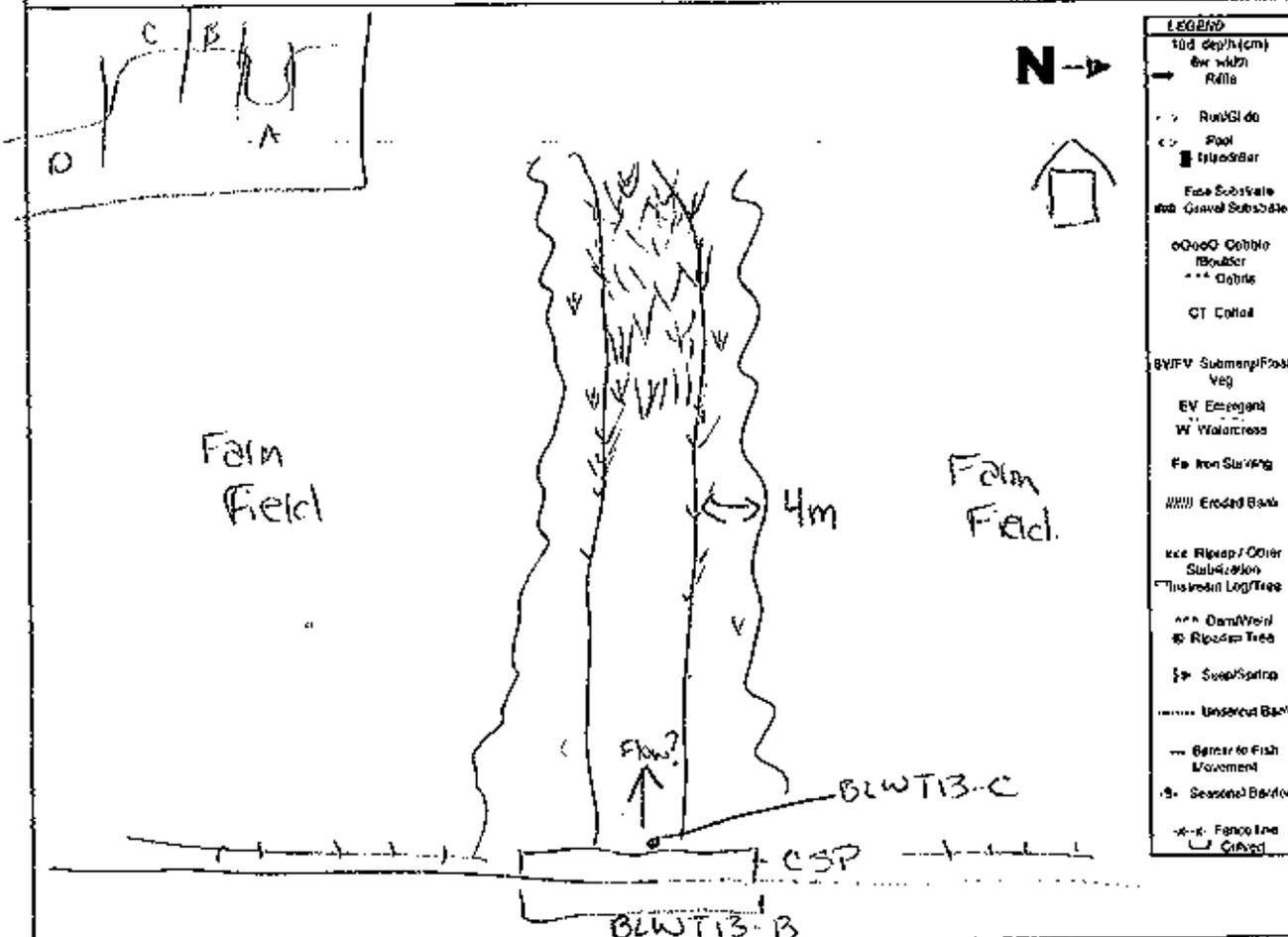
Jericho

Goshen

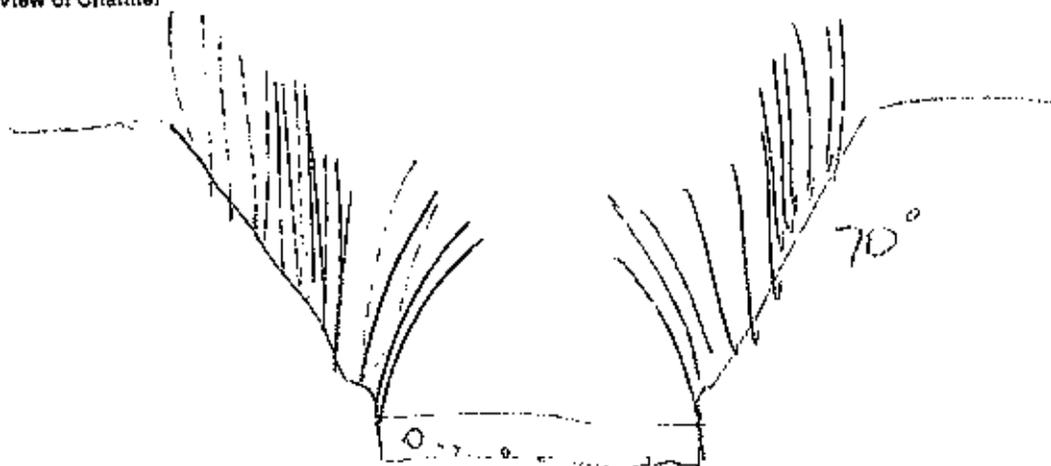
Bluewater Land Parcel#

Turbine #

BLWT13-C



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew:		General Information	
Study Area: Jericho <u>Goshen</u> Bluewater Land Parcel#	Turbine # <u>BLWT13D</u>		
Date: <u>Aug 9, 2011</u>	Start time:	End Time:	
Weather Conditions: <u>Overcast</u>	Field Notes By: <u>CB</u>		
Site Location: <u>Staffe Road</u>			
UTM Co-ordinates			
Easting: <u>0460430</u>	Northing: <u>4815522</u>	Description: <u>adjacent</u>	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overlend flow)			
<u>- drainage pipe located on south side</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>19.5</u>	AT (°C):	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>7.34</u>	Cond (µm/cm): <u>0.499</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m): <u>~50m</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>0.7</u>	Mean Bankfull Width (m): <u>1.0</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.05</u>	Mean Bankfull Depth (m): <u>0.15</u>	Left Bank <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description:			
Notes: <u>widener of erosion and slumping on left bank, but entire reach very well veg banks</u>			

**AECOM**

Page 2 of 4

**Stream Morphology (continued)**

**Substrate (< = >)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

5.77 gr ~~dt~~

Notes:

Morphological Structure (%)			
Pool	Rifle	Run	Flat
		100	

**Habitat**  
Instream Cover (%) 85

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			10	<del>80</del>		overhanging - 10

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

- grasses

**Canopy Cover (% closed cover):**

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_
- Grasses 100
- Shrubs \_\_\_\_\_
- Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

Notes:

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

- flat

- Terrestrial features Present** Yes  No
- Terrestrial Recon Form Filled out** Yes  No

AECOM

Aug 9/11

BLW T13 D

Page 3 of 4

## Other General Comments Regarding the Study Area:

- receives roadside drainage - pipe noted

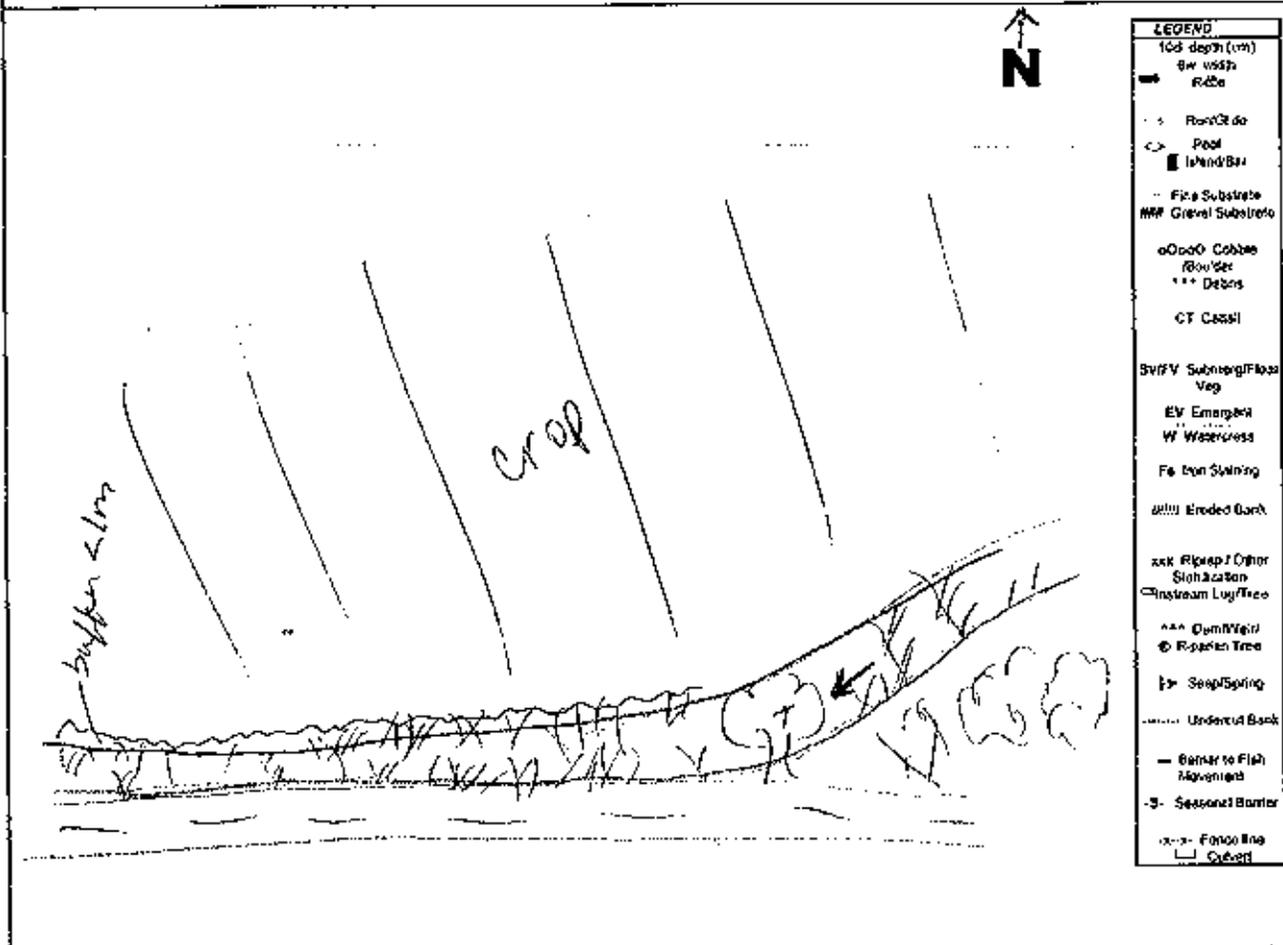
## Photo log

Picture #	Description	Picture #	Description
6	overview - east		
7	overview - west		
8	stream bed		
9	pipe		

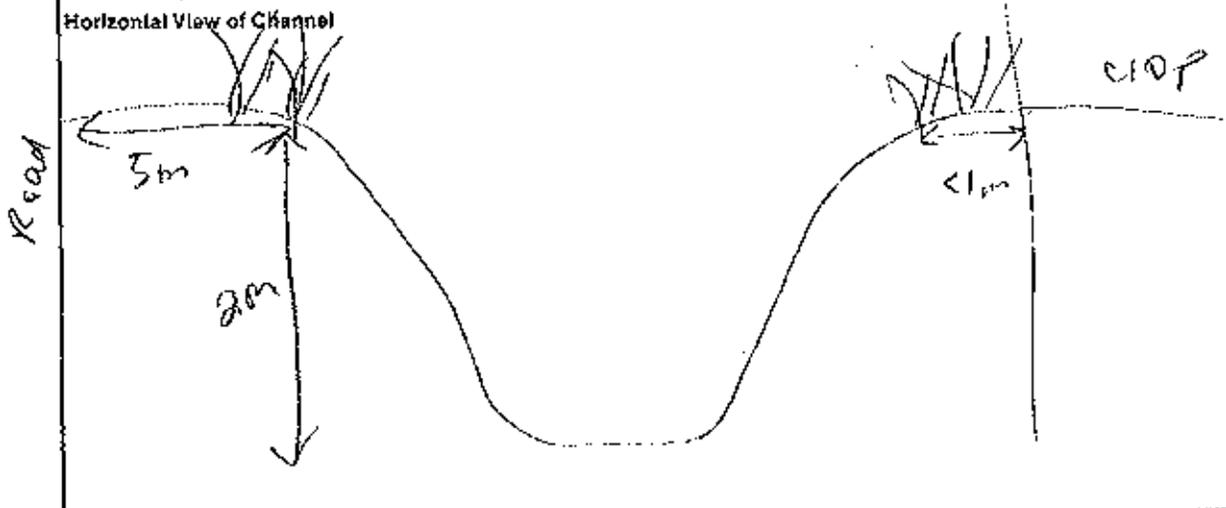
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel#

Turbine # BLW-T13-P



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: CB, AD		General Information	
Study Area: Jericho Goshen <u>Bluewater</u> Land Parcel# 1055	Turbine # BLWC7		
Date: Aug 10 / 11	Start time: 11:10	End Time:	
Weather Conditions: Cloudy, 18°C	Field Notes By: CB		
Site Location Staffa Ln - east of Bronson			
UTM Co-ordinates			
Eastings: 1447323	Northing: 4813637	Description: Culvert South side	
Eastings:	Northing:	Description:	
Eastings:	Northing:	Description:	
Eastings:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow) - rolling hills <del>run off</del> drain into valley			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): /	AT (°C): /	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: /	Cond ( s/cm): /	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: WL too low for WQ			
Stream Morphology			
Site Length (m): ~15m		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): ~0.15	Mean Bankfull Width (m): ~0.7	Moderately unstable	Unstable
Mean Wetted Depth (m): ~0.02	Mean Bankfull Depth (m): ~0.3	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: no flow noted			
Notes:			

**Stream Morphology (continued)**

**Substrate (<=>)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

**Description**

*[Handwritten scribble]*  
G + fines

**Notes:**

N/A

Morphological Structure (%)			
Pool	Riffle	Run	Flat

**Instream Cover (%)**

30

**Habitat**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
			50	50		

**\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)**

grasses, algae

**Canopy Cover (% closed cover):**

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees 10
- Grasses 10
- Shrubs 80
- Herbaceous
- Man-made structures
- Other

**Notes:**

**Obstructions to Fish Passage**

- No Obstructions  Natural
- Man-Made

**Description:**

**Drainage Features within Study Area**

**Observations of Land Topography within 120 m buffer area:**

**Terrestrial features Present**

Yes  No

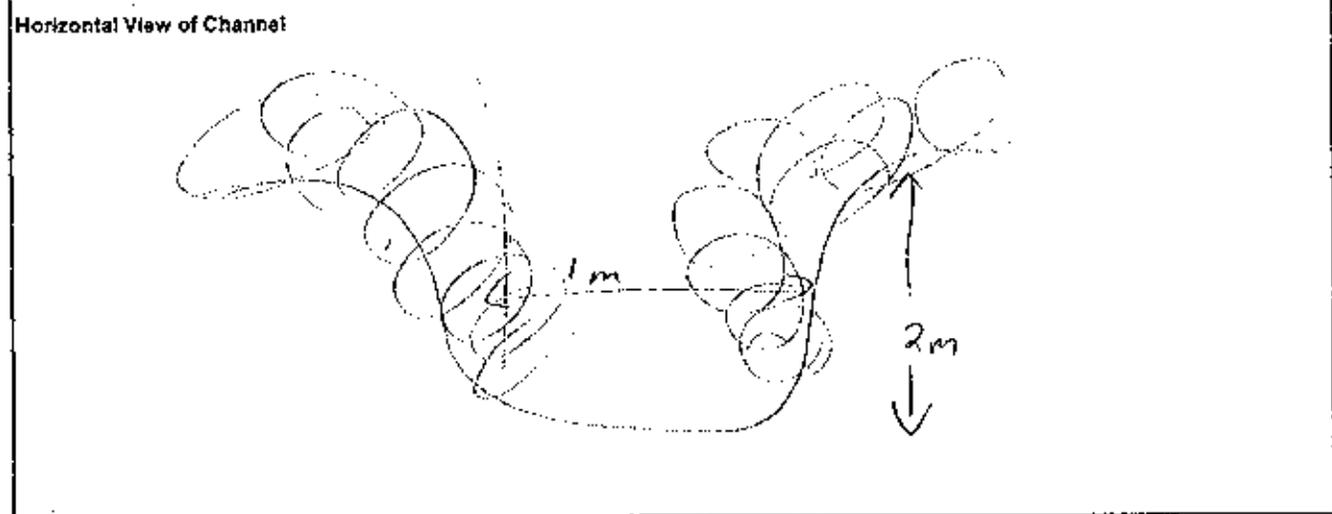
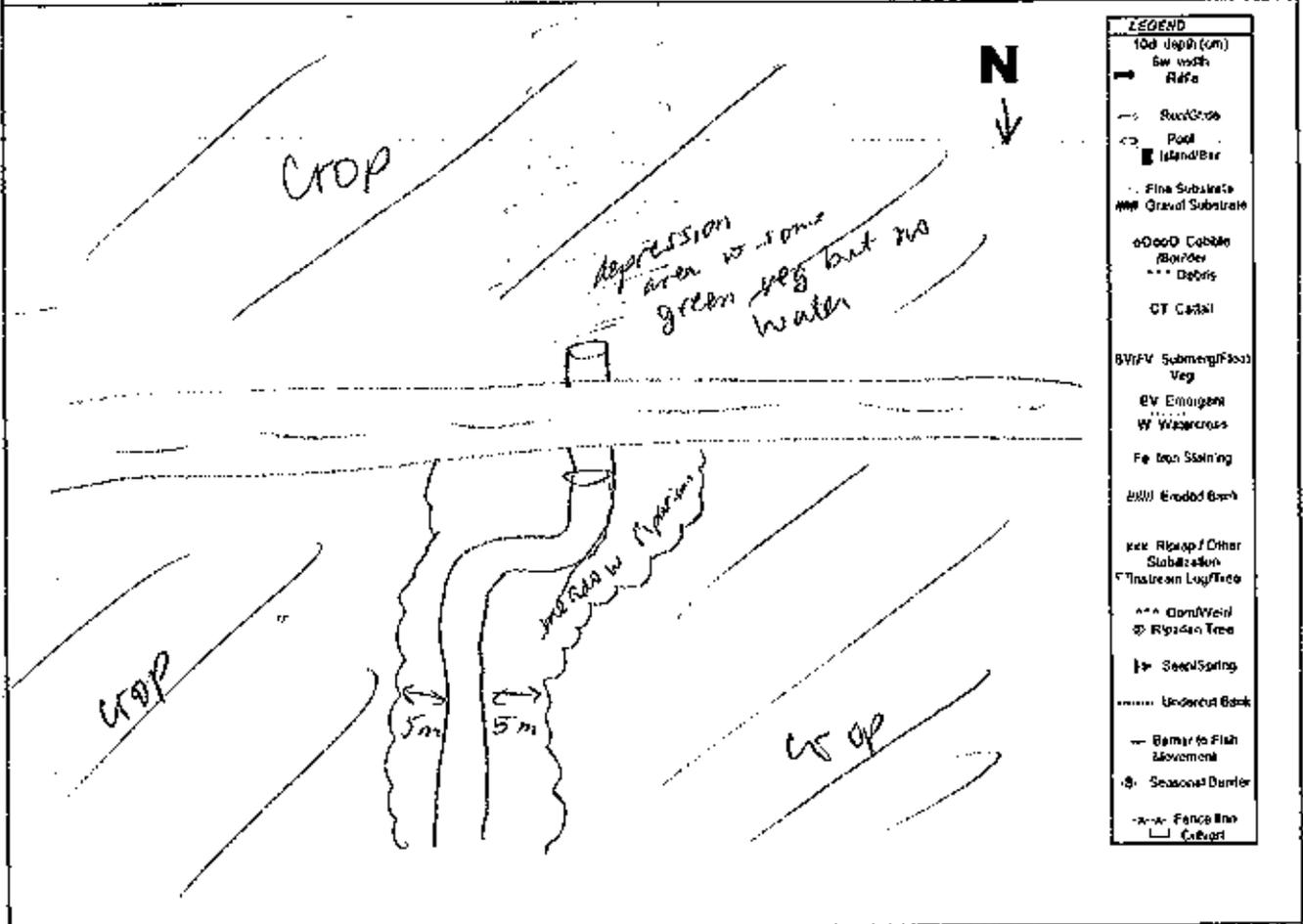
**Terrestrial Recon Form Filled out**

Yes  No



Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1055 Turbine # BLW-C7



AECOM

Field Crew: N. Hodges, A. Steblin

General Information			
Study Area:	Jericho Goshen <u>Bluewater</u>	Land Parcel#	BLW1023
Date:	Sept 28/2011	Start time:	7:15 am
Weather Conditions:	Clear, 16°C	End Time:	7:55 am
Field Notes By:		N. Hodges	

## Site Location

Access from Centennial Rd @ 1km east of Bronson Line

## UTM Co-ordinates

Easting:	Northing:	Description:

Surrounding Landuse/Pollution Sources		Type of Watercourses	
Residential	<input type="checkbox"/>	Meadow	<input type="checkbox"/>
Agriculture	<input type="checkbox"/>	Wetland	<input type="checkbox"/>
Forest	<input checked="" type="checkbox"/>	Livestock	<input type="checkbox"/>
Other:		Intermittent	<input type="checkbox"/>
		Permanent	<input checked="" type="checkbox"/>
		Ephemeral	<input type="checkbox"/>
		Channelized	<input type="checkbox"/>
		Natural Channel	<input checked="" type="checkbox"/>

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

Iron staining, watercress noted. Forested buffer 10-50m wide  
 ↳ artesian flow Overland flow from pasture

In-Situ Water Quality		Ground Water Indicators	
WT (°C):	13°C	Watercress	<input checked="" type="checkbox"/>
pH:	N/A	Iron Staining	<input checked="" type="checkbox"/>
AT (°C):	17°C	Bubbling	<input type="checkbox"/>
Cond (µm):	N/A	Bank Seepage	<input checked="" type="checkbox"/>
Water Clarity:	Clear <input checked="" type="checkbox"/> Turbid <input type="checkbox"/>	None	<input type="checkbox"/>
		Other	<input type="checkbox"/>

Notes: WQ not recorded  
GPS batteries dead

## Stream Morphology

Site Length (m):	300m	Bank Stability:			
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m):	1.25m	Left Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m):	0.4m	Right Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mean Bankfull Width (m):	3.0m				
Mean Bankfull Depth (m):	0.6m				

Flow Description: Minor flow below confluence; trickle above confluence

Notes: Seasonal low flow barriers → riffles 1-2 cm deep  
Stream buried (pastured swale) w/s of forested reach

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Sa = Bo = Co > Gr  
overlying hardpan clay ex-  
posed sporadically

## Morphological Structure (%)

Pool	Rifle	Run	Flat
30	30	30	10

## Notes:

Sinuous channel through variable topography w extensive lateral bank erosion in forested valley

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10%	45%	45%	n/a	n/a	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

n/a except sporadic watercress

## Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

100%

Shrubs

Man-made structures

Grasses

Herbaceous

Other

## Notes:

No overhanging veg.

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

Seasonal low flow

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Rolling topography (pasture & woodland, > agriculture)

## Terrestrial features Present



No

Terrestrial Recon Form Filled out

Yes



Mature FOD (maple-beech) w numerous vernal pools still moist.  
Frogs (<10) observed.

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## Other General Comments Regarding the Study Area:

High quality morphology and habitat structure/cover  
 but highly variable.  
 No fish observed.  
 Evidence of high flows (lateral bank erosion, down-cutting)

## Photo log

Picture #	Description	Picture #	Description
907, 909	Iron staining at d/s end of reach		
908, 918	Rep. channel form		
910	Exposed hand-pm clay		
913	Representative substrate		
915	Confluence to CII trib		
914	Bank erosion		
923	Tile outlets @ WS end of open channel		

Watercourse Sketch

Study Area:

Jericho

Goshan

Bluewater

Land Parcel#

BUW1023

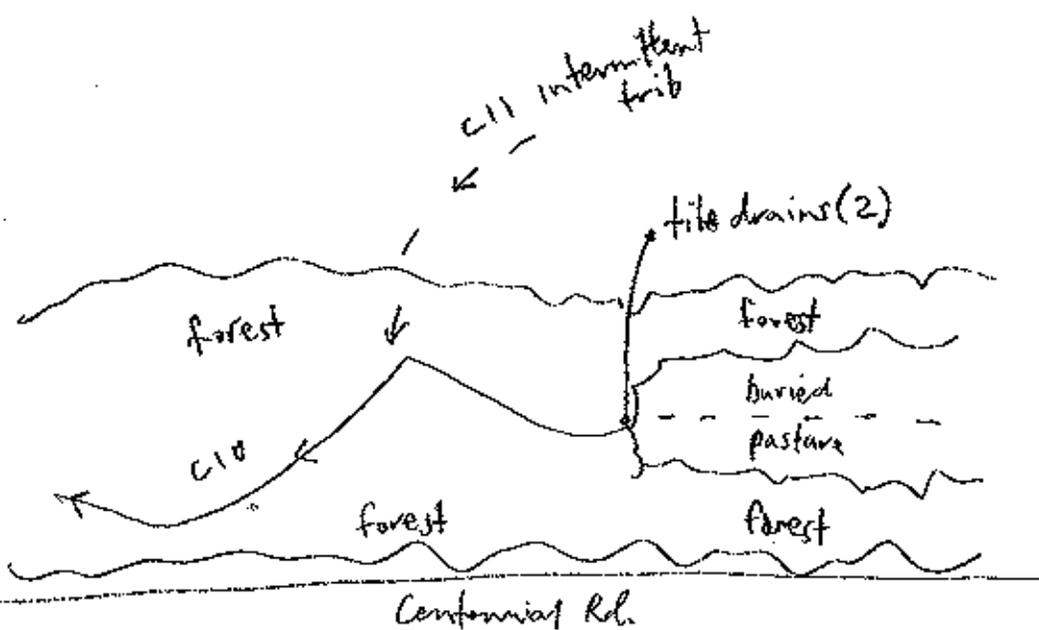
Turbine #

Site

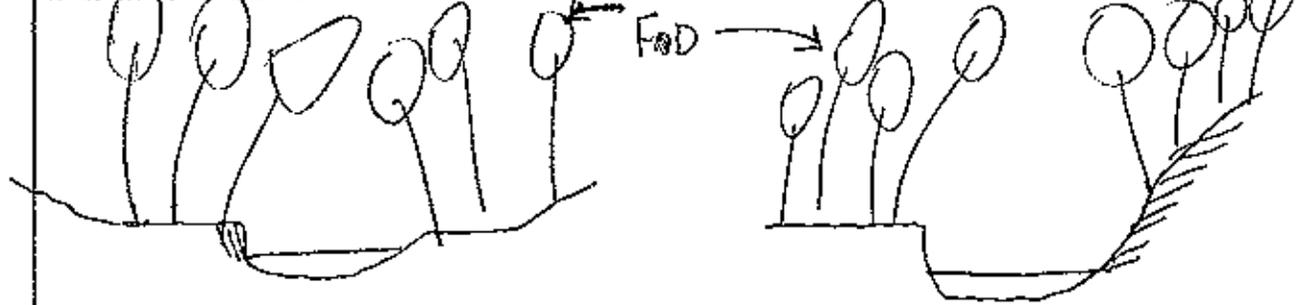
C10



LEGEND	
10d (depth) (cm)	SW (width)
→	Flow
→	Run/Clay
○	Pool
■	Water Bar
○	Fine Substrate
■	Gravel Substrate
○	Cobble
■	Boulder
***	Debris
CT	Canal
BW/FV	Submerged/Veg
EV	Emergent
W	Watercross
F	Iron Staking
	Erosion Bank
AAA	Algae / Other Substrate
□	Stream Log/Tree
AAA	Dead/Weak
⊗	Repaired Tree
⊗	Stump/Spring
.....	Unfaced Bank
-	Barrier to Fish Movement
-S-	Seasonal Barrier
-x-x-	Fenced (No) / Curbed



Horizontal View of Channel



Rep. A  
lateral erosion low tops

Rep. B  
lateral erosion high tops

AECOM

Field Crew: N. Hodges, A. Steblin

General Information					
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel# <u>BLW1023</u>	Turbine # <u>Site C11</u>			
Date: <u>Sept 28/11</u>	Start time: <u>7:55</u>	End Time: <u>8:30</u>			
Weather Conditions: <u>Sunny, breezy, 16°C</u>	Field Notes By: <u>N.H.</u>				
Site Location					
<u>Same as C10</u>					
UTM Co-ordinates					
Eastng:	Northng:	Description:			
Eastng:	Northng:	Description:			
Eastng:	Northng:	Description:			
Eastng:	Northng:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>		
Agriculture <input type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other: <u>Pasture</u>					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)					
In-Situ Water Quality		Ground Water Indicators			
WT (°C): <u>13°C</u>	AT (°C): <u>17°C</u>	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH: <u>n/a</u>	Cond (µm): <u>n/a</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: <u>WQ not recorded</u> <u>GPS batteries dead</u>					
Stream Morphology					
Site Length (m): <u>100m</u>	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>0.7m</u>	Mean Bankfull Width (m): <u>3.3m</u>	Left Bank <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Mean Wetted Depth (m): <u>0.04m</u>	Mean Bankfull Depth (m): <u>0.85m</u>	Right Bank <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description: <u>Intermittent, isolated pools</u>					
Notes: <u>Stream buried (pastured swale) w/s of forested reach</u>					

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Sa &gt; Co = Bo &gt; Gr

Notes:

## Morphological Structure (%)

Pool	Rifle	Run	Flat
30	30	30	10

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5%	30%	30%	n/a	n/a	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

n/a

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
80-30%

## Types of Cover (% cover)

Trees 100% Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses \_\_\_\_\_ Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

Seasonal low flow

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Rolling pasture land + forest

Terrestrial features Present

Yes  No 

FOD (mature sugar maple-beech)

Terrestrial Recon Form Filled out

Yes  No

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Other General Comments Regarding the Study Area:

See c10

## Photo log

Picture #	Description	Picture #	Description
924	Swale w/s of open channel		
925	tile drain w/s end of open channel		
926-928	Rep. substrate, flow morphology		

Watercourse Sketch

Study Area:

Jericho

Goshan

Blowwater

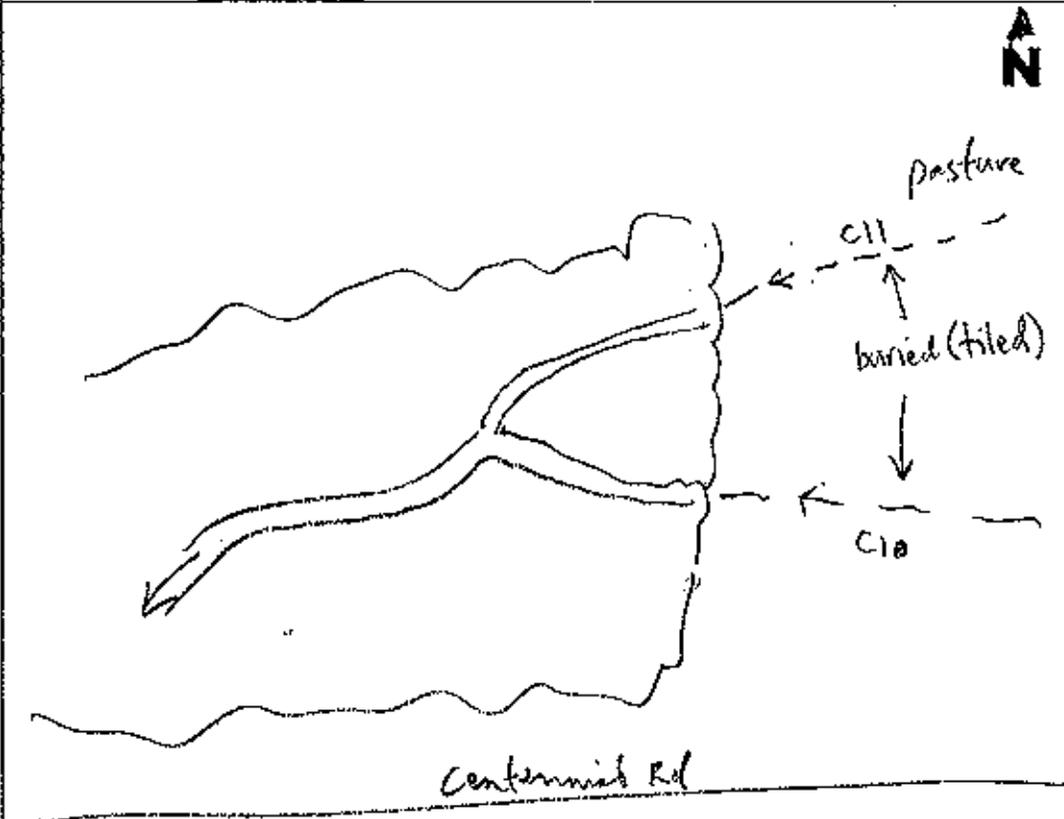
Land Parcel#

BLW1023

Turbine #

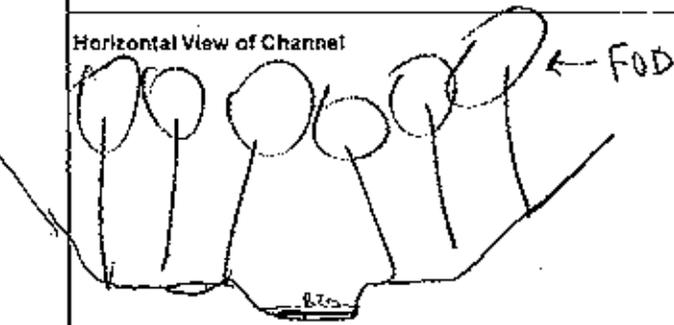
Site

C11



LEGEND	
10d depth (cm)	
5w width	
R/R	
Run/Clad	
Pool	
Inter/Bur	
Fine Substrate	
Gravel Substrate	
o o o Cobble	
o o o Boulder	
* * * Gravel	
CT Canal	
BWFV Submerge/Floa	
Veg	
E/V Emergent	
W Watercress	
Fa Iron Slaking	
Exposed Bank	
Riprap / Other	
Substrate	
Stream Log/Tree	
*** Open Water	
o Poplar Tree	
Seep/Spring	
..... Undercut Bank	
— Barriers to Fish	
Movement	
-B- Seasonal Barrier	
*** Fallow Area	
— Control	

Horizontal View of Channel



AECOM		Field Crew: N. Hodges, A. Steblin	
General Information			
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel# <u>BLW1079</u>	Site Turbine# <u>C34</u>	
Date: <u>Sept 28/11</u>	Start time: <u>9:30</u>	End Time: <u>10:00</u>	
Weather Conditions: <u>Overcast, 16°C</u>		Field Notes By: <u>N. Hodges</u>	
Site Location			
<u>Access from Bronson Ln approx. 500m south of Pavilion Rd</u>			
UTM Co-ordinates			
Eastings:	Northings:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (Include any inputs into the system i.e. lta drainage, seepages, overland flow)			
<u>Overland flow from corn fields, tile drainage from pasture</u> <u>GPS batteries dead</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>14°C</u>	AT (°C): <u>16°C</u>	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>n/a</u>	Cond (µS/cm): <u>n/a</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: <u>Clear</u> <input checked="" type="checkbox"/>	<u>Turbid</u> <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input checked="" type="checkbox"/>
<u>Abundant jewelweed</u>			
Notes: <u>Stream thru cultural woodland and meadow marsh where water -</u> <u>table at/near surface → water = golden-rod = jewelweed</u>			
Stream Morphology			
Site Length (m): <u>70 m</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>0.35 m</u>	Mean Bankfull Width (m): <u>1.1 m</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>3 cm</u>	Mean Bankfull Depth (m): <u>0.25 m</u>	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: <u>Intermittent, Small shallow braided channel thru 40m wide</u> <u>shallow valley between cornfields. Valley bottom meadow marsh</u> <u>w canopy of mid-aged black ash trees. First order trib</u>			
Notes:			

AECOM

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## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
Mk - Muck  
DT - Detritus  
Other

## Description

Si

## Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
30%	10%	10%	50%

low gradient stream

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	n/a	n/a	n/a	n/a	10%	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

n/a

## Canopy Cover (% closed cover):

100-90%

30-1%

90-60%

0%

60-30%

## Type of Cover (% cover)

Trees 80%

Shrubs

Man-made structures

Grasses

Herbaceous 20%

Other

## Notes:

Channel definition variable (mostly defined to some vaguely defined ovals) (and braided sections)

## Obstructions to Fish Passage

No Obstructions Natural Man-Made 

## Description:

Seasonal low flow

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

rolling agricultural cropland (corn)

## Terrestrial Features Present

 Yes

No

Cultural woodland (pine plantation)

## Terrestrial Recon Form Filled out

Yes

 No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

No fish observed.

## Photo log

Picture #	Description	Picture #	Description
931	General view of steep d/s end		
932	Dry channel d/s end		
933	Channel thru meadow marsh aster = goldenrod = jewelweed		
934-935	Rep. channel at d/s end.		

Watercourse Sketch

Study Area:

Jericho

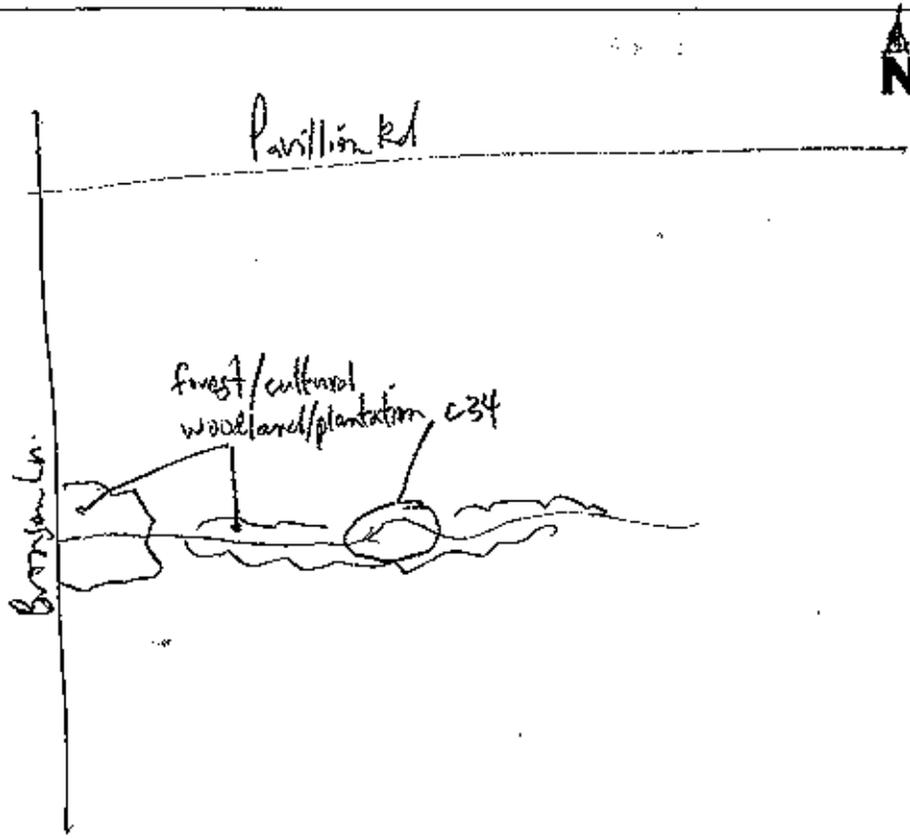
Goshen

Bluewater Land Parcel#

BLW1079

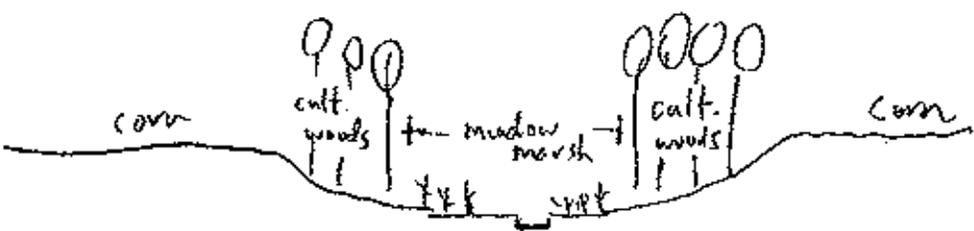
~~Turbid #~~

Site C34



LEGEND	
10d depth (cm)	6w width
→	Subs
→	Run/Glide
○	Pool
■	Intens/Bur
	Fine Substrate
■	Gravel Substrate
○	Cottail
○	Reeds
*	Dobbs
CT	Cottail
SWFV	Sub-emerg/Frost Veg
EV	Emergent
W	Watercress
F	Iron Spring
	Eroded Bank
xxx	Reprop / Other Substitution
○	Stream Log/Tree
***	Down/Walk Riparian Tree
▶	Soap/Spring
---	Unexcavated
—	Barrier to Fish Movement
⊕	Seasonal Barrier
—	Fence Line
□	Culvert

Horizontal View of Channel



AECOM

Field Crew: N. Hodges, A. Stablin

General Information  
 Study Area: Jericho Goshen Bluswater Land Parcel# BLW 1050 Site C35  
 Date: Sept 28/11 Start time: 10:45 am End Time: 11:40 am

Weather Conditions: Partly cloudy, 16°CField Notes By: N. Hodges

## Site Location

Access from Pavillion Rd approx. 500m east of Bronson Ln.

## UTM Co-ordinates

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

## Surrounding Landuse/Pollution Sources

## Type of Watercourse

 Residential   
 Agriculture   
 Forest 

 Meadow   
 Wetland   
 Livestock 

 Intermittent   
 Permanent   
 Ephemeral 

 Channelized   
 Natural Channel 

Other: \_\_\_\_\_

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

Bank seepage in valley wallGPS batteries dead

## In-Situ Water Quality

## Ground Water Indicators

WT (°C): 14°C AT (°C): 15°CpH: n/a Cond (µm): n/aWater Clarity: Clear  Turbid Watercress  Bank Seepage Iron Staining  None Bubbling  Other 

Notes:

WQ not recorded. One small watercress plant. Jewelweed observed.

## Stream Morphology

Site Length (m): 150m

Bank Stability:

## Channel Dimensions

Mean Wetted Width (m): 3.8m Mean Bankfull Width (m): 8.05mMean Wetted Depth (m): 0.12m Mean Bankfull Depth (m): 0.7m

Stable Slightly unstable Moderately unstable Unstable

Left Bank    Right Bank    

Flow Description:

Second order stream. Highly sinuous morphology w evidence of high flows (extensive lateral bank erosion + downcutting). Velocity 3 sec/m in riffle.

Notes:

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
Mk - Muck  
DT - Detritus  
Other

## Description

Co > Gr > Bo > Gr

## Notes:

Textbook morphology

Morphological Structure (%)			
Pool	Rifle	Run	Flat
30%	30%	30%	10%

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10%	30%	45%	n/a	15%	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

n/a

## Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



## Types of Cover (% cover)

Trees

100%

Shrubs

Grasses

Herbaceous

Man-made structures

Other

## Notes:

Darters observed 7.

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Rolling agricultural lands (crops, pasture)

## Terrestrial features Present

Yes

No

Mature deciduous forest (maple-beech)  
w/ occasional vernal pools

Terrestrial Recon Form Filled out

Yes

No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

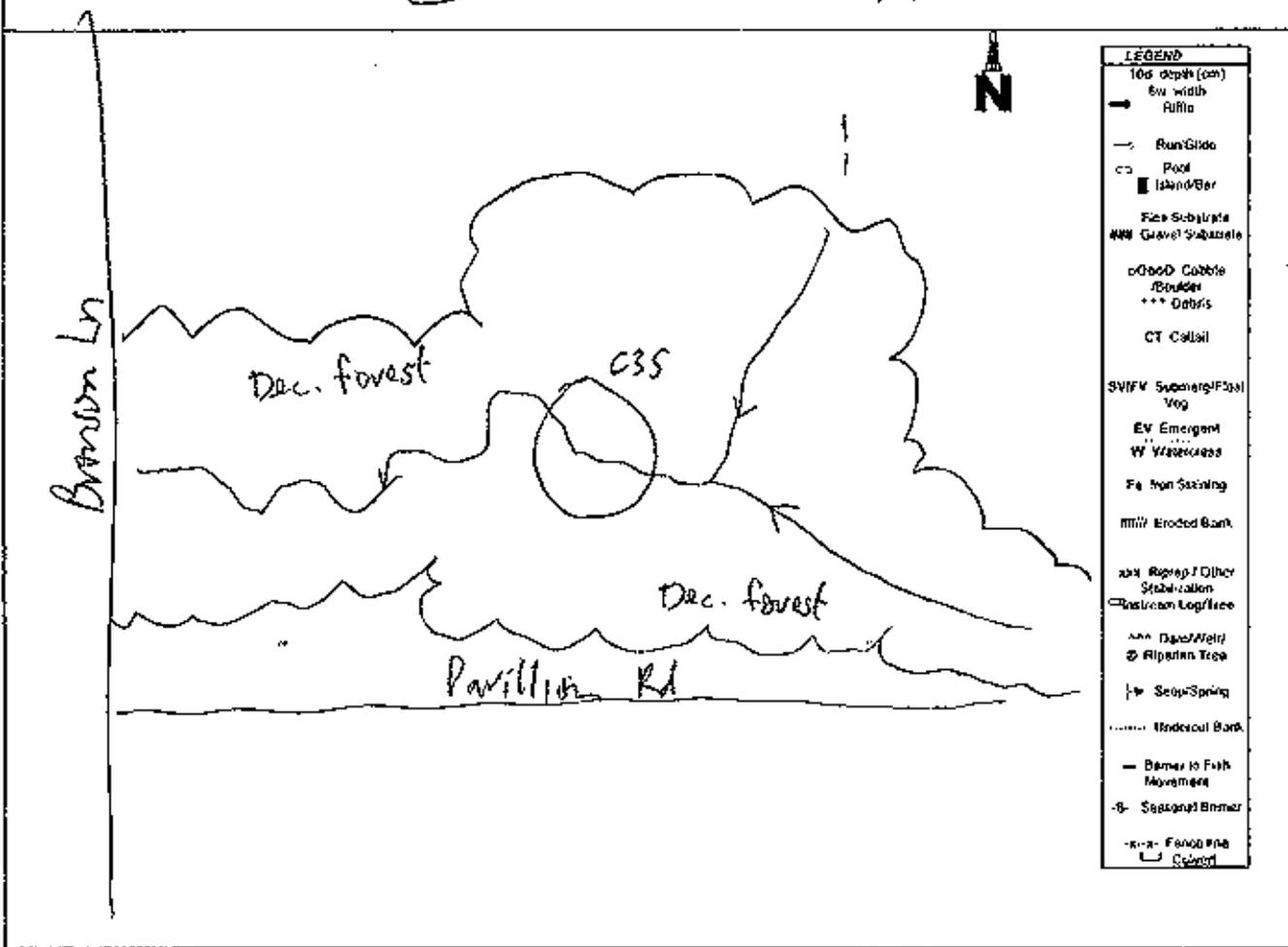
High quality habitat cover / morphology.

## Photo log

Picture #	Description	Picture #	Description
936, 938	Rep. morphology, flow		
937	Rep. substrate		
939	Rep. pool / woody debris		

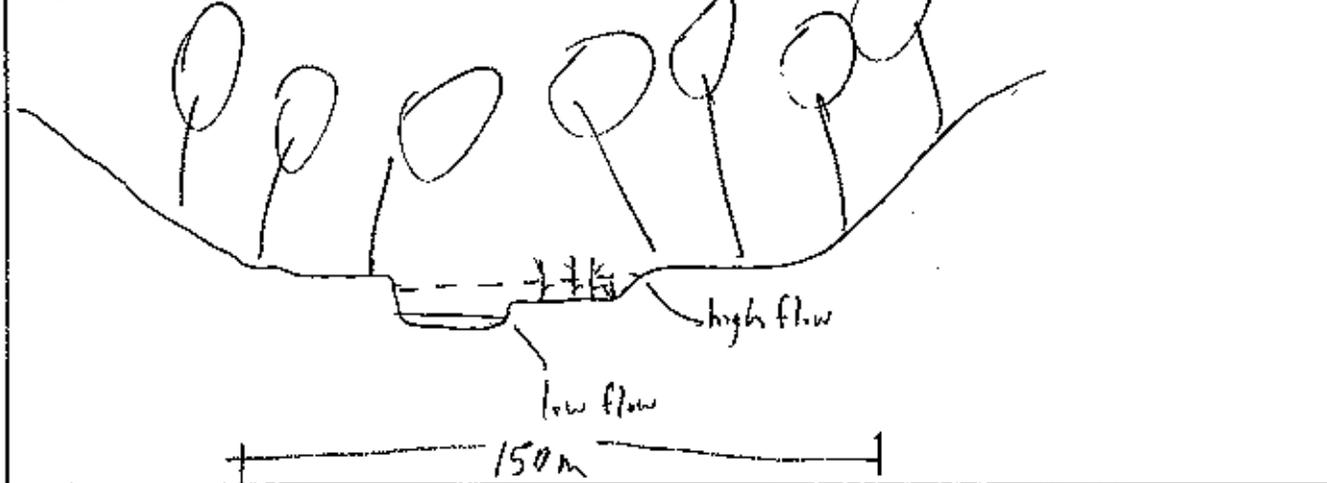
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# BLW 1050 Turbine # C35



LEGEND	
100 depth (cm)	
5m width	
Riffle	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Cobble Boulder	
Debris	
Callail	
Submerged Plant Veg	
Emergent	
Watercress	
Freshwater Snail	
Eroded Bank	
Regrain / Other Stabilization	
Instream Log/Tree	
Downfall	
Algal Mats	
Scum/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence Post	
Corner	

Horizontal View of Channel



AECOM

Field Crew: N. Hodges, A. Steblin

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel# BLW 1087 Turbine # C19  
 Date: Sept 28/11 Start time: 11:30 AM End Time:

Weather Conditions: Partly cloudy, 20°C Field Notes By: N. Hodges

## Site Location

Access from Bronson Ln approx. 100m north of Blue Bluff Rd.

## UTM Co-ordinates

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

## Surrounding Landuse/Pollution Sources

## Type of Watercourse

Residential  Meadow  +pasture  
 Agriculture  Wetland   
 Forest  Livestock

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Other: \_\_\_\_\_

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

Overland flow, seepage

## In-Situ Water Quality

## Ground Water Indicators

WT (°C): 14°C AT (°C): 20°C  
 pH: N/A Cond (µm): N/A  
 Water Clarity: Clear  Turbid

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes: WQ not recorded  
GPS batteries dead

## Stream Morphology

Site Length (m): 300m

## Bank Stability:

## Channel Dimensions

Mean Wetted Width (m): 0.12m Mean Bankfull Width (m): 2.4m  
 Mean Wetted Depth (m): 1.4m Mean Bankfull Depth (m): 0.65m

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Right Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

Flow Description: first order stream, flow velocity 4 sec/m on riffle

Notes: \_\_\_\_\_

Stream Morphology (continued)

Substrate (<=>)

- Bc - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- Mk - Muck
- DT - Detritus
- Other

Description

Sa > Co > Gr = Bc

Morphological Structure (%)			
Pool	Riffle	Run	Flat
45%	15%	10%	30%

Notes:

Low gradient, sinuous channel thru cultural meadows + thickets

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5%	2%	25%	n/a	10%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

n/a

Canopy Cover (% closed cover):

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

Types of Cover (% cover)

- Trees 45%
- Grasses 10%
- Shrubs 45%
- Herbaceous
- Man-made structures
- Other

Notes:

Obstructions to Fish Passage

- No Obstructions  Natural
- Man-Made

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Rolling ranch/pasture land

Terrestrial features Present

- Yes
- No

Cultural meadow/thicket

Terrestrial Recon Form Filled out

- Yes
- No



Watercourse Sketch

Study Area:

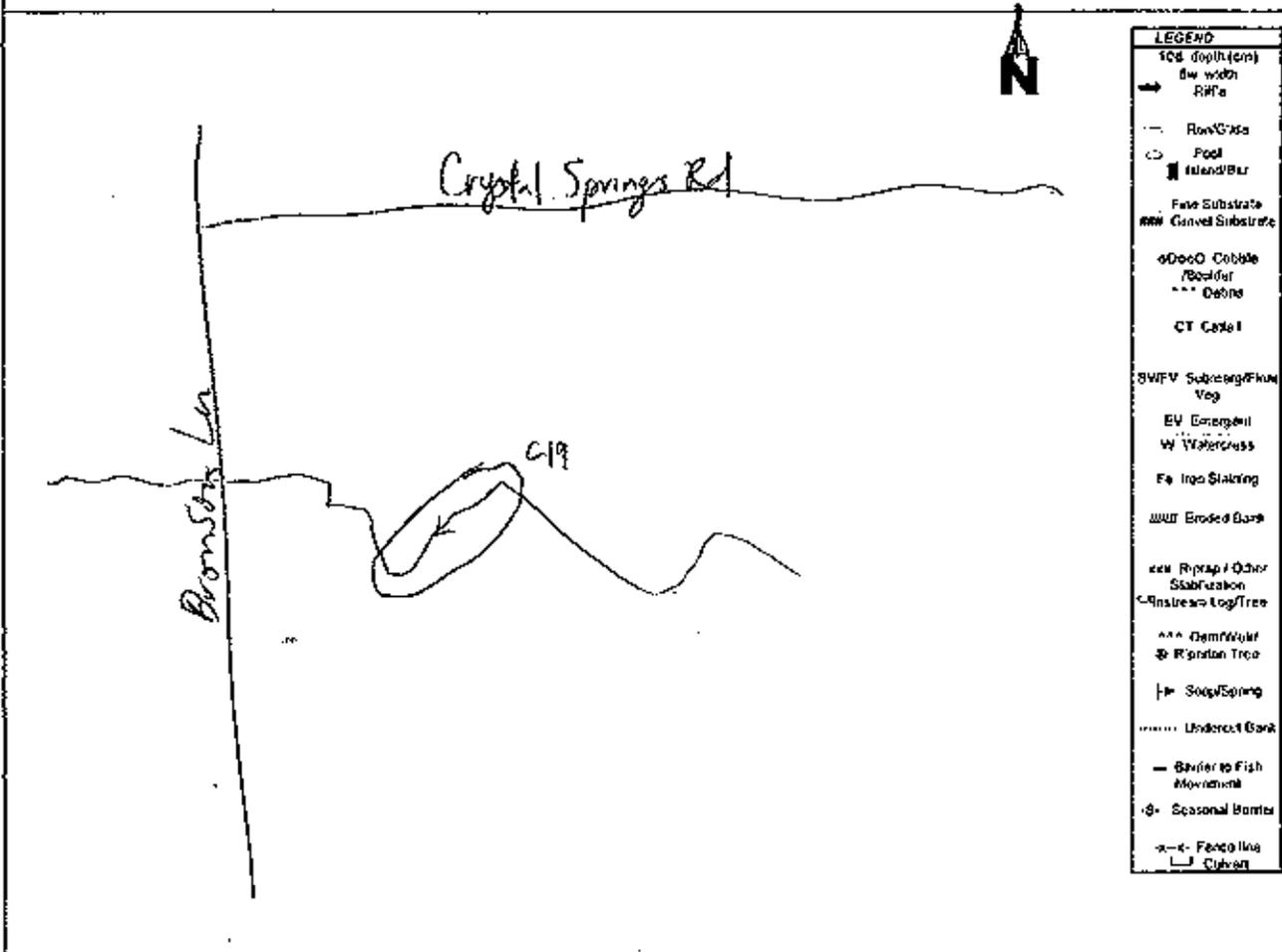
Jencho

Goshen

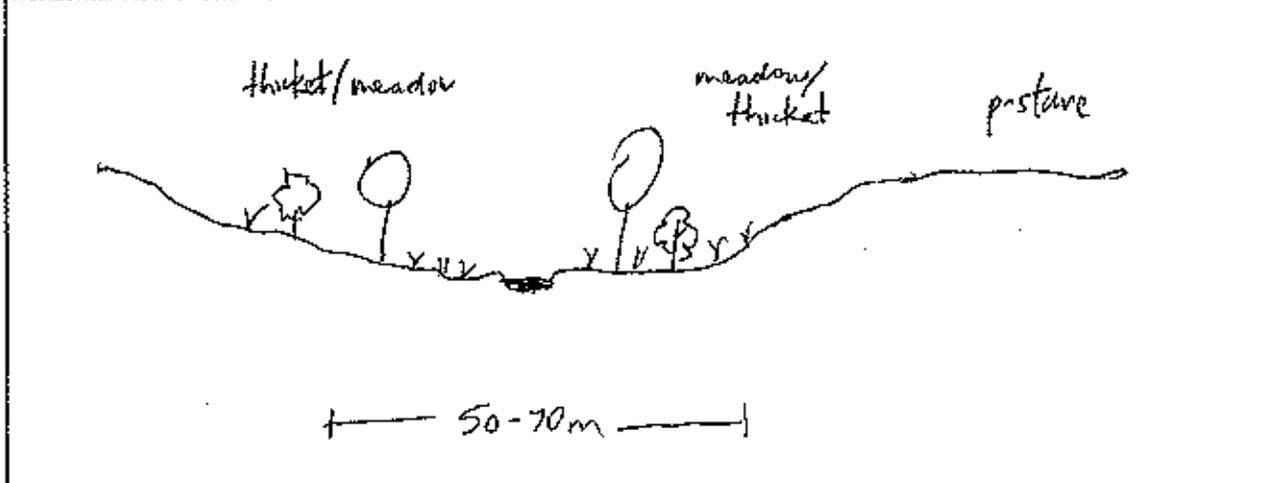
Bluewater Land Parcel# BLW 1087

Turbine #

Site C19



Horizontal View of Channel



AECOM

Field Crew: N. Hodges, A. Stebbins

## General Information

Study Area: Jericho Goshen Bioswale Land Parcel# BLW 1065 Tract # Site C21  
 Date: Sept 28/11 Start time: 11:30pm End Time:

Weather Conditions:

Sunny 20°C

Field Notes By:

N. Hodges

## Site Location

Access from Bronson Ln approx. 500m south of Crystal Springs Rd.

## UTM Co-ordinates

Easting:	Northing:	Description:

## Surrounding Landuse/Pollution Sources

Residential	<input type="checkbox"/>	Meadow	<input checked="" type="checkbox"/>
Agriculture	<input type="checkbox"/>	Wetland	<input checked="" type="checkbox"/>
Forest	<input checked="" type="checkbox"/>	Livestock	<input type="checkbox"/>

## Type of Watercourse

Intermittent	<input type="checkbox"/>	Channelized	<input type="checkbox"/>
Permanent	<input checked="" type="checkbox"/>	Natural Channel	<input checked="" type="checkbox"/>
Ephemeral	<input type="checkbox"/>		

Other:

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

Overland flow, seepage

## In-Situ Water Quality

WT (°C):	<u>14°C</u>	AT (°C):	<u>20°C</u>
pH:	<u>n/a</u>	Cond (µm):	<u>n/a</u>
Water Clarity:	Clear <input checked="" type="checkbox"/>	Turbid	<input type="checkbox"/>

## Ground Water Indicators

Watercress	<input checked="" type="checkbox"/>	Bank Seepage	<input checked="" type="checkbox"/>
Iron Staining	<input type="checkbox"/>	None	<input type="checkbox"/>
Bubbling	<input type="checkbox"/>	Other	<input type="checkbox"/>

Notes:

Floodplain saturated; sensitive fern abundant  
WQ not recorded; GPS batteries dead

## Stream Morphology

Site Length (m):	<u>400m</u>	Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m):	<u>1.6m</u>	Moderately unstable	Unstable
Mean Wetted Depth (m):	<u>0.12m</u>	Left Bank	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Mean Bankfull Width (m):	<u>4.1m</u>	Right Bank	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input checked="" type="checkbox"/>
Mean Bankfull Depth (m):	<u>0.55m</u>		

Flow Description:

First order trib. Flow velocity 65/m at riffle

Notes:

Yoy cyprinids observed  Adult cyprinids    
 Red algae observed

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Debris  
Other

## Description

Sa &gt; Co = Gr &gt; Bo &gt; Si

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
30%	30%	30%	10%

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	30%	5%	35%	NA	15%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Red algae observed sporadically

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-60%  0%   
60-30%

## Types of Cover (% cover)

Trees 100% Shrubs \_\_\_\_\_  
Grasses \_\_\_\_\_ Herbaceous \_\_\_\_\_  
Man-made structures \_\_\_\_\_  
Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat to rolling agriculture (hay)

Terrestrial features Present

Yes

No

Deciduous swamp/forest

Terrestrial Recon Form Filled out

Yes

No

AECOM

Page 3 of 4

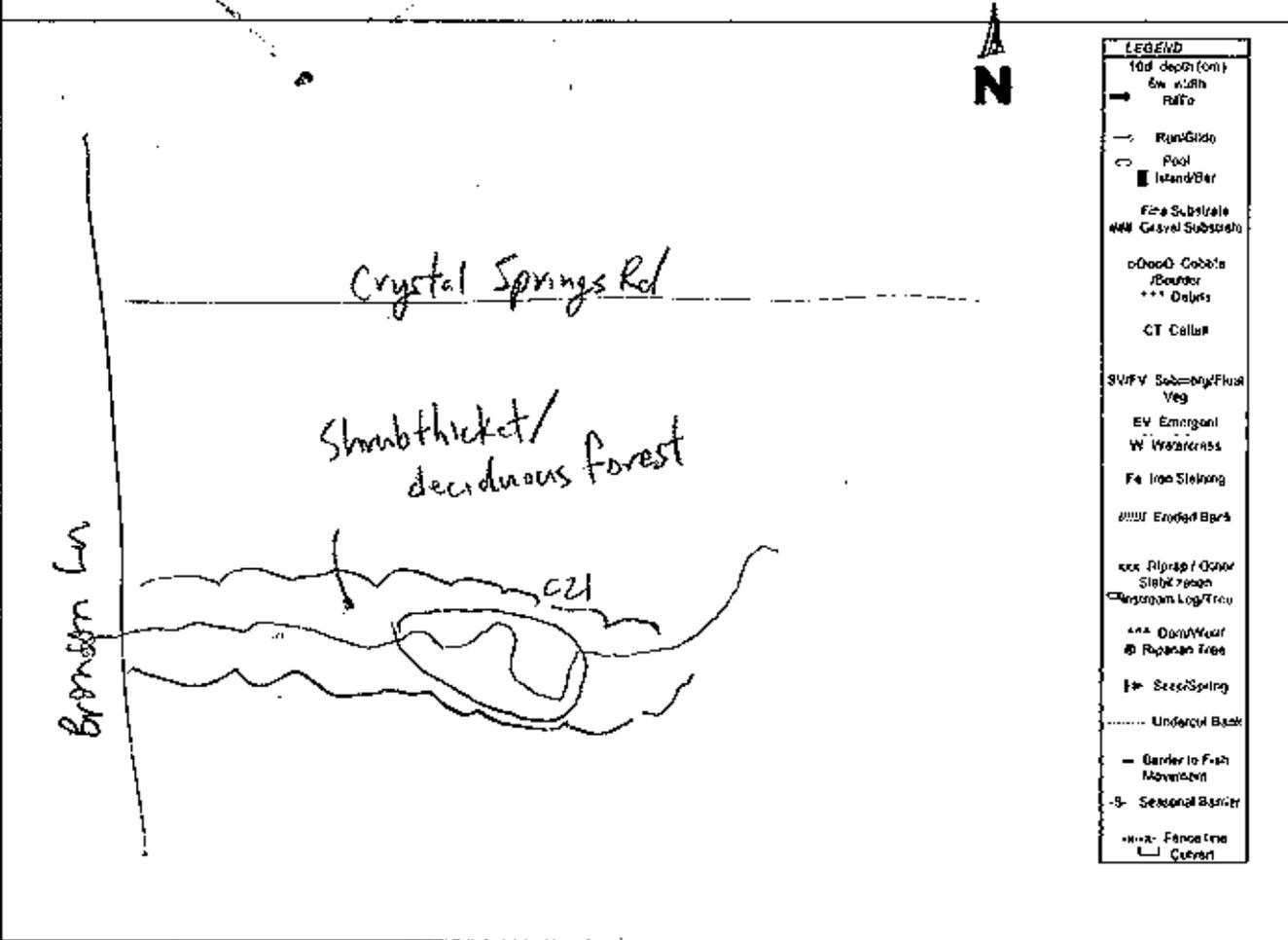
Other General Comments Regarding the Study Area:

## Photo log

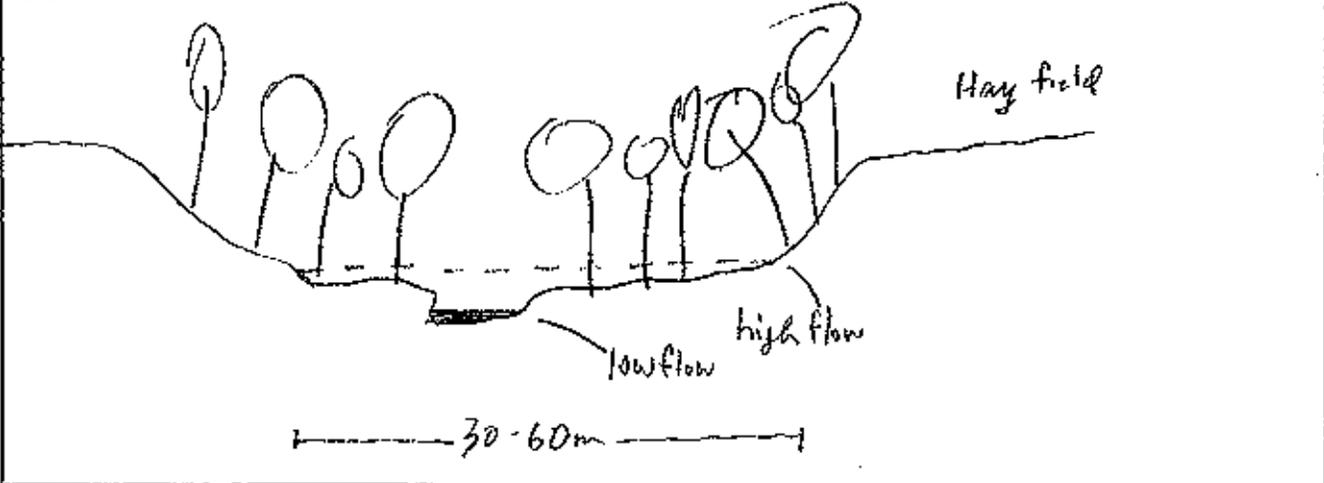
Picture #	Description	Picture #	Description
947, 948 952, 955	Rep. channel, flow		
949	Rep. woody debris cover		
950	Unidentified substance		
951	Rep. bank seepage		
953	Rep. substrate		
954	Minnows		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# BLW 1065 Turbine # C21



Horizontal View of Channel



AECOM		Field Crew: N. Hodges, A. Steblin	
General Information			
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel#: 1042	Turbine #: Site C25	
Date: Oct 5/11	Start time: 9:00 am	End Time: 9:30 am	
Weather Conditions: Sunny, calm 12°C	Field Notes By: N. Hodges		
Site Location			
Access from Centennial Ln. approx. 1 km west of Babylon Ln.			
UTM Co-ordinates			
Eastings:	Northings:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	Agricultural drain
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
Tile drainage from 2 corn fields immediately adjacent to drain GPS malfunctioning			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 12°C	AT (°C): 12°C	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: ~	Cond (µm): ~	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: Watercross noted @ west end of reach 40m d/s of tile drain			
Stream Morphology			
Site Length (m): 600m		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 3.10	Mean Bankfull Width (m): 3.85	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.26	Mean Bankfull Depth (m): 0.61	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: Flow velocity 6 s/m, Flow possibly intermittent.			
Notes: 3" rain in previous 2 weeks. Observed flow likely augmented by rain via tile drainage. Tile drains flowing well.			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
Mk - Muck  
Dt - Debris  
Other

## Description

Si

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100%

## Notes:

Straightened ag. drain, low gradient

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	-	-	-	90%	10%	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Channel bottom dominated by reed canary grass in isolated patches of watercress, lesser duckweed

## Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



80-30%



## Types of Cover (% cover)

Trees

Shrubs

Man-made structures

Grasses

100%

Herbaceous

Other

## Notes:

Channelized ag. drain.

## Obstructions to Fish Passage

No Obstructions   
Natural

Man-Made



## Description:

No obstructions observed

## Drainage Features within Study Area

## Observations of Land Topography within 120 m buffer area:

Flat to rolling

## Terrestrial features Present?

Yes

No

## Terrestrial Recon Form filled out

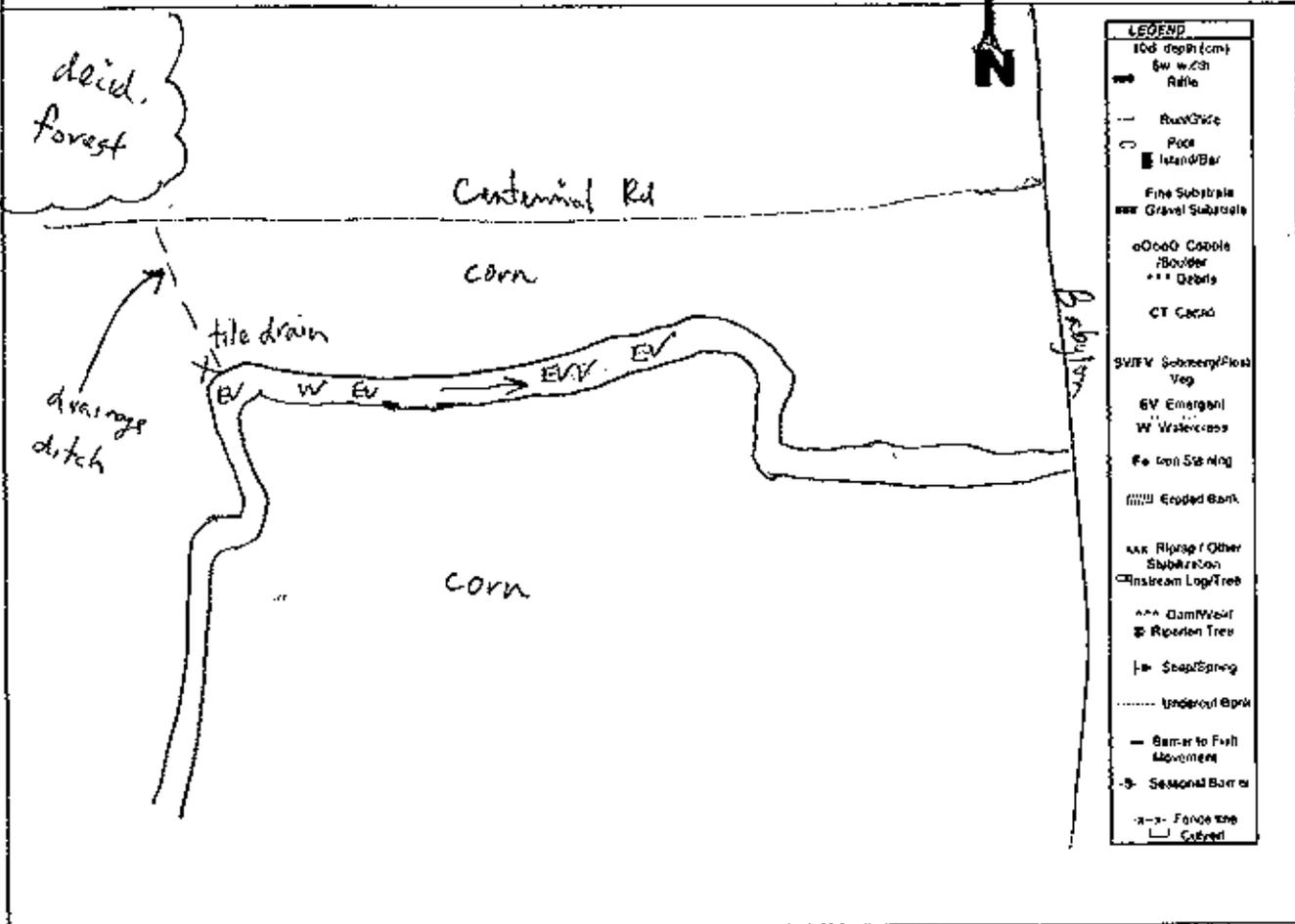
Yes

No

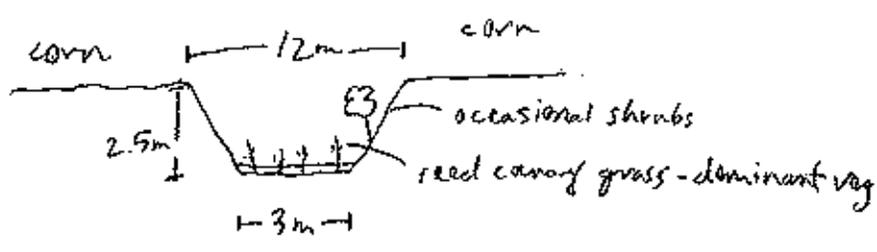


Watercourse Sketch

Study Area: Jencho Goshan Bluewater Land Parcel# 1042 Turbine# Site C25



Horizontal View of Channel



AECOM

Field Crew: N. Hodges, A. Steblin

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel# BLW1450 Turbine# Site C28  
 Date: Oct 5/11 Start time: 10:10 am End Time: 10:45 am

## Weather Conditions:

Sunny, calm 13°C

## Field Notes By:

N. Hodges

## Site Location

Access from Goshen Ln approx. 800m south of Centennial Rd

## UTM Co-ordinates

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

## Other:

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

Tile drainage GPS mal functioning. Adjacent Site documented in summer months, flow observed there.

## In-Situ Water Quality

WT (°C): 11°C AT (°C): 14°C  
 pH: \_\_\_\_\_ Cond (µ/cm): \_\_\_\_\_  
 Water Clarity: Clear  Turbid

## Ground Water indicators

Watercross  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

## Notes:

Scattered watercross throughout reach

## Stream Morphology

Site Length (m): 400m

## Bank Stability:

## Channel Dimensions

Mean Wetted Width (m):	2.59	Mean Bankfull Width (m):	3.97
Mean Wetted Depth (m):	0.24	Mean Bankfull Depth (m):	0.75

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Flow Description:

Flow velocity 0 m/s (100% flats)

## Notes:

Blue heron observed in channel → potentially feeding.  
 No fish observed.

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Debris  
Other

## Description

Mn = Si

## Morphological Structure (%)

Pool	Riffle	Run	Flat
-	-	-	100%

## Notes:

Straightened ag. drain; low gradient

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5%	-	-	15%	10%	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Algae, lesser duckweed, scattered watercress

## Canopy Cover (% closed cover):

100-90%   
90-60%   
60-30%

30-1%   
0%

## Types of Cover (% cover)

Trees 60% Shrubs 15%  
Grasses 10% Herbaceous 5%

Man-made structures \_\_\_\_\_  
Other \_\_\_\_\_

## Notes:

Deciduous forest on both sides of drain. Banks of drain dominated by goldenrod/aster w occasional grasses, sedges, redosier dogwood shrubs, iris

## Obstructions to Fish Passage

No Obstructions   
Natural

Man-Made 

## Description:

None observed

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat to rolling

## Terrestrial features Present

Yes

No

## Terrestrial Recon Form Filled out

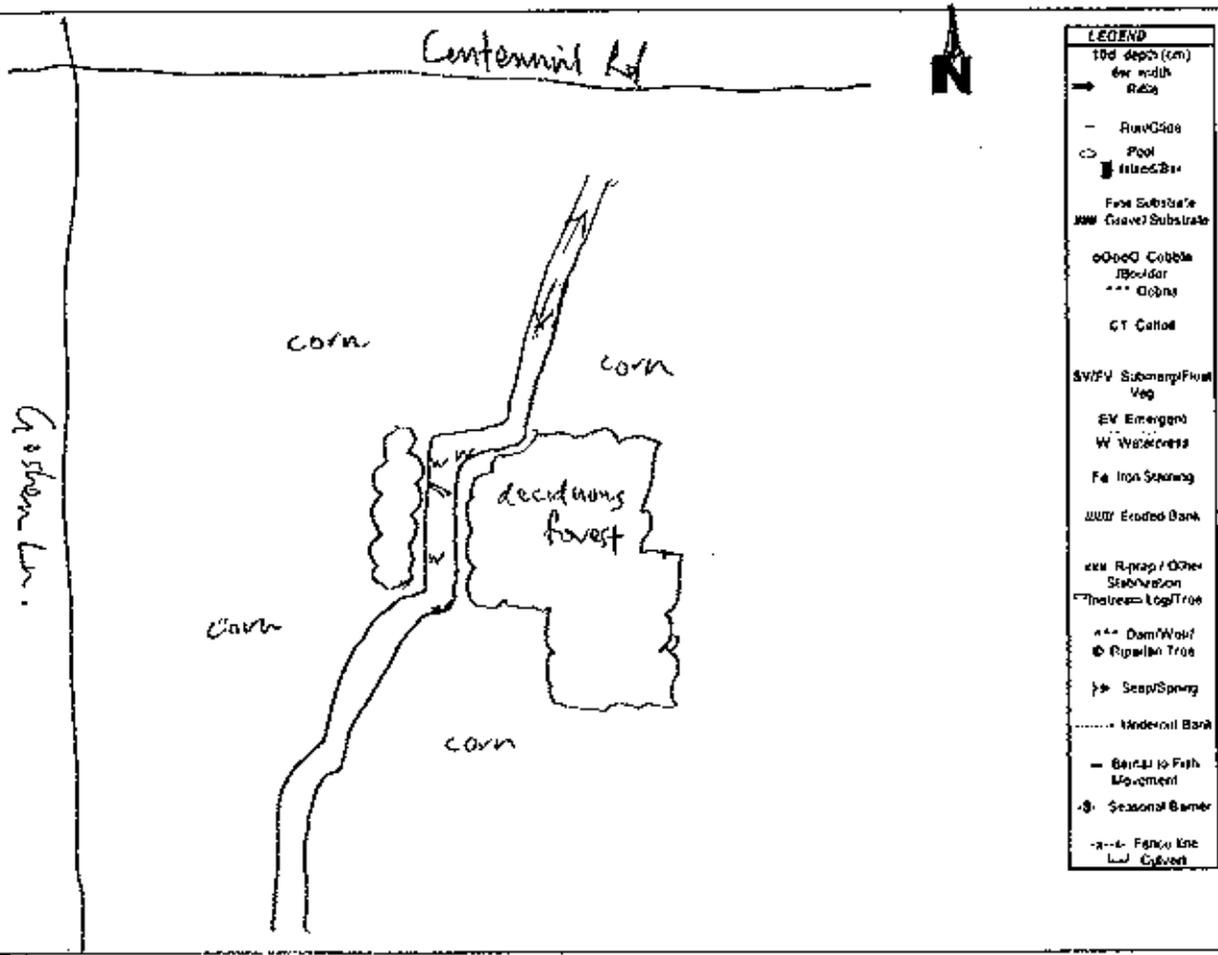
Yes

No

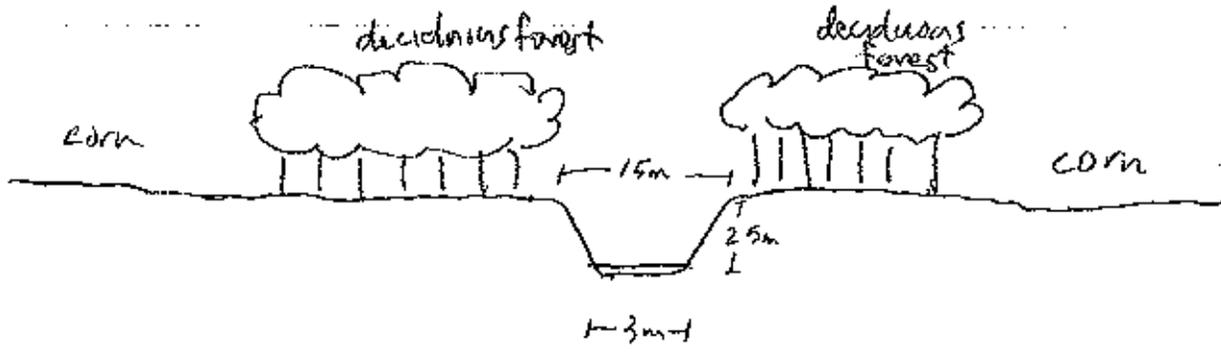


Watercourse Sketch

Study Area: Jencho Goshen Bluewater Land Parcel# BUN1450/51 Turbine# 27 / Site C28



Horizontal View of Channel



AECOM

Field Crew: *N. Hodges, A. Stebbins*

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel#: BLW1452 Turbine # 28/C29  
 Date: Oct 5/11 Start time: 11:00 am End Time:

Weather Conditions:

Field Notes By:

*N. Hodges*

## Site Location

*East side of Goshen Line approx 6 km south of Centennial Rd.*

## UTM Co-ordinates

Easting:	Northing:	Description:

## Surrounding Landuse/Pollution Sources

## Type of Watercourse

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Other:

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

## In-Situ Water Quality

## Ground Water Indicators

WT (°C): \_\_\_\_\_ AT (°C): \_\_\_\_\_  
 pH: \_\_\_\_\_ Cond (µ/cm): \_\_\_\_\_  
 Water Clarity: Clear  Turbid

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes:

## Stream Morphology

Site Length (m):	Bank Stability:			
Channel Dimensions	Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m):	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m):	Right Bank <input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Flow Description:

*See comments on pg 3*

Notes:

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

Description

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
80-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses \_\_\_\_\_ Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



C27

<b>AECOM</b>		Page 1 of 3	
Field Crew: <u>N. Hodges, N. Lauer</u>			
<b>General Information</b>			
Study Area:	<u>Jericho</u>	Goshen:	<u>Bluewater</u>
		Land Parcel#	<u>1084</u>
		Turbine #	<u>GE16-31/526</u>
UTM Co-ordinates:	Easting: <u>0451180</u>	Northing:	<u>4815439</u>
Date:	<u>July 12/2011</u>	Start time:	<u>4:00 pm</u>
		End Time:	<u>4:30 pm</u>
Weather Conditions:	<u>Sunny, breezy 30° +</u>		Field Notes By: <u>N. Hodges</u>
<b>Site Location</b>			
<u>East side Babylon Line, south of Centennial Rd.</u>			
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>		Ephemeral <input type="checkbox"/>	
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>No overland flow observed</u> <u>Banks covered in veg → couldn't see drains/seepage</u>			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C) _____	AT (°C) _____	Watercress <input type="checkbox"/>	Bubbling <input type="checkbox"/>
pH _____	Cond (us/cm) _____	Iron Staining <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	None <input checked="" type="checkbox"/>	Other <input type="checkbox"/>
		<u>visibility poor due to veg</u>	
Notes: <u>water brown</u> <u>no WQ due to access issues</u>			
<b>Stream Morphology</b>			
Site Length (m): _____	Bank Stability:		
Channel Dimensions	Stable	Slightly unstable	Moderately unstable
Mean Wetted Width (m): <u>7m</u>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): <u>0.75m (est.)</u>			
Mean Bankfull Width (m): <u>9m</u>	Left Bank	<input type="checkbox"/>	<input type="checkbox"/>
Mean Bankfull Depth (m): <u>1.5m</u>	Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Notes: <u>4m CSP culvert</u>			
<b>Stream Morphology (continued)</b>			
Substrate (<=>)	Description	<b>Morphological Structure (%)</b>	
Bo - Boulder	<u>Si = cl (est.)</u>	Pool	Flat
Co - Cobble		Riffle	Run
Gr - Gravel			<u>100</u>
Sa - Sand			
Si - Silt			
Cl - Clay			
Other			
Notes:			

Habitat						
Instream Cover (%)						
None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		5		5		

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Algae

Canopy Cover (% closed cover):				Types of Cover (% cover)			
100-90%	<input type="checkbox"/>	30-1%	<input checked="" type="checkbox"/>	Trees	Shrubs	<input checked="" type="checkbox"/>	Man-made structures
90-60%	<input type="checkbox"/>	0%	<input type="checkbox"/>	Grasses	Herbaceous	<input checked="" type="checkbox"/>	Other
60-30%	<input type="checkbox"/>						

Notes:

Riparian veg ~ 10m both sides on steep banks →  
Shrub dominated in grasses

Obstructions to Fish Passage		Drainage Features within Study Area	
No Obstructions	<input checked="" type="checkbox"/>	Man-Made	<input type="checkbox"/>
Natural	<input type="checkbox"/>	Observations of Land Topography:	
Description:		Flat table land (wheat) both sides	

Terrestrial features present:  Yes  No

Other Comments:

Green frog heard  
Catbird heard  
Deer tracks

Photolog			
Picture #	Description	Picture #	Description
1148	Man south (culvert)		
1147	Man north (culvert)		
1146	culvert inlet		

Watercourse Sketch

Study Area:

Jericho

Goshen

Bluewater

Land Parcel#

1084

Turbine #

4-15-21 / S 26

**LEGEND**

- 10d depth (cm)
- 5w width
- Riffle
- Run/Glide
- Pool
- sand/Bar
- Fine
- \*\*\* Gravel
- Substrate
- Cobble
- Boulder
- \*\*\* Debris
- CT Canal
- SV/EV Submerge/Float
- EV Emergent
- W Watercress
- F<sub>1</sub> Iron Staining
- ||||| Eroded Bank
- xxx Riprap / Other
- Instream Log/Tree
- \*\*\* Dam/Wall
- Riparian Tree
- ↳ Seep/Spring
- Undercut Bank
- Barrier to Fish Movement
- S- Seasonal Barrier
- x-x- Fence
- U Culvert

Ag.

Drainage

[ ]

Wheat

Grass

[ ]

Substrate

200 ft

Horizontal View of Channel



<b>AECOM</b>		Field Crew: <i>N. Hodges, T. Shorney</i>	
General Information			
Study Area:	Jericho Goshan <u>Bluewater</u>	Land Parcel#	<u>1508</u>
Date:	<u>Oct 12/11</u>	Start time:	<u>10:35 am</u>
		Turbine #	<u>Site C20</u>
		End Time:	<u>11:15 am</u>
Weather Conditions: <u>Overcast 15°C</u>		Field Notes By: <u>N. Hodges</u>	
Site Location			
<u>Access from Bronson Ln approx. 500m north of Blue Bluff Rd.</u>			
UTM Co-ordinates <u>GPS malfunctioning</u>			
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input checked="" type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>Seepage via wetland in floodplain</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>13°</u>	AT (°C): <u>16°C</u>	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>—</u>	Cond (µscm): <u>—</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m): <u>300m</u>		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>1.4</u>	Mean Bankfull Width (m): <u>2.7</u>	Modgrately unstable	Unstable
Mean Wetted Depth (m): <u>0.3</u>	Mean Bankfull Depth (m): <u>0.8</u>	Left Bank	
		Right Bank	
Flow Description: <u>Trickle of flow observed. Potentially permanent via ground-water contributions in meadow marsh/swamp thicket wetland.</u>			
Notes: <u>Cyprinids observed ☒☒☒☒☒</u>			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Description

Bc - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Debris  
Other

Sa = Si &gt; Gr = Dt

## Morphological Structure (%)

Pool	Riffle	Run	Flat
25	10	10	55

Notes: Naturally meandering stream thru no decid. forest & swamp thicket / meadow marsh. Downcutting thru silt and sand soils evident. Moderate lateral erosion / bank migration.

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	15			10	15	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Algae, scattered watercress, sedges

## Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



80-30%



## Types of Cover (% cover)

Trees 50      Shrubs 20      Man-made structures \_\_\_\_\_  
Grasses 10      Herbaceous 20      Other \_\_\_\_\_

## Notes:

East end in deciduous forest / swamp w tree cover.  
West end in thicket swamp / meadow marsh w herbaceous cover / shrub cover

## Obstructions to Fish Passage

No Obstructions   
Natural

Man-Made 

## Description:

Seasonal low flow

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat to rolling w broad stream valleys

## Terrestrial features Present

Yes No 

## Terrestrial Recon Form Filled out

Yes No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log			
Picture #	Description	Picture #	Description
Pic #1	overview of stream		
#2	Stream channel		
#3	Stream channel		
#4	Stream Pooling		

Watercourse Sketch

C 20

Study Area:

Jericho

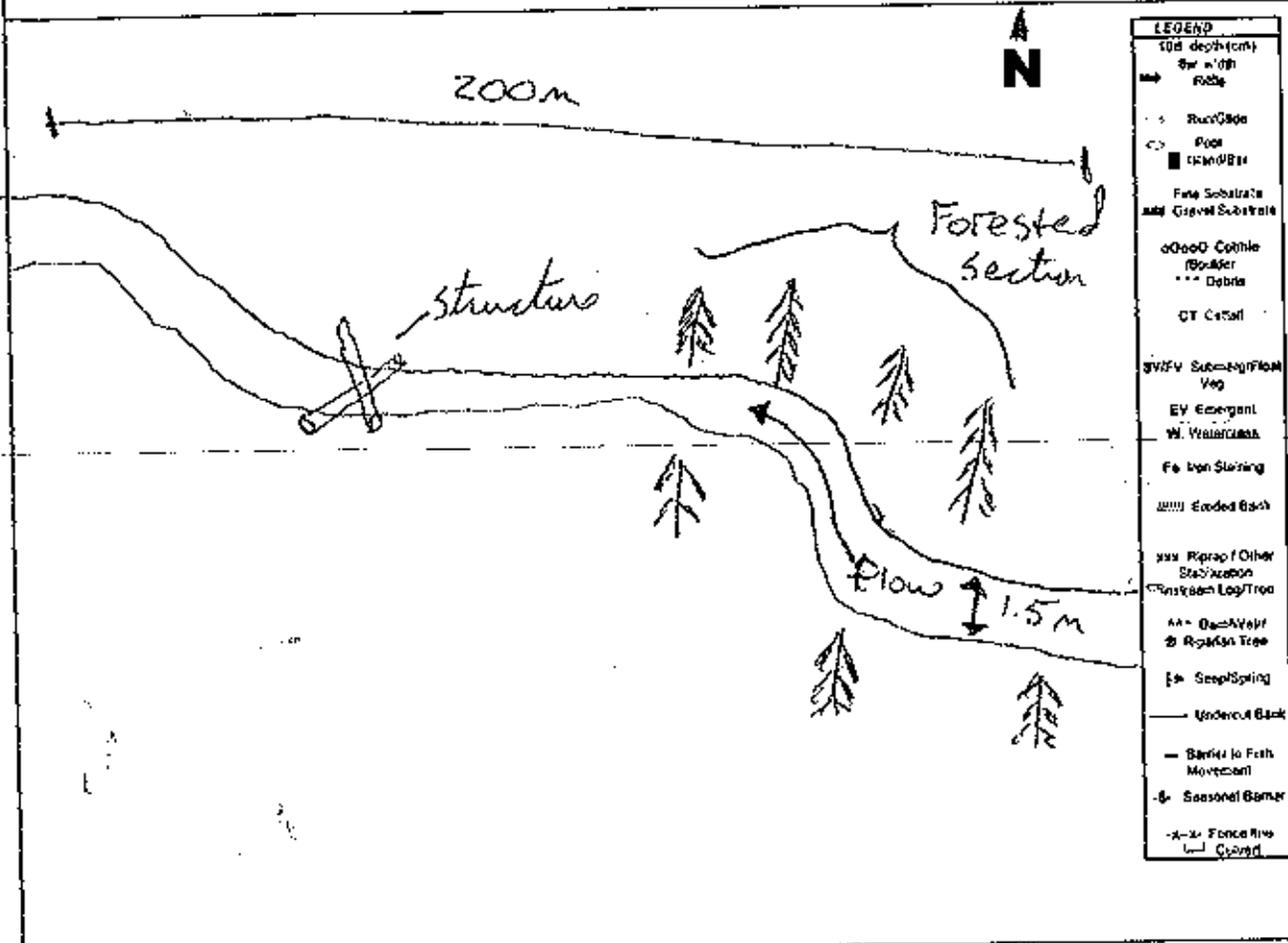
Goshen

Bluewater

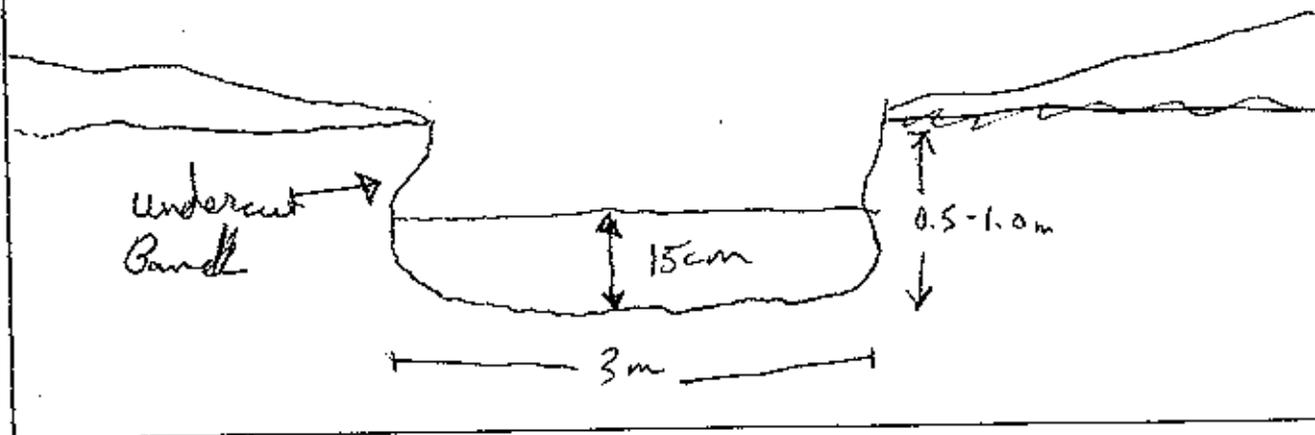
Land Parcel#

1518

Turbine #



Horizontal View of Channel



AECOM

Field Crew: N. Hodges, T. Shorney

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel # BLW1542 Turbine # Site CH1  
 Date: Oct 12/11 Start time: 1:15 pm End Time:

Weather Conditions: Light rain 15° Field Notes By: N. Hodges

## Site Location

Access from Bronson Ln approx. halfway between Pavilion + Carpenter Rd.

## UTM Co-ordinates GPS malfunctioning

Easting: Northing: Description:

Easting: Northing: Description:

Easting: Northing: Description:

Easting: Northing: Description:

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other:

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

None Overland flow, seepage from valley bottom

## In-Situ Water Quality

WT (°C): 15°C AT (°C):  
 pH: — Cond (µS/cm): —  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercross  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes:

Abundant iron staining throughout, bubbling at one location, scattered watercross

## Stream Morphology

Site Length (m): 200m

Bank Stability:

## Channel Dimensions

Mean Wetted Width (m): 0.9 Mean Bankfull Width (m): 2.1  
 Mean Wetted Depth (m): 0.1 Mean Bankfull Depth (m): 0.6

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Flow Description:

Moderate flow relative to other streams nearby.

Notes:

Cyprinids observed

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Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

$$Sa = Si > Gr > Bo = Cl$$

## Notes:

Meandering channel w downcutting and lateral movement through sand/silt fill in broad, shallow valley

## Morphological Structure (%)

Pool	Riffle	Run	Flat
30	30	30	10

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	25	10		10	15	

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Watercress occasional

## Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



80-30%



## Types of Cover (% cover)

Trees

50

Shrubs

50

Grasses

Herbaceous

Man-made structures

Other

## Notes:

## Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

5m drop structure  
out pond outlet at upstream  
end of reach

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat to rolling agriculture

## Terrestrial features Present

 Yes No

Shrub-thicket in 60m wide valley

Terrestrial Recon Form Filled out

Yes

 No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log			
Picture #	Description	Picture #	Description
#1	Stream channel		
#2	Stream channel		
#3	ground water channel & staining		
#4	Stream channel		

Watercourse Sketch

C41

Study Area:

Jericho

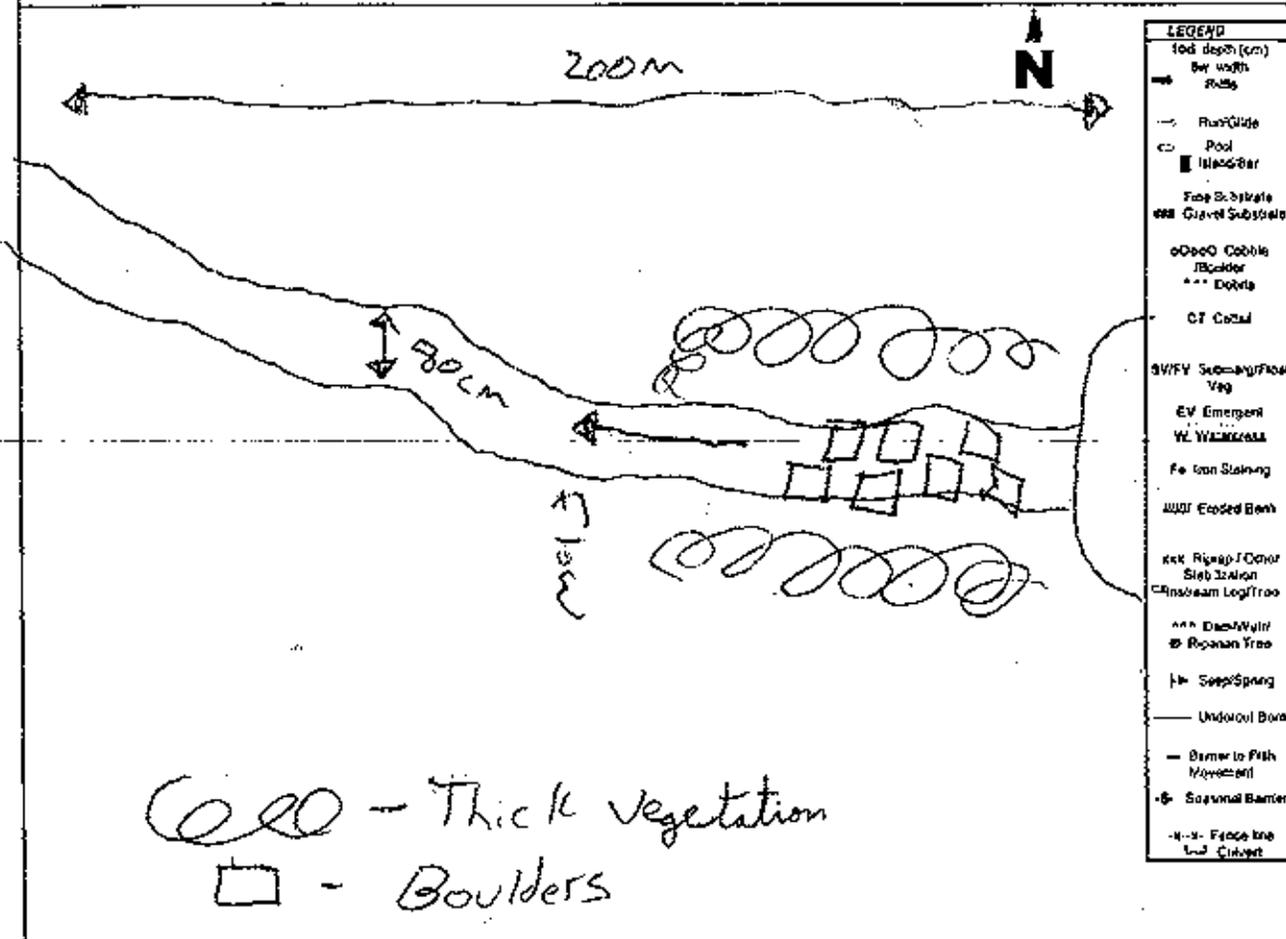
Goshen

Bluewater

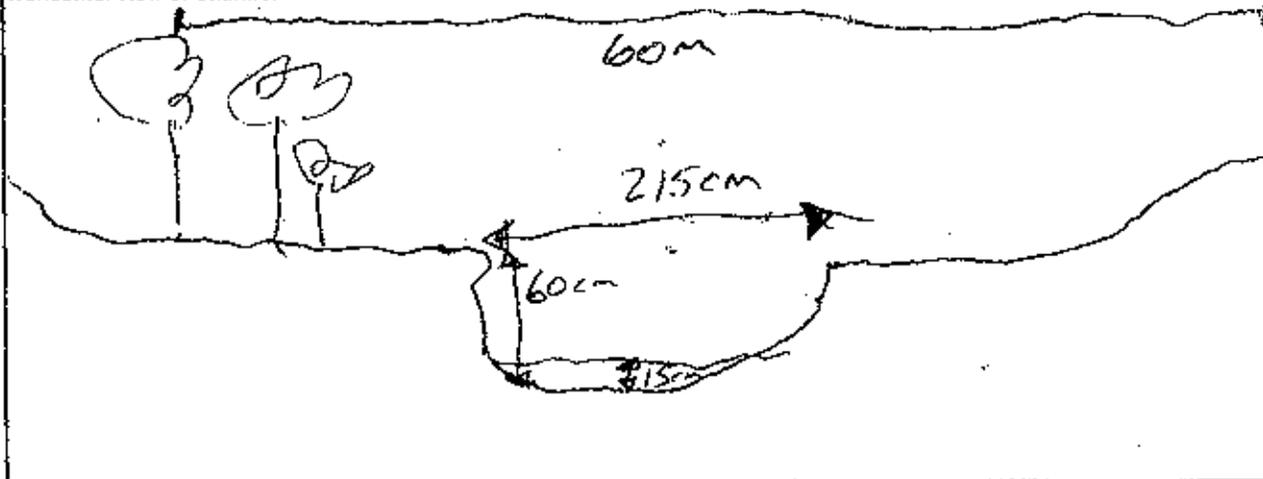
Land Parcel#

1542

Turbine #



Horizontal View of Channel



walked through field

2100

Property ID: 1085 (Turbine 14) Date: Oct 25/11

Property Access: 1085 from Centennial Rd - leased Start Time: 10:20

End Time: 10:30

Field Investigators: SA, GF Weather: Overcast, light rain

Terrestrial Feature Present: No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

grassed swale present, no water  
during investigation - surface water  
conveyance during rain events/freshette.

Photograph Numbers: 278 - 279

Property ID: 1011 Date: Oct 25/11  
 Property Access: leased Start Time: 13:35  
 End Time: 14:00

Field Investigators: SA, GF Weather: overcast

**Terrestrial Feature Present:** No  Yes   
 Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)  
terrestrial team has seen  
site  
 Photograph Numbers: Turbine 15

**Aquatic Feature Present:** No  Yes   
 Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)  
headwater to C42  
cement culvert w standing water  
-tile drainage  
 Photograph Numbers: 318 - 320

Property ID: 1524 Date: Oct 25/11Property Access: KOE Start Time: 14:30End Time: 14:40Field Investigators: SA, GF Weather: overcast,  
light rain**Terrestrial Feature Present:** No  Yes 

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

terrestrial team has seen site

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes 

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

swale features presents  
standing water - grass feature  
in agricultural fieldPhotograph Numbers: 327 - 334

**AECOM**

Field Crew: SA, GF

**General Information**  
 Study Area: Jericho Goshen Bluewater Land Parcel# 1074 Crossing Turbine # C42  
 Date: Oct 25/11 Start time: 10:25 End Time: 11:40

Weather Conditions: overcast; light rain Field Notes By: JA

**Site Location**  
 located south of Centennial Road, east of Bronson line

**UTM Co-ordinates**

Easting: 446637	Northing: 4815218	Description: C42 A
Easting: 446785	Northing: 4815018	Description: C42 WC
Easting: 446812	Northing: 4814988	Description: C42 - 300
Easting: 446945	Northing: 4814849	Description: C42 2

**Surrounding Landuse/Pollution Sources**

Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input checked="" type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>

Other:

**Type of Watercourse**

Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Permanent <input checked="" type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Ephemeral <input type="checkbox"/>	

**Notes:** (include any inputs into the system i.e. tile drainage, seepages, overland flow)  
 no tile drains observed, gully or rill features flowing into valley area. - WC is located in valley area adjacent fields corn. tile drain @ C42.3 - water flowing from 2.5 ft

In-Situ Water Quality		Ground Water Indicators	
WT (°C): 9°C	AT (°C): 8°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µ/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>

**Notes:** WC located throughout defined channel. lots of gravel weed present wetland area to west.

**Stream Morphology**

Site Length (m):

Bank Stability: *no defined banks*

Channel Dimensions				Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m):	1.57	Mean Bankfull Width (m):	0.60	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m):	0.30	Mean Bankfull Depth (m):		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

**Flow Description:** Braided flow throughout wet meadow area  
 2-3 main channels flowing grass checked area

**Notes:** 4 Sjm. TOB - 5m high  
 - no defined banks 50m wide valley feature  
 some erosion along left in US section

AECOM

Page 2 of 4

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- Mk - Muck
- DT - Detritus
- Other

Description

Sa = Si > Gr

Morphological Structure (%)			
Pool	Riffle	Run	Flat
	30	30	30

Notes:

meandering, sinuous channel  
 some debris in channel  
 no undercut

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		/	/	10%	40%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grasses  
 algae in channel

Canopy Cover (% closed cover):

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

Types of Cover (% cover)

- Trees \_\_\_\_\_
- Shrubs 20%
- Man-made structures \_\_\_\_\_
- Grasses 10%
- Herbaceous 70%
- Other \_\_\_\_\_

Notes:

some shrub cover, mostly grass cover

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description: none observed

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

all adjacent lands slope toward valley

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

defended channel 80m u/s of C42 A  
 turns back into braided channels 100m u/s  
 through wetland - main channel runs along  
 west side of property  
 - channel flows in from east field - clay bottom - 6m<sup>3</sup> confluence

## Photo log

Picture #	Description	Picture #	Description
		295- 297	C42 B - v/s, stream, etc.
		298	
284	View of channel	299	
285	d/s - cattails	300	
286	v/s		
287	Water cross		
288	Creek		
289	View of wetland		
290	Watercross		
291	v/s of channel		
292- 294	view of channel near crossings		

AECOM

Watercourse Sketch

Study Area:

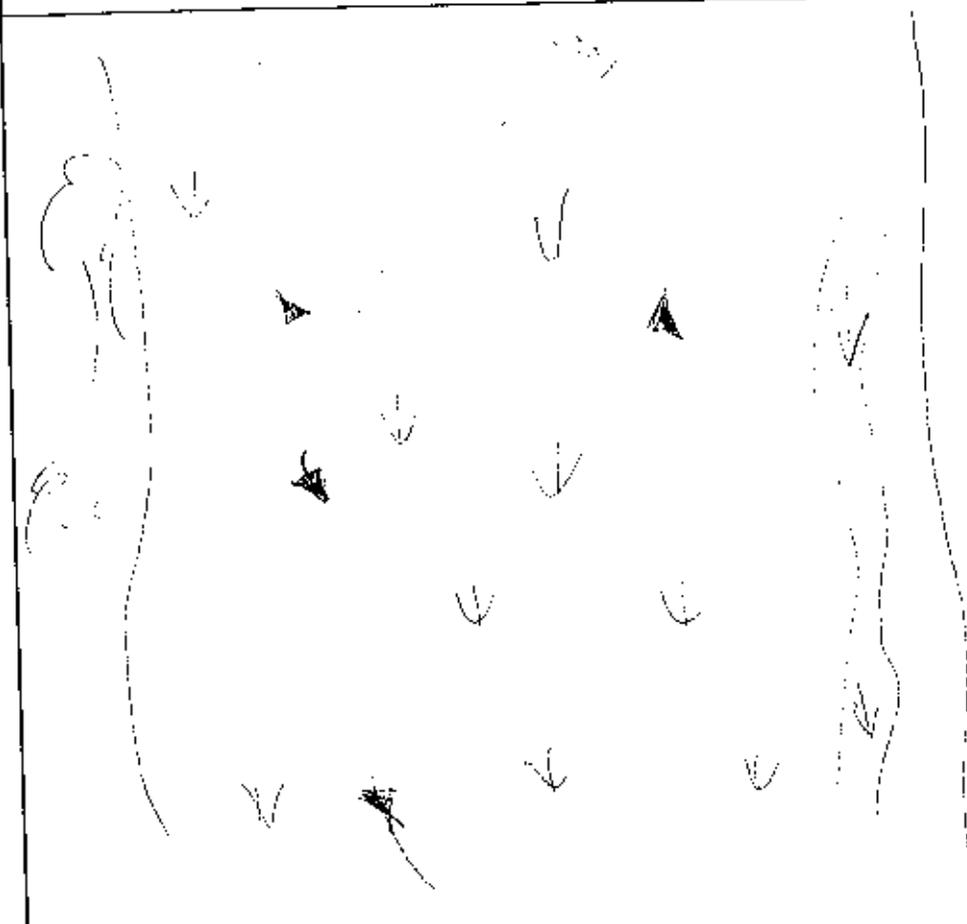
Jericho

Goshen

Bluewater Land Parcel

1074

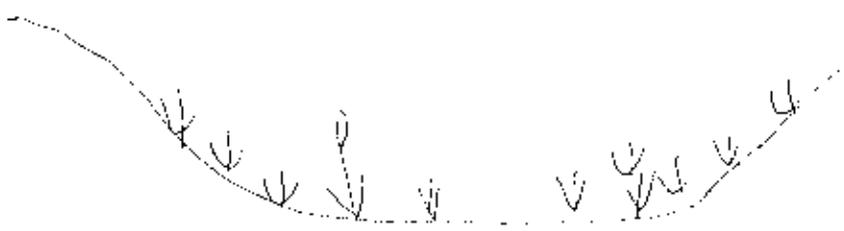
0455115, C42  
Turbine



N

LEGEND	
10d	Depth (cm)
W	Width
→	Flow
---	Run/Gate
...	Pool
■	Island/Bar
○	Fine Substrate
■	Gravel Substrate
o	Cobble
○	Boulder
***	Debris
CT	Canal
SVFV	Submerged/Vegetation
EV	Emergent
W	Water/Less
Fa	Iron Staining
	Eroded Bank
xxx	Riprap / Other Stabilization
□	Streambed Log/Tree
---	Dam/Weir
⊙	Riparian Tree
⊕	Swamp/Spring
---	Undercut Bank
---	Barrier to Fish Movement
⊕	Seasonal Barrier
---	Fence Line
---	Culvert

Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: SA, GSE			
General Information			
Study Area: Jericho Goshen <u>Blueswater</u>	Land Parcel# <u>1358</u>	Turbine# <u>140</u>	
Date: <u>01/20/11</u>	Start time: <u>15:38</u>	End Time: <u>16:50</u>	
Weather Conditions: <u>rain, overcast</u>		Field Notes By: <u>SA</u>	
Site Location <u>South of Jericho, at junction of Brook on Line</u>			
UTM Co-ordinates			
Easting: <u>445393</u>	Northing: <u>4813039</u>	Description: <u>C40A</u>	
Easting: <u>445734</u>	Northing: <u>4813036</u>	Description: <u>C40B</u>	
Easting: <u>445571</u>	Northing: <u>4813017</u>	Description: <u>C40T.6-D</u>	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>drain inputs</u> <u>no ups portion of stream only swales</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>11</u>	AT (°C):	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µs/cm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>1.0</u>	Mean Bankfull Width (m): <u>1.5</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.10</u>	Mean Bankfull Depth (m): <u>1.5</u>	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description:			
Notes: <u>no upland inputs</u>			

**AECOM**

**Stream Morphology (continued)**

**Substrate (<=>)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Ss - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

**Description**

(S) > (G) > (Gr) > (Co)

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
	50	50	

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	/	10%	/	30%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

**Canopy Cover (% closed cover):**

- 100-90%  30-1%
- 90-80%  0%
- 80-30%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_
- Grasses 10% Herbaceous \_\_\_\_\_ Other \_\_\_\_\_

Notes:

**Obstructions to Fish Passage**

- No Obstructions  Man-Made
- Natural

Description:

file drain

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

**Terrestrial features Present:**

Yes No

Terrestrial Recon Form Filled out

Yes No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

- Channelized, riparian zone removed
- Under an "artificial" meadow
- mostly - riparian zone left over
- lots of culverts in water to avoid channel grade work
- no fish habitat
- change in stream channel

## Photo log

Picture #	Description	Picture #	Description
343	rip.		
344	rip.		
345	up at crossing		
346	dis at crossing		
347 351	subject		
348 352	- viewing the area, note changes in riparian zone		

Watercourse Sketch

Study Area:

Jericho

Goshen

Bluewater

Land Parcel#

1558

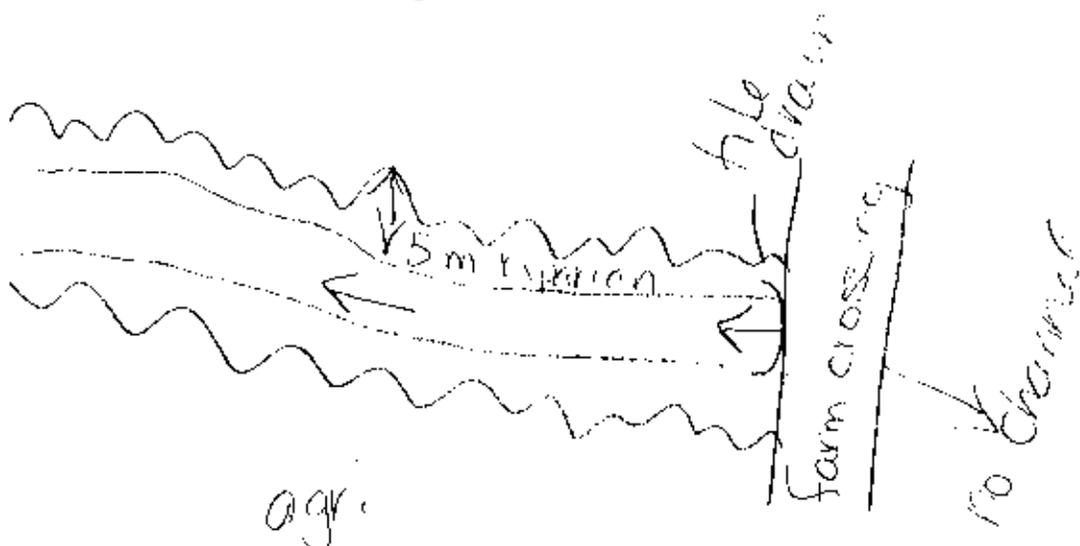
Turbine #

C40

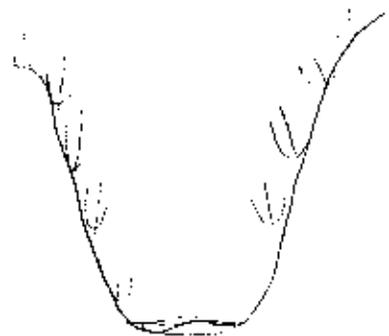
Staffa



LEGEND	
10d Depth (cm)	
6m width	
Ruffs	
Run/Gro	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Cobble Boulder	
Depth	
CT Canal	
Submerg./Fast Veg	
Emergent	
Wetlands	
Freshwater	
Flood Bank	
Regr. / Other Stabilization	
Stream Log/Tree	
Dam/Weir	
Riparian Tree	
Seep/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence line	
Culvert	



Horizontal View of Channel



AECOM

Page 1 of 4

Field Crew: SA GSK

## General Information

Study Area: Jericho Goshen Bluewater Land Parcel# 10660 CREC# 046  
 Date: 10/26/11 Start time: 10:18 End Time: 10:39

Weather Conditions: overcast Field Notes By: SA

Site Location

## UTM Co-ordinates

Eastings: 445584	Northing: 4811431	Description: 1410A
Eastings: 445750	Northing: 4811404	Description: 1410B
Eastings: 446298	Northing: 4811511	Description: C46-C
Eastings: 446512	Northing: 4811536	Description: C46-D

## Surrounding Landuse/Pollution Sources

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

Other:

## Type of Watercourse

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)

## In-Situ Water Quality

WT (°C): 10 AT (°C): 9  
 pH: Cond (µs/cm):  
 Water Clarity: Clear  Turbid

## Ground Water Indicators

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes: lots of watercress observed at existing throughout channel

## Stream Morphology

Site Length (m):

Channel Dimensions		Bank Stability:			
Mean Wetted Width (m):	Mean Bankfull Width (m):	Stable	Slightly unstable	Moderately unstable	Unstable
2.5	1.20m	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m):	Mean Bankfull Depth (m):	Left Bank		Right Bank	
0.20		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Flow Description:

Moderate flow ~ 2.5 m  
 evidence of high flows - scoured banks at 1.75 m

Notes:

Top → H = 2 m  
 W = 6.5 m

Stream Morphology (continued)

Substrate (<=>)

- Bb - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Sa > Gr > Co > Bb

Area of crossing all boulder

Morphological Structure (%)			
Pool	Riffle	Run	Flat
10	40	40	

Notes:

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	15	10	15%	10%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

WC, green  
algae appeared on boulders around

Canopy Cover (% closed cover):

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs 50  
Grasses 25 Herbaceous 25  
Man-made structures \_\_\_\_\_  
Other \_\_\_\_\_

Notes:

dogwood, willows, goldenrods, asters, grasses

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

large boulder have been removed  
2.5 m wide - no way  
0.50 m high around

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

- Terrestrial features Present** Yes No
- Terrestrial Recon Form Filled out Yes No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

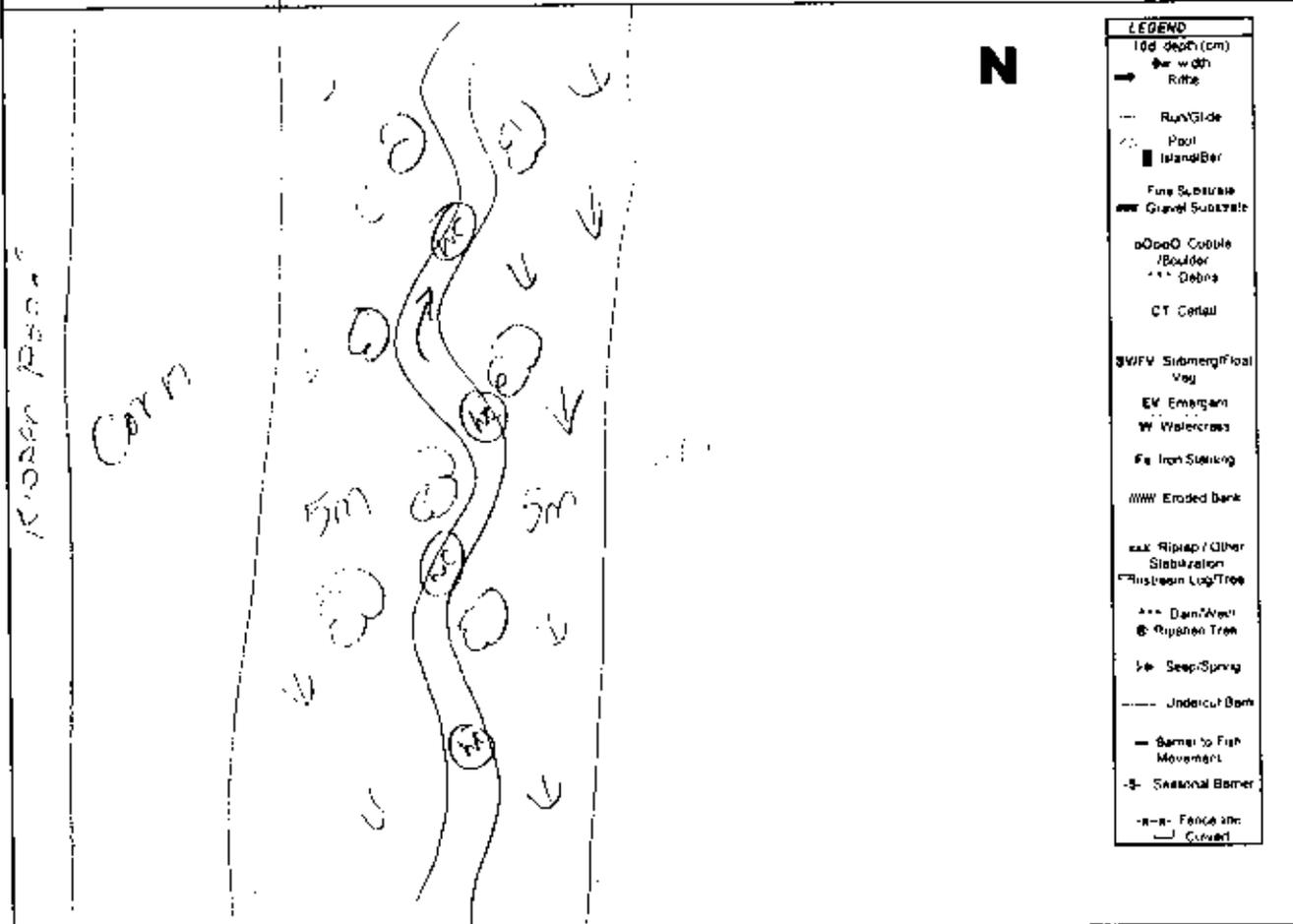
- channelized before channel was study area
- was through corn field
- meanders through field
- some issues in extreme erosion along banks
- some areas of bank slumping

## Photo log 2007-2010

Picture #	Description	Picture #	Description
1997-1998	UIS Channel		
1999	View of farm crossing		
2000	Water cross		
2006	UIS view		
2007	UIS view functional		
2008	modified crossing P.S. Miller		
2009	UIS view		
2010	eroded bank		
2011-2019	assessment area		

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1066 Turbine # CH6



Horizontal View of Channel



**AECOM**

Field Crew: SA, L...

**General Information**

Study Area: Jericho Goshen Bluewater Land Parcel# 1063 Turbine # C46  
 Date: 01/21/11 Start time: 10:30 End Time: 12:10

Weather Conditions: overcast Field Notes By: SA

**Site Location**

mouth of stream, west of ...

**UTM Co-ordinates**

Easting: _____	Northing: _____	Description: <u>C46 C-file area</u>
Easting: _____	Northing: _____	Description: _____
Easting: _____	Northing: _____	Description: _____
Easting: _____	Northing: _____	Description: _____

**Surrounding Landuse/Pollution Sources**

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

**Type of Watercourse**

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)  
tile drains flowing at time of investigation

**In-Situ Water Quality**

WT (°C): \_\_\_\_\_ AT (°C): \_\_\_\_\_  
 pH: \_\_\_\_\_ Cond (µs/cm): \_\_\_\_\_  
 Water Clarity: Clear  Turbid

**Ground Water Indicators**

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes:

**Stream Morphology**

Site Length (m): _____				Bank Stability:			
Channel Dimensions				Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): <u>2.0</u>	Mean Bankfull Width (m): _____	Mean Wetted Depth (m): <u>0.20</u>	Mean Bankfull Depth (m): <u>1.10</u>	Left Bank	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
				Right Bank	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>

Flow Description: 2-3 m low energy flow

Notes: Bank scouring observed  
erosion occurring around area where channel narrows

Stream Morphology (continued)

Substrate (<=>)

- Bb - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Sa) Gr) S)

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
20	40	40	

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5%	/	<5	10	10	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

None (reeds)

Canopy Cover (% closed cover):

- 100-90%  <sup>100%</sup>
- 90-60%  <sup>0%</sup>
- 60-30%

Types of Cover (% cover)

- Trees 0%
- Grasses 10%
- Shrubs 20%
- Herbaceous 20%
- Man-made structures
- Other

Notes:

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

none observed

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

relative to flat to north, steep slope from Kypen Rd, signs of road runoff

Terrestrial features Present



No

Terrestrial Recon Form Filled out

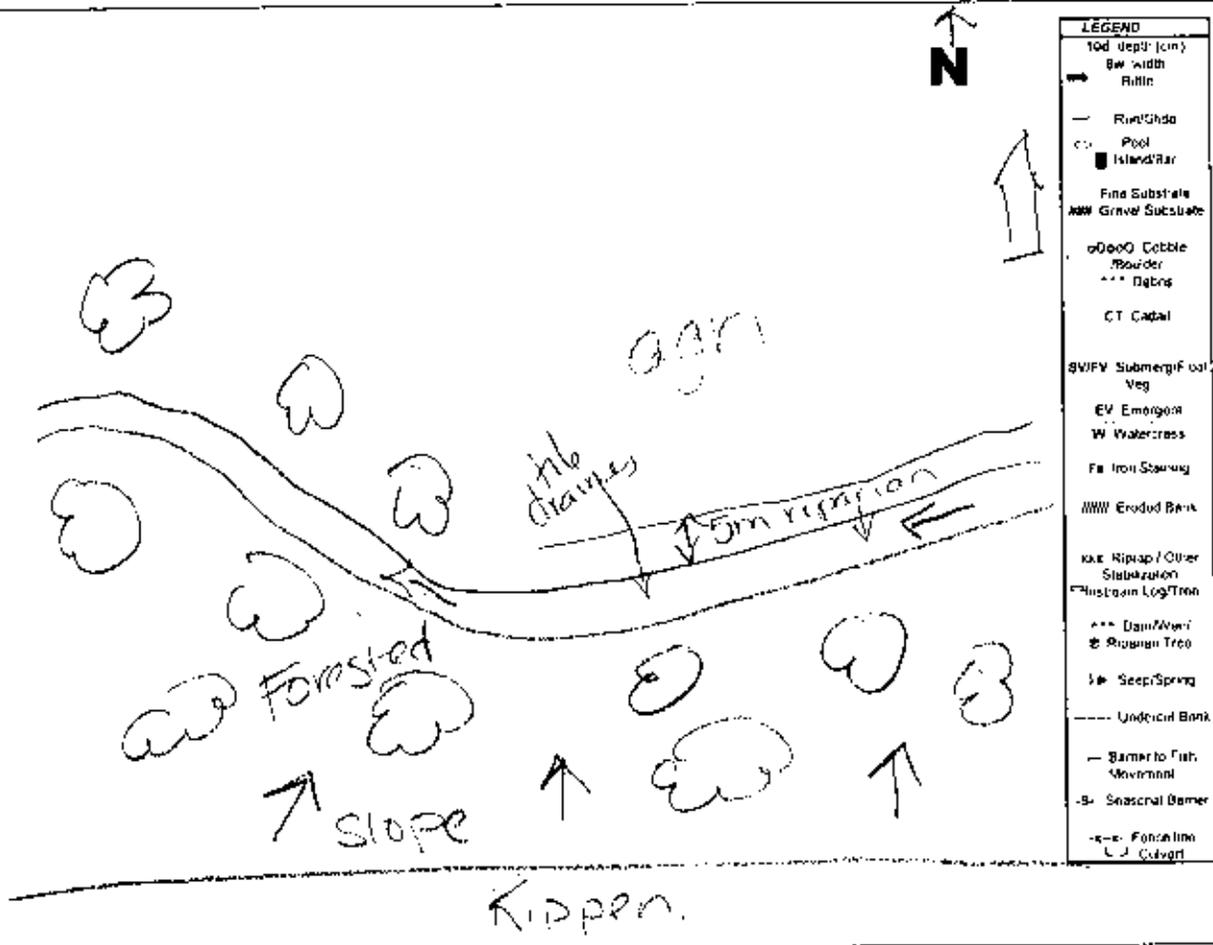
Yes

No

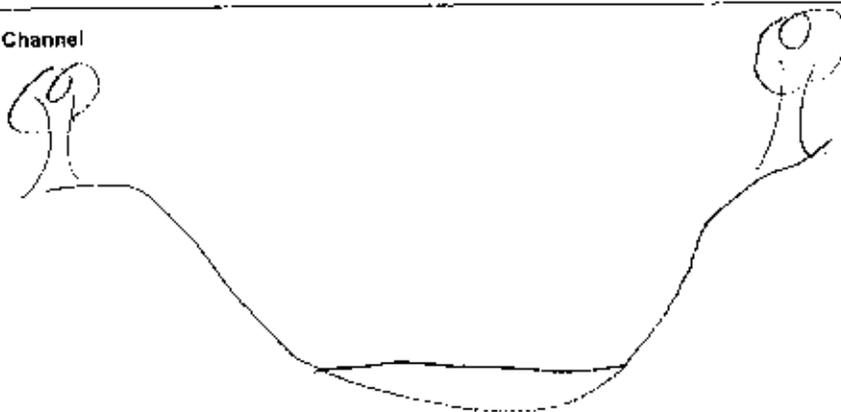


Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 10663 Turbine # C410



Horizontal View of Channel



<b>AECOM</b>		Page 1 of 4	
Field Crew: SA, GTF			
<b>General Information</b>			
Study Area: Jaricho Goshen <u>Bluewater</u>	Land Parcel # <u>1067 + 1069</u>	Turbine # <u>C83</u>	
Date: <u>Oct 26/11</u>	Start time: <u>12:27</u>	End Time: <u>12:46</u>	
Weather Conditions: <u>overcast</u>		Field Notes By: <u>SA</u>	
<b>Site Location</b>			
<u>C83 crossing at Bronson Line</u>			
<b>UTM Co-ordinates</b> <u>None</u>			
Easting:	Northing:	Description:	
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<b>In-Situ Water Quality</b> <u>N/A</u>		<b>Ground Water Indicators</b>	
WT (°C):	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µ/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability: <u>on d/s side</u>	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>1.5</u>	Mean Bankfull Width (m): <u>2.5</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.15</u>	Mean Bankfull Depth (m): <u>0.45</u>	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description: <u>flow originates from tile drain</u>			
Notes:			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
Mk - Muck  
DT - Detritus  
Other

## Description

clay bottom of culvert  
(1/2) (1/2) cob

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
20	40	40	

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10%	5%	15%	25%	15%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

water cross

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
80-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs 20 \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses 40 \_\_\_\_\_ Herbaceous 40 \_\_\_\_\_ Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

hls drain up

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



AECOM

Watercourse Sketch

Study Area:

Jericho

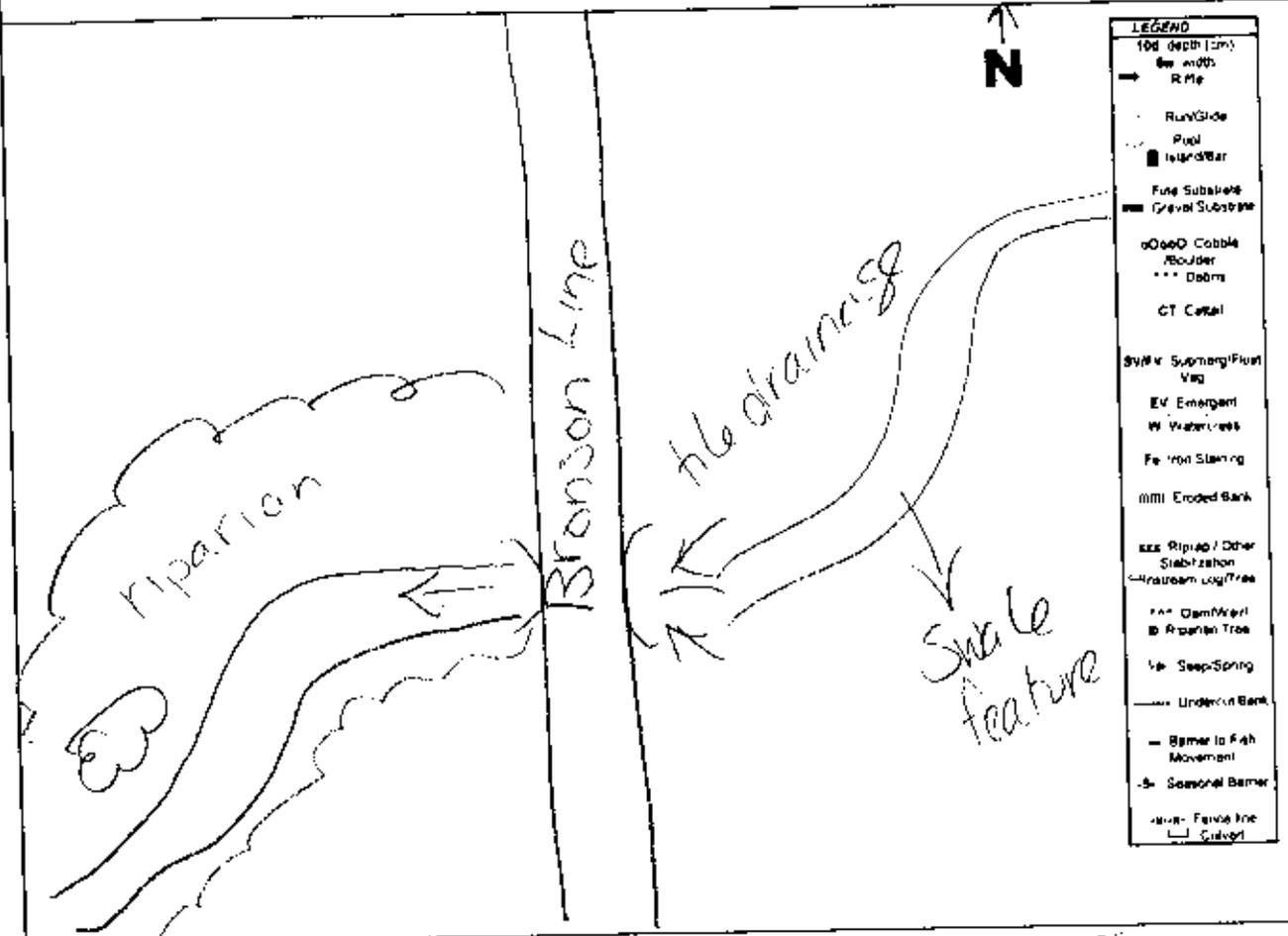
Goshen

Bluewater Land Parcel #

1067 + 1063

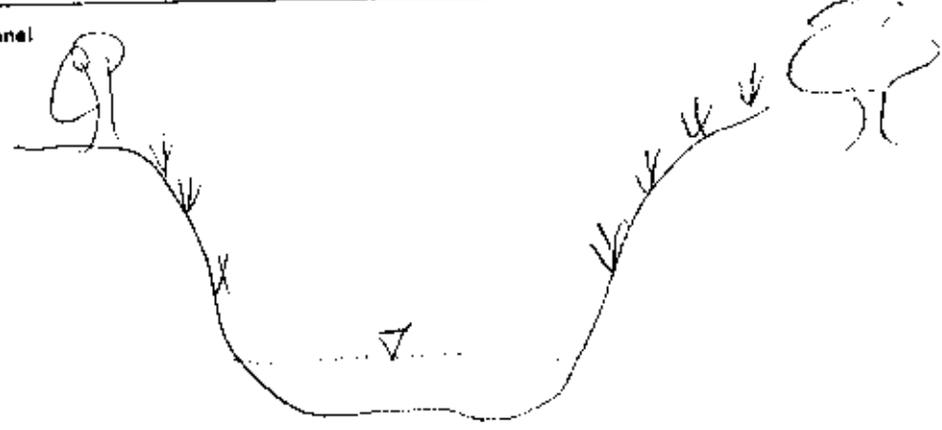
Turbine #

C83



LEGEND	
100' depth (cm)	
50' width	
R.Fe	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
oOoO Cobble	
Boulder	
*** Debris	
CT Canal	
Swale	Swamp/Fluvial Vag.
EV	Emergent
W	Waterless
Fe	Iron Slating
mm	Eroded Bank
xxx	Riprap / Other Stabilization
—	Stream Log/Tree
—	Dam/Weir
—	Arched Tree
—	Seep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
—	Seasonal Barrier
—	Fence line
—	Subopt

Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: SA, LF		General Information	
Study Area: Jericho Goshen Bluewater	Land Parcel# 1811 + 1815	Turbine #	CS4
Date: Oct 26/11	Start time: 12:47	End Time:	13:10
Weather Conditions: overcast, misting		Field Notes By: SA	
Site Location on west + east side of Provision Line			
UTM Co-ordinates			
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input checked="" type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µs/cm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 2.5	Mean Bankfull Width (m): 0.905	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.20	Mean Bankfull Depth (m): 3.7	Left Bank	Right Bank
		<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description:			
Notes: bank seepage on west side Top = 1.10 m 2.30 w			

**AECOM**

**Stream Morphology (continued)**

**Substrate (<=>)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

**Description**

Silt > fine Co

Notes:

**Morphological Structure (%)**

Pool	Riffle	Run	Flat
	20	80	

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	5			60	3	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

**Canopy Cover (% closed cover):**

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_
- Grasses 50
- Shrubs \_\_\_\_\_
- Herbaceous 20
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

Notes:

1 willow border sk

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



AECOM

Page 4 of 4

Watercourse Sketch

Study Area:

Jericho

Goshen

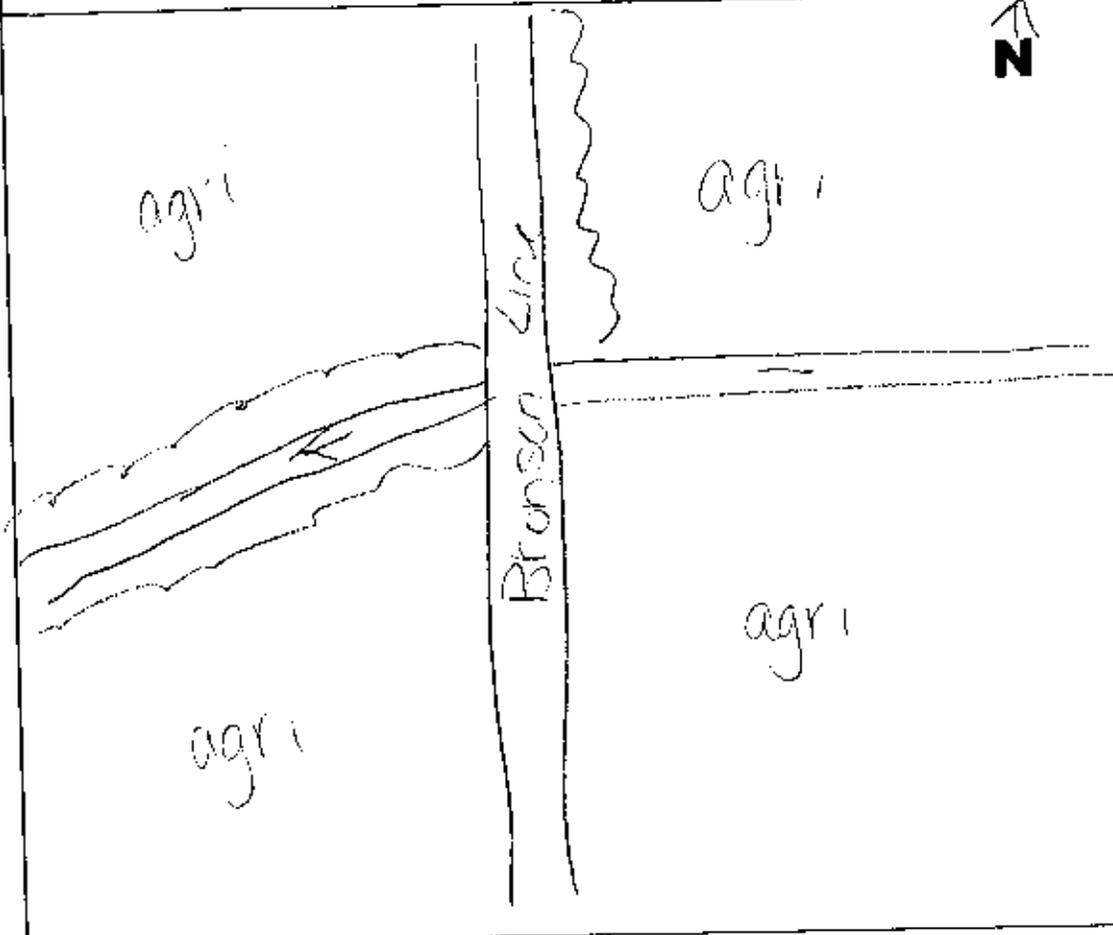
Bluewater

Land Parcel#

1815 + 1811

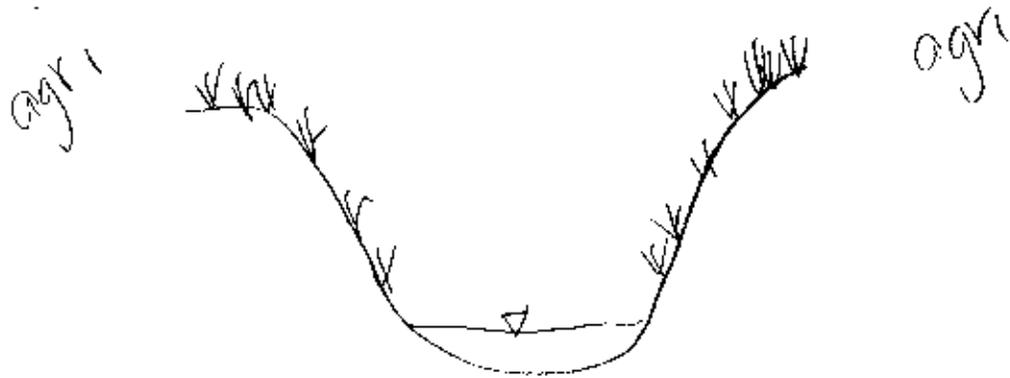
Turbine #

C54



LEGEND	
100	Depth (cm)
Bar width	Bar width
→	Run
•	Run/Glide
○	Pool
■	Island/Bar
—	Fine Substrate
—	Gravel Substrate
o o o o	Cobble
Boulder	Boulder
***	Debris
CT	Cattail
SubV	Submerged Veg
EV	Emergent
W	Watercross
Fe	Iron Staining
	Eroded Bank
xxx	Regrasp Other
Station	Station
Log/Tree	Log/Tree
▲▲▲	Dam View
●	Riparian Tree
⊥	Seep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
—	Seasonal Barrier
—	Fence line
—	Gauge

Horizontal View of Channel



AECOM		Page 1 of 4			
Field Crew: SA, DJF		General Information			
Study Area: Jericho Goshen Bluewater	Land Parcel# 1067 + 1563	Turbine #	C72		
Date: Oct 26/11	Start time: 13:14	End Time:	13:25		
Weather Conditions: overcast	Field Notes By: SA				
Site Location Watercourse running parallel to Kippin Rd					
UTM Co-ordinates - none.					
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Easting:	Northing:	Description:			
Surrounding Landuse/Pollution Sources		Type of Watercourse			
Residential <input checked="" type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>		
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>		
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>			
Other:					
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) tile drains entering watercourse					
In-Situ Water Quality - none.		Ground Water Indicators			
WT (°C):	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>		
pH:	Cond (µm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>		
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>		
Notes: tile drains flowing					
Stream Morphology					
Site Length (m):	Bank Stability:				
Channel Dimensions		Stable	Slightly unstable	Moderately unstable	Unstable
Mean Wetted Width (m): 1.3	Mean Bankfull Width (m): 4.5	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mean Wetted Depth (m): 0.25	Mean Bankfull Depth (m): 1.8	Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: good flow					
Notes: Some undercutting on both banks					

Stream Morphology (continued)

Substrate (< e >)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Si > Sa > Gr > Co

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
					10	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Canopy Cover (% closed cover):

- 100-80%
- 90-60%
- 60-30%
- 30-1%
- 0%

Types of Cover (% cover)

Trees 10 Shrubs 10 Man-made structures \_\_\_\_\_  
 Grasses 10 Herbaceous 10 Other \_\_\_\_\_

Notes:

residents cut up to stream bank  
 - bridge structure - ornamental

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

-relatively flat

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No

Other General Comments Regarding the Study Area:

- Watercourse running along road

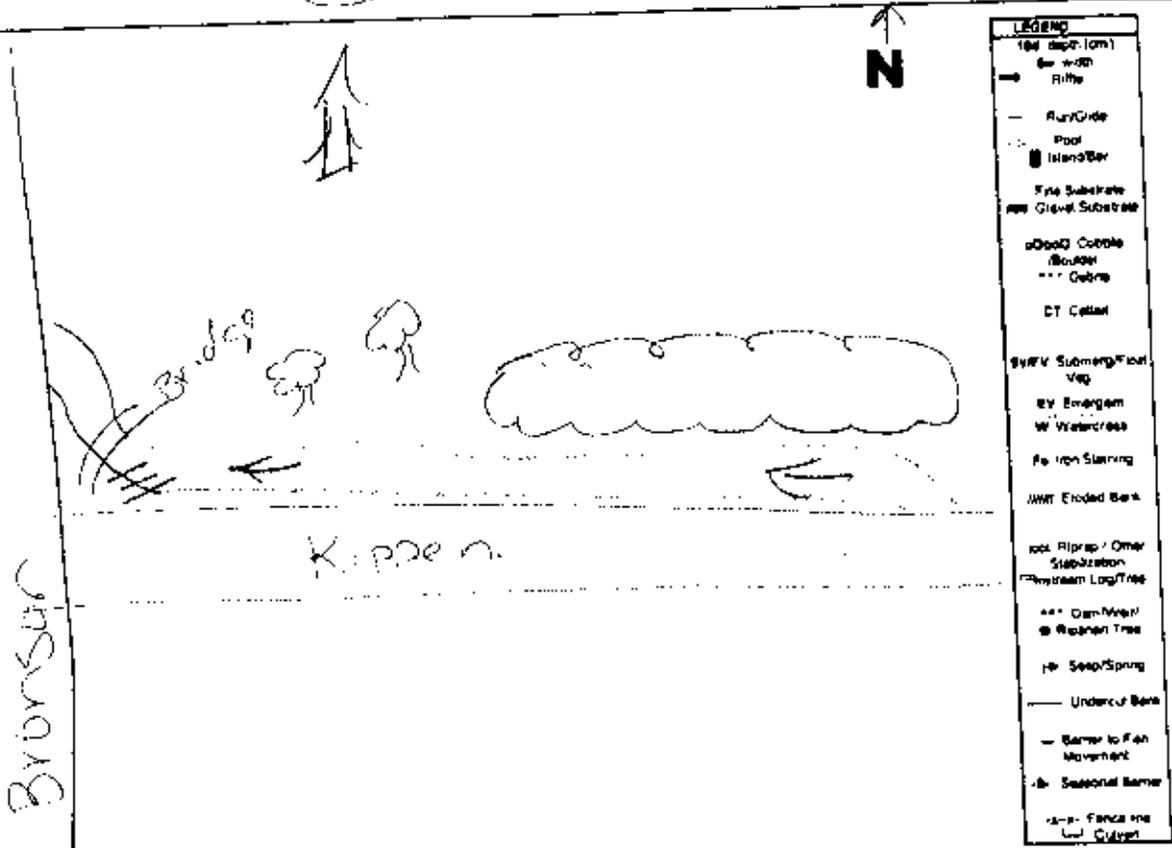
Photo log

Picture #	Description	Picture #	Description
376			
377			
378			
379			

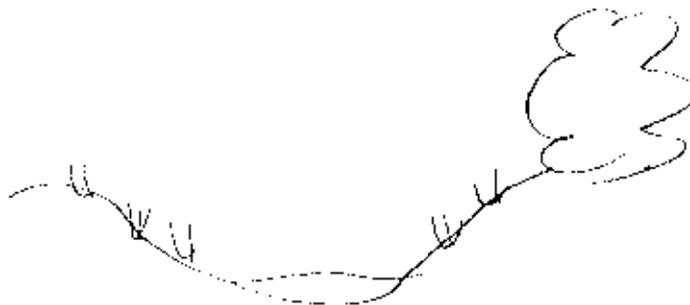
**AECOM**

**Watercourse Sketch**

Study Area: Jencho Goshen Bluewater Land Parcel# 1069 + 1568 Turbine # C32



**Horizontal View of Channel**



AECOM		Page 1 of 4	
Field Crew: SA SAF		General Information	
Study Area: Jarcho Goshen Bluewater	Land Parcel# 1812	Turbine # 087	
Date: Oct 26/11	Start time: 13:30	End Time: 13:50	
Weather Conditions: overcast		Field Notes By: SA	
Site Location			
West of Pearsonson Line			
UTM Co-ordinates			
Easting: 446510	Northing: 4810025	Description: 087A	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input checked="" type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
tile drain inputs → several			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 10°C	AT (°C): 8°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: /	Cond (µ/cm): /	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: some we			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable      Slightly unstable      Moderately unstable      Unstable	
Mean Wetted Width (m): 3.00	Mean Bankfull Width (m): 4.00	Left Bank	<input type="checkbox"/> <input checked="" type="checkbox"/> ↔ <input checked="" type="checkbox"/> <input type="checkbox"/>
Mean Wetted Depth (m): 0.12	Mean Bankfull Depth (m): 1.0	Right Bank	<input type="checkbox"/> <input checked="" type="checkbox"/> ← → <input checked="" type="checkbox"/> <input type="checkbox"/>
Flow Description: 4.5 s/m			
Notes: Channel choked with contrasts			

AECOM

Stream Morphology (continued)

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Sa/Si/Gr

Very sandy near base channel

Morphological Structure (%)			
Pool	Riffle	Run	Flat
	100	0	

Notes:

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	/	/		60	50%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Cattails, grasses, pondweed  
Some water lilies spawning, etc.

Canopy Cover (% closed cover):

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

Types of Cover (% cover)

- Trees
- Grasses
- Shrubs
- Herbaceous
- Man-made structures
- Other

Notes:

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

none observed

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

land relatively flat.

Terrestrial features Present

Yes  No

Terrestrial Recon Form Filled out

Yes  No



AECOM

Page 4 of 4

Watercourse Sketch

Study Area:

Jericho

Goshen

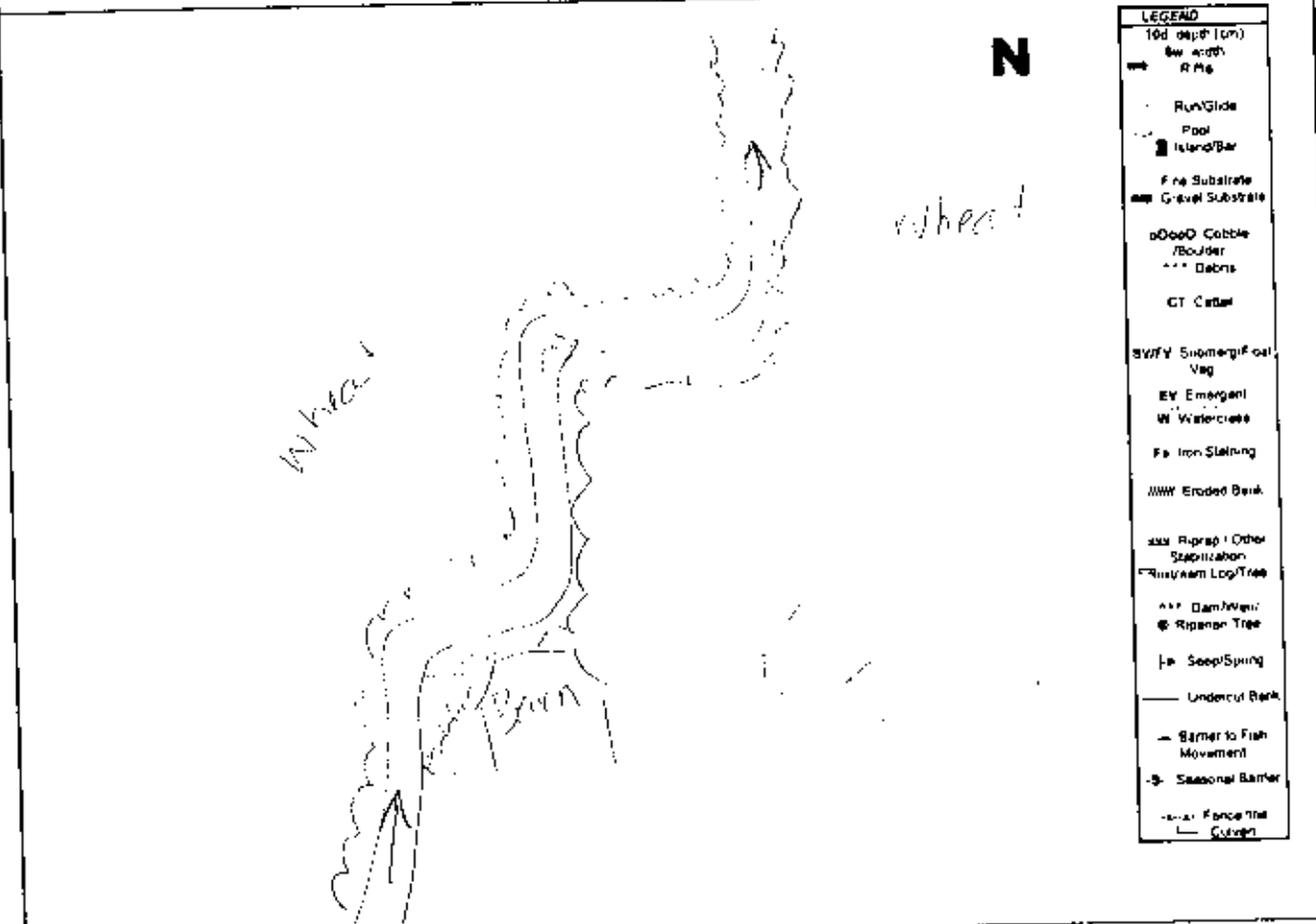
Bluewater

Land Parcel#

1812

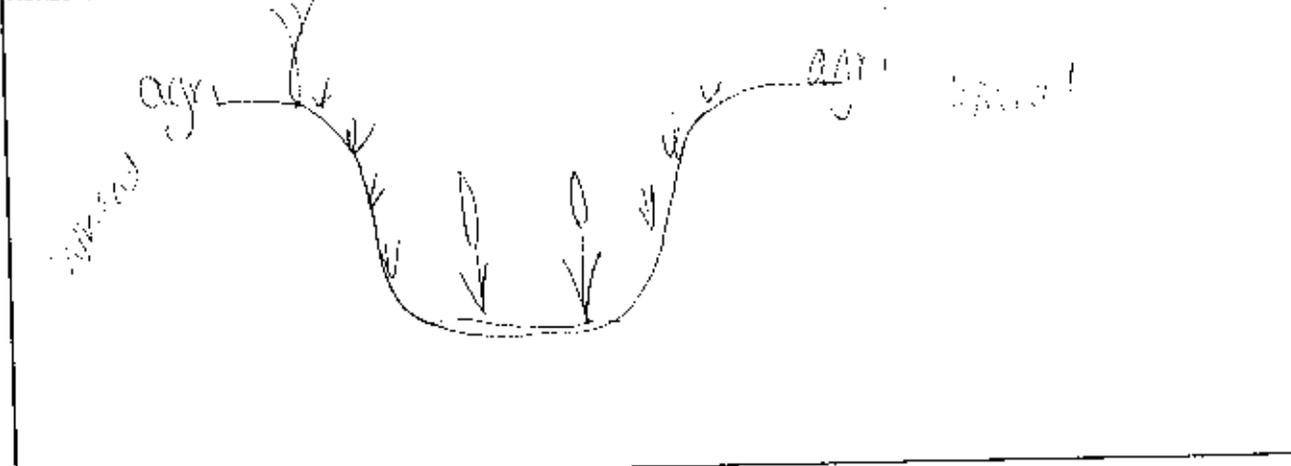
Turbine #

C87



LEGEND	
10d depth (cm)	10d depth (cm)
10w width	10w width
R Mg	R Mg
Run/Glide	Run/Glide
Pool	Pool
Island/Bar	Island/Bar
Fine Substrate	Fine Substrate
Gravel Substrate	Gravel Substrate
Cobble/Boulder	Cobble/Boulder
Debris	Debris
Ct Cedar	Ct Cedar
SVFY Submerged/Veg	SVFY Submerged/Veg
EV Emergent	EV Emergent
W Watercress	W Watercress
Fx Iron Staining	Fx Iron Staining
EWV Eroded Bank	EWV Eroded Bank
Riprap/Other Stabilization	Riprap/Other Stabilization
Stream Log/Tree	Stream Log/Tree
Dam/Weir	Dam/Weir
Riparian Tree	Riparian Tree
Seep/Spring	Seep/Spring
Undercut Bank	Undercut Bank
Barrier to Fish Movement	Barrier to Fish Movement
Seasonal Barrier	Seasonal Barrier
Fence (the)	Fence (the)
Gate(s)	Gate(s)

Horizontal View of Channel



Property ID: 1066 Date: Oct 26/11  
Property Access: leased Start Time: 9:40  
End Time: 10:00

Field Investigators: SA, GF Weather: overcast

**Terrestrial Feature Present:** No  Yes   
Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Photograph Numbers:** \_\_\_\_\_

**Aquatic Feature Present:** No  Yes   
Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)  
Swale features - no water  
\_\_\_\_\_  
\_\_\_\_\_

**Photograph Numbers:** 304 - 308

Turbine 4 + road access

Property ID: 1022Date: Oct 26/11Property Access: LeasedStart Time: 9:00End Time: 9:20Field Investigators: SM, GFWeather: overcastTerrestrial Feature Present: No  Yes 

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

terrestrial team has been  
to site

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes 

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

Swale features - no water

Photograph Numbers: ... 284-298

Turbine 18 + road + collection line

Property ID: 1657 (A14) Date: Nov 2/2011  
 Property Access: 1657 Start Time: 15:15  
 End Time: 15:25

Field Investigators: SA, bit Weather: overcast

**Terrestrial Feature Present:** No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

Swale feature in verged area  
- wet area no standing  
water

Photograph Numbers: 25 - 28

Wetland Assessment  
Report  
0103



# Reconnaissance Assessment Record

Property ID: 1636 - Watkins Oct Date: Nov 3/2001  
through road  
 Property Access: leased Start Time: 14:40  
 End Time: 14:55

Field Investigators: SA, BIF Weather: overcast

Terrestrial Feature Present: No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

Swale feature in field - farmer  
drives through. No  
standing water

Photograph Numbers: 1-6 of 7

AECOM		Page 1 of 4	
Field Crew: SA, GF			
<b>General Information</b>			
Study Area:	Jericho Goshen	Bluewater Land Parcel #	1656, 1657 Turbine #
Date:	Nov 3/11	Start time:	10:05 End Time: 15:25
Weather Conditions: overcast		Field Notes By: SA, GF	
<b>Site Location</b>			
West of Barrington Line north of Centennial Rd			
<b>UTM Co-ordinates</b>			
Easting:	451111	Northing:	4817154
Description:	VIC 34A		
Easting:		Northing:	
Description:			
Easting:		Northing:	
Description:			
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:		Cultural	
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C):	10.2°C	Watercress	<input type="checkbox"/>
AT (°C):	11°C	Bank Seepage	<input type="checkbox"/>
pH:	7.73	Iron Staining	<input type="checkbox"/>
Cond (µs/cm):	699	Bubbling	<input type="checkbox"/>
Water Clarity:	Clear <input type="checkbox"/>	Other	<input type="checkbox"/>
	Turbid <input checked="" type="checkbox"/>		
Notes: green colour, cloudy			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m):	3.0	Moderately unstable	Unstable
Mean Bankfull Width (m):	8	Left Bank	<input type="checkbox"/>
Mean Wetted Depth (m):	0.60	Right Bank	<input type="checkbox"/>
Mean Bankfull Depth (m):	2.5		
Flow Description: flat gradient 8s/m			
Notes: Top - 4m Top - 1.5m Well vegetated banks some slumping near entrance			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; = &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

Description

cl &gt; sand

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobbles	Aquatic Vegetation*	Undercut Bank	Other:
		/	/		5%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
80-30%

## Types of Cover (% cover)

Trees 10% Shrubs 10% Man-made structures \_\_\_\_\_  
Grasses 30% Herbaceous 30% Other \_\_\_\_\_

Notes: riparian is generally very wooded, some shrubs & tree cover  
~ 10 m riparian buffer on both sides of the reach

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

None observed.

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



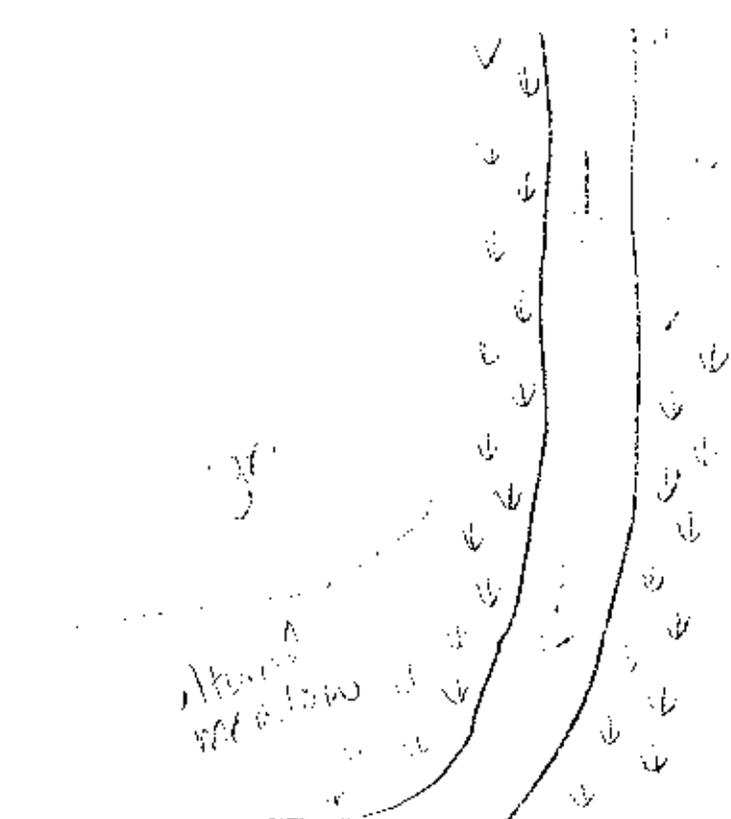
AECOM

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel 1631, 1637 Turbine # C71

N

LEGEND	
100 depth (cm)	
60 width	
Bank	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Coarse Cobble	
Boulder	
Debris	
OT Canal	
Subm. Submerged Veg	
Emergent Veg	
Watercress	
Iron Skating	
Eroded Bank	
Rebar / One Station	
Stream Log/Tree	
Dam/Weir	
Rebar Tree	
Seep/Spring	
Under Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence the Gulch	



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: SA, GF		General Information	
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel#: 1658	Turbine #: C99	
Date: Nov 3/11	Start time: 15:30	End Time: 15:42	
Weather Conditions: overcast		Field Notes By: SA	
Site Location west of Broughton Line, north of Centennial Rd.			
UTM Co-ordinates			
Easting: 451050	Northing: 4816655	Description: C99 3D	
Easting: 450930	Northing: 4816580	Description: C99 End	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input checked="" type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 10.5°C	AT (°C):	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 7.68	Cond (µs/cm): 700	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: green colour...			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 3.5	Mean Bankfull Width (m): 5	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.75	Mean Bankfull Depth (m): 2.0	Left Bank	Right Bank
		<input type="checkbox"/>	<input type="checkbox"/>
		<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>
Flow Description: no flow - bank up from Beaver dam			
Notes: bank scouring observed To B - 3.5 To B W - 7.8 m			

AECOM

Stream Morphology (continued)

Substrate (< = >)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Cl / Sa = 80

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
/	20	/	/	20	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Grasses

Canopy Cover (% closed cover):

100-90%	<input type="checkbox"/>	30-1%	<input checked="" type="checkbox"/>
90-80%	<input type="checkbox"/>	0%	<input type="checkbox"/>
80-30%	<input type="checkbox"/>		

Types of Cover (% cover)

Trees	15%	Shrubs	5%	Man-made structures	
Grasses	30	Herbaceous	30	Other	

Notes:

Obstructions to Fish Passage

No Obstructions  Man-Made   
 Natural

Description:

Beaver dam - ~0.5m high - 1m wide  
 this dam

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

fairly flat

Terrestrial features Present

Yes No

Terrestrial Recon Form Filled out

Yes No



AECOM

Watercourse Sketch

Study Area:

Jencho

Goshen

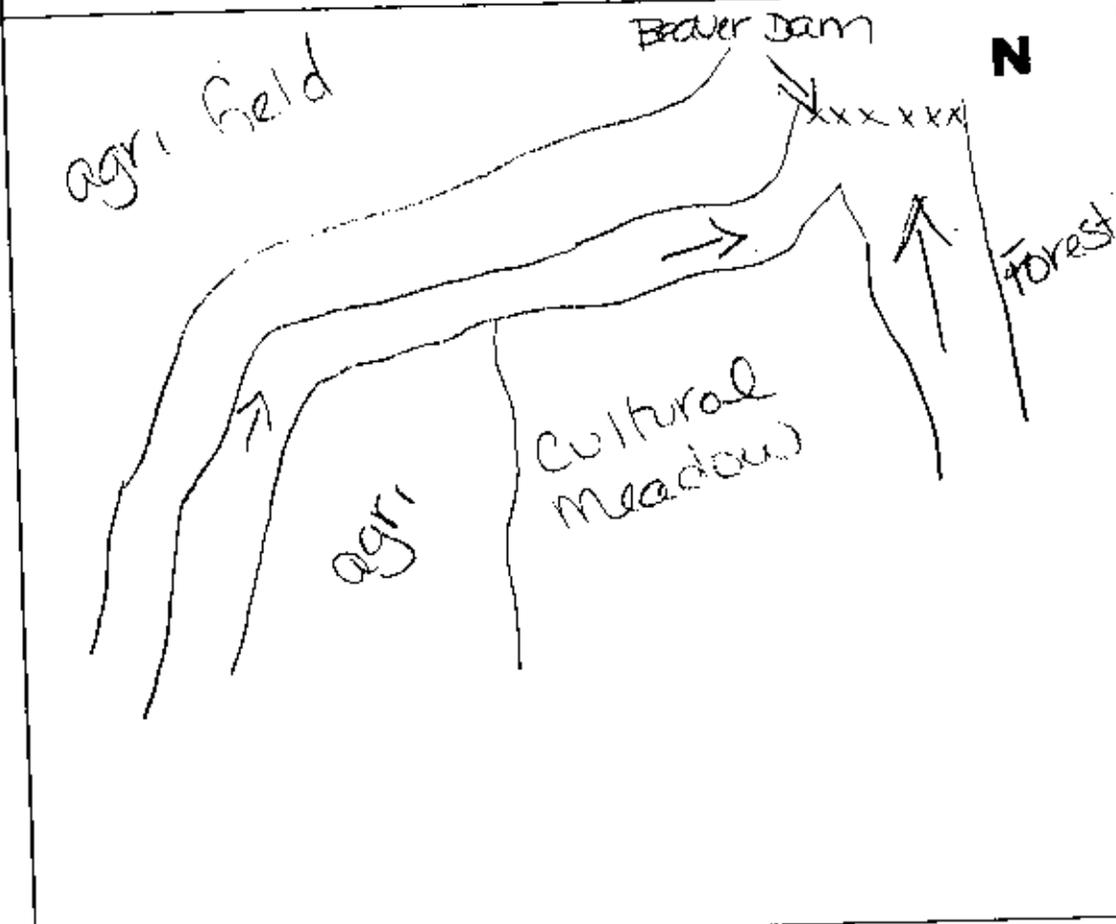
Bluewater

Land Parcel #

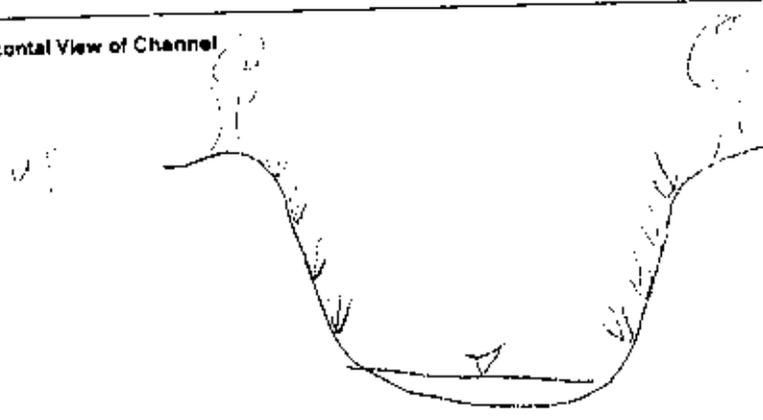
16158

Turbine #

099



Horizontal View of Channel



AECOM		Page 1 of 4	
Study Area: Jericho Goshen <u>Bluewater</u>		Field Crew: SA, GJT	
<b>General Information</b>			
Date: NOV 3/11	Start time: 16:00	Land Parcel #: 1682 + 1088	Turbine #: C 986
Weather Conditions: <u>overcast</u>		Field Notes By: <u>GJT</u>	
<b>Site Location</b>			
Corner of Pavilion Rd & Babylon Line			
<b>UTM Co-ordinates</b> - none taken			
Easting:	Northing:	Description:	
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other: <u>Roadway into drain</u>			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>tile drainage on both sides of road</u>			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C):	AT (°C):	Watercross <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µm):	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m):	1.0	Mean Bankfull Width (m):	2.0
Mean Wetted Depth (m):	0.20	Mean Bankfull Depth (m):	1.0
		Left Bank	<input type="checkbox"/> Stable <input checked="" type="checkbox"/> Slightly unstable <input type="checkbox"/> Moderately unstable <input type="checkbox"/> Unstable
		Right Bank	<input type="checkbox"/> Stable <input checked="" type="checkbox"/> Slightly unstable <input type="checkbox"/> Moderately unstable <input type="checkbox"/> Unstable
Flow Description:			
Notes: <u>ToB - 2.5 - Bank scouring present</u>			
<u>ToBW - 7m - C</u>			

**AECOM**

**Stream Morphology (continued)**

**Substrate (<=>)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

*clean*

**Morphological Structure (%)**

Pool	Riffle	Run	Flat
		100%	

Notes:

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		/	/			

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

**Canopy Cover (% closed cover):**

- 100-80%
- 90-80%
- 80-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees 5%
- Grasses 30
- Shrubs 1%
- Herbaceous 30
- Man-made structures 10%
- Other \_\_\_\_\_

Notes:

*Some trees without surrounding cover*

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

**Terrestrial features Present** Yes No

Terrestrial Recon Form Filled out Yes No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

- agri drain along road - channeling of flows through broken cement culvert
- cultural meadow area
- grass lined channel
- some flow
- u/s - flows through pipe culvert - grass lined
- by main channel

Photo log

Picture #	Description	Picture #	Description
29	u/s side		
30	dis		
31	dis		
32	u/s		

AECOM

Watercourse Sketch

Study Area:

Jericho

Goshen

Bluewater

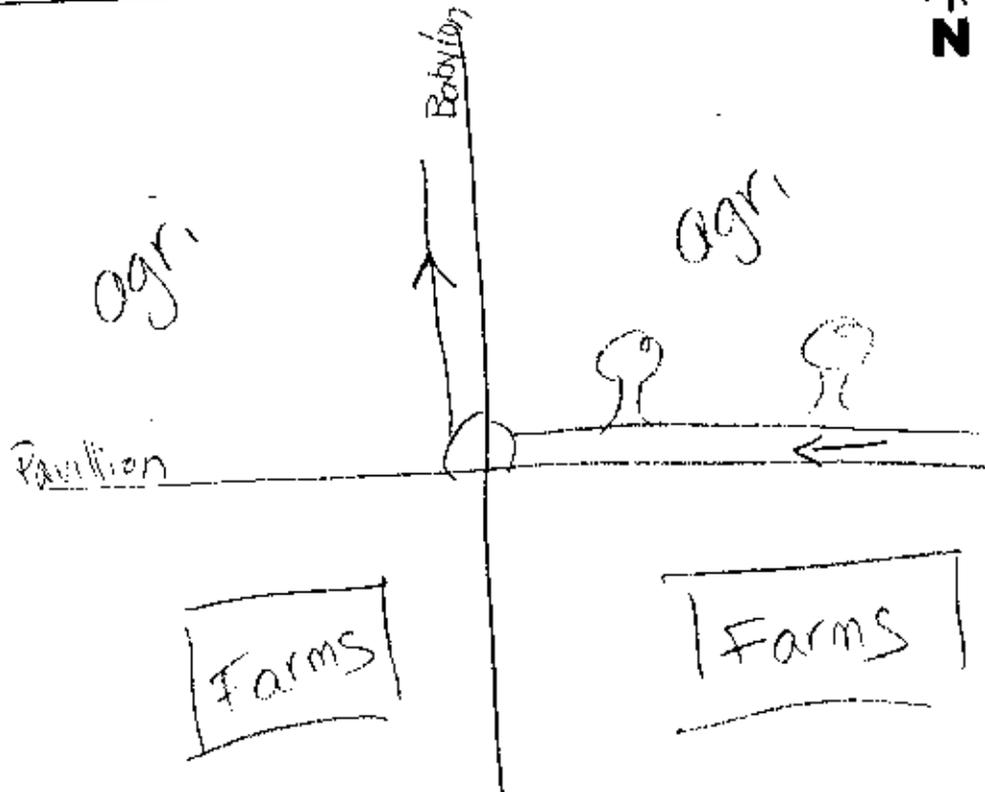
Land Parcel# 1082, 1088

Turbine #

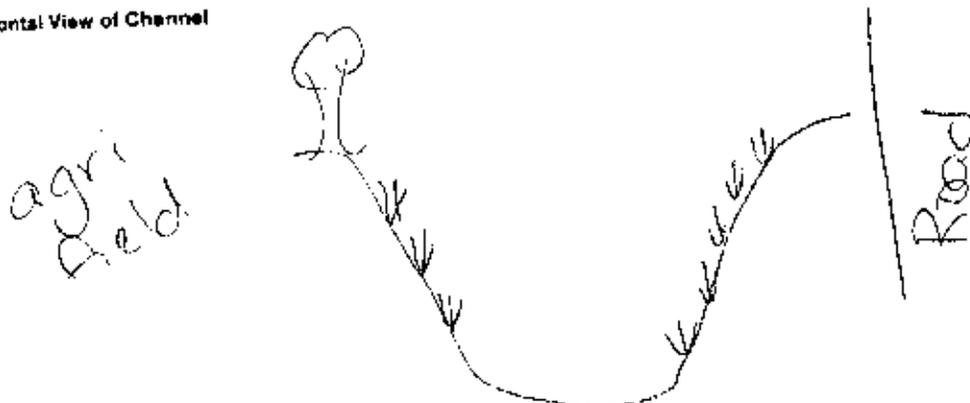
C88



LEGEND	
10d depth (cm)	
5w width	
Ring	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Good Cobble Boulder	
Debris	
CF Cuttel	
Subly Submerged Veg	
EM Emergent	
W Watercress	
Fe Iron Staining	
AWI Eroded Bank	
Exp Repair / Other Stabilization	
Prostem Log/Tree	
DM Dam/Wall	
RT Riparian Tree	
LS Seep Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence line	
Cutwell	



Horizontal View of Channel



AECOM		Page 1 of 4	
Study Area: Jericho Goshen <u>Bluewater</u>		Field Crew: SA bvf	
Date: <u>Nov 3/11</u>		General Information	
Start time: <u>16:25</u>		Land Parcel # <u>1659</u>	
Weather Conditions: <u>overcast</u>		Turbine # <u>C52</u>	
Field Notes By: <u>JM</u>		End Time: <u>16:38</u>	
Site Location			
<u>South of Centennial Road &amp; Babylon Line</u>			
UTM Co-ordinates - <u>none taken</u>			
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<u>agricultural channelized drainage</u>			
<u>tile drain on ULS LB side &amp; RB</u>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): <u>10.1°C</u>	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>8.18</u>	Cond (µm): <u>69</u>	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): <u>2.00</u>	Mean Bankfull Width (m): <u>5.0</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.20</u>	Mean Bankfull Depth (m): <u>1.2</u>	Left Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
		Right Bank <input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description:			
Notes: <u>bank scouring observed</u>			
<u>TOB H - 2.5</u>			
<u>TOB W - 10m</u>			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; x &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

0.75 Si 0.75 Sa 0.75 Gr

Notes:

## Morphological Structure (%)

Pool	Riffle	Run	Flat
	30	70	

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
				15		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Algae and  
Water Cress  
Cyperus

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
60-30%

## Types of Cover (% cover)

Trees 2% Shrubs 5% Man-made structures \_\_\_\_\_  
Grasses 30 Herbaceous 30 Other \_\_\_\_\_

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

none observed

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

relatively flat

Terrestrial features Present

Yes

No

Terrestrial Recon Form filled out

Yes

No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

- large CSP culvert
- Straightened channel uniform
- steep high banks - well vegetated
- slight meandering, stream close to banks in stream
- relatively uniform channel

Photo log			
Picture #	Description	Picture #	Description
33-35	- d/s side -		
36			
37			
38	facing u/s		
39	facing d/s		
40	view of bank		

AECOM

Watercourse Sketch

Study Area:

Jericho

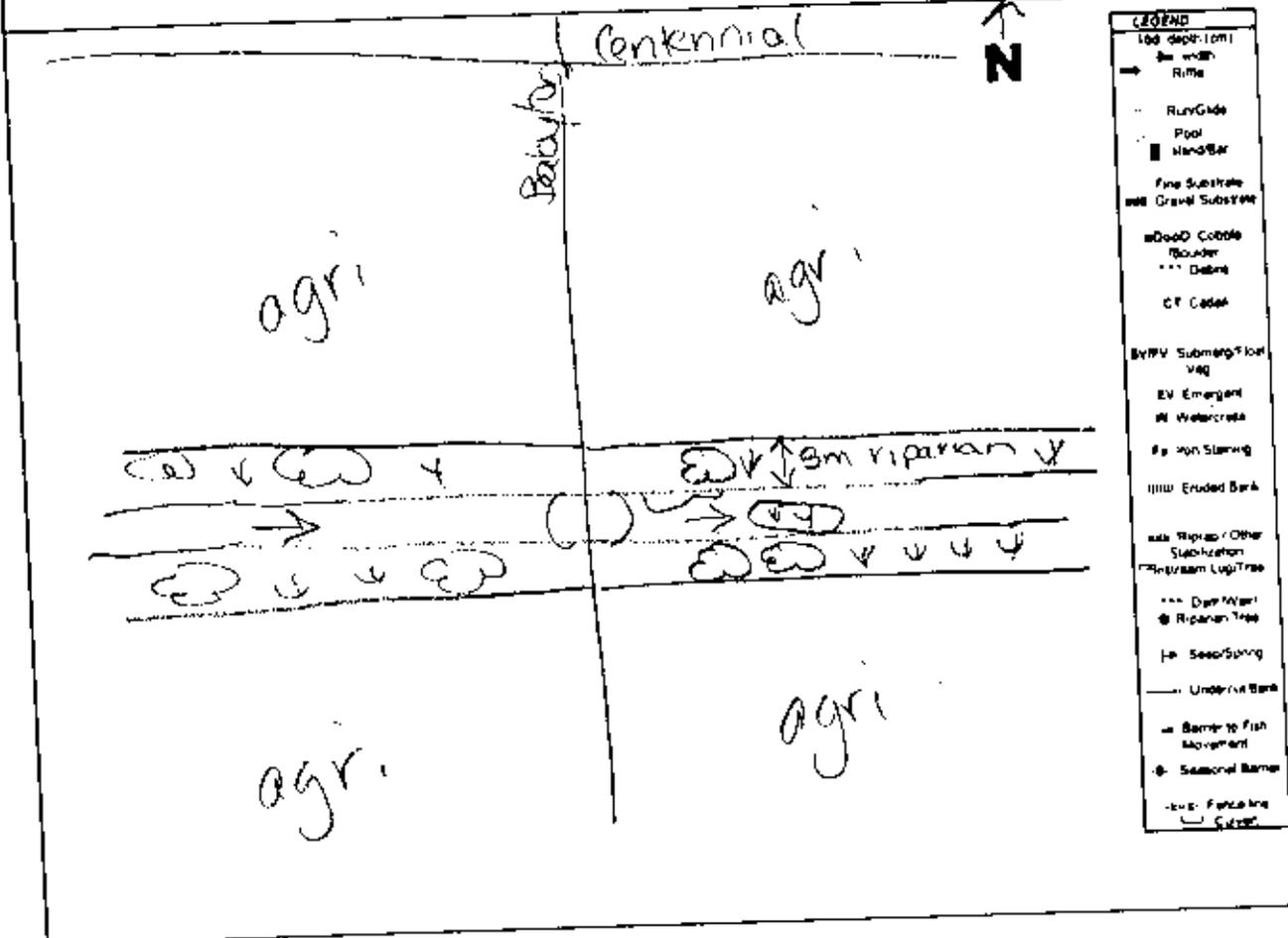
Goshen

Bluewater Land Parcel#

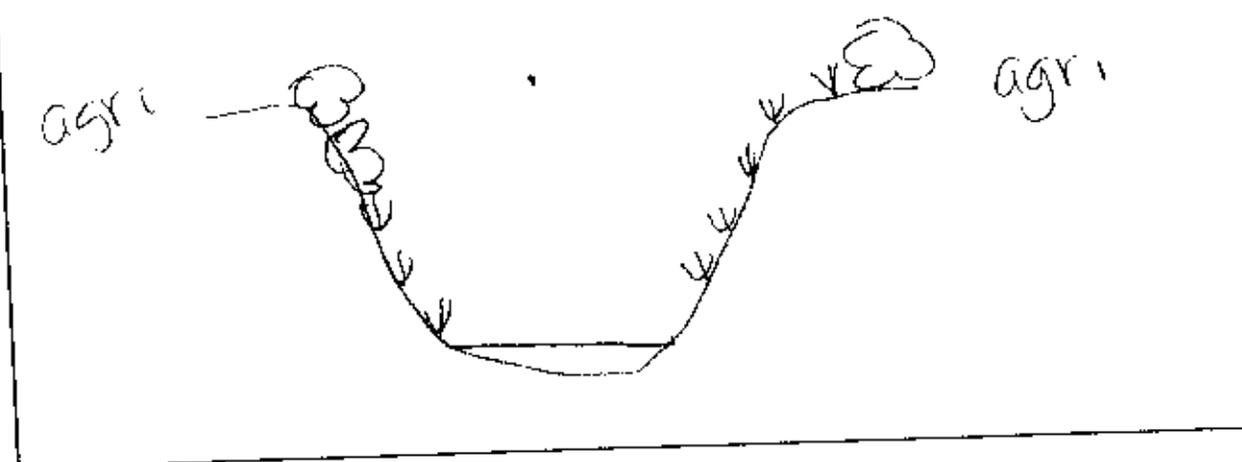
1059

Turbine #

C52



Horizontal View of Channel



AECOM		Page 1 of 4	
Field Crew: SA MF			
<b>General Information</b>			
Study Area: Jericho Goshen Bluewater	Land Parcel# 1452, 1453	Turbine # C.666	
Date: NOV 3/11	Start time: 16:47	End Time: 16:55	
Weather Conditions: overcast		Field Notes By: SA	
<b>Site Location</b>			
crossing at Staffn Rd, between Goshen Line & Babylon Line			
<b>UTM Co-ordinates - none taken</b>			
Easting:	Northing:	Description:	
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C):	AT (°C):	Watercress <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH:	Cond (µscm):	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: Clear <input type="checkbox"/>	Turbid <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: no groundwater indicators observed			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 1.00	Mean Bankfull Width (m): 4.00	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.10	Mean Bankfull Depth (m): 0.50	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description:			
Notes: TOB H - 2.5 m TOB W - 6.0 m			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt; + &gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

S1 &gt; DT

Clay bottom

## Morphological Structure (%)

Pool	Riffle	Run	Flat
20	30	50	

Notes:

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		/	/	60%		

## \*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Cattails

## Canopy Cover (% closed cover):

100-90%  30-1%   
90-80%  0%   
80-30%

## Types of Cover (% cover)

Trees \_\_\_\_\_ Shrubs \_\_\_\_\_ Man-made structures \_\_\_\_\_  
Grasses 30 Herbaceous 30 Other cattails

Notes:

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

Description:

none observed

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

relatively flat

Terrestrial features Present Yes No

Terrestrial Recon Form filled out Yes No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

- cattail choked channel
- grass choked channel
- channelized uniform channel on both sides

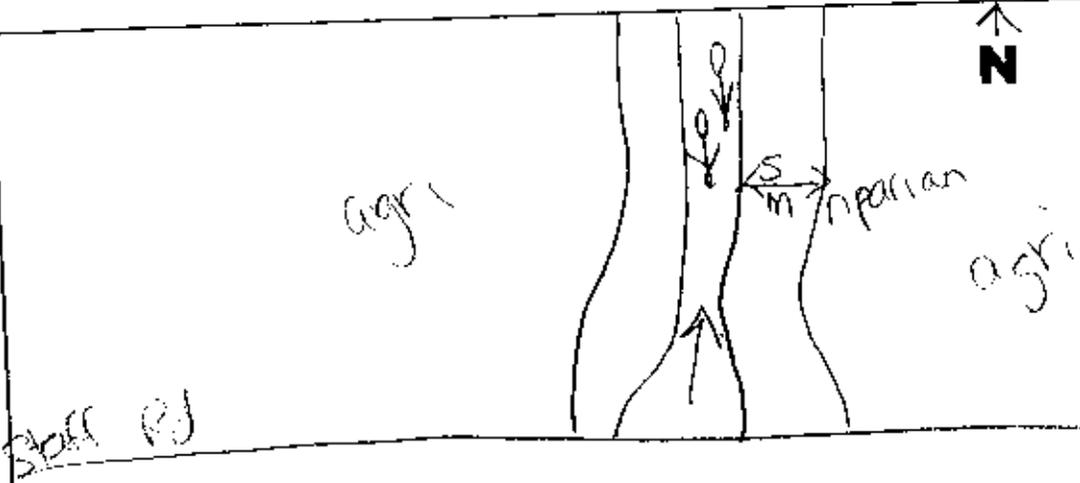
Photo log

Picture #	Description	Picture #	Description
41	facing dis.		
42	on ups side		
43	on ups side		
44	facing ups		

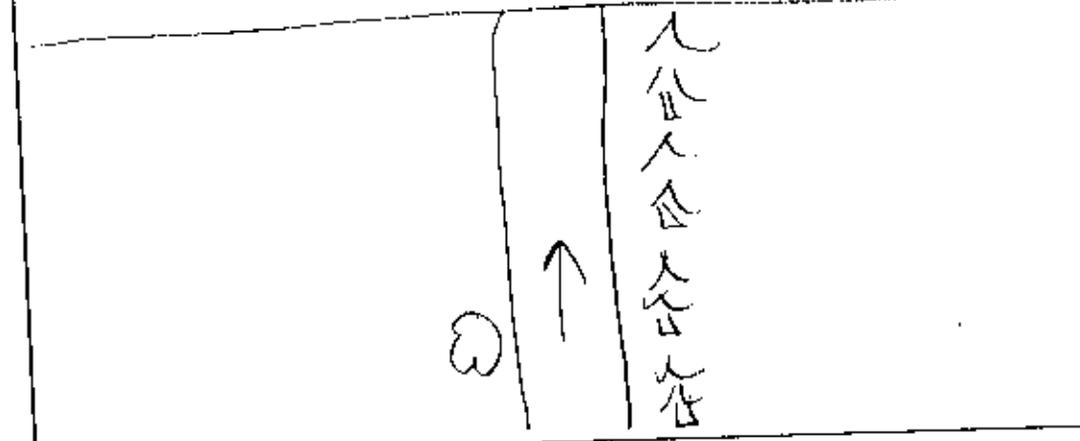
AECOM

Watercourse Sketch

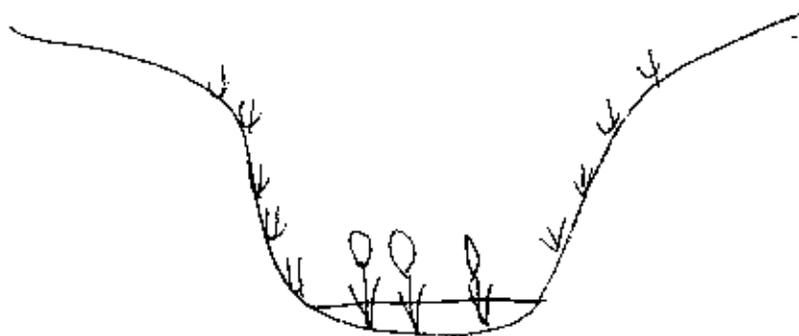
Study Area: Jericho Goshen Bluewater Land Parcel # 1452, 1453 Turbine # C Lolo



LEGEND	
100 depth (cm)	
Bar width	
Rifle	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Coarse Substrate	
Cobble	
Boulder	
Debris	
CT Culvert	
Submerg/Floa Veg	
Emergent	
Watercress	
Non-Stemmg	
Eroded Bank	
Riprap/Other Stabilization	
Stream Log/Tree	
Dam/Weir	
Riparian Tree	
Seep/Spring	
Underl Bank	
Barrier to Fish Movement	
Seasonal Barier	
Fence line	
Culvert	



Horizontal View of Channel



Wetland Site  
C104



### Reconnaissance Assessment Record

Property ID: 1043 Date: Nov 11 11  
Property Access: Leased Start Time: 12:00  
End Time: 13:30

Field Investigators: CA, bif Weather: Sunny

Terrestrial Feature Present: No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

Small feature among field  
not watercourse - low lying area  
where tile drainage

Photograph Numbers: 130-132

taken from road



# Reconnaissance Assessment Record

Property ID: P8-11615 Date: Nov 1/11

Property Access: NO ACCESS Start Time: 11:15

End Time: 11:20

Field Investigators: SA/bf Weather: \_\_\_\_\_

**Terrestrial Feature Present:** No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

low lying area drained  
no signs of current or  
water feature

Photograph Numbers: 82

Property ID: P7 - 1893 Date: Nov 4/11

Property Access: NO ACCESS Start Time: 8:15

End Time: 8:25

Field Investigators: SA, GP Weather: Sunny

**Terrestrial Feature Present:** No  Yes

Provide brief description of observations (i.e. hedgerow, trearow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Photograph Numbers:** \_\_\_\_\_

**Aquatic Feature Present:** No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

low lying area around  
tile drainage trench. water  
at base of vegetation

**Photograph Numbers:** 485-51

Property ID: 1052 + 1048 Date: Nov 4/11Property Access: Loose d Pot Start Time: 14:15End Time: 14:20Field Investigators: SA, JPF Weather: Sunny**Terrestrial Feature Present:** No  Yes 

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

---

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---

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes 

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

swale feature was observed, some  
water flows towards Blue Bluff rd  
and into tile drain.

mitigation measures should be installed

Photograph Numbers: 115-120

C108

Property ID: 1044 Date: NOV 11

Property Access: NO ACCESS Start Time: 13:35  
End Time: 13:45

Field Investigators: SA, BF Weather: SUNNY

**Terrestrial Feature Present:** No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

swale through field  
\_\_\_\_\_  
\_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

AECOM		Page 1 of 4	
Field Crew: <i>JP, JF</i>			
General Information			
Study Area:	Jericho Goshen <u>Bluewater</u>	Land Parcel#	Turbine #
Date:	<i>11/01/11</i>	Start time:	End Time:
Weather Conditions:	<i>Sunny 30°</i>	Field Notes By: <i>JA</i>	
Site Location			
<i>North of Kippen Rd</i>			
UTM Co-ordinates			
Easting:	<i>4496103</i>	Northing:	<i>4812480</i>
Easting:	<i>450244</i>	Northing:	<i>4812626</i>
Easting:		Northing:	
Easting:		Northing:	
Surrounding Landuse/Pollution Source		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Welland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
<i>no seepage or tile drainage visible</i>			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	<i>13.3</i>	Watercress	<input checked="" type="checkbox"/>
pH:	<i>8.07</i>	Bank Seepage	<input type="checkbox"/>
Water Clarity:	Clear <input checked="" type="checkbox"/> Turbid <input type="checkbox"/>	Iron Staining	<input type="checkbox"/>
		Bubbling	<input type="checkbox"/>
		None	<input type="checkbox"/>
		Other	<input type="checkbox"/>
Notes: <i>none observed</i>			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m):	<i>1.5</i>	Moderately unstable	Unstable
Mean Bankfull Width (m):	<i>3.0</i>	Left Bank	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Mean Wetted Depth (m):	<i>0.20</i>	Right Bank	<input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Mean Bankfull Depth (m):	<i>1.2</i>		
Flow Description: <i>4.5 m/s</i>			
Notes: <i>top of H - 34.5 m</i>			
<i>top of W - 10 m</i>			
<i>no underflow</i>			
<i>main channel</i>			

**AECOM**

**Stream Morphology (continued)**

**Substrate (<=>)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- Mk - Muck
- DT - Detritus
- Other

Description

*50% Gravel 20% Sand*

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
<i>5%</i>	<i>20</i>	<i>30</i>	<i>10</i>

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	<i>/</i>	<i>/</i>	<i>5%</i>	<i>20</i>	<i>/</i>	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

*None*

**Canopy Cover (% closed cover):**

- 100-90%
- 90-60%
- 60-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees *2%*
- Shrubs *5%*
- Man-made structures \_\_\_\_\_
- Grasses *30*
- Herbaceous *30*
- Other \_\_\_\_\_

Notes:

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



ASCOM

Watercourse Sketch

Study Area:

Jericho

Goshen

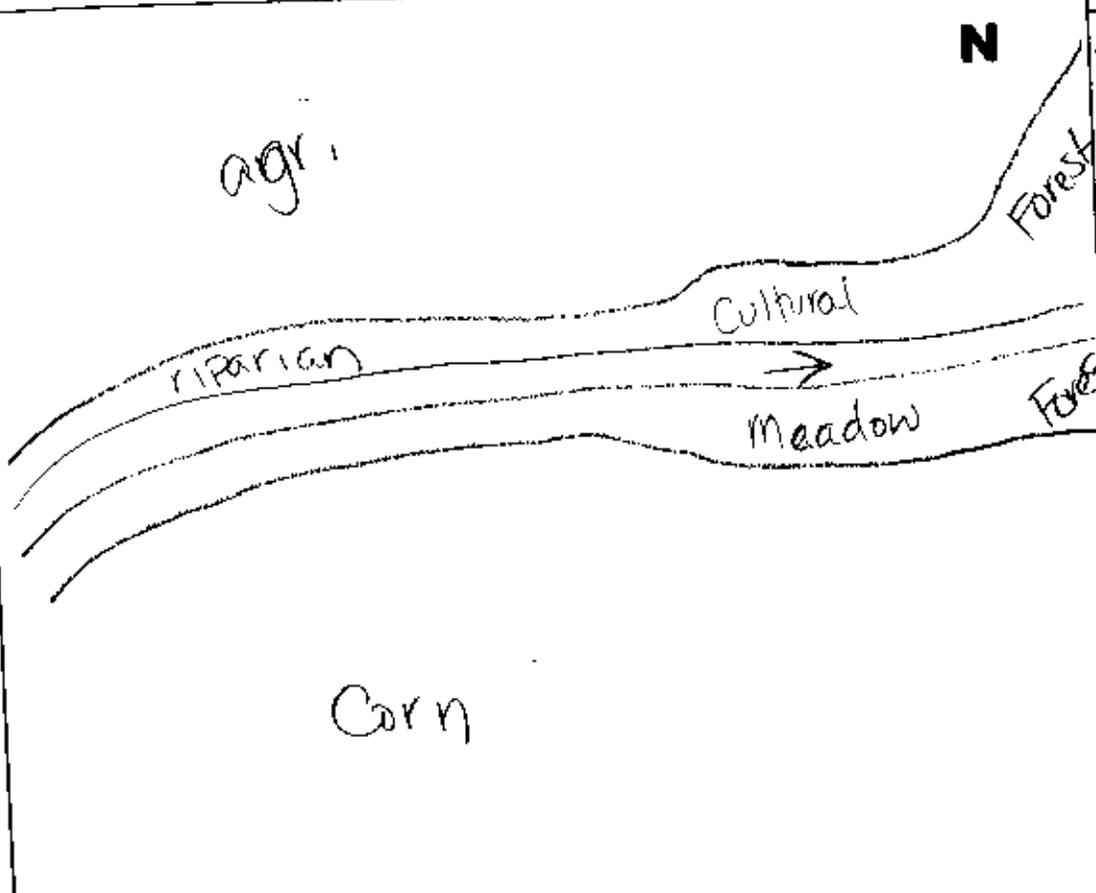
Bluewater

Land Parcel#

1619

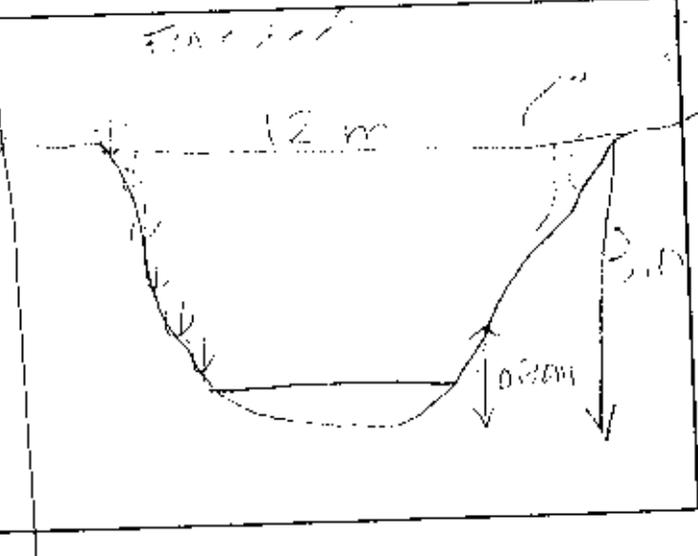
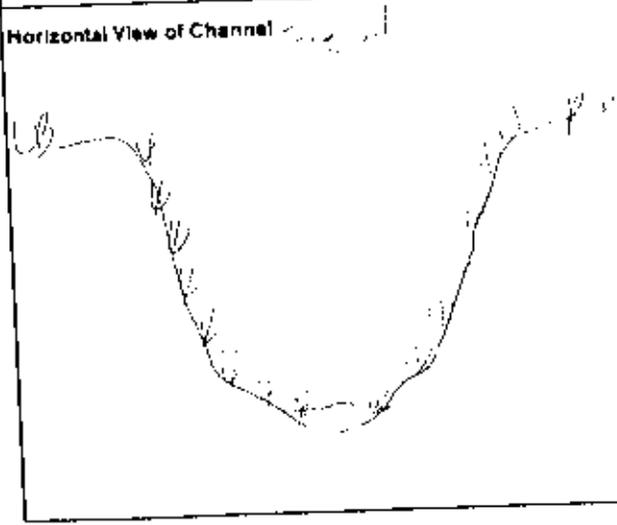
Turbine #

C 30



**LEGEND**

- 10d depth (cm)
- 6w width
- R/M
- Run/Side
- Pool
- Island/Bar
- Fine Substrate
- Gravel Substrate
- Wood Cobble Boulder
- \*\*\* Debris
- Capital
- SWW Submerged Veg
- EV Emergent Watercress
- Fe Iron Staining
- WHI Eroded Bank
- CCA Riprap / Other Stabilization
- Tree/Log/Tree
- \*\*\* Dam/Veget
- ⊙ Riparian Tree
- ⊙ Seep/Spring
- Underl Bank
- Barrier to Fish Movement
- ⊖ Seasonal Barrier
- Force the Current



AECOM		Page 1 of 4	
Field Crew: SA, GF			
<b>General Information</b>			
Study Area: Jericho Goshen <u>Blowwater</u>	Land Parcel#: 16001	Turbine #: C51	
Date: Nov 9/11	Start time: 10:11	End Time: 11:10	
Weather Conditions: Sunny 10°C	Field Notes By: SA		
<b>Site Location</b>			
located under 10' barrier line between Centennial rd and Staffa rd at back of property			
<b>UTM Co-ordinates</b>			
Easting: 451666	Northing: 4815879	Description: C51	
Easting: 451600	Northing: 4815873	Description: C51B	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
All fed from tile drains. 3 drains at start of channel			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C): 10.7°C	AT (°C):	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 8.21	Cond (µs/cm): 570	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: <i>no ground water indicators observed</i>			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 0.50	Mean Bankfull Width (m): 2.0	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.03	Mean Bankfull Depth (m): 0.30	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description:			
Notes: TOB W - 1.70 - well vegetated banks TOB W - 2m - steep lanes on RB			

AECOM

Stream Morphology (continued)

Substrate (< = >)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Sl - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Sand & Silt

Notes:

Morphological Structure (%)			
Pool	Riffle	Run	Flat
	50	50	

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	30	/	/	10%	/	leaf litter

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

Some algae attached

Canopy Cover (% closed cover):

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

Types of Cover (% cover)

Trees 30 Shrubs 15  
Grasses 40 Herbaceous 30  
Man-made structures \_\_\_\_\_  
Other \_\_\_\_\_

Notes:

Obstructions to Fish Passage

- No Obstructions
- Natural
- Man-Made

Description:

no obstructions  
at headwater trib

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Relatively flat

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

- Straight channel originates out of tile drains from adjacent crop fields
- Flows through natural meadow riparian to adjacent trees
- water is stagnant area lower end
- lots of wet mud

Photo log 75-83

Picture #	Description	Picture #	Description
75	View of channel		
76-78	tile drains		
79-83	View of channel		

AECOM

Watercourse Sketch

Study Area:

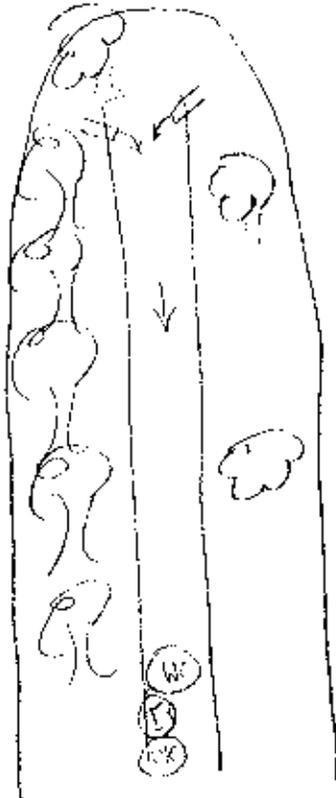
Jericho Goshen Bluewater Land Parcel#

Turbine #

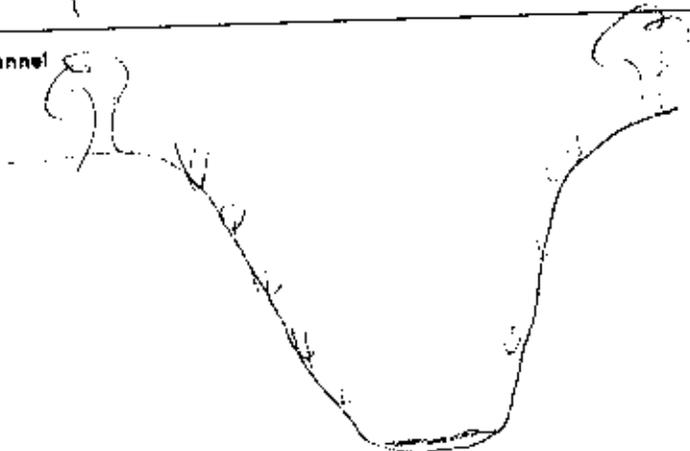
051



LEGEND	
10d	Depth (cm)
sw	width
cm	cm
---	Run/Glide
o	Pool
■	Island/Bar
---	Fine Substrate
---	Gravel Substrate
o	Dead Cobble
o	Boulder
---	Debris
CT	Cutbank
g	Submerged
g	Emergent Veg
g	Emergent
W	Watercress
F	Iron Staining
MM	Erosion Bank
---	Repair - Other
---	Stabilization
---	Structure Log/Tree
---	Dam/Weir
o	Repair Tree
o	Seep/Spring
---	Undercut Bank
---	Barrier to Fish Movement
---	Seasonal Barrier
---	Fence line
---	Gully



Horizontal View of Channel



Washed Site

C112



### Reconnaissance Assessment Record

Property ID: 1019 - BLW Date: Nov 17/11

Property Access: leased Start Time: 10:30

End Time: 11:15

Field Investigators: SA TS Weather: overcast

Terrestrial Feature Present: No  Yes

Provide brief description of observations (i.e. hedgerow, tree row, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

Swale feature to connectivity to  
small channel feature in forest  
WC in forest no. 5m wide, 0.05 m deep  
fruit of leaves not flowering

Photograph Numbers: 20-South, 21-North, 22-South, 23-North  
24-South

B2 - originates in wetland that is  
wet 26-29

B1 - originates from the drain  
30-33

B3 - originates in adjacent property  
34-35

evidence of erosion to seaward  
banks

Property ID: 1049 & 1088

Date: Nov 2011

Property Access: ROE & NO ACCESS

Start Time: 11:15

End Time: 11:16

Field Investigators: SA, JS

Weather: overcast, windy

Terrestrial Feature Present: No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Photograph Numbers: \_\_\_\_\_

Aquatic Feature Present: No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

tile drained field - grassed

swale feature - no water

concrete box culverts

Photograph Numbers: 36-North 37-South

AECOM		Page 1 of 4	
Field Crew: SA, JS			
<b>General Information</b>			
Study Area: Jericho Goshen <u>Bluewater</u>	Land Parcel # 1070, 1001	Turbine # C56	
Date: NOV 17/11	Start time: 11:20	End Time: 11:49	
Weather Conditions: overcast, windy		Field Notes By: SA	
<b>Site Location</b>			
crossing at Goshen			
<b>UTM Co-ordinates</b>			
Easting:	Northing:	Description:	
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other:			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
US side tile drain no channel			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C): 8.2°C	AT (°C): 2.5°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 8.15	Cond (µ) s/cm: 684	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: lots of watercress on US side - very clear			
<b>Stream Morphology</b>			
Site Length (m):		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 1.36	Mean Bankfull Width (m): 3.29	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.20	Mean Bankfull Depth (m): 0.71	Left Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
		Right Bank <input checked="" type="checkbox"/>	<input type="checkbox"/>
Flow Description: 710 sec/m			
Notes: TOBH - 2.0 TOBW - 6.0			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

3a &gt; Co

## Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
/	5%	/	10%	80%	/	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%   
90-80%   
80-70%

30-1%   
0%

## Types of Cover (% cover)

Trees 1% Shrubs 0  
Grasses 50 Herbaceous 50

Man-made structures 0  
Other \_\_\_\_\_

## Notes:

Asters, Cattail, grasses, hydrocotyl, sedges

## Obstructions to Fish Passage

No Obstructions   
Natural

Man-Made 

## Description:

perched culvert  
no ups flow  
into drain

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

relatively flat

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No



ASCOM

Watercourse Sketch

Study Area:

Jericho

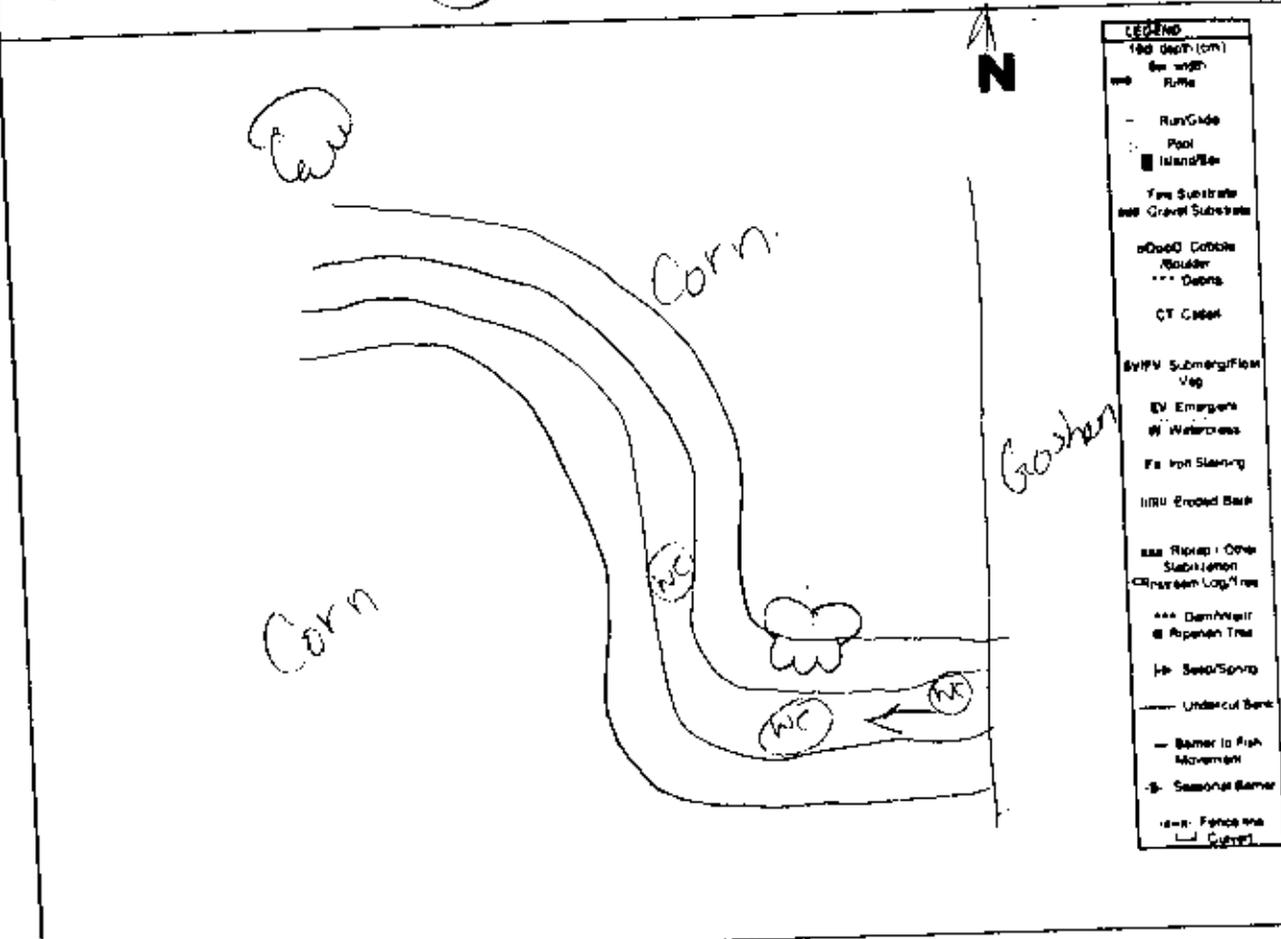
Goshen



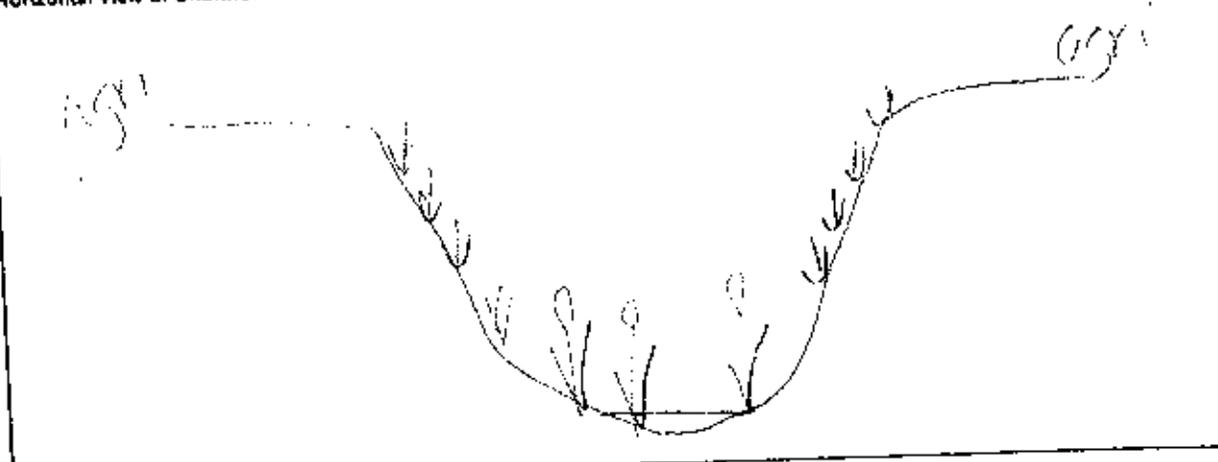
Land Parcel#

Turbine #

C56



Horizontal View of Channel



**AECOM**

Field Crew: SIA, TS

**General Information**

Study Area: Jericho Goshen Bluewater Land Parcel# 1001 + 1082 Turbine # C55  
 Date: Nov 17/11 Start time: 10:00 End Time: 10:55

Weather Conditions: overcast, light snow Field Notes By: SIA

**Site Location**

**UTM Co-ordinates**

Easting:	Northing:	Description:

**Surrounding Landuse/Pollution Sources**

Residential  Meadow   
 Agriculture  Wetland   
 Forest  Livestock

**Type of Watercourse**

Intermittent  Channelized   
 Permanent  Natural Channel   
 Ephemeral

Other:

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)  
Site has several low lying areas no obvious channel

**In-Situ Water Quality**

WT (°C): \_\_\_\_\_ AT (°C): \_\_\_\_\_  
 pH: \_\_\_\_\_ Cond (µs/cm): \_\_\_\_\_  
 Water Clarity: Clear  Turbid

**Ground Water Indicators**

Watercress  Bank Seepage   
 Iron Staining  None   
 Bubbling  Other

Notes:

**Stream Morphology**

Site Length (m):	Bank Stability:			
Channel Dimensions	Stable	Slightly unstable	Moderately unstable	Unstable
	Mean Wetted Width (m):	Mean Bankfull Width (m):	Left Bank	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Mean Wetted Depth (m):	Mean Bankfull Depth (m):	Right Bank	<input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	

Flow Description:

Notes: Records Review Change

**AECOM**

**Stream Morphology (continued)**

**Substrate (< = >)**

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus
- Other

Description

Notes:

Morphological Structure (%)			
Pool	Riffle	Rut	Flat

**Habitat**

**Instream Cover (%)**

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

**Canopy Cover (% closed cover):**

- 100-90%
- 90-80%
- 80-30%
- 30-1%
- 0%

**Types of Cover (% cover)**

- Trees \_\_\_\_\_
- Grasses \_\_\_\_\_
- Shrubs \_\_\_\_\_
- Herbaceous \_\_\_\_\_
- Man-made structures \_\_\_\_\_
- Other \_\_\_\_\_

Notes:

**Obstructions to Fish Passage**

- No Obstructions
- Natural
- Man-Made

Description:

**Drainage Features within Study Area**

Observations of Land Topography within 120 m buffer area:

**Terrestrial features Present** Yes No

Terrestrial Recon Form Filled out Yes No

AECOM

Page 3 of 4

## Other General Comments Regarding the Study Area:

- no channel likely water conveyance during Spring or high rain events
- no defined channel in open field - swale like features

## Photo log

Picture #	Description	Picture #	Description
9	South		
10	North		
12	East		
13	West		
14	View of where channel should be		

Property ID: 1001 P1 & P2 Date: Nov 17/11

Property Access: 1001 Start Time: 10:00

End Time: \_\_\_\_\_

Field Investigators: SA, TS Weather: overcast

**Terrestrial Feature Present:** No  Yes

Provide brief description of observations (i.e. hedgerow, treerow, woodlot, valleylands, deciduous vs coniferous, crop)

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Records  
Review

Photograph Numbers: \_\_\_\_\_

**Aquatic Feature Present:** No  Yes

Provide brief description (i.e. drainage ditch, watercourse, intermittent, permanent)

no permanent connection between ponds  
- spring & high flow connectivity

Photograph Numbers: 1, 2 north, 3-South, 4-west, 5-north view of  
ponds of channel, 7- 15-South, 16-north, 17-South  
22- 18-west, 19-SW

AECOM		Page 1 of 4	
Field Crew: SA JS		General Information	
Study Area: Jaricho Goshen <u>Bluewater</u>	Land Parcel# 1065	Turbine # C504048	
Date: Nov 17/11	Start time: 11:57	End Time: 12:35	
Weather Conditions: overcast, windy		Field Notes By: SA JS	
Site Location located east of Bluewater			
UTM Co-ordinates			
Easting: _____		Northing: _____	
Description: _____		Description: _____	
Easting: _____		Northing: _____	
Description: _____		Description: _____	
Easting: _____		Northing: _____	
Description: _____		Description: _____	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential <input type="checkbox"/>	Meadow <input checked="" type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input type="checkbox"/>
Agriculture <input type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input checked="" type="checkbox"/>	Natural Channel <input type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	
Other: _____			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)			
In-Situ Water Quality		Ground Water Indicators	
WT (°C): 4.70	AT (°C): 2.5°C	Watercress <input checked="" type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: 8.19	Cond (µs/cm): 651	Iron Staining <input type="checkbox"/>	None <input type="checkbox"/>
Water Clarity: Clear <input checked="" type="checkbox"/>	Turbid <input type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes:			
Stream Morphology			
Site Length (m): _____		Bank Stability:	
Channel Dimensions		Stable	Slightly unstable
Mean Wetted Width (m): 0.73	Mean Bankfull Width (m): 0.70	Moderately unstable	Unstable
Mean Wetted Depth (m): 0.25	Mean Bankfull Depth (m): 0.88	Left Bank	Right Bank
		<input type="checkbox"/>	<input checked="" type="checkbox"/>
		<input type="checkbox"/>	<input checked="" type="checkbox"/>
Flow Description: Top large floodplain to adjacent floodplain across road.			
Notes: Some undercut banks along the main channel Some slumping observed.			

AECOM

Page 2 of 4

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Si - Silt  
Cl - Clay  
MK - Muck  
DT - Detritus  
Other

## Description

Sa > Gr = 60 > Bo  
DT.

## Morphological Structure (%)

Pool	Riffle	Run	Flat
20	45	30	

Notes: good riffle/pool/run sequence  
pool depth - 0.24  
riffle - 0.07

## Habitat

## Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	15%	5	20%	2%	10%	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

## Canopy Cover (% closed cover):

100-90%   
90-80%   
80-30%

30-1%   
0%

## Types of Cover (% cover)

Trees 3% Shrubs \_\_\_\_\_  
Grasses 30 Herbaceous 30 Man-made structures \_\_\_\_\_  
Other \_\_\_\_\_

## Notes:

dense meadow vegetation

## Obstructions to Fish Passage

No Obstructions  Man-Made   
Natural

## Description:

none observed  
-small debris dams

## Drainage Features within Study Area

## Observations of Land Topography within 120 m buffer area:

located in valley area

Terrestrial features Present Yes No

Terrestrial Recon Form Filled out Yes No



AECOM

Watercourse Sketch

Study Area:

Jericho

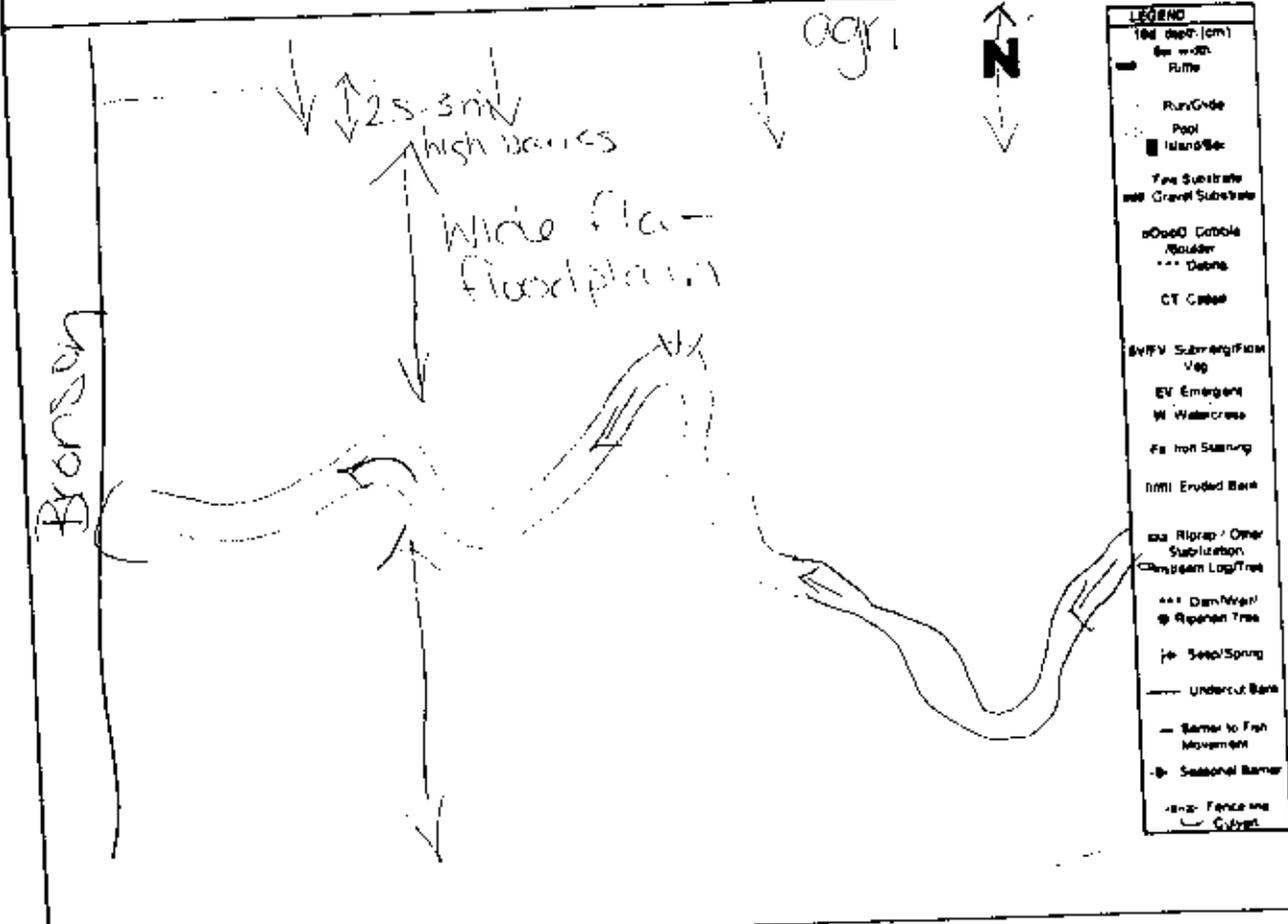
Goshen

Bluewater Land Parcel

1065

Turbine #

C50 + C48



Horizontal View of Channel



<b>AECOM</b>		Page 1 of 4	
Field Crew: <u>CB, TS</u>			
<b>General Information</b>			
Study Area: <u>Jericho Goshen Bluewater</u>		Land Parcel# <u>1813</u>	
Date: <u>Dec 15/11</u>		Turbine # _____	
Start time: <u>16:15</u>		End Time: _____	
Weather Conditions: <u>Cloudy, 10°C</u>		Field Notes By: <u>CB</u>	
<b>Site Location</b>			
<u>Beaconsen Ln, North Doreland</u>			
<b>UTM Co-ordinates</b>			
Easting: <u>044633</u>		Northing: <u>4810183</u>	
Description: <u>at stream</u>			
Easting: _____		Northing: _____	
Description: _____			
Easting: _____		Northing: _____	
Description: _____			
Easting: _____		Northing: _____	
Description: _____			
<b>Surrounding Landuse/Pollution Sources</b>		<b>Type of Watercourse</b>	
Residential <input type="checkbox"/>	Meadow <input type="checkbox"/>	Intermittent <input type="checkbox"/>	Channelized <input checked="" type="checkbox"/>
Agriculture <input checked="" type="checkbox"/>	Wetland <input type="checkbox"/>	Permanent <input type="checkbox"/>	Natural Channel <input checked="" type="checkbox"/>
Forest <input type="checkbox"/>	Livestock <input type="checkbox"/>	Ephemeral <input type="checkbox"/>	<u>↳ appears to be natural channel</u>
Other: _____			
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow) <u>- no tile drains noted</u>			
<b>In-Situ Water Quality</b>		<b>Ground Water Indicators</b>	
WT (°C): <u>7.6</u>	AT (°C): _____	Watercross <input type="checkbox"/>	Bank Seepage <input type="checkbox"/>
pH: <u>7.59</u>	Cond (µm/cm): <u>492</u>	Iron Staining <input type="checkbox"/>	None <input checked="" type="checkbox"/>
Water Clarity: <u>Clear</u> <input type="checkbox"/>	<u>Turbid</u> <input checked="" type="checkbox"/>	Bubbling <input type="checkbox"/>	Other <input type="checkbox"/>
Notes: <u>brown</u>			
<b>Stream Morphology</b>			
Site Length (m): _____		Bank Stability:	
<b>Channel Dimensions</b>		Stable	Slightly unstable
Mean Wetted Width (m): <u>2</u>	Mean Bankfull Width (m): <u>3</u>	Moderately unstable	Unstable
Mean Wetted Depth (m): <u>0.33</u>	Mean Bankfull Depth (m): <u>0.8</u>	Left Bank <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Right Bank <input type="checkbox"/> <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>
Flow Description: <u>high &amp; fast flow</u>			
Notes: _____			

12/15/11  
 14:00  
 15:00

AECOM

## Stream Morphology (continued)

## Substrate (&lt;=&gt;)

Bo - Boulder  
Co - Cobble  
Gr - Gravel  
Sa - Sand  
Sl - Silt  
Cl - Clay  
Mk - Muck  
Dt - Detritus  
Other

Description

Sl &gt; Co/boulders &gt; Cl

## Morphological Structure (%)

Pool	Riffle	Run	Flat
	25	<del>75</del>	

Notes:

High flow

## Habitat

## Instream Cover (%)

50

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	15	10		5	20	

\*Aquatic Vegetation Types Present (algae, submergent, emergent etc.)

grass  
but hard to see since within habitat

## Canopy Cover (% closed cover):

100-90%

30-1%

90-80%

0%

80-30%

## Types of Cover (% cover)

Trees

80

Shrubs

10

Man-made structures

Grasses

10

Herbaceous

Other

Notes:

## Obstructions to Fish Passage

No Obstructions

Man-Made

Natural

Description:

## Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No



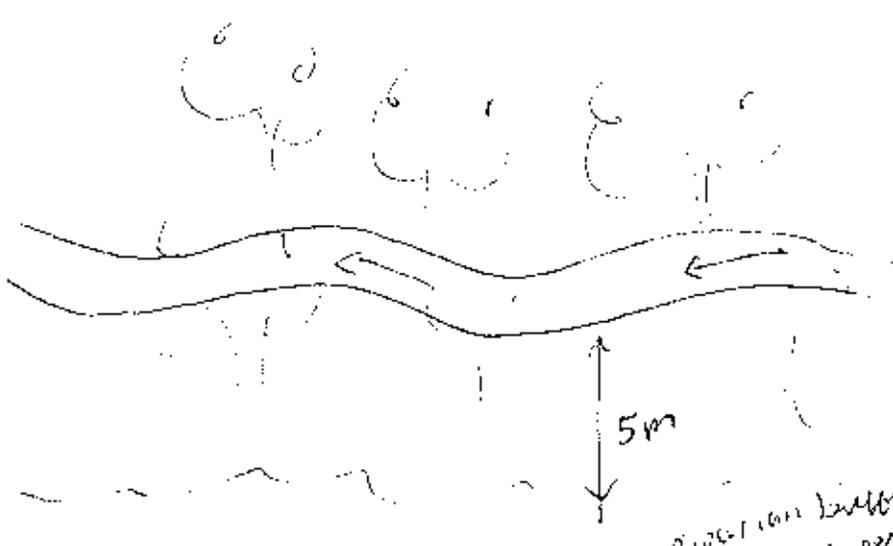
AECOM

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1813 Turbine #

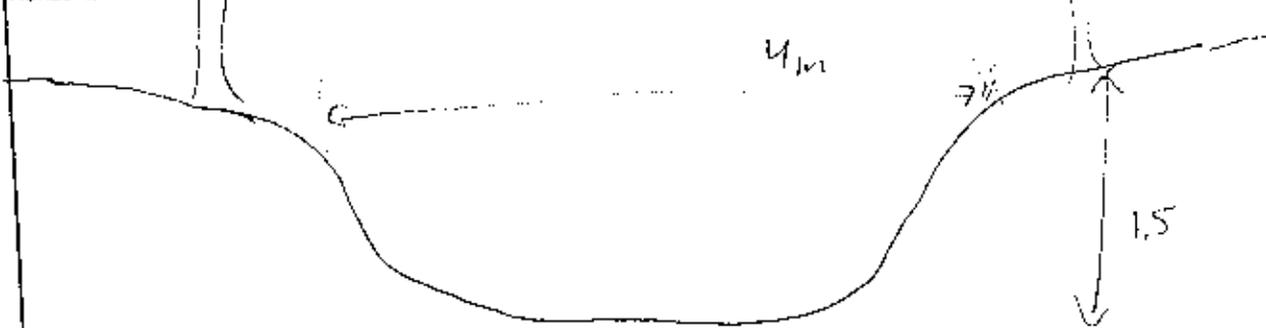


LEGEND	
100	Depth (cm)
80	Bank width
0.1m	Flow
-	Run/Gide
□	Pool
■	Island/Bar
-	Fine Substrate
	Gravel Substrate
o	Small Cobble
o	Large Boulder
---	Open
CT	Catch
	Supraglacial
	Veg
	Emergent
W	Watercress
	Iron Slating
	Eroded Bank
	Riprap / Other Stabilization
	Recessed Log/Tree
---	Dam/Weir
o	Riparian Tree
	Scrap/Song
---	Undercut Bank
---	Barrier to Fish Movement
---	Seasonal Barrier
---	Fence Line
---	Subnet



*Banker riparian habitat  
to deciduous trees  
by top of bank*

Horizontal View of Channel



Water Bodies Assessment Field Collection Form

AECOM

Study Area: Jericho Goshen Bluewater Land Parcel# BLW1024 Site ID: Twinning 19--C114

Date: April 19/08 Start time: 10:40 End Time: 12:06

Weather Conditions: Sunny 10°C Field Crew: C. Boos, S. Lohves  
Field Notes By: C. Boos

Goshen Co., north of Shankhuff Rd.

Easting: 9448289 Northing: 4820866 Description: North Street

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

Easting: \_\_\_\_\_ Northing: \_\_\_\_\_ Description: \_\_\_\_\_

- Residential
- Agriculture
- Forest
- Other
- Meadow
- Wetland
- Livestock

- Intermittent  Channelized
- Permanent  Natural Channel
- Ephemeral  \_\_\_\_\_

Description: In forest, surrounding forest is up to field.

Description: small river channel, meanders naturally

Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)

None observed

Is any portion of the water body underground or not as mapped? (Y) N

If Yes describe: watercourse not mapped as it leads south through the forest

GPS Coordinate: Easting - 9448438 Northing - 4820675 Description: mapped winter course at this point → but continues on

Description of Land Topography Surrounding Water Body (rolling hills, sloping towards water body)

Slightly rolling hills

WT (°C): 12.58 AT (°C): 7.5°C  
pH: 8.23 Cond (µs/cm): 5.04  
D.O. (mg/L): 9.83  
Water Clarity: Clear  Turbid

- Watercross  Bank Seepage
- Iron Staining  None
- Bubbling  \_\_\_\_\_
- Other

Water Colour: n/a

Details: no large mat observed

Notes:

Water Bodies Assessment Field Collection Form

Site Length (m): 350m

Bank Stability:

Channel Dimensions

Mean Wetted Width (m):	0.4	Mean Wetted Depth (m):	0.07
Mean Bankfull Width (m):	0.5	Mean Bankfull Depth (m):	0.2
Mean Top of Bank Width (m):	0.55	Mean Top of Bank Depth (m):	0.25

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Right Bank	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Description:

well veg banks

Flow Description: (high or low flow conditions, stagnant, etc)

very low flow, visible in only some locations

Substrate (<=>)

- Bo - Boulder
- Co - Cobble
- Gr - Gravel
- Sa - Sand
- Si - Silt
- Cl - Clay
- MK - Muck
- DT - Detritus

Description

Si, dt >> Co, sand, gr

Morphological Structure (%)

Pool	Riffle	Run	Flat
10			90

Notes:

Instream Cover (%)

Other (etc.)	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Nons	Undercut Banks
10	10		5	5		Average Depth (% Cover)

Note: Low = 0 - 30%; Moderate = 30 - 75%; High = 75 - 100%

\*Aquatic Vegetation Species Present (algae, submergent, emergent etc.)

grasses, watercress

Canopy Cover (% closed cover):

100-90%	<input type="checkbox"/>	30-1%	<input type="checkbox"/>
90-60%	<input checked="" type="checkbox"/>	0%	<input type="checkbox"/>
60-30%	<input type="checkbox"/>		

Types of Cover (% cover)

Trees	80	Shrubs	10	Man-made structures	
Grasses	10	Herbaceous		Other	

Note: Low = 0 - 30%; Moderate = 30 - 60%; High = 60 - 100%

Notes: (vegetation species, types of structures)

Sugar maple, birch, apple.

Riparian Vegetation

Width of riparian vegetation: in forest > 20m, at edge of forest < 2m

Description of vegetation community surrounding 30 m from watercourse: forest + agri field

No Obstructions  Man-Made  Natural  Low Flow Barrier

Description of Barrier:

Height of Barrier (m)

GPS Coordinates:



walked to 04418433 water in channel of entire line 4820675

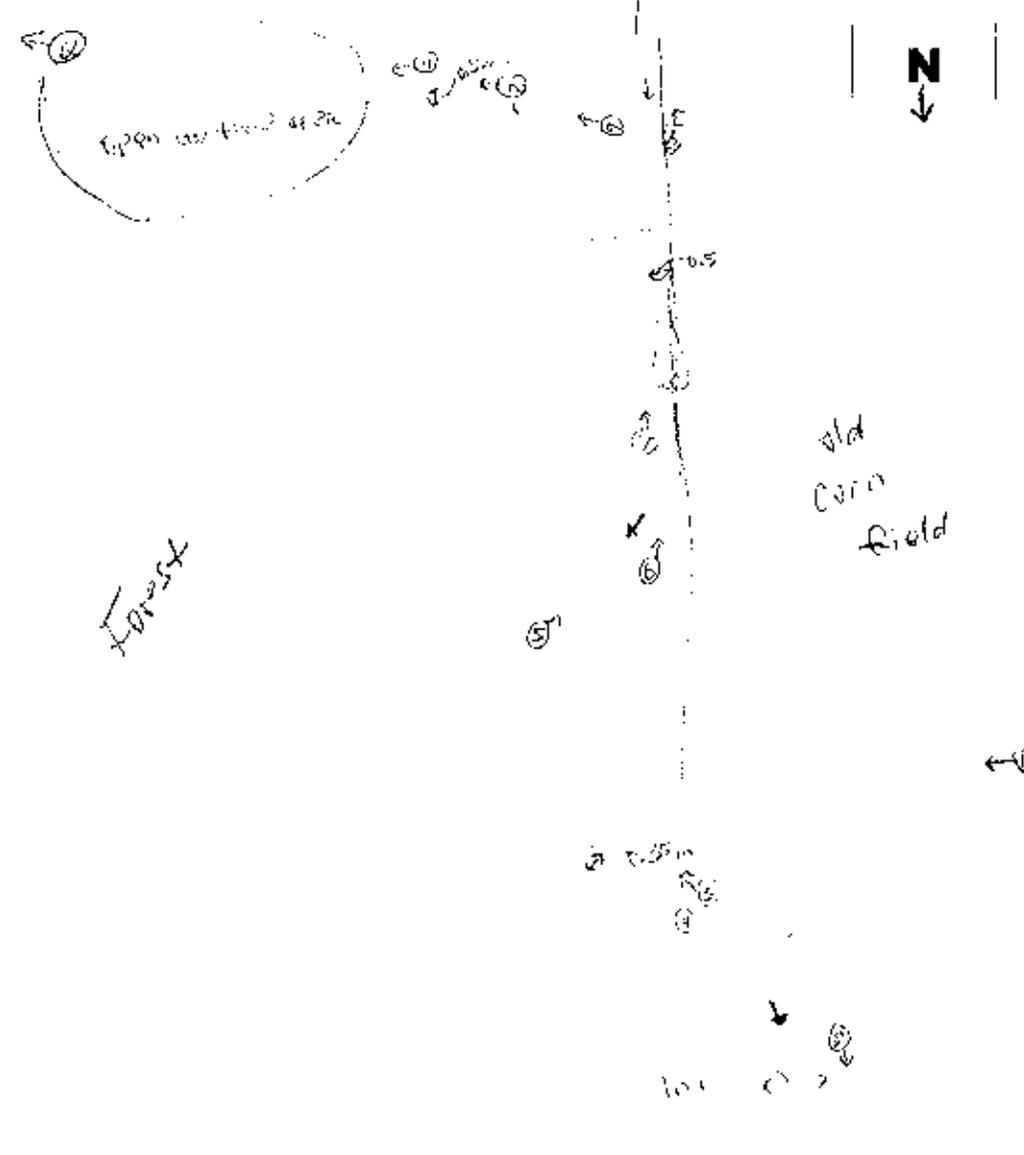
Water Bodies Assessment Field Collection Form

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Page 4 of 4

Study Area: Jericho Goshen Bluewater Land Parcel# BLV 1029 Site ID Turbine 19

B-93  
going into forest area



LEGEND

- 10g depth (cm)
- 6w width
- Rufa
- Rufa/Glide
- Pool
- Hard Bar
- Fine Substrate
- Gravel Substrate
- Cobble/ Boulder
- Debris
- OT Canal
- SWFV Submerged/Veg
- EV Emergent Vegetation
- W Watercress
- Fa Iron Staining
- AWH Eroded Bank
- R/Rap/Other Stabilization
- Instream Log/Tree
- Dam/Weir/Obstruction
- Riparian Tree
- Seep/Spring
- Undercut Bank
- Bank to Fish Movement
- Seasonal Barrier
- Fence line
- Subway

Horizontal View of Channel



Initial QA/QC By AM 5

Date 8/19/12

Technical QA/QC By

Date:

# Appendix D

## Weather

Month	Day	Max Temp (°C)	Min Temp (°C)	Mean Temp (°C)	Total Precip (mm)
July	3	22.4	13	17.7	0
	4	22.2	11.2	16.7	0
	5	<b>27.1</b>	<b>11.9</b>	<b>19.5</b>	0
	10	28.7	19.8	24.3	0
	11	28.6	20.5	24.6	0
	12	<b>26.1</b>	<b>17.4</b>	<b>21.8</b>	0
	24	27.1	19.9	23.5	0
	25	23.5	19.6	21.6	0
	26	<b>22.8</b>	<b>12.5</b>	<b>17.7</b>	0
	27	23.6	11.1	17.4	0
	28	25.7	19.9	22.8	19.9
	29	<b>25.8</b>	<b>16.9</b>	<b>21.4</b>	<b>10.1</b>
August	7	25.6	18.8	22.2	15.8
	8	24.6	16.9	20.8	0
	9	<b>23.7</b>	<b>18.3</b>	<b>21</b>	1.7
	10	<b>21.2</b>	<b>16.9</b>	<b>19.1</b>	7.1
September	26	23.1	16.2	19.7	12.9
	27	20.3	12.4	16.4	3
	28	<b>22.3</b>	<b>11.8</b>	<b>17.1</b>	0
October	3	12.6	8.8	10.7	4.9
	4	15.8	4.7	10.3	0
	5	<b>18.9</b>	<b>5.7</b>	<b>12.3</b>	0
	10	24.2	8.8	16.5	0
	11	26.6	10	18.3	0
	12	<b>19</b>	<b>13.3</b>	<b>16.2</b>	13.1
	23	16.6	2.7	9.7	0
	24	13.1	8.5	10.8	2.4
	25	<b>10.1</b>	<b>3.8</b>	<b>7</b>	<b>10.9</b>
26	<b>8.3</b>	<b>3.7</b>	<b>6</b>	0	
November	1	12.5	5.1	8.8	0
	2	17	7.9	12.5	0
	3	<b>12.4</b>	<b>2.1</b>	<b>7.3</b>	0
	4	<b>9.2</b>	<b>-0.8</b>	<b>4.2</b>	0
	15	11.9	5.7	8.8	0
	16	10.1	2.4	6.3	0
	17	<b>2.9</b>	<b>-0.2</b>	<b>1.4</b>	0

# Appendix E

## Project Team CVs



## Sarah Aitken, B. Sc. Hon., ET Diploma Aquatic Ecologist

### Professional History

2008 - present, AECOM, Aquatic Ecologist

2007 – Kawartha Lake Conservation, Fisheries Technician

2004-2006, Gartner Lee Limited, Environmental Technologist

2004 – Credit Valley Conservation, Water Resources Assistant

### Education

Environmental Technology, Sir Sandford Fleming College Lindsay, ON 2001 – 2004

Environmental Resource Science (Honours) Trent University Peterborough, ON 2006 – 2008

### Years of Experience

With AECOM: 5

With Other Firms: 1

### Training

MTO/DFO/OMNR Fisheries Protocol Training for Consultant Fisheries Specialists – January 2010

Canadian Pleasure Craft Operator

WHMIS Training

Fall Arrest Training

Ontario Benthos Biomonitoring Network Certification Course, Ministry of the Environment, April 2005

Electrofishing Certification Level 2 Backpack, September 2010

Sarah Aitken is an Aquatic Ecologist with AECOM. She has over five years of experience in the environmental field in both the public and private sector. Since joining AECOM in 2004, Sarah has worked on a diverse range of projects including environmental monitoring projects, projects involving storm water management pond monitoring, environmental impact studies, large-scale dewatering projects, and several EEM mining programs and lake management studies. Sarah has co-ordinated and implemented a variety of ecological and water resource monitoring activities for various projects and also has experience collecting benthic invertebrates, fish sampling and conducting detailed fish habitat information. She has experience in the collection and analysis of water quality data, stream assessments, various lake sampling techniques, installation of a variety of surface water field equipment, and report writing.

### EXPERIENCE

Experience with various lake sampling techniques, including sediment coring, bathymetry, benthic invertebrate sampling, water quality and lake profiling for Brampton Lakes and Fairy Lake.

Completed several Fish community and biomass surveys for various projects including EA's and EIS studies. This included the use of different equipment including; backpack electrofisher, gill nets, hoop nets and minnow traps. Sarah has contributed technical advice to the permitting and approval process of several projects.

Completed several construction monitoring projects including site inspection, fish capture and relocation and turbidity monitoring. Conducted various water quality sampling programs for both surface water and groundwater systems. Also completed detailed analysis and report preparation with these results.

Sarah has coordinated and implemented several Environmental Effects Monitoring (EEM) programs for several mining projects.

### Lake Management Studies

#### **Fairy Lake Water Quality Study, Acton, Ontario (2008-2009)**

Sarah coordinated and completed field work analysis of a small urban lake including low flow and rain event sampling, dissolved oxygen lake profiling, water quality measurements and sediment core sampling. She compiled and analysed field data and assisted in the preparation of the final report. Sarah also helped determine options for enhancing the quality of the lake for the client and nuisance geese management options.

Standard First Aid with CPR Level A,  
June 2008

Gartner Lee Centres of Excellence –  
Fisheries Methods Course, June 2008

Lake Management in a Changing  
Environment, North American Lake  
Management Society Conference,  
November 2008

Taxonomy, Ecology and Control of  
Nuisance Algae, Pre-conference  
Workshop, North American Lake  
Management Society, November 2008

Fish Identification Workshop - Royal  
Ontario Museum (2009)

**Citywide Lake Assessment/Management Study, Brampton, Ontario  
(2004-2006)**

Sarah participated in an extensive monitoring program to collect water quality, fish community data and habitat ecology for several urban lakes within the City of Brampton. Sarah assisted in the data organization and report writing, as well as answering client comments.

**West End Community Centre, DFO Compliance Monitoring, Guelph,  
Ontario (2008-2009)**

Project manager for a pond monitoring study (2008-2009) resulting in management recommendations for improvements to water quality, mitigation of nuisance wildlife and suitability of fish stocking. Sarah conducted pond profiling and captured and re-stocked pond with select species.

**Woodbine Racetrack Water Quality Monitoring, Etobicoke, Ontario  
(2004-2006)**

Sarah completed monthly surface water quality sampling from various stormwater ponds and the receiving waterbodies.

**Fisheries and Fish Habitat Assessments**

**Walpole Island First Nation, Walpole Island Dredge Cut Restoration  
Project, ON (2009-2010)**

Conducted a feasibility study that included assessments of sediment and water quality in order to develop a strategy to restore 14 linear kilometres of aquatic habitat around Potawatomi Island.

**Squirrel Island Bridge Replacement, Walpole Island, ON (2009)**

Aquatic investigations were undertaken to aid in the assessment of potential effects of a bridge replacement on Squirrel Island between River Road South and Squirrel Island Road. Detailed background view and fish habitat mapping was conducted.

**Mississauga Road Widening – Huttonville Creek, Mississauga  
Ontario (2010-Present)**

Sarah contributed technical advice to the permitting and approval process for an ESA required permit. This involved the evaluation of different alternatives and their associated impacts and benefits analysis. Sarah also assisted in developing rationale for the different alternatives and compensation plans.

**City of Guelph, Arkell Springs Creek AMP Monitoring, Eden Mills  
Ontario (2008-2009)**

Monitored the effects of a long-term pumping project on a coldwater trout stream. Sarah collected data including stream velocities, surface and groundwater interaction, fisheries community information, redd surveys and aquatic habitat assessments.

**Monora Creek, Brook Trout Biomass Survey, Ontario (2004-2009)**

Conducted annual biomass surveys and spawning surveys to determine if there was an impact on fish populations from groundwater extraction. Temperature monitoring and stream flow monitoring was also conducted on a monthly basis. Sarah also coordinated and prepared annual reports for the client.

**City of London, Storm Drainage and Stormwater Management Facility and Servicing - Class Environmental Assessment, White Oak Area, London, Ontario.**

Collected aquatic habitat and reconnaissance level fish species presence data from White Oak drain and tributaries and provided recommendations for stormwater management implications. [2009]

**Blockline Environmental Impact Study, Kitchener, Ontario (2009-Present)**

Sarah collected detailed fish habitat information in Schneider Creek for the Preliminary Design Brief for the extension of Block Line Road from Hanson Avenue to Courtland Avenue East. Sarah assessed the significance of Schneider Creek, the present constraints and opportunities, the potential impacts anticipated as a result of the proposed road extension and provided an Environmental Management Plan for the protection and management of Schneider Creek.

**TTC – 407 Subway Station, Toronto, Ontario (2009)**

Sarah collected detailed fish habitat information according to the MTO/DFO Fish Habitat Protocol. Fish community surveys were also conducted the length of the study reach.

**Waterloo LRT Environmental Impact Study, Region of Waterloo, Ontario (2009-2010)**

Conducted detailed fish habitat assessments of all identified watercrossings in study area, specifically looking at crossing locations and downstream habitat. Sarah conducted fish community surveys by electrofishing and minnow traps and assessed the significance of all the watercourse crossings, the present constraints and opportunities, the potential impacts anticipated and mitigation techniques to protect the watercourses.

**Environmental and Construction Monitoring**

**Design-Build of the Elgin Area Primary Water Transmission Main Twinning, Ontario (2010-Present)**

Sarah played a large role in coordinating and implementing the field work which included detailed assessment of all potential watercourse crossings, collection of fish habitat information and fish community studies. Sarah maintained contact with regulatory agencies and compiled a detailed report submitted for agency approval. She also worked with Transport Canada to obtain Navigable Waters approvals.

**York Region Sanitary Sewer Installation – 16th Avenue, Markham, Ontario (2004-2006)**

Sarah coordinated field schedules and implemented field programs for the 16th Avenue Projects, which included stream flows, groundwater levels, maintenance of stream loggers, site investigations, water quality sampling and fish sampling. Sarah was also responsible for peer reviewing data collection from other consulting firms and auditing site selections. She was responsible for organizing high quality field notes for project records, developing rating curves, creating a database for data storage and preparing reports for the client.

**York Region Sanitary Sewer Installation – 9<sup>th</sup> Line, Stouffville, Ontario (2004-2006)**

Sarah played a large role in completing a long-term monitoring program which monitored the impacts from dewatering on a coldwater Brook Trout stream. Weekly stream flows, groundwater levels, maintenance of stream loggers, construction monitoring, water quality sampling and fish sampling. She was responsible for data collection and organization, developing rating curves and preparing reports for the client. Sarah also maintained relationships with sub-consultants and the client.

**York Region Sanitary Sewer Installation – King Road, King City, Ontario (2004-2006)**

Sarah coordinated and implemented field programs for the King Road sanitary sewer installation, which included stream flows, groundwater levels, construction monitoring, wetland monitoring, and site investigations. She was responsible for the taking and organizing field notes for the project records and preparing reports for the client.

**Puslinch Culvert 93 Replacement, Puslinch, Ontario (2010)**

Coordinated and assisted in construction monitoring of silt fencing and channel removal. Helped develop and implement a fish capture and relocation plan during construction phase.

**Huron County Culvert 86-19.7 Bridge Replacement, Huron County, Ontario (2010)**

Coordinated and assisted in construction monitoring of silt fencing and channel removal. Helped develop and implement a fish capture and relocation plan during construction phase.

**Mining Projects****Liberty Mines, McWatters Mine, Ontario (2010-Present)**

Completed an adult fish survey and detailed habitat mapping to fulfill the regulatory requirements of the EEM Cycle 1 program for assessing impacts on the aquatic environment from mine effluent for the EEM program. Assisted in completing the reports for agency review.

**FNX Mining, Podolsky Site, Ontario (Fall 2009)**

Provided technical support for the fall field program of the EEM Cycle 1 for the Podolsky Mine Site. Conducted an adult fish survey, benthic invertebrate sampling, as well as sediment and water quality sampling to meet the requirements of the EEM program.

**Kirkland Lake Gold, Ontario (2008)**

Completed an adult fish survey, benthic invertebrate, sediment and water quality sampling to fulfill the regulatory requirements of assessing impacts on the aquatic environment from mine effluent for the EEM program.



## **Caroline Boros, Honours B. Env. Sc. Aquatic Ecologist**

### **Professional History**

2007 - present, AECOM, Aquatic Ecologist

Grand River Conservation Authority  
Water Quality Technician  
Cambridge Ontario  
2006 – 2007

Hamilton Conservation Authority  
Water Resource  
Technologist Assistant  
Ancaster Ontario  
2004 – 2005

### **Education**

Honours Bachelor of  
Environmental Science  
University of Guelph  
2000 – 2004

Ecosystem Restoration  
Graduate Certificate  
Niagara College

### **Years of Experience**

With AECOM: 5

With Other Firms: 2

Caroline is a graduate of the University of Guelph Honours Environmental Science degree program and is currently working as an Aquatic Ecologist for AECOM (formerly Gartner Lee Limited) with over four years experience in the field. She has an excellent background in the aquatic sciences, specifically with ecosystem restoration and habitat assessment.

### **EXPERIENCE**

#### **Ecological Assessment and Monitoring**

##### **Walkers Aggregates Inc., Aquatic Ecology Monitoring Program, Thorold (2007 – 2011)**

Collection and management of surface water and aquatic data to assess impacts on streams due to quarry activities. The investigation includes surface water flow monitoring, benthic macroinvertebrate community assessment, and fish community and habitat assessment. Participate in formal responses to various provincial agency technical comments as it pertains to submitted reports for on-going compliance of permits.

##### **Township of Brock, Blackwater Bridge Replacement Environmental Impact Study, Brock (2010 – 2011)**

Conducted fish habitat assessment and fish community survey to document existing conditions and identify potential impacts as a result of the proposed bridge replacement. Ongoing consultation with local conservation authority to determine mitigation and compensation measures for the potential bridge design.

##### **Clean Harbors Canada Inc., Natural Environment Assessment, Petrolia (2011)**

Completed a natural features assessment in support of the Environmental Assessment document for the potential expansion of the landfill. Field investigations included fish habitat and community assessments in surrounding areas, and bird surveys for onsite woodlots.

##### **Walpole Island First Nations, Dredge Cut Restoration, Walpole Island (2011)**

Assisted in the desktop background research, data compilation and interpretation and summarized the water quality, and fish habitat and community findings in the report.

##### **Town of Innisfil, Lakeshore Water Treatment Plant Expansion Municipal Class Environmental Assessment (2010)**

Completed fish habitat and fish community assessments, including fish habitat assessment in the lake using live underwater video feed (using scuba divers and a dive boat). Prepared field data results and potential impacts to fisheries in the respective sections in the final report.

**Town of Fort Erie, Bridge Replacement: Fish habitat and community assessment, Fort Erie (2010)**

Completed a fish habitat and fish community assessment as part of an Environmental Assessment for two proposed bridge replacements in the township. Prepared a memo which included the characterization of the relative risk for the proposed works within the DFO Risk Management Framework.

**Walkers Aggregates Inc., Ten Mile Creek Re-alignment Monitoring, Thorold (2007- 2009)**

Conducted post-construction monitoring and reporting of fish habitat and community for a re-aligned stream in order to comply with Department of Fisheries and Oceans (DFO) authorization.

**Walkers Aggregates Inc., Permit to Take Water: Aquatic Ecology Monitoring, Ridgemount (2009)**

As part of the reapplication process for a Permit to Take Water (PTTW) a potential stream re-alignment assessment was completed. The investigation included surface water flow monitoring, temperature monitoring, benthic macroinvertebrate community assessment, and fish community and habitat assessment.

**Surface Water Monitoring****Clean Harbors Canada Inc., Surface Water Investigation, Petrolia (2011)**

Involved in an off-site surface water investigation for a waste transfer facility which includes wet weather sampling events, water level monitoring (using loggers), and sediment sampling. On-going monitoring for 2011 with a final report to be completed at the end of the year.

**Décor, Surface Water and Operations and Maintenance Monitoring, Hamilton (2009- 2010)**

Project Manager. Co-ordinated field investigations and monitoring for the Certificate of Approval for their surface water monitoring, and operations and maintenance monitoring. Prepared quarterly reports for Ministry of Environment review which examined water quality conditions on site.

**Clean Harbors Canada Inc., Assimilative Capacity Study, Mississauga (2010)**

Responsible for collecting the surface water quality samples and stream flow measurements used to assess the assimilative capacity of the onsite discharge to the down gradient stream.

**Groundwater Monitoring****Confidential Private Company, Remediation monitoring, Cambridge (2007 – 2011)**

Site is TCE impacted and has a purge water containment program in place. Assisted in remediation program initiation through groundwater well development, groundwater sampling, hydraulic conductivity testing, water level measurements, and PID measurements. Also participated in the monitoring program during the in-situ chemical oxidant injections.

**Clean Harbors, Compliance monitoring, Facilities- London, Niagara, Sarnia, Mississauga (2007 – 2010)**

Involved in ongoing Certificate of Approval compliance monitoring for each of the facilities. Conducted field work which included: water levels, groundwater sampling, groundwater well development, surface water sampling, well recovery pump test.

**CBM St. Mary's Cement, Permit to take water – Phase 1 pump test, Flamborough (2008)**

Involved in the Permit to Take Water Phase 1 Pump Test conducted in the spring. Assisted in field work co-ordination and preparation for daily on-site meetings with the Ministry of Environment. On-site work included groundwater sampling, slug testing, logger calibration, logger installations, database management, piezometer installation in wetlands.

**City of Guelph - Imico, Groundwater monitoring, Guelph (2007 – 2009)**

Complete bi-annual monitoring on-site for the Certificate of Approval which includes water levels and groundwater sampling.

**City of Guelph, Arkell Springs Aquifer Investigations, Guelph (2007)**

Involved in groundwater investigations including quarterly water levels, groundwater sampling, piezometer installation and monitoring, logger installations and logger data management.



## Nicola Lower B.Sc., M.Sc., Ph.D Senior Fisheries Biologist

### Professional History

09/2010 - present, AECOM, Senior Fisheries Biologist

10/2007 - 09/2010, University of Guelph, Post-Doctoral Research Fellow

01/1998 – 09/2007, The Centre for Environment, Fisheries and Aquaculture Science (cefas), Fisheries Biologist and Project Manager

### Education

Ph.D, Fisheries Biology, 2007, The University of Portsmouth, UK.

M.Sc. (with Distinction), Natural Resource Management, 1998, The University of Leicester, UK.

B.Sc.(Hons), Environmental Life Science, 1996, The University of Nottingham, UK.

### Years of Experience

With AECOM: 1

With Other Firms: 12

### Professional Affiliations

City of Guelph River System Advisory Committee

American Fisheries Society

Society of Environmental Toxicology and Chemistry

Winston Churchill Fellow

British Science Association

### Training

MTO/DFO/OMNR Fisheries Protocol Training for Consultant Fisheries Specialists – January 2011

Dr. Lower is a Senior Aquatic Biologist with over 12 years professional experience in fisheries and natural resource management. Nicola has delivered project reports for a variety of clients and has work experience in the private, public and academic sectors. Dr Lower has published research on a range of factors affecting fish populations, including barriers to migration, water quality, and invasive species in the Great Lakes. Dr Lower has conducted research for the Great Lakes Fishery Commission and serves as a peer-reviewer for a number of International scientific journals. Nicola has much practical experience in fisheries management and in the techniques used to assess and monitor habitat and fish populations, including radio-acoustic and PIT telemetry, backpack and boat electrofishing, and netting and trapping. Dr Lower was awarded a prestigious Canadian Commonwealth Post-Doctoral Fellowship to conduct research on the migratory biology of the sea lamprey and native fish species in the Great Lakes, and was presented with the Churchill Medallion by HM The Queen for her work on advancing a new technology aimed at improving the sustainability of aquaculture. In AECOM, Dr Lower contributes technical advice to environmental assessments and monitoring programs, and is skilled at coordinating and bringing environmental teams together for the purpose of providing a comprehensive study integrated with all relevant disciplines.

### Experience

**Métis Nation of Ontario.** Technical review report on the migratory characteristics of species of interests (mammal, fish, birds) and potential development impacts and mitigation techniques.

**Billiken Management Inc.** Project Manager for mining client in northern Ontario for the proposed dewatering of the mine site. Responsible for environmental regulatory planning, baseline environmental surveys including water quality and integration of all relevant disciplines to provide a comprehensive work program.

**Quadra FNX Mining Company Inc., Podolsky Mine Environmental Effects Monitoring, Sudbury, Ontario.** Statistical data analysis, report writing, and overall project co-ordination for the Cycle 1 environmental effects monitoring (EEM) interpretive report, in accordance with the Metal Mining Effluent Regulations (MMER) under the *Fisheries Act*.

**Liberty Mines, EEM Cycle Report, Northern Ontario.** Lead author for a study the Cycle 1 report in accordance with Schedule 5, Section 10 – 14 of the 2002 Metal Mining Effluent Regulations of the *Fisheries Act*. Included data analysis and interpretation on the effects of effluents on aquatic populations.

**Labrador Iron Mines, Houston, Howse and Road Corridor Baseline Studies, Schefferville, Quebec.** Provided senior review for fish

communities and habitat assessments for three properties in Labrador outside of Schefferville, Quebec, to facilitate in acquiring various agency permits for proposed mining operations.

**Region of Peel, Road Widening.** Provided technical advice, and liaison with Project Team and MNR on the evaluation of culvert and bridge alternatives in order to protect fish habitat, including the Endangered Redside Dace (ESA 2007). Completion of ESA permit application, mitigation and compensation plans.

**City of Guelph, Road Widening.** Provided technical advice and worked with Conservation Agency to determine the impact of a culvert extension on fish habitat prior to Fisheries Act Approval.

**Elgin Area Primary Water Supply System (EAPWSS), Authority Regulatory Approvals for the Elgin Area Primary Water Supply System, Elgin County, Ontario.** Provided technical advice to the overall project team, Conservation Agency liaison as well as construction monitoring during a design and build operation to ensure compliance with permits and regulatory requirements.

**Ontario Realty Corporation, Development Potential for land, Orillia.** Conducted site assessments to determine ecological significance and development constraints, and produced the Environmental Impact Study.

**Sifton Properties, Developmental Potential for land, City of London.** Conducted due diligence study and identified environmental constraints and development opportunities.

**City of Kitchener, City of London, City of Mississauga, Stream Restorations.** Conducted fish habitat assessments and provided advice on stream rehabilitation and permitting requirements.

**City of Burlington, Fish Removal Plan and Fish Habitat Assessment, Burlington, Ontario.** Aided in the restoration of a stream system which encompasses realignment of stream segments and provision of erosion control techniques through completion of a fish habitat assessment and fish removal plan.

**Post-Doctoral Research Fellow, University of Guelph, Ontario.**

**Great Lakes Fishery Commission / Department of Foreign Affairs and International Trade (DFAIT).**

Led innovative research on the habitat use and migration patterns of sea lamprey that will be applied for practical management initiatives in the Great Lakes.

Led field research in tributaries of Lake Ontario around sea lamprey barriers. Research focused on understanding the migratory behavior of sea lamprey in streams and around barriers in order to increase the effectiveness of portable trapping techniques.

Presented research results and recommendations to the binational Government Agency, as well as the International scientific community.

**Fisheries Biologist, The Centre for Environment, Fisheries and Aquaculture Science (cefas), Lowestoft.**

Led multi-disciplinary monitoring and research projects investigating the factors regulating salmonid and freshwater fish populations, and provided advice to government and private clients on fisheries management. Project-manager for 'Diffuse pollution and freshwater fish populations'. Provided recommendations on the management of aquatic contaminants for the UK government client, the Department of Environment, Food and Rural Affairs.

Key scientist working on the chemical communication (pheromones) of freshwater fish. Commercial applications included feeding technology and invasive species control..

Joint inventor (of two) on patent for the application of fish feeding chemical cues which led to Joint Venture company between UK Government and private enterprise.



Andrea Dart  
**Environmental Technician**

**Professional History**

01/2006 - present, AECOM,  
Environmental Technician

2005 - 2005, Nulmage Landscaping,  
Crew Member

2005 - 2005, Ministry of the Environment,  
Nutrient Management Specialist  
Assistant

2004 - 2004, Acorus Restorations, Native  
Wetland Nursery Supervisor

2003 - 2003, Ministry of Natural  
Resources, Surface Water Specialist's  
Assistant

**Education**

Diploma, Environmental Technology,  
Sir Sandford Fleming College

**Training**

40 Hour Hazwoper Training

RAQS Fisheries Contract Specialist

Certified Inspector of Sediment and  
Erosion Control

Excavation and Trenching Safety  
Awareness

Asbestos Awareness

Health and Safety Personal Protective  
Equipment Training

Working at Heights

Confined Space Entry

Confined Space Awareness

Ms. Dart is an environmental technician with over five years of experience in the environmental consulting business. She has been the lead field coordinator and team member for many large-scale projects. Ms. Dart has been responsible for managing compliance monitoring, environmental assessments, data evaluation, quality control, and liaison with subcontractors and the public. She has been the deputy project manager on multiple projects. She has written landfill, aggregate, and sections of environmental assessments and monitoring reports, as well as field methodologies. She has worked in headwater streams, rivers, lakes, wetlands, landfills, quarries, and contaminated sites. Ms. Dart is a member of the Woodlot Association, Willow Beach Naturalist Club, Friends of Presqu'ile Park, and became an Ontario Stream Steward in 2011. Within her first year at AECOM, Ms. Dart won the Top Contributor award.

**EXPERIENCE**

**Regional Municipality of York, 16th Avenue Trunk Sewer Phase II, Markham, Ontario.**

Lead field coordinator. Conducted streamflows and electrofishing. Collected surface water samples, field chemistry, wetland moisture measurements, benthic invertebrates, and temperatures. Installed mini piezometers and collected water levels. Worked with the telemetry system uploading data into database. Compiled data and created the graphical presentation for the monthly reports, created stage discharge curves, and wrote the surface water section. Organized the extensive field work and coordinated several employees. [2006-2010]

**Regional Municipality of York, West Rainbow Creek Sanitary Sewer Project, Markham, Ontario.**

Lead field coordinator. Conducted a mussel rescue, electrofishing, and streamflows. Collected water levels, surface water samples, field chemistry, temperatures, and monitored the discharge water quality. Compiled data and created the graphical presentation for reports. reated TSS and turbidity relationship curves and wrote sections of the report. [2009-2010]

**Ministry of Transportation Ontario, 407 East Environmental Assessment and 407 East Foundation Design Study, Markham, Ontario.**

Lead field coordinator. Collected streamflows, water levels, field chemistry, temperature, surface/residential water samples, as well as hundreds of residential water well surveys. Conducted stream reconnaissance; installed and set up level loggers and barologgers, which were downloaded regularly and created detailed graphs with this information. Performed pump and hydraulic conductivity testing; developed boreholes and collected groundwater samples; compiled data and created the graphical presentation for reports; and organized II data into spreadsheet and graphs used for the report. [2008-2009]

Fall Prevention Training	<b>NextEra, Wind Energy Centre, Natural Heritage Assessment Report. Grand Bend, Ontario.</b>
WHMIS Training	Conducted extensive amphibian surveys throughout season and conducted rapid Ontario stream assessments. As well, assisted with Ecological Land Classification. Compiled data and created the graphical presentation for reports.[2011-present]
CPR and First Aid Training	
Transportation of Dangerous Goods Certificate	<b>Regional Municipality of York, Upper York Sanitary Sewer, Environmental Assessment.</b>
Operator in Training of Water Treatment	Conducted amphibian surveys at multiple locations. Conducted fish habitat assessments and rapid Ontario stream assessments. Crew member for electrofishing at multiple locations. Weekly temperature logger downloads.[2011-present]
Operator in Training of Wastewater Treatment	<b>Regional Municipality of York, Southeast Collection Trunk Sewer, Environmental Assessment.</b>
Operator in Training of Water Distribution	Conducted amphibian surveys, benthic collection and rapid Ontario stream assessments at multiple locations. Conduct weekly sediment and erosion control inspections. Conduct extensive water level measurements and wetland monitoring. Compiled data and created the graphical presentation for reports.[2010-present]
Operator in Training of Wastewater Collection	
Pleasure Craft Operator Certificate	<b>CN Rail, Credit River Expansion Project, Georgetown, Ontario</b>
Ontario Stream Assessment Protocol Certified with Level 1 Fish I.D	Liaison with contractor and client. Overseeing restoration planting in accordance with design drawings and making further recommendations if applicable while on site.[2011-2011]
<b>Years of Experience</b>	<b>Confidential Client, Groundwater Investigation and Remediation Work, Toronto and Guelph, Ontario.</b>
With AECOM: 5	Field staff that conducted extensive groundwater sampling, water levels, field chemistry, low flow sampling, and LNAPL and DNAPL bailing. [2006-present]
With Other Firms: 3	<b>Holcim, Permit To Take Water and Certificate of Approval Monitoring, Mississauga, Colborne, Peterborough, and Port Hope, Ontario.</b>
	Lead field that conducted water levels from mini piezometers, boreholes, and residential wells. Collected field chemistry; sediment samples from Lake Ontario; and surface water, residential, and groundwater samples. Also conducted a surface water tracer test in Lake Ontario. Compiled data and created the graphical presentation for reports as well as prepared and wrote the quarterly and annual reports. [2006-present]
	<b>Township of Georgina, Landfill, Georgina, Ontario.</b>
	Deputy project manager. Collected gas readings water levels and groundwater samples from boreholes. Also collected surface water samples, field chemistry, and streamflows. Compiled data and created the graphical presentation for reports, as well as prepared and wrote the annual report. Created the 2010 budget. [2008-present]
	<b>County of Simcoe, Tosorontio, Alliston, Mara and Essa Landfills, County of Simcoe, Ontario.</b>
	Deputy project manager to manage and complete all required field work such as groundwater levels, groundwater samples, gas readings, surface water samples, field chemistry, streamflows, residential samples, and leachate seep observations. Liaison with landfills site supervisors; compiled data and created the graphical presentation for reports, as well as prepared and wrote the annual reports. [2010-present]

**Bram West Landowners Association, Block 40-3 Environmental Impact Study, Mississauga, Ontario.**

Lead field coordinator that collected water levels, field chemistry, and streamflows. Conducted a habitat assessment: completed surveying for top of pipe elevations for the new mini piezometers; performed pump and hydraulic conductivity testing; developed boreholes and collected groundwater samples; and compiled data and created the graphical presentation for reports



## Nick Hodges Aquatic Ecologist

### Professional History

2005 - present, AECOM, Aquatic Ecologist

EcoTec Environmental Consultants Inc  
Resource Technician & Environmental Inspector  
2001 – 2005

EcoTec Construction Limited  
Ecological Restoration Technician  
2001 – 2005

U.S. Fish & Wildlife Service  
Biological Intern, Mojave Desert  
1999

### Education

Fish & Wildlife Technician Diploma  
(Letter of Academic Achievement)  
Sir Sandford Fleming College  
Lindsay, ON  
2000

Terrain & Water Technician Diploma  
(Letter of Academic Achievement)  
Sir Sandford Fleming College  
Lindsay, ON  
1999

### Years of Experience

With AECOM: 5

With Other Firms: 5

### Professional Affiliations

Field Botanists of Ontario  
Society for Ecological Restoration -  
Ontario Chapter

Nick Hodges is an Aquatic Ecologist with ten years of consulting experience with expertise in fisheries and aquatic habitat assessment and ecological restoration. Since 2001, Nick has participated in a diverse range of projects with a focus on environmental impact studies and ecological restoration.

Applying his expertise in fisheries and aquatic habitat assessments for municipal and provincial clients, Nick has obtained HADD authorizations by developing fish habitat compensation plans and has overseen implementation of fish habitat improvement projects.

Nick has participated in biodiversity studies and has provided consulting services to Aboriginal communities (First Nations and Métis) with respect to ecological restoration opportunities and review of major development projects. Nick has helped clients understand specific natural heritage functions in the context of provincial and federal policies as they relate to development proposals. He has helped facilitate regulatory approvals under the Fisheries Act, Conservation Authorities Act, Planning Act, Ontario Environmental Assessment Act and the Canadian Environmental Assessment Act. Nick's broad understanding of aquatic and terrestrial ecology has allowed him to effectively manage multi-disciplinary projects. He has received training in project management effectiveness.

### EXPERIENCE

#### **Fisheries Act and Regulatory Approvals**

Approvals obtained under the *Fisheries Act* require determination of fish habitat significance and sensitivity and determination of mitigation opportunities to avoid or minimize impacts. Fish habitat enhancement and compensation planning is undertaken in order to successfully obtain Letter of Advice or HADD authorizations and is followed by post-construction monitoring. Project experience includes:

#### **Hays Pond Modifications, Oakville (2011)**

Prepared habitat enhancement plan and regulatory submission for approval of fish habitat modifications under *Canada Fisheries Act* and *Conservation Authority Act*.

#### **Fisheries Existing Conditions and Impact Assessment for Goulais River Embankment Repairs, MTO (2010)**

Conducted an impact assessment to sensitive fish habitat in the Goulais River and recommended fish and fish habitat mitigation measures. Applied DFO Risk Management Framework, Pathways of Effect and prepared HADD/no HADD forms.

#### **DFO Compliance Monitoring, City of Guelph (2005 – 2009)**

Project manager for a multi-year pond monitoring study resulting in management recommendations for improvements to water quality,

mitigation of nuisance wildlife and suitability of fish stocking. Conducted fish community and habitat assessments and related water quality results to inform management recommendations.

**Marina Conceptual Development and Fisheries Act Review, Port Severn (2005-2007)**

Conducted multi-season fisheries inventory using trap nets and fyke nets. Conducted muskellunge spawning habitat assessment. Assessed significance and sensitivity of fish habitat, impact assessment and developed mitigation measures. Reviewed *Fisheries Act* regulations and provided assessment of opportunities for marina development adjacent to Provincially Significant Wetland.

**Sunnybrook Sub-trunk Sewer Construction, City of Toronto (2005-2007)**

Conducted fisheries and aquatic habitat assessment and subsequently developed an open-cut stream crossing mitigation plan and streambank restoration plan. Developed a frac-out contingency plan for directional drilling operations. Assisted in obtaining regulatory approvals for above noted works.

**Blueshores Marina Development, Collingwood (2005-2006)**

Obtained an amendment to a *Fisheries Act* HADD authorization for in-water works in a Georgian Bay marina. Provided client and contractor with advice on *Fisheries Act* regulations.

**Detail Design for Highway 11/502, GWP 407-00-00, MTO, Fort Frances (2004)**

Conducted fisheries and aquatic habitat assessments for multiple watercourse crossings, developed a fish habitat compensation and post-construction monitoring plan, and obtained *Fisheries Act* HADD authorization for works to proceed in accordance with DFO policies on fish habitat.

**Dufferin Concrete, Various Locations (2005-2006)**

Conducted fish habitat assessments in conjunction with hydrogeology investigations by other team members to identify potential impacts as a result of proposed groundwater takings at aggregate facilities. These site-specific studies supported Permit to Take Water applications in Guelph, Stratford, London and Cambridge.

**Lake Simcoe SWTP Detail Design, City of Barrie (2005-2006)**

Helped facilitate approvals from Lake Simcoe Conservation Authority and DFO for construction of a Surface Water Treatment Plant on Kempenfelt Bay required to supply the City of Barrie with expanded water supply. Provided guidance on *Fisheries Act* approvals process and collaborated with Landscape Architect to develop a forest restoration plan.

### **Fisheries and Aquatic Habitat Inventory, Assessment and Monitoring**

Fisheries and aquatic habitat inventory and assessments have required detailed investigations of fish habitat and aquatic environments according to provincial methodologies, standards and protocols. Identification of fish species, determination of existing conditions, assessment of potential impacts and development of mitigation measures was carried out. Long-term fisheries compensation monitoring was also carried out. Project experience includes:

#### **Fisheries and Aquatic Habitat Assessment for Conestogo Wind Farm Project, Wellington County (2008)**

Assessed fish communities and fish habitat in preparation for Fisheries Act approvals for watercourse crossings on a proposed wind farm.

#### **Fisheries and Aquatic Habitat Assessment for Mine permitting, Red Lake (2007-2008)**

Conducted trap netting surveys in McNeely Bay and collected benthic macroinvertebrate samples for Ecological Effects Monitoring study.

#### **Fish Habitat Assessment of the Grand River, Town of Elora (2006)**

Characterized fish habitat in Elora Gorge reach of Grand River to support an Assimilative Capacity Study.

#### **Brook Trout Spawning Survey, Fisheries and Aquatic Habitat Assessment for Blue Springs Creek, City of Guelph (2006)**

Conducted fall spawning surveys to identify brook trout redds, and conducted fish community sampling and aquatic habitat mapping to support a Class EA for municipal groundwater taking.

#### **Brook Trout Spawning Survey, Monora Creek, Town of Orangeville (2006)**

Identified brook trout redds in three reaches of Monora Creek to support on-going monitoring program for a municipal groundwater taking.

#### **Lake Assessment Study, City of Brampton (2005)**

Conducted trap netting and seine netting of multiple lakes in City of Brampton to support Lake Management Study.

#### **Brook Trout Monitoring Survey, Town of Caledon (2005)**

Conducted electrofishing of brook trout habitat using three-pass removal method to facilitate population estimation in support of OWRA permit monitoring.

#### **Fisheries and Aquatic Habitat Assessment for Osler Bluffs Secondary Plan, Grey/Simcoe Cty (2005)**

Characterized fish community and fish habitat conditions in large study area to support development of a municipal Secondary Plan.

**Fisheries and Aquatic Habitat Assessment for Dreamer's Park, Georgian Bay, Port Severn (2005)**

Conducted trap netting and seine netting along Georgian Bay shoreline to support private development application.

**Fisheries and Aquatic Habitat Assessment of Bay of Quinte for City of Belleville Master Plan (2005)**

Conducted trap netting and aquatic habitat assessment in City of Belleville waterfront to support municipal Master Planning process.

**Fisheries and Aquatic Habitat Assessment for Corbyville Creek, MTO (2002-2004)**

Characterized fish community composition and aquatic habitat to support highway reconstruction activities.

**Fisheries Assessment and Compensation Planning, Ravenshoe Road, Town of Georgina (2003)**

Assisted in development of fish habitat compensation planning for road widening in PSW.

**Fisheries and Aquatic Habitat Assessment for Highway 6, MTO (2003)**

Characterized fish community composition and aquatic habitat to support highway reconstruction activities.

**Fisheries and Aquatic Habitat Assessment for Highway 118, MTO (2003)**

Characterized fish community composition and aquatic habitat to support highway reconstruction activities.

**Lake Sturgeon Spawning Assessment for Petrie Island, Ottawa River, City of Ottawa (2003)**

Implemented larval sampling program for Lake Sturgeon in Ottawa River.

**Long Term Monitoring of Highway 417 Mississippi River Fish Habitat Compensation, MTO (2002-2003)**

Conducted trap netting and electrofishing to monitor effectiveness of fish habitat compensation measures on Mississippi River.

**Long Term Monitoring of Carruthers Creek Tributary Realignment, Regional Municipality of Durham (2002-2003)**

Conducted multi-year monitoring to determine effectiveness of fish habitat compensation measures.

**Fish Residency and Shoreline Aquatic Habitat Assessment for Morton Bay, Whitefish Lake, Parks Canada, Rideau Canal Office (2002)**

Assisted with snorkelling surveys and centrarchid nest mapping for Whitefish Lake on behalf of Parks Canada.

**Fisheries Inventory and Assessment for Highway 15 from Highway 401 to Highway 7 (2001-2002)**

Conducted three-season fish community surveys at bridge and culvert crossings on Highway 15 to support highway reconstruction.

**Ecological Restoration**

Fish habitat, wetland and forest restoration as well as bioengineering and naturalization planting projects involve production of planting plans, identification of appropriate native species, cost estimation and preparation of tender bids, project management, site supervision and implementation. Project experience includes:

**Confidential Client, Guelph (2008-2010)**

Developed an experimental approach to forest restoration of a contaminated site.

**Windermere Basin Fish Habitat Restoration, City of Hamilton (2008)**

Identified a suite of sentinel fish species to form the basis of a fish habitat compensation plan to provide enhanced aquatic habitat as part of Hamilton Harbour remediation activities.

**Walpole Island First Nation (2008)**

Conducted Phase 1 of a feasibility study, including sediment and water sampling, in order to commence a strategy to restore 14 linear kilometers of fish habitat.

**Environmental Monitoring and Restoration, Confidential Client (2007-2008)**

Obtained soil and water samples before and after clean up of a mine tailings release to a wetland. Assessed and mapped impacts to vegetation and provided recommendations for restoration options.

**Various Projects, York Region (2006 – 2008)**

Responsible for co-ordinating and designing ecological restoration improvements for 16<sup>th</sup> Avenue Trunk Sewer Construction projects. Designed and implemented stream bank bioengineering, wetland restoration and lowland forest restoration. Developed riparian planting plans to improve buffer zones on Bruce Creek and increase ecological function of the riparian corridor.

**9th Line Tributary D Restoration, Town of Markham (2005)**

Developed an ecological restoration plan for stream bank, wetland and forest restoration to mitigate an open cut crossing of a tributary of the Rouge River.

**Keele Street and Highway 7 Stream Restoration and Bioengineering Works, City of Vaughan (2004)**

Implemented stream bank bioengineering and riparian/floodplain plantings.

**Black Ash Creek Flood Control –Bioengineering and landscaping, Town of Collingwood (2004)**

Installed 1000s of bareroot shrubs and live stakes along Black Ash Creek.

**Humber River Tributary Aquatic Habitat Restoration for Airport Road Widening, Regional Municipality of Peel (2004)**

Constructed new reach of creek channel to reinstate fish habitat and riparian vegetation.

**Laurel Creek Bank Stabilization and Live Crib Wall Construction, University of Waterloo (2004)**

Installed biologs and riparian shrub plantins for shoreline stabilization project.

**Fish Habitat Compensation Works – Rootwad Installation, Iron Bridge, Ministry of Transportation (2003)**

Installed rootwads on Mississauga River and aquatic vegetation renewal in back bay habitat.

**Hansen Boulevard/Creek Realignment and Bioengineering Construction and Supervision, Town of Orangeville (2003)**

Provided supervision of natural channel realignment and installation of riparian shrubs.

**Aquatic Plant Installation, Richmond Green Park, Town of Richmond Hill (2003)**

Installed aquatic plantings for large stormwater management pond facility.

**Wood Boulder Reef Construction, Matheson, MTO (2003)**

Constructed wood boulder reefs on lake ice for subsequent submersion as part of fish habitat compensation plan.

**Live Crib Wall Construction for Lynde Creek Stabilization, Town of Whitby (2003)**

Constructed live crib wall along Lynde Creek to support bank and slope stabilization project.

**Creek Channel Realignment and Live Crib Wall Construction and Supervision, Pottageville, Region of Peel (2003)**

Constructed live crib wall along Pottageville Creek to support bank stabilization project.

**Mosquito Creek Channel Realignment and Live Crib Wall Construction and Supervision, City of Ottawa (2003)**

Constructed live crib wall along Pottageville Creek to support bank stabilization project.

**Carruthers Creek Channel Realignment and Landscaping, Ajax, Ministry of Transportation (2003)**

Supervised construction of natural channel design for Carruthers Creek realignment.

**Construction of Ecological Enhancements for Stormwater Pond, Town of Erin (2002)**

Constructed a stormwater management pond and installed native plantings to stabilize side slopes and gravel baffles.

**Lemon Creek Fisheries Compensation Implementation, CNR (2001)**

Participated in creation of fish refuge habitat and bank shading/stabilization as part of fish habitat compensation.

**Trout Creek Fisheries Compensation Implementation, MTO (2001)**

Constructed and installed LUNKERS and rootwads for creation of fish refuge habitat and shoreline stabilization on Trout Creek as part of fish habitat compensation.

**Willow Park Ecology Centre Wetland, Boardwalk and Trail Construction (2001)**

Installed aquatic plants to enhance wetland habitat, and constructed viewing platform and trail system for recreational activities in urban park.

**Doon Mills South Stormwater Pond Enhancement Plantings (2001)**

Installed aquatic plants and riparian vegetation to enhance stormwater management pond.

**Environmental Impact Studies, Feasibility Studies**

EIS and Feasibility Studies integrate fisheries, aquatic habitat, vegetation, wildlife and species at risk to guide development proposals in accordance with provincial planning policies and objectives. Project experience includes:

**Impact Assessment to Grand River Fish Habitat from the Proposed Elora WWTP Expansion, Elora (2010)**

Assessed potential impacts of revised effluent criteria to Grand River fish habitat. Reviewed potential impacts of proposed changes in water quality as they relate to brown trout spawning habitat.

**EIS to support Replacement of Bridge Structure on Middlebrook Road, Wellington County (2008-2010)**

Conducted assessment of terrestrial ecosystems and developed mitigation measures for proposed bridge replacement.

**Impact Assessment for Elora Wastewater Treatment Plant Expansion (2007-2010)**

Conducted an assessment of significance and impact assessment on natural features and functions as they relate to the Provincial Policy Statement and Grand River Conservation Authority policies for wetlands.

**EIS to support Replacement of Bridge Structure, Town of Erin (2009)**

Conducted assessment of terrestrial ecosystems and developed mitigation measures for proposed bridge replacement.

**Hayes Bridge Replacement EIS, Municipality of Trent Hills (2008)**

Conducted fish habitat assessment of Hoards Creek tributary and Ecological Land Classification for surrounding lands to document existing conditions and identify potential impacts to an adjacent Provincially Significant Wetland as a result of a proposed bridge replacement. Developed mitigation measures to avoid and minimize potential impacts to both wetland and watercourse.

**Nature Park EIS, Haliburton County (2007)**

Conducted a fisheries and aquatic habitat assessment and provided mitigation recommendations for a proposed recreational park in Haliburton County.

**Advanced Compost Corporation Feasibility Study, Guelph (2006)**

Conducted an inventory of natural heritage features to identify preliminary environmental macro-constraints to a proposed composting facility. Identified natural heritage policy considerations and provided recommendations for further field investigations required to support a development application.

**EIS to support Replacement of Bridge Structure on Speed River Tributary (2006)**

Conducted assessment of terrestrial ecosystems and developed mitigation measures for proposed bridge replacement.

**Beaver Valley Woodlands EIS, Municipality of Grey Highlands (2005-2006)**

Project Manager for EIS prepared for a proposed housing subdivision intended to qualify as a Zero-Carbon development. Policy issues included presence of nationally endangered species and species of conservation concern. Provided design and mitigation recommendations to align project with objectives of Provincial Policy Statement.

**Whiting Street Feasibility Study, Town of Ingersoll (2005-2006)**

Project Manager for EIS prepared for a proposed commercial development abutting locally significant wetlands. Hydrogeologic investigation aided characterization of wetland as an impacted fen. Provided recommendations for wetland buffers and mitigation measures.

**Port Severn Village Resort EIS, Port Severn (2005-2006)**

Conducted fish habitat assessment and provided guidance on

Fisheries Act issues for a proposed development on Georgian Bay involving complex planning and policy issues.

**W.C. Wood Property Feasibility Study, Guelph (2005)**

Conducted a fish habitat inventory of a municipal drain to determine the potential for a habitat connection between the drain and the Speed River. Study was conducted to assist with future land use planning.

**EIS to support Sleepy Hollow Golf Course Expansion, Stouffville (2004)**

Classified vegetation according to Ecological Land Classification protocols to support EIS.

**EIS to support Crompton Lot Severance, Penetanguishene (2002)**

Conducted assessments of fish community and fish habitat to support EIS for lot severance.

**Transportation Class EA**

Fish community and aquatic habitat evaluations were undertaken in order to assess potential impacts from proposed highway construction projects and mitigation measures were developed. Project experience includes:

**Detailed Design for Highway 401 Widening, Mississauga, MTO (2011)**

Conducted fisheries assessment and associated documentation as per MTO/DFO/MNR protocol.

**Preliminary Design for Highway 24, Cambridge, MTO (2007)**

Participated in collection of aquatic ecosystem and amphibian data to support EA.

**Preliminary Design for Highway 8, Stratford, MTO (2007)**

Participated in collection of aquatic ecosystem and amphibian data to support EA.

**Planning Study and Preliminary Design for Highway 401 from Brock Road to Courtice Road, WP 242-86-00, MTO (2004-2005)**

Assisted with preparation of Class EA documentation for highway improvements.

**Preliminary & Detail Design for Highway 11/502, GWP 407-00-00, Fort Frances, MTO (2001-2004)**

Conducted all phases of Class EA process, including agency consultation, for preliminary and detail design.

**Detailed Design for Highway 11/17, GWP 524-00-00, Thunder Bay, MTO (2004)**

Conducted all phases of Class EA process, including agency consultation, for preliminary and detail design.

**Detailed Design for Highway 546, WP 513-00-01, MTO (2003-2004)**

Prepared Class EA documentation for highway improvements.

**Detailed Design for Highway 651, WP 512-00-01 and WP 137-97-01, MTO (2003-2004)**

Prepared Class EA documentation for highway improvements.

**TPM – Preliminary Design for Highway 401/Lakeridge Road Interchange Widening from Carruthers Creek to Highway 12, WP 128-99-00, MTO (2002-2003)**

Assisted with preparation of Class EA documentation for highway improvements.

**TPM – Preliminary Design for Highway 401 Widening from Westney Road to Harwood Avenue, WP 170-00-00, MTO (2002-2003)**

Assisted with preparation of Class EA documentation for highway improvements.

**Preliminary Design for Reconstruction of Ravenshoe Road from Prout Road to Lakeridge Road, Region of York (2001-2002)**

Conducted natural science field inventories to support preliminary design for highway improvements. Conducted literature search for highway wildlife collision mitigation options.

**Environmental Monitoring**

Environmental monitoring requires a diverse range of technical capability including collection of water quality samples, soil and sediment samples, groundwater/surface water interaction studies, review of watershed monitoring data and collection of baseline environmental conditions. Project experience includes:

**Fairy Lake Sediment Coring Study, Town of Acton (2009)**

Collected under-ice lake bottom sediment cores for sediment analysis study.

**Adaptive Management Plan Development for Blue Springs Creek, City of Guelph (2006 – 2008)**

Assisted in development of an Adaptive Management Plan to monitor effects on coldwater trout habitat in Blue Springs Creek from a long-term groundwater pumping test. Helped develop surface water monitoring study to determine groundwater / surface water interactions, identify conditions required to sustain aquatic biota, and assess potential effects on a coldwater ecosystem.

**Subwatershed Monitoring Data Review, Credit Valley Conservation (2007)**

Provided technical fisheries review of CVC's Effectiveness Monitoring program data.

**Subwatershed Monitoring Data Review, Credit Valley Conservation (2006)**

Project manager for seven year review of Fletchers Creek subwatershed monitoring data. Data sets included water quality, hydrology, benthic macroinvertebrates, fisheries and fluvial geomorphology. Provided a quality assurance review of raw data and helped integrate results across technical disciplines to provide conclusions on watershed health and recommendations for improvements to the monitoring program.

**Aquatic Ecosystem Monitoring, Walker Aggregates, Niagara Falls (2006)**

Project Manager for an Aquatic Ecology Monitoring Program to support a Permit To Take Water amendment for ongoing quarry activities. Study began with collection of baseline data and followed with a monitoring program to assess impacts on streams due to changes to groundwater levels. Investigation included surface water flow monitoring, shallow groundwater monitoring, fish community and habitat assessment, and benthic macroinvertebrate community assessment.

**Aboriginal / Métis Consultation and Peer Review****Taykwa Tagamou Nation (2010)**

Provided technical ecological review, on behalf of Taykwa Tagamou Nation, of the Fish Removal and Protection Plan for Abitibi Canyon Dam Generating Station Tailrace Rehabilitation.

**Métis Nation of Ontario (2010)**

Prepared an 80 page report titled 'Ecological Values of the Boreal Forest' intended to provide MNO with an accessible information resource relating consequences of natural and anthropogenic change in the Boreal Forest on Metis Way of Life.

**Métis Nation of Ontario (2009)**

Provided technical ecological review, on behalf of the Metis Nation of Ontario, of Hydro One's Bruce to Milton Hydro Corridor Twinning EA. Provide client with advice on effectiveness of proposed ecological restoration on large scale project.

**Walpole Island First Nation (2008)**

Retained by WIFN to provide technical review of Shell Canada's EA for the proposed Sarnia oil refinery. Reviewed issues on biodiversity, species at risk, provincially significant wetlands, fish habitat, hunting access, and potential impacts to livelihood of community members. Participated as a member of joint consultation group consisting of representatives of WIFN, federal and provincial governments and Shell Canada.

**District Municipality of Muskoka (2007-2008)**

Provided peer review and technical fish habitat review for various shoreline development applications in Muskoka District.



Gregg Ferris, B.Sc.  
**Environmental Scientist**

**Professional History**

2006 - present, AECOM, Hydrologist

Zenon Environmental Inc.  
Laboratory Technician/Pilot Tester  
Burlington, ON  
2003 – 2004

Canada Centre for Inland Waters  
National Water Research Institute  
Scientific Researcher/  
Laboratory Technician  
Burlington, ON  
2002

Environment Canada  
Ontario Region  
Scientific Researcher  
Downsview, ON  
2002

Terraprobe Engineering Consultants  
Soil Laboratory Technician  
Hamilton, ON  
1997, 1998, 2001

**Education**

B.Sc., Honours  
Earth and Environmental Science Co-op  
Program  
McMaster University  
Hamilton, ON  
1999 - 2004

**Training**

Environmental Science Technician  
Diploma  
Mohawk College  
Hamilton, ON  
1997 – 1999

Chemical Technician Diploma  
Mohawk College  
Hamilton, ON  
1995 – 1997

Gregg Ferris is an Environmental Scientist with over five years of professional consulting experience with AECOM in the fields of physical hydrology and hydrogeology. Gregg has been extensively involved in projects related to source water protection studies and the aggregate industry. He is very experienced with many types of field data acquisition, including drilling supervision and monitoring well construction, streamflow assessments and water quality sampling. Currently, Gregg is managing multiple aggregate projects for Holcim Canada. This work includes ensuring compliance with issued Permits-to-Take Water (PTTW) and Certificates of Approval (CoA), as well as working closely with the client to improve the environmental soundness of facilities. Gregg acts as board member and outside consultant to the Waterloo-Wellington chapter of the Ontario Stone, Sand and Gravel Association (OSSGA) and the Environmental Committee of the Ready-Mix Concrete Association of Ontario (RMCAO).

**EXPERIENCE**

**Mining Industry**

**Ring of Fire Area: McFaulds Lake, James Bay Lowlands**

Conducted baseline spot flow surveys, benthic sampling and surface water quality analysis and installed continuous stream stage monitoring equipment at an exploration mine site in Northern Ontario

**Dundee Precious Metals: Back River (Goose Lake site)**

Reconnaissance for spot flow survey sites in and around exploration mining camp

**Aggregate Facility Monitoring**

**Holcim (Canada) Inc. Permit to take Water for Ogden Point Quarry, Cobourg, ON**

Project Manager for maintaining existing PTTW (dewatering) and CofA (Industrial Sewage Works) compliance monitoring program for facility.

**Holcim (Canada) Inc. Permit to Take Water (PTTW)**

Various locations throughout Southern Ontario  
Project manager for yearly monitoring of surface water and groundwater levels. Responsible for establishing yearly monitoring program changes and preparing annual report

**Holcim (Canada) Inc. Water Quality Monitoring, Whitby, ON**

Project manager for establishing water quality monitoring program for surface and groundwater. Providing guidance on site specific designs for water quality compliance and preparing quarterly and annual reports.

**Holcim (Canada) Inc. Water Quality Monitoring, Etobicoke, ON**

Project manager for establishing water quality monitoring program for

**Years of Experience**

With AECOM: 6

With Other Firms: 6

surface water discharge. Providing guidance on site specific designs for water quality compliance

**CBM, Flamborough Quarry**

Aided in monitoring water levels during highly sensitive pumping test for proposed quarry, prepared daily hydrographs for clients on-site.

**Groundwater Well Drilling****Halton Region Tier 3 Water Budget**

Supervising the drilling of numerous groundwater monitoring wells throughout Halton Region. This included logging overburden and bedrock core samples for determination of well design. Project responsibilities also included:

- Aiding in monitoring well site selection
- Selecting sites for shallow groundwater monitoring (and installation of necessary equipment)
- Conducting Spotflow surveys for baseline data collection

**Cedarvale Drilling Operations**

Supervising the drilling of eight groundwater monitoring wells within the Arborglenn Community. This included logging overburden and bedrock core samples for determination of well design.

**Limehouse Drilling Operations**

Supervising the drilling of three groundwater monitoring wells within the CVC Limehouse Conservation Area. This included logging overburden and bedrock core samples for determination of well design.

**Water Resources/Hydrology****Upper York Sanitary Sewer Discharge Assessment**

Aided in conducting a series of geomorphic surveys throughout the Holland River Watershed to identify point source discharge locations

**Halton Region, Black Creek Assessment**

Established spot flow monitoring stations along reach of Black Creek where suspected buried bedrock valley exists. Installed mini-piezometers at selected locations for groundwater gradient determination

**Halton Region, Beeney Creek Assessment**

Established spot flow monitoring stations along reach of Beeney Creek where suspected buried bedrock valley exists. Installed mini-piezometers at selected locations for groundwater gradient determination

**Nestle Waters Canada**

Design of project was to determine new source of water for local Nestle Facility. Responsibilities included site selection of and installation of shallow groundwater monitors, water levels measurements during a series of step-tests, and collection and preparation of data for analysis

**Arkell Springs Baseline Monitoring**

Oversaw the design and equipment installation for the surface water monitoring program. Provided consultation on site selection and modification of existing sites to facilitate the collection of representative

data. Regularly conducted field work which included but was not limited to:

- Surface water discharge measurements
- Shallow groundwater level monitoring

**16th Avenue Sewer Trunk Expansion**

Designed surface water model to predict low-flow periods during project run. Aided in collecting periodic field data to increase precision of model