

AECOM

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Other General Comments Regarding the Study Area:

- natural - channelized water course
- good in stream cover.
- up stream of tile drain - channel choked @ phragmites
↳ slower moving water
- channel then becomes open and similar to
d/s of tile drain

Photo log

Picture #	Description	Picture #	Description
23-32			

AECOM

Watercourse Sketch

Study Area:

Jericho

Goshen

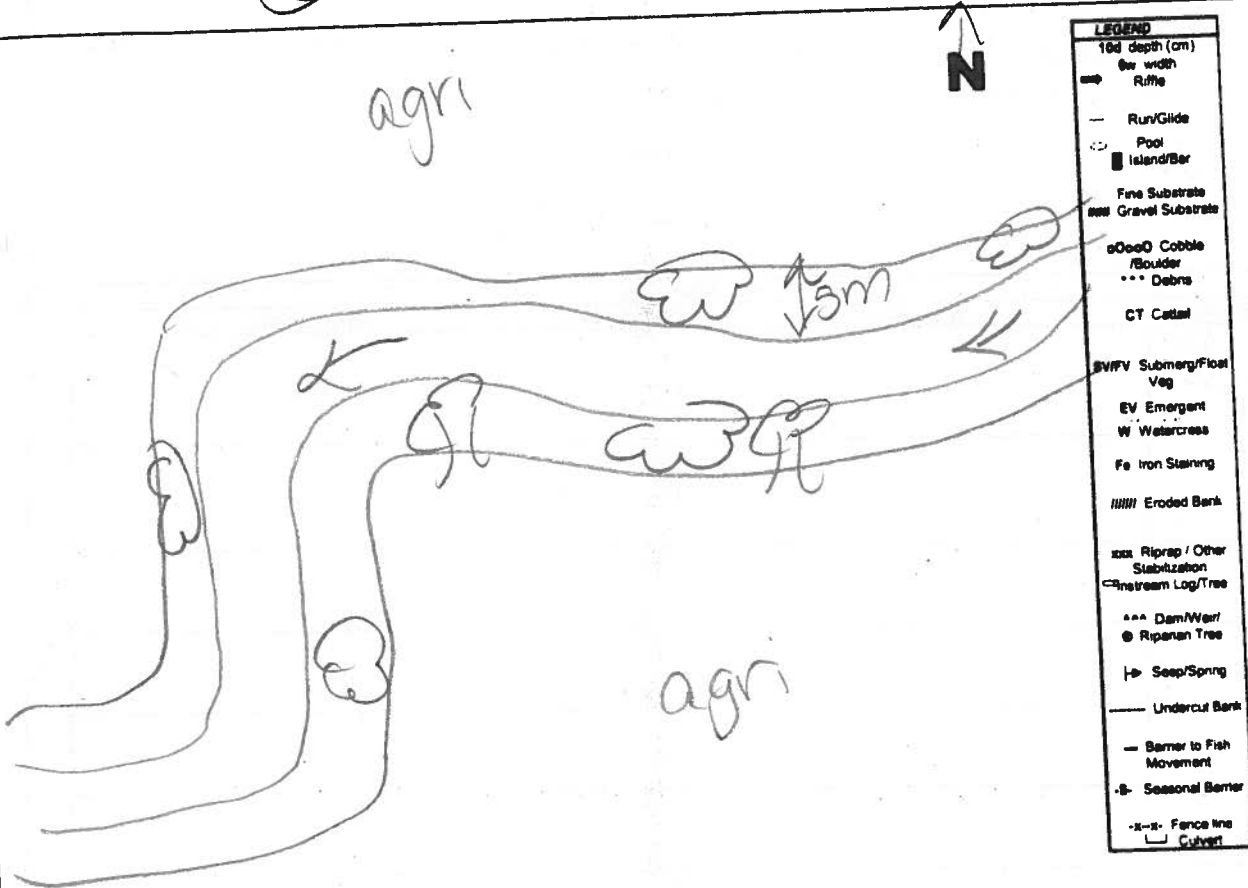
Bluewater

Land Parcel#

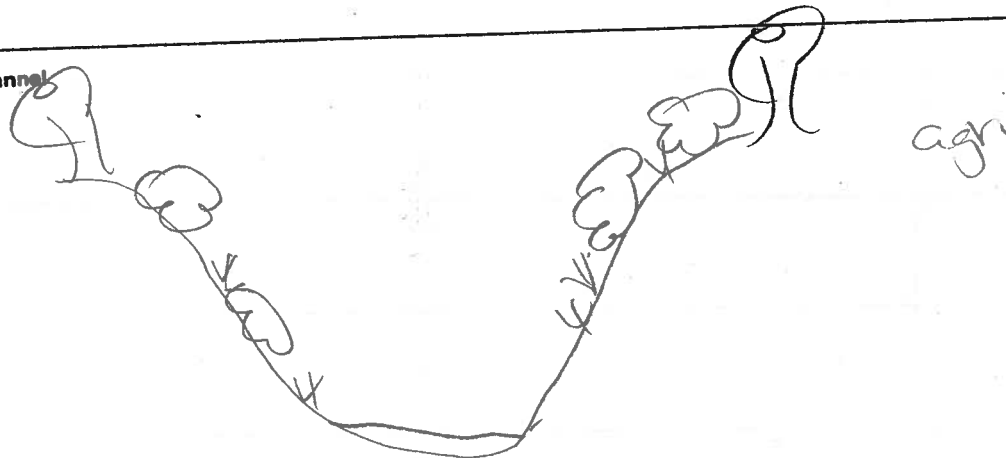
1091

Turbine #

C80



Horizontal View of Channel



AECOM

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Field Crew: SA, TS

General Information

Study Area: Jericho Goshen Bluewater Land Parcel# 1090 Turbine # C81
 Date: Nov 17/11 Start time: 14:20 End Time: 14:40

Weather Conditions: overcast, windy Field Notes By: SA

Site Location

North of South Rd, East of Mollard

UTM Co-ordinates

Easting: _____ Northing: _____ Description: C81A (end)

Easting: _____ Northing: _____ Description: C81B (data)

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)

in forest & agriculture fields on either side

In-Situ Water Quality

WT (°C): 4.8°C AT (°C): _____
 pH: 8.32 Cond (µs/cm): 690
 Water Clarity: Clear ☒ Turbid ☐

Ground Water Indicators

Watercress ☐ Bank Seepage ☐
 Iron Staining ☐ None ☒
 Bubbling ☐ Other ☐

Notes: none observed

Stream Morphology

Site Length (m): 200

Bank Stability:

Channel Dimensions

Mean Wetted Width (m):	<u>2.4</u>	Mean Bankfull Width (m):	<u>7.00</u>
Mean Wetted Depth (m):	<u>0.18</u>	Mean Bankfull Depth (m):	<u>1.3</u>

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	☐	☐	☒	☐
Right Bank	☐	☐	☒	☐

Flow Description: Low flow
-evidence of high flow channel

Notes: signs of erosion along RB & LB - exposed soils + tree roots

TOBH - 1.8 m TOBW - 8.0 m

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Stream Morphology (continued)

Substrate (<=>)

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

Description

Sa > Gr. > Si

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
10	30	50	

Habitat

Instream Cover (%)

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

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

wide flat system @ small-large woody debris

Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



60-30%



Types of Cover (% cover)

Trees

60

Shrubs

Grasses

15

Herbaceous

15

Man-made structures

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:

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

C81

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Other General Comments Regarding the Study Area:

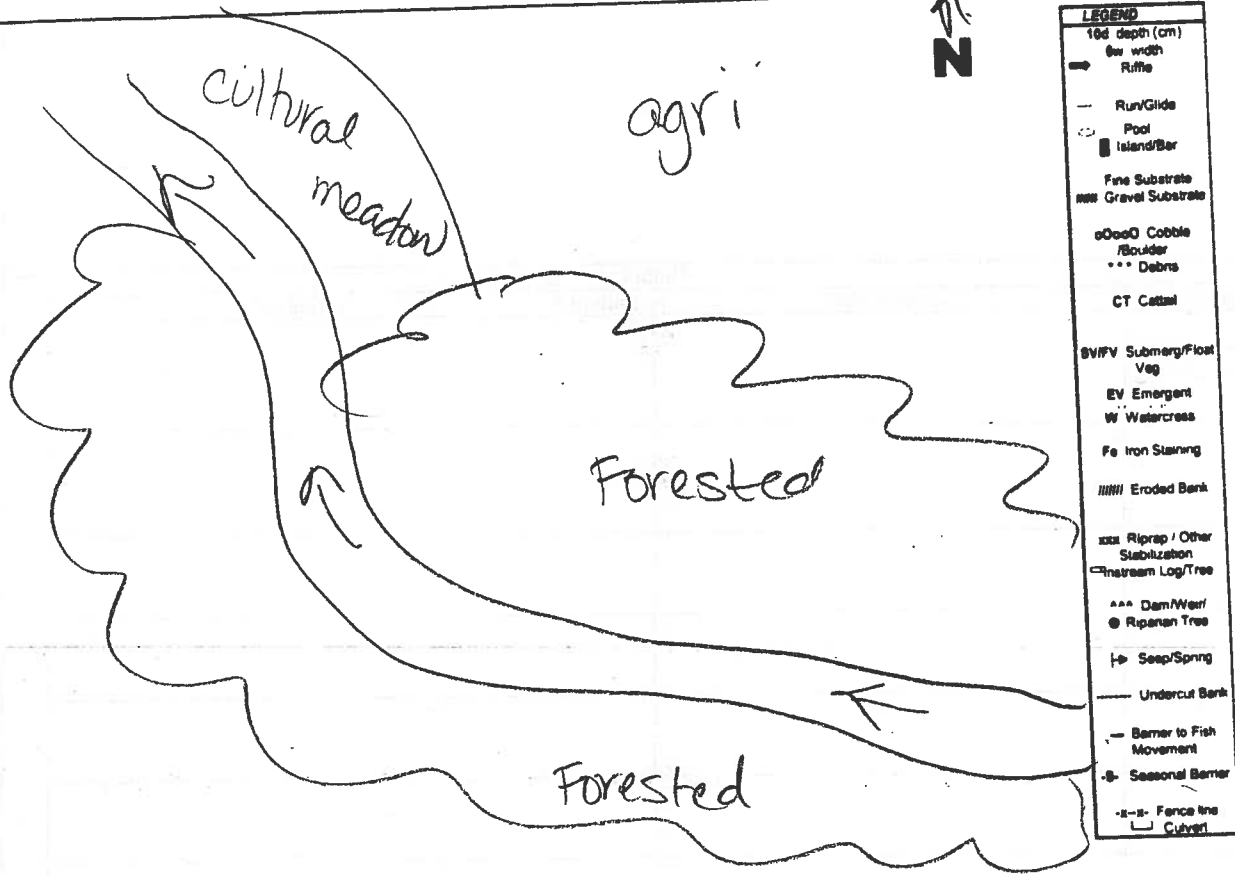
Photo log 83-92			
Picture #	Description	Picture #	Description
83.92			

081

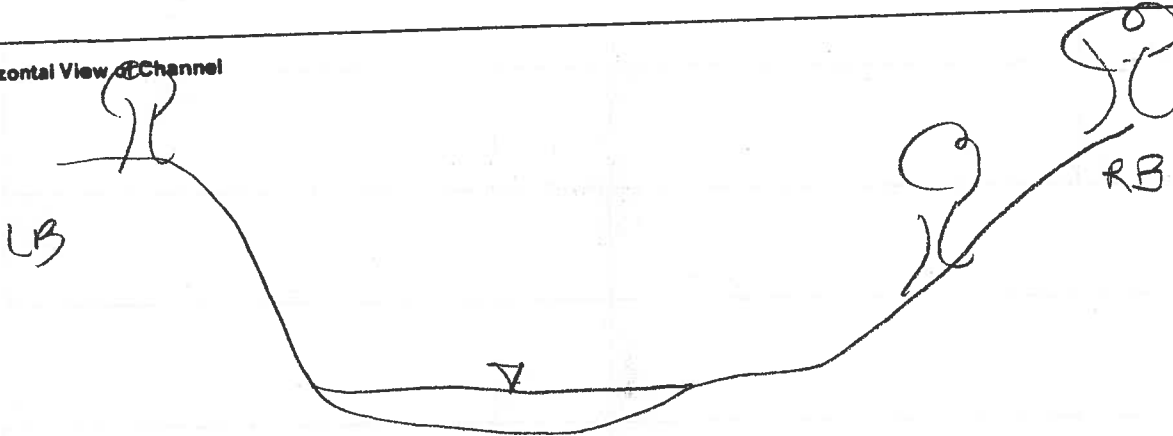
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Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1090 Turbine # C81



Horizontal View of Channel



AECOM

Field Crew:

SA, TS

General Information

Study Area: Jericho

Goshen

Bluewater

Land Parcel# 1075

Turbine #

C82

Date: Nov 17/11

Start time: 15:00

End Time: 15:24

Weather Conditions:

overcast, windy

Field Notes By:

SA

Site Location

South Rd., East of Grand Bend Line

UTM Co-ordinates

Easting:

Northing:

Description:

GPS not working

Easting:

Northing:

Description:

Easting:

Northing:

Description:

Easting:

Northing:

Description:

Surrounding Landuse/Pollution Sources

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)

In-Situ Water Quality

Same as C81

WT (°C):

4.8

AT (°C):

pH:

8.32

Cond (µs/cm):

690

Water Clarity:

Clear

☒

Turbid

☐

Ground Water Indicators

Watercress

☐

Bank Seepage

☐

Iron Staining

☐

None

☒

Bubbling

☐

Other

☐

Notes:

Stream Morphology

Site Length (m):

Same as C81

Bank Stability:

Channel Dimensions

Mean Wetted
Width (m):

2.4

Mean Bankfull Width
(m):

7.0

Mean Wetted
Depth (m):

0.2

Mean Bankfull Depth
(m):

1.3

Stable

Slightly
unstableModerately
unstable

Unstable

Left Bank

☐☐☒☒

Right Bank

☐☐☒☐

Flow Description:

Notes:

large meander where bank is eroding away

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Stream Morphology (continued)

Substrate (< = >)

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

Description

sa > gr > si

Morphological Structure (%)

Pool	Rifle	Run	Flat
15	15	30	

Notes:

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	20	15	15	/		

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

Small + large woody debris
instream boulders + cobble

Canopy Cover (% closed cover):

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

Types of Cover (% cover)

Trees 80 Shrubs 20 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

C82

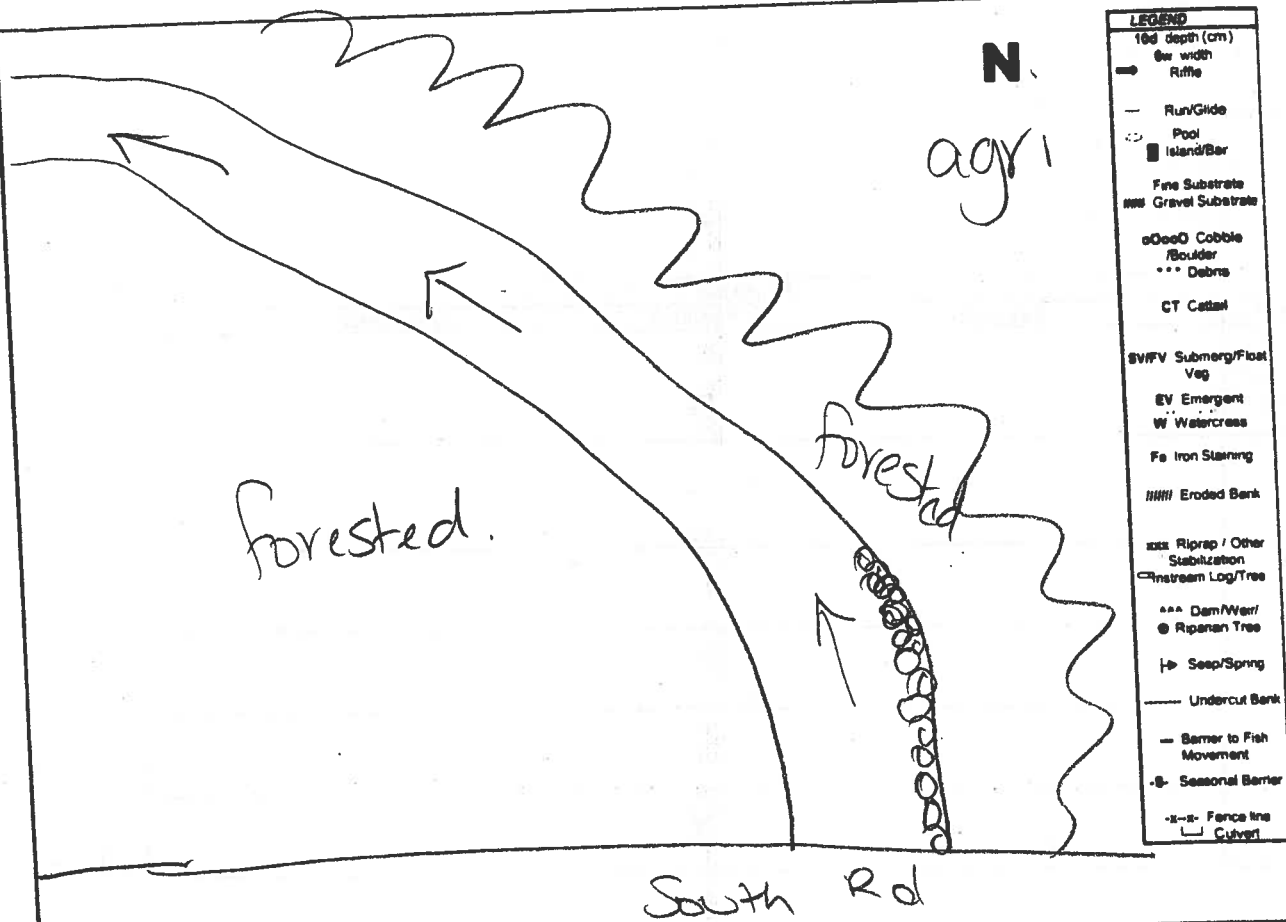
- area near culvert where bank have been reinforced w/ cobble
- severe erosion located near culvert
- failed reinforcements
- u/s side is green colour & very slow moving due to stream modifications made d/s

[illegible]

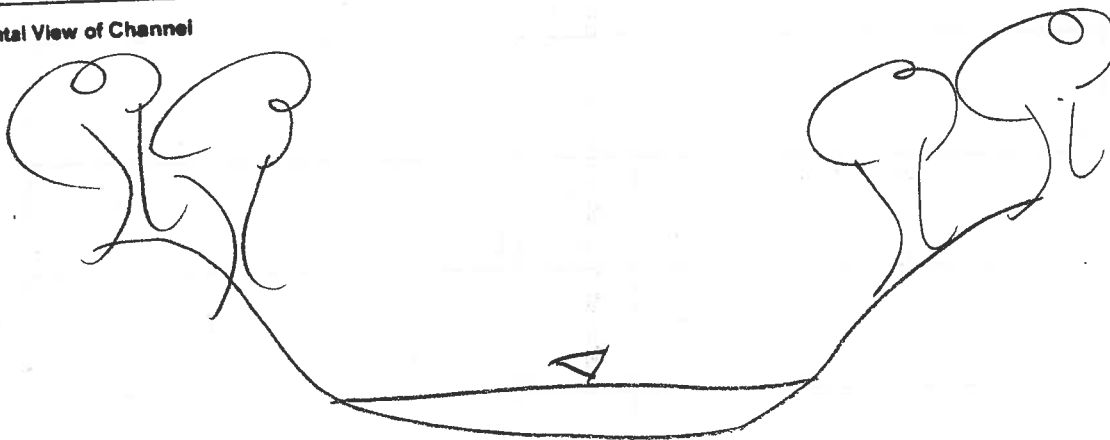
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Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1075 Turbine # C82



Horizontal View of Channel



AECOM

Field Crew:

General Information

Study Area: Jericho Goshen Bluewater Land Parcel# 1021,1557,2204 Turbine # 283
 Date: Nov 17/11 Start time: 15:36 End Time: 14:20

Weather Conditions:

overcast, windy

Field Notes By:

SA

Site Location

Crossing at South Rd & Grand Bend Lino

UTM Co-ordinates

Easting: Northing:

Description: GPS not working

Easting: Northing:

Description:

Easting: Northing:

Description:

Easting: Northing:

Description:

Surrounding Landuse/Pollution Sources

Residential
Agriculture
ForestMeadow
Wetland
Livestock

Other:

Type of Watercourse

Intermittent
Permanent
EphemeralChannelized
Natural Channel

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

lots of water

In-Situ Water Quality

WT (°C):

4.2

AT (°C):

pH:

8.07

Cond (µs/cm):

714

Water Clarity:

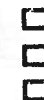
Clear



Turbid



Ground Water Indicators

Watercress
Iron Staining
BubblingBank Seepage
None
OtherNotes: lots of water cross located on east & west side of Grand Bend Line

Stream Morphology

Site Length (m):

250

Bank Stability:

Channel Dimensions

Mean Wetted
Width (m):0.50Mean Bankfull Width
(m):1.5Mean Wetted
Depth (m):0.10Mean Bankfull Depth
(m):2.0

Stable

Slightly
unstableModerately
unstable

Unstable

Left Bank



Right Bank



Flow Description:

Notes:

AECOM

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Stream Morphology (continued)

Substrate (< = >)

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

Description

Si = Sa

Morphological Structure (%)

Pool	Riffle	Run	Flat
	30	50	

Notes:

Habitat

Instream Cover (%)

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

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

Watercress + grasses

Canopy Cover (% closed cover):

100-90%

☐

30-1%

☒

90-60%

☐

0%

☐

60-30%

☐

Types of Cover (% cover)

Trees

Shrubs

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:

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

083

AECOM

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Other General Comments Regarding the Study Area:

- straightened ditch, cattail choked
- some filamentous alga
- runoff from ditch

Photo log

120-124

Picture #	Description	Picture #	Description
116-118	South of South Rd.		
119	North of South Rd East of Grand Bend Line		

C83

AECOM

Watercourse Sketch

Study Area:

Jericho

Goshen

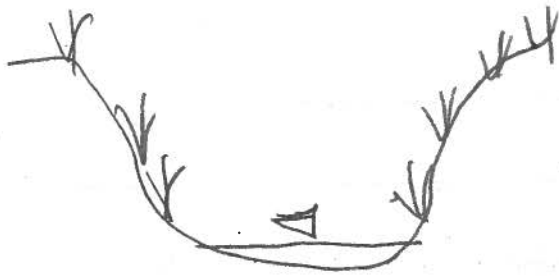
Bluewater

Land Parcel#

1021, 1587, 2264

Turbine #

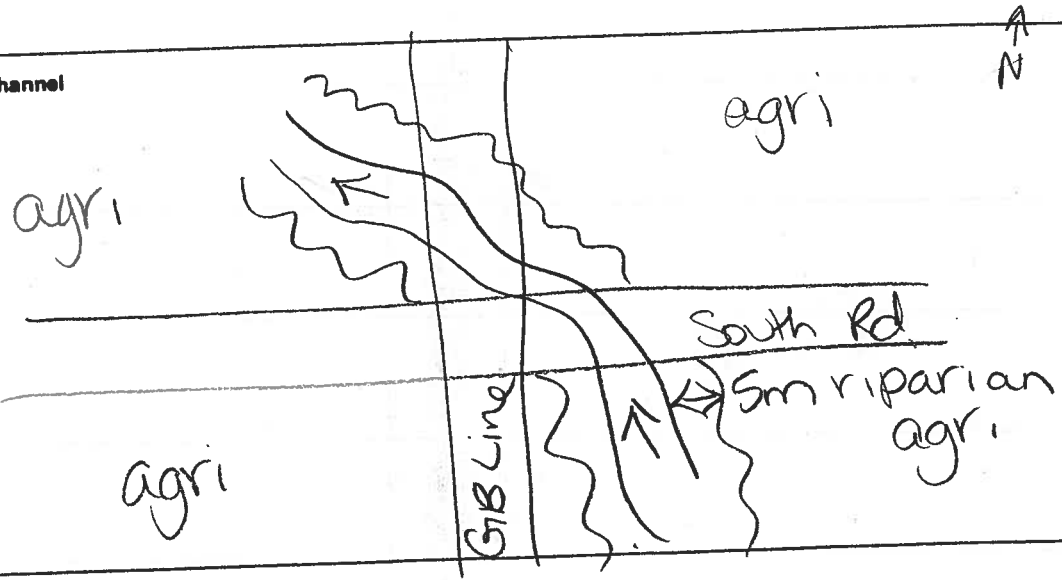
C 83



N

LEGEND	
10d depth (cm)	
6w width	
→ Riffle	
— Run/Glide	
○ Pool	
■ Island/Bar	
— Fine Substrate	
--- Gravel Substrate	
oOoO Cobble/Boulder	
*** Debris	
CT Cattail	
SV/FV Submerge/Float Veg	
EV Emergent	
W Watercress	
Fe Iron Staining	
Eroded Bank	
xxx Riprap / Other Stabilization	
— Instream Log/Tree	
*** Dam/Weir	
● Riparian Tree	
↳ Seep/Spring	
— Undercut Bank	
— Barrier to Fish Movement	
-S- Seasonal Barrier	
-x-x- Fence line	
□ Culvert	

Horizontal View of Channel



C86

AECOM		Page 1 of 4	
		Field Crew: <i>NZ JAG</i>	
General Information			
Study Area:	Jericho <u>Goshen</u> Bluewater	Land Parcel# <u>1781</u>	Turbine # 1781 <u>C86</u>
Date: <u>13/07/11</u>	Start time: <u>15:20</u>	End Time: <u>15:50</u>	
Weather Conditions: <i>Sunny, light wind</i>		Field Notes By: <i>NZ</i>	
Site Location			
<i>near agricultural field. car @ South line. opposite G846</i>			
UTM Co-ordinates			
Easting: <u>0448887</u>	Northing: <u>4791712</u>	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential ☐	Meadow ☐	Intermittent ☐	Channelized ☒
Agriculture ☒	Wetland ☐	Permanent ☒	Natural Channel ☐
Forest ☐	Livestock ☐	Ephemeral ☐	<i>naturalized</i>
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 ☐	Bank Seepage ☐
pH:	Cond (s/cm):	Iron Staining ☐	None ☒
Water Clarity: Clear ☒	Turbid ☐	Bubbling ☐	Other ☐
Notes: <i>No groundwater indicators observed</i>			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions <i>EST.</i>			
Mean Wetted Width (m): <u>0.70</u>	Mean Bankfull Width (m): <u>1.5</u>	Stable	Slightly unstable
Mean Wetted Depth (m): <u>0.10m</u>	Mean Bankfull Depth (m): <u>30cm</u>	Moderately unstable	Unstable
		Left Bank ☒	☐
		Right Bank ☒	☐
Flow Description: <i>SLOW MOVING. stagnant in parts.</i>			
Notes: <i>Choked with veg. - grasses + shrubs @ some points</i>			

AECOM

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Stream Morphology (continued)

Substrate (< = >)

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

Description

Co = MK

Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

Habitat

Instream Cover (%)

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

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

filamentous brown-green algae
grasses - some islands in stream

Canopy Cover (% closed cover):

100-90%

☐

30-1%

☐

90-60%

☐

0%

☐

60-30%

☒

Types of Cover (% cover)

Trees

5

Shrubs

15

Man-made structures

Grasses

70

Herbaceous

10

Other

Notes:

vegetation choked - overgrown with shrub + grasses

Obstructions to Fish Passage

No Obstructions

☒

Man-Made

☐

Natural

☐

Description:

Maybe some
low flow obstructions
- veg. + debris

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

flat, no obvious drainage features

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

(C86)

AECOM

July 13/11

~~6/15/10~~

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Other General Comments Regarding the Study Area:

Photolog

Picture #	Description	Picture #	Description
225	General Location		
226	Upstream		
227	Downstream		

AECOM

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Watercourse Sketch

Study Area:

Jericho

Goshen

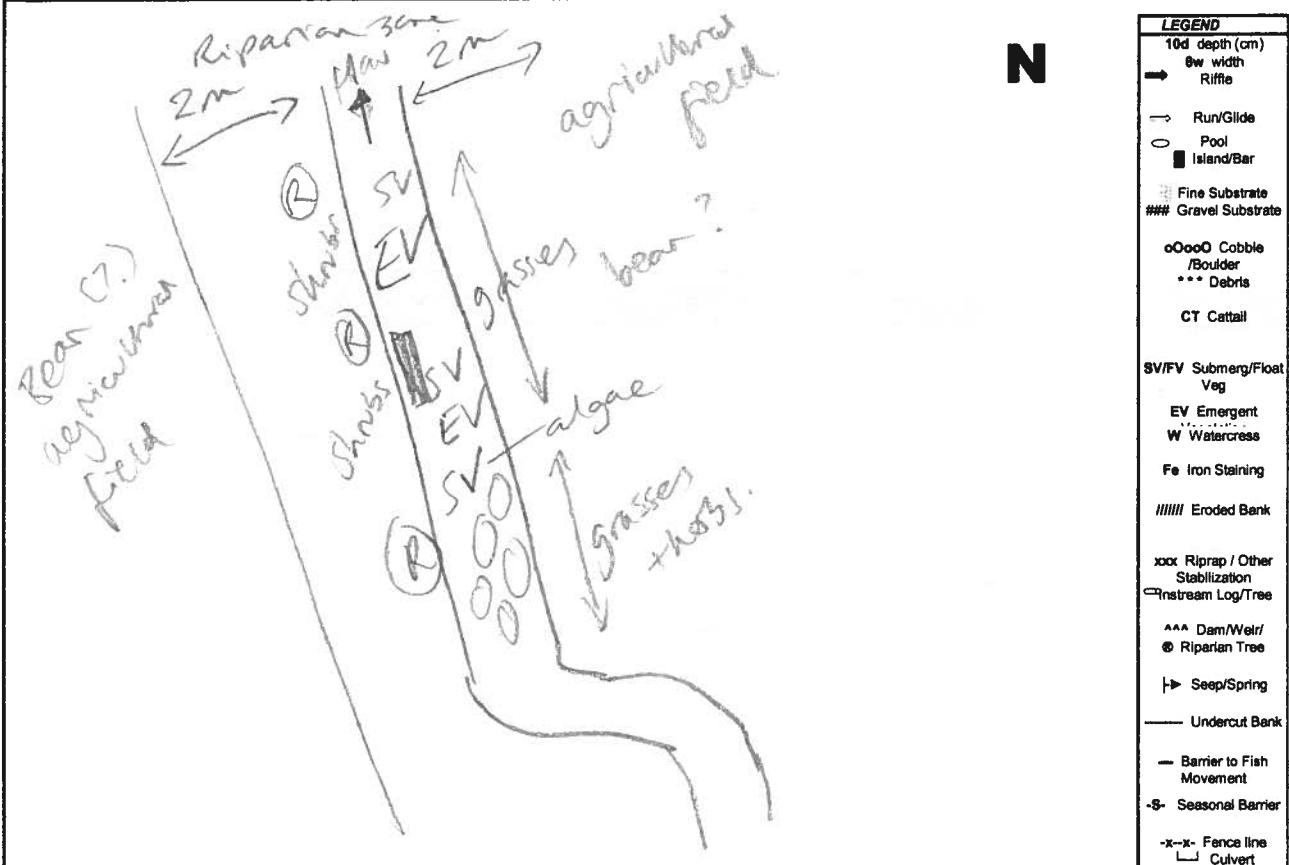
Bluewater Land Parcel#

1781

Turbine #

~~67E46~~

C86



Horizontal View of Channel



C89

AECOM		Page 1 of 4	
		Field Crew: <u>NL, JAG</u>	
General Information			
Study Area:	Jericho <u>Goshen</u> Bluewater	Land Parcel# <u>1062</u>	Turbine # <u>9547</u>
Date:	<u>13th July 2011</u>	Start time: <u>14:50</u>	End Time: <u>15:05</u>
Weather Conditions: <u>Sunny, light wind</u>		Field Notes By: <u>NL</u>	
Site Location			
<u>know' field from south line</u>			
UTM Co-ordinates			
Easting: <u>0448876</u>	Northing: <u>4790731</u>	Description: <u>unsure correct site location</u>	
Easting: <u>0448867</u>	Northing: <u>4790880</u>	Description: <u>much this is correct location</u>	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential ☐	Meadow ☐	Intermittent ☐	Channelized ☐
Agriculture ☒	Wetland ☐	Permanent ☒	Natural Channel ☒
Forest ☒	Livestock ☐	Ephemeral ☐	
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>25.2</u>	AT (°C):	Watercress ☐	Bank Seepage ☐
pH: <u>9.13</u>	Cond (µs/cm): <u>614</u>	Iron Staining ☐	None ☒
Water Clarity: Clear ☒	Turbid ☐	Bubbling ☐	Other ☐
Notes:			
Stream Morphology			
Site Length (m):		Bank Stability:	
Channel Dimensions			
Mean Wetted Width (m): <u>1</u>	Mean Bankfull Width (m): <u>2.4</u>	Stable	Slightly unstable
Mean Wetted Depth (m): <u>130m</u>	Mean Bankfull Depth (m): <u>70cm</u>	Moderately unstable	Unstable
		Left Bank	Right Bank
		☒	☒
		☐	☐
		☐	☐
Flow Description: <u>slow - moderate</u>			
Notes:			

AECOM

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Stream Morphology (continued)

Substrate (< = >)

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

Description

SI > MK = DT > Gr

Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10	0	0	30	10	

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

lots of algae - blankets of green filamentous algae

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

Notes:

Obstructions to Fish Passage

No Obstructions
Natural☒

Man-Made

☐

Description:

some piles of
LWD but flow depth
= sufficient for fish
passage

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

None noted - flat topography

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

C89

C89

AECOM

July 18 / 11

~~2012~~

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Other General Comments Regarding the Study Area:

land-use doesn't fit with Orms on one side of W/C -
forested areas closer to W/C than appears on photo-map.

confirmation visit required

Fish observed. - stickleback?

Photolog

Picture #	Description	Picture #	Description
220	Ben location		
221	Upstream		
222	downstream		
223*	Upstream - correct location		
224	downstream		

AECOM

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Watercourse Sketch

Study Area:

Jericho

Goshen

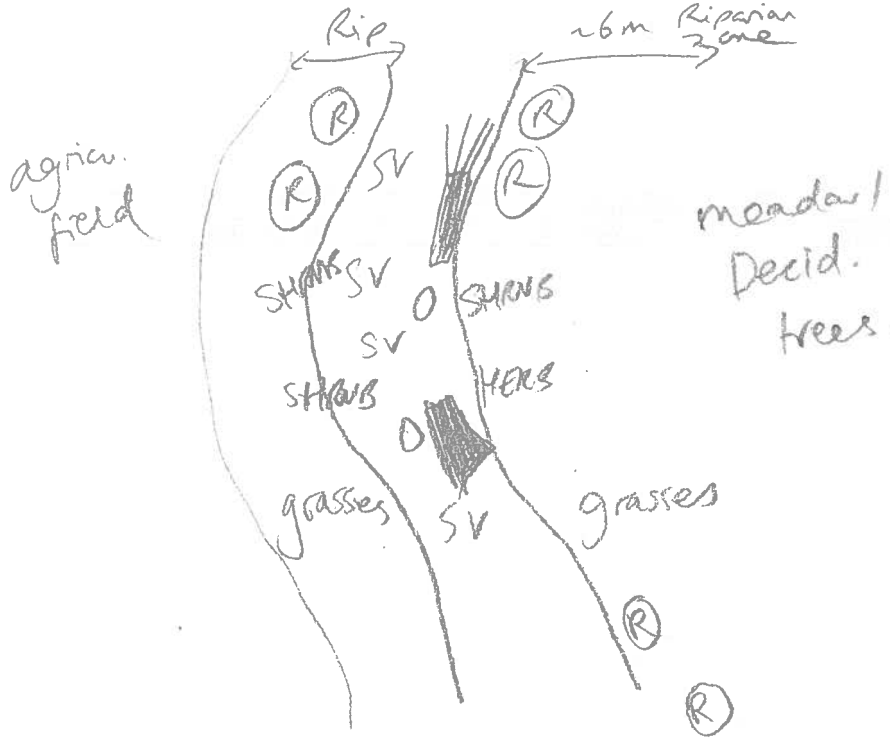
Bluewater Land Parcel#

1062

Turbine #

~~1062~~

C89



LEGEND	
10d depth (cm)	
Sw width	
Riffle	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Cobble	
Boulder	
Debris	
CT Cattail	
SV/FV Submerged/Float Veg	
EV Emergent	
W Watercress	
Fe Iron Staining	
Eroded Bank	
Riprap / Other Stabilization	
Instream 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			
General Information							
Study Area: Jericho <u>Goshen</u> Bluewater		Land Parcel# <u>1062</u>		Field Crew: <u>CB, JP</u>			
Date: <u>Sept 8/11</u>		Start time: <u>8:15</u>		Turbine # <u>G05-C89</u> End Time: <u>9:00</u>			
Weather Conditions: <u>Cloudy, 120c</u>				Field Notes By: <u>CB</u>			
Site Location							
<u>South Rd - west of Brown</u>							
UTM Co-ordinates							
Easting: <u>0448863</u>		Northing: <u>4790854</u>		Description: <u>in stream - N end</u>			
Easting: <u>0448950</u>		Northing: <u>4790664</u> <u>5/8m</u>		Description: <u>close to S end in field</u>			
Easting:		Northing:		Description:			
Easting:		Northing:		Description:			
Surrounding Landuse/Pollution Sources				Type of Watercourse			
Residential ☐	Meadow ☐			Intermittent ☐	Channelized ☐		
Agriculture ☒	Wetland ☐			Permanent ☒	Natural Channel ☒		
Forest ☒	Livestock ☐			Ephemeral ☐			
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 ☐			
pH: <u>/</u>		Cond (s/cm): <u>/</u>		Bank Seepage ☐			
Water Clarity: <u>Clear</u> ☒		Turbid ☒		Iron Staining ☐			
				None ☒			
				Bubbling ☐			
				Other ☐			
Notes: <u>sl. turbid water</u> <u>w/g meter not available</u>							
Stream Morphology							
Site Length (m): <u>~200m</u>				Bank Stability:			
Channel Dimensions				Stable Slightly unstable Moderately unstable Unstable			
Mean Wetted Width (m):	<u>1.25</u>	Mean Bankfull Width (m):	<u>2</u>	Left Bank	☐	☒	☐
Mean Wetted Depth (m):	<u>0.10</u>	Mean Bankfull Depth (m):	<u>0.35</u>	Right Bank	☐	☒	☐
Flow Description: <u>low flow -> in some areas no visible flow</u>							
Notes: <u>banks undercut in some areas causing slumping</u>							

AECOM

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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 > co > mk > bo

Morphological Structure (%)

Pool	Riffle	Run	Flat
10	/	45	45

Notes:

Habitat

Instream Cover (%) 40

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10	10	50	30		

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

emergents, grasses, algae

Canopy Cover (% closed cover):

100-90%

☐

30-1%

☐

90-60%

☒

0%

☐

60-30%

☐

Types of Cover (% cover)

Trees

30

Shrubs

30

Man-made structures

Grasses

30

Herbaceous

10

Other

Notes:

veg v. dense in some locations, sparser in others.

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

-ELC completed by JP

Terrestrial Recon Form Filled out

Yes

No

C89

AECOM Sep 8/11

G105 - C89

Page 3 of 4

Other General Comments Regarding the Study Area:

- Blue Heron observed
- no fish observed.

Photo log

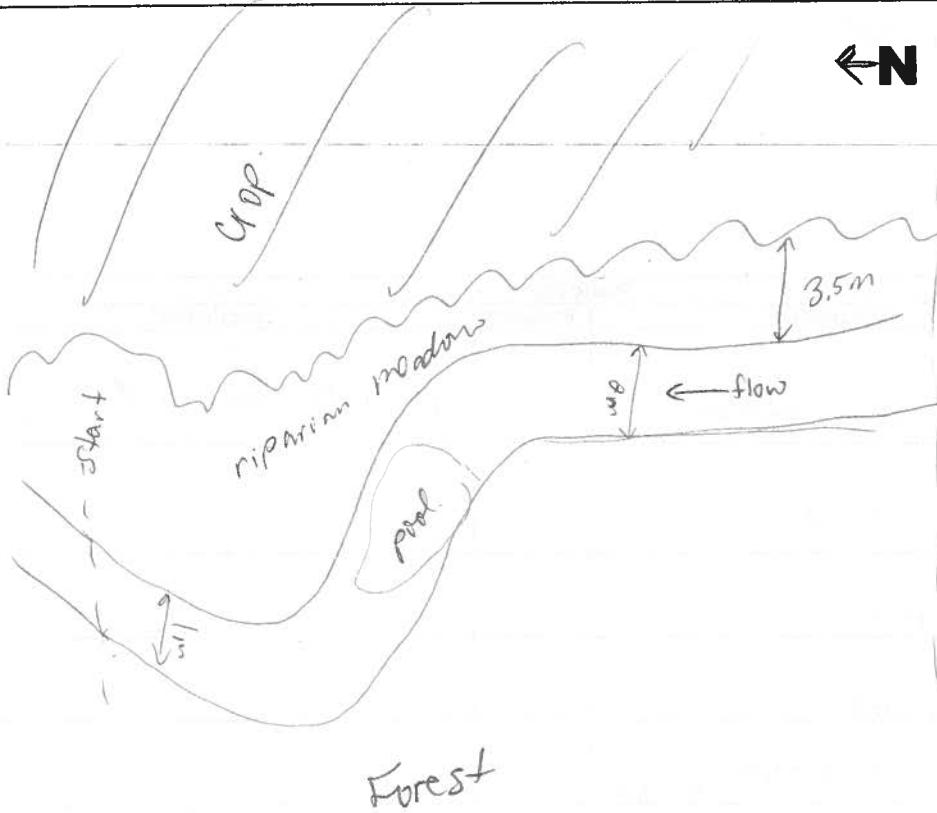
Picture #	Description	Picture #	Description
1	North end stream	12	preview of end
2	Site preview		
3	Substrate		
4	1/3 of site		
5	site overview reef ^{reef} line		
6	Substrate		
7	overview of middle section		
8	overview "		
9	stream 1/2 site length		
10	pool.		
11	end section of site		

AECOM

GOS-089

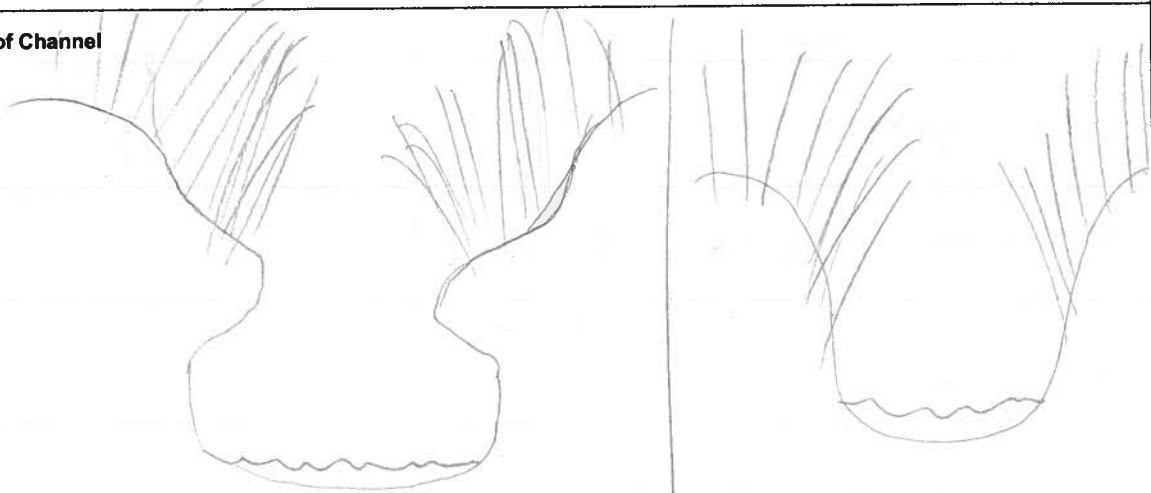
Page 4 of 4

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1062 Turbine # C89

LEGEND	
10d depth (cm)	
6w width	
Riffle	→
Run/Glide	→
Pool	○
Island/Bar	■
Fine Substrate	•••
Gravel Substrate	###
Cobble/Boulder	o o o o
Debris	•••
Cattail	CT
Submerg/Float Veg	SV/FV
Emergent	EV
Watercress	W
Iron Staining	Fe
Eroded Bank	
Riprap / Other Stabilization	xxx
Instream Log/Tree	□
Dam/Weir	***
Riparian Tree	●
Seep/Spring	└─▶
Undercut Bank	—
Barrier to Fish Movement	- - -
Seasonal Barrier	-S-
Fence line	-x-x-
Culvert	┌─┐

Horizontal View of Channel



AECOM

Page 1 of 4

Field Crew:

CB, MO

General Information

Study Area: Jericho Gosher Bluewater Land Parcel# 1360, 1117 Turbine# C96
 Date: Dec 9/11 Start time: 9:45 End Time: 10:25

Weather Conditions:

Light snow

Field Notes By:

C. Boras

Site Location

Gosher Line, north of Pepper Rd. + roadside survey on west

UTM Co-ordinates

Easting: 5449989 Northing: 4803855 + 3m Description: wheel on East side
 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)

drainage from roadside ditch entering

In-Situ Water Quality

WT (°C): / AT (°C): /
 pH: / Cond (s/cm): /
 Water Clarity: Clear ☒ Turbid ☐

Ground Water Indicators

Watercress ☐ Bank Seepage ☐
 Iron Staining ☐ None ☒
 Bubbling ☐ Other ☐

Notes:

no access to site so wq not completed

Stream Morphology

Site Length (m): 40m east, 20m west

Bank Stability:

Channel Dimensions

Mean Wetted Width (m): 1.3 Mean Bankfull Width (m): 1.5m
 Mean Wetted Depth (m): 0.3 Mean Bankfull Depth (m): 0.45

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	☐	☒	☐	☐
Right Bank	☐	☒	☐	☐

Flow Description:

at outfall end of culvert flow into ocean causing erosion

Notes:

good flow observed

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

Co = Sa = Gr = fine

Notes:**Morphological Structure (%)**

Pool	Riffle	Run	Flat
	10	90	

Habitat**Instream Cover (%)** 70

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
		25	25	40	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

10

Shrubs

Grasses

80

Herbaceous

10

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:**

barely 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:

- Channelized features

Photo log

Picture #	Description	Picture #	Description
25	Looking East		
26	standing on culvert looking down East side		
27	Looking East		
28	Looking West		
29	Looking down at culvert		
30	Looking west		

AECOM

Page 4 of 4

Watercourse Sketch

Study Area:

Jericho

Goshen

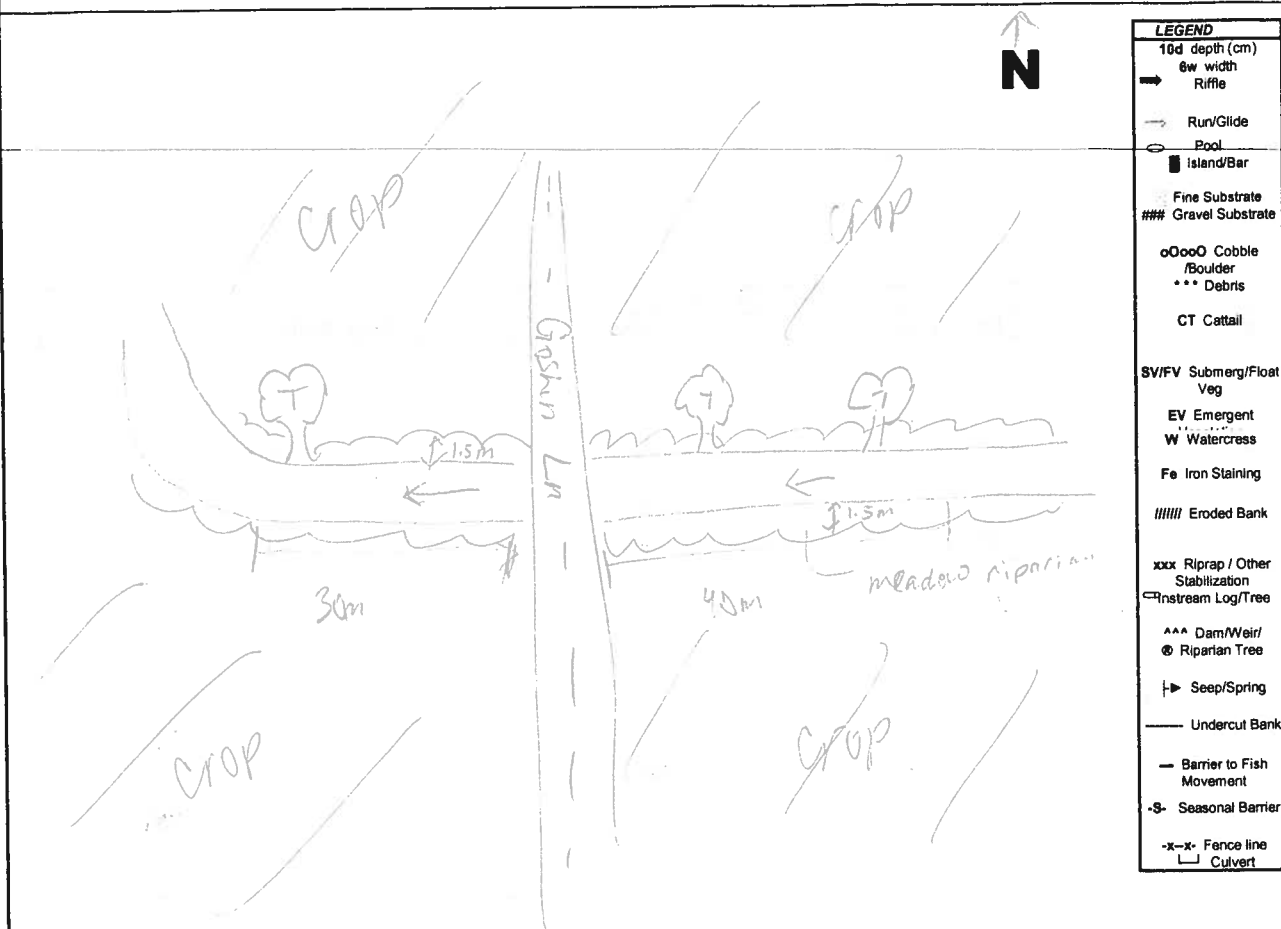
Bluewater

Land Parcel#

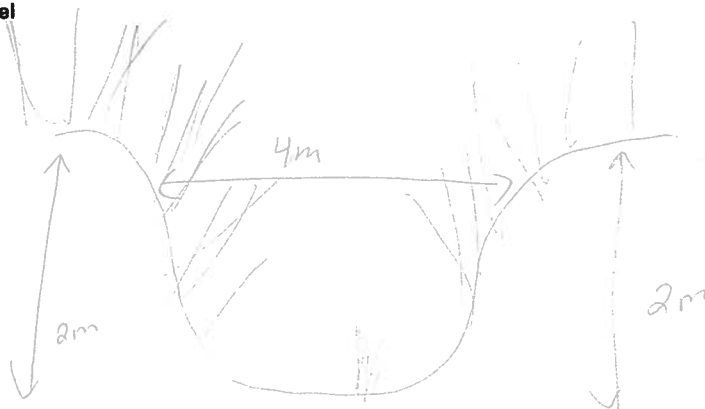
1360, 1117

Turbine #

C 96



Horizontal View of Channel



Property ID:

C106 Roadside

Date:

Nov 18-2011

Property Access:

Goshen Line

Start Time:

1:30

End Time:

1:39

Field Investigators:

Dalt + Ferris

Weather:

overcast, OC

Terrestrial Feature Present:

No ☒

Yes ☐

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

No feature

Photograph Numbers:

Aquatic Feature Present:

No ☒

Yes ☐

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

No feature - just low lying
area

Photograph Numbers:

217

AECOM

Page 1 of 4

Field Crew:

CB, TS

General Information

Study Area: Jericho Goshen Bluewater Land Parcel# 2098 Turbine # C110
 Date: Dec 15/11 Start time: 15:00 End Time: 15:40

Weather Conditions:

Cloudy, 10°C

Field Notes By:

CB

Site Location

Pass Line, north of Huron

UTM Co-ordinates

Easting: <u>0453963</u>	Northing: <u>4798803</u>	Description: <u>at stream</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 ☐

- newly dug

Other:

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

- tile drain inputs noted

In-Situ Water Quality

WT (°C): 6.9 AT (°C): 10
 pH: 7.46 Cond (µs/cm): 521
 Water Clarity: Clear ☐ Turbid ☒

Ground Water Indicators

Watercress ☐ Bank Seepage ☐
 Iron Staining ☐ None ☒
 Bubbling ☐ Other ☐

Notes:

brown

Stream Morphology

Site Length (m): 50 m

Bank Stability:

Channel Dimensions

Mean Wetted Width (m):	<u>1.5</u>	Mean Bankfull Width (m):	<u>2.3</u>
Mean Wetted Depth (m):	<u>0.15</u>	Mean Bankfull Depth (m):	<u>0.45</u>

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	☒	☐	☐	☐
Right Bank	☒	☐	☐	☐

Flow Description:

mod flow

Notes:

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

Cl > Si >> Gr > Co

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
		100	

Habitat

Instream Cover (%)

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

*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

Man-made structures

Grasses

Herbaceous

Other

Notes:

Obstructions to Fish Passage

No Obstructions

☐

Man-Made

☒

Natural

☐

Description:

perched culvert at
edge of property

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

C/10

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

- freshly dug out channel

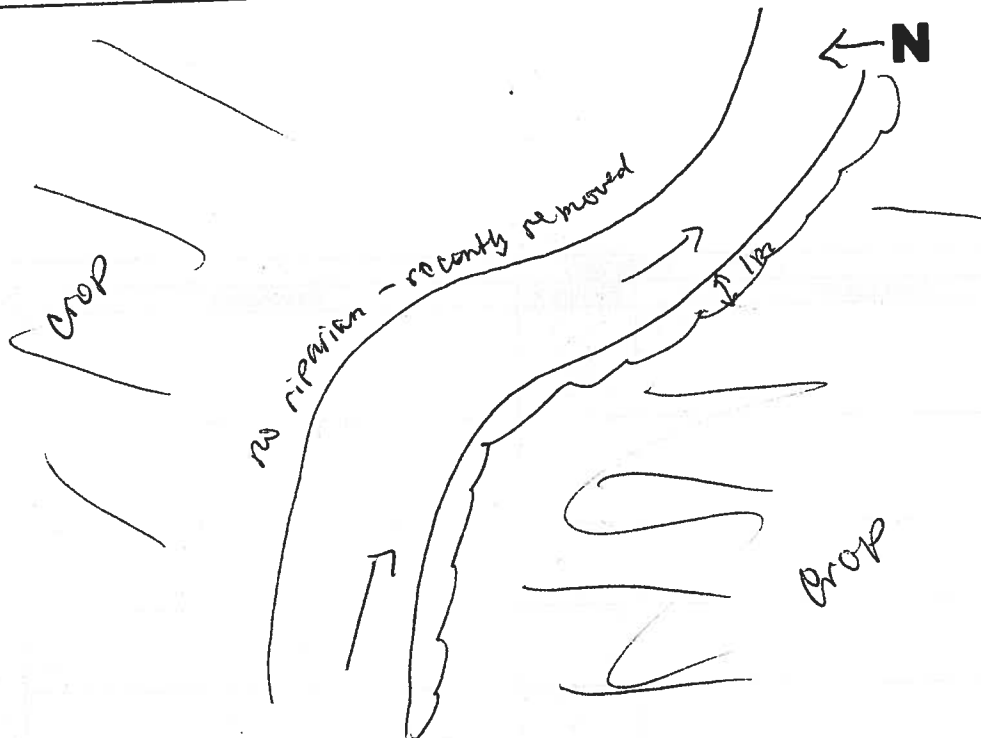
Photo log

Picture #	Description	Picture #	Description
70-75			

AECOM

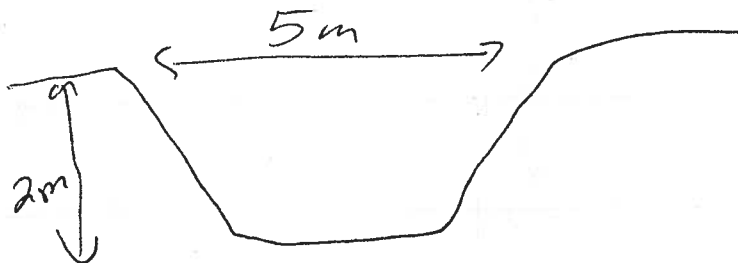
Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 2098 Turbine # C110



LEGEND	
10d depth (cm)	
6w width	
Rifle	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Cobble/Boulder	
Debris	
CT Catall	
SV/FV Submerg/Float Veg	
EV Emergent	
W Watercress	
Fe Iron Staining	
Eroded Bank	
Riprap / Other Stabilization	
Instream Log/Tree	
Dam/Wall	
Riparian Tree	
Seep/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence line	
Culvert	

Horizontal View of Channel



C124

AECOM

Page 1 of 3

Field Crew:

SA, BG

Study Area:

Jericho

Goshen

Bluewater

General Information

Land Parcel#

1758

Turbine #

GE24

UTM Co-ordinates:

Easting:

447599

Northing:

4795595

Date:

July 14/2011

Start time:

12:20

End Time:

13:10

Weather Conditions:

Sunny ~28°C

Field Notes By:

SA

Site Location

Surrounding Landuse/Pollution Sources

Residential
Agriculture
ForestMeadow
WetlandIntermittent
Permanent
Ephemeral

Type of Watercourse

Channelized
Natural Channel

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

In-Situ Water Quality

WT (°C)

AT (°C)

pH

Cond (us/cm)

Water Clarity:

Clear
Turbid

Ground Water Indicators

Watercress



Bubbling



None



Iron Staining



Bank Seepage



Other



Notes:

no WQ

standing water, no flow

Stream Morphology

Site Length (m):

Bank Stability:

Channel Dimensions

Mean Wetted Width
(m):

0.30

Mean
Bankfull
Width (m):

1.25

Mean Wetted Depth
(m):

0.05

Mean
Bankfull
Depth (m):

0.50

Left Bank

Stable

Slightly
unstableModerately
unstable

Unstable



Right Bank



Notes:

well vegetated banks

Stream Morphology (continued)

Substrate (<=>)

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

Description

Sa - Si

Morphological Structure (%)

Pool

Riffle

Run

Flat

Notes:

AECOM

Page 2 of 3

Habitat**Instream Cover (%)**

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

*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

30

Man-made structures

Grasses

30

Herbaceous

30

Other

Notes:

Jewelweed, WC, grasses
 Sycamore, Virginia creeper, goldenrods

Obstructions to Fish Passage

No Obstructions

☐

Man-Made

☐

Natural

☐

Description:

low flow

Drainage Features within Study Area

Observations of Land Topography:

flat

Terrestrial features present:

Yes

No

Other Comments:

Photolog

Picture #	Description	Picture #	Description

AECOM

Page 3 of 3

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# 1758 Turbine # 2529

LEGEND

10d depth (cm)

Sw width

Rifle

Run/Glide

Pool

Island/Bar

Fine

Gravel

Substrate

oOooO Cobble

/Boulder

*** Debris

CT Cattail

SV/FV

Submerg/Float

EV Emergent

W Watercress

Fe Iron Staining

////// Eroded

Bank

xxx Riprap /

Other

□ Instream

Log/Tree

AAA Dam/Weir/

⊙ Riparian Tree

Seep/Spring

Undercut

Bank

Barrier to

Fish Movement

-S- Seasonal

Barrier

-x-x- Fence

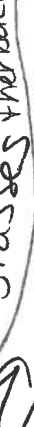
□ Culvert



Corn.

Forest

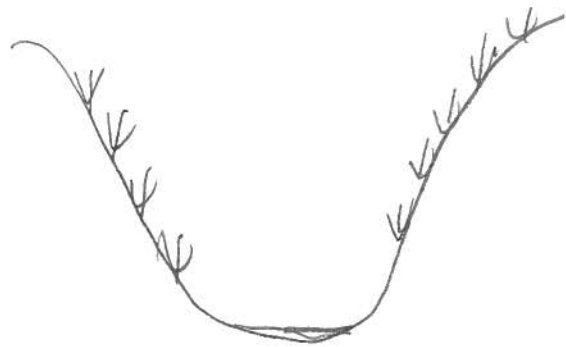
Riparian - grasses + herbaceous



Riparian - grass + herbaceous

Cattail
choked
Channel

Horizontal View of Channel



- 33 overview
- 34 Over view
- 35 facing vls
- 36 facing dls
- 37 Water cress
- 38 cattails

C124

AECOM		Page 1 of 4																																
Field Crew: CB, TS																																		
General Information																																		
Study Area: Jericho Goshen Bluewater	Land Parcel#: 1758	Turbine # 045-041																																
Date: Sept 27/11	Start time: 16:00	End Time: 16:45																																
Weather Conditions: Sunny, 17°C (last 24hrs 10mm rain)		Field Notes By: CB																																
Site Location																																		
East of Blacklash Ln, North of Kirkton																																		
UTM Co-ordinates																																		
Easting: 0447510	Northing: 4795818	Description: West end of site																																
Easting: 0447975	Northing: 4796057	Description: East end of site																																
Easting:	Northing:	Description:																																
Easting:	Northing:	Description:																																
Surrounding Landuse/Pollution Sources		Type of Watercourse																																
Residential ☐	Meadow ☐	Intermittent ☐	Channelized ☒																															
Agriculture ☒ West end	Wetland ☐	Permanent ☒	Natural Channel ☐																															
Forest ☒ one side	Livestock ☐	Ephemeral ☐																																
Other: side agri on other																																		
Notes: (include any inputs into the system i.e. tile drainage, seepages, overland flow)																																		
- no tile inputs observed however still possible -> although channel flows through a forest it appears to be channelized -> evidence of dredging seen could be interpreted through new growth forest adjacent to channel																																		
In-Situ Water Quality		Ground Water Indicators																																
WT (°C): 11°C	AT (°C): 17°C	Watercress ☒ a	Bank Seepage ☐																															
pH: /	Cond (s/cm): /	Iron Staining ☐	None ☐																															
Water Clarity: Clear ☒	Turbid ☐	Bubbling ☐	Other ☐																															
Notes: agri - water clean, watercress noted forest - water clean																																		
Stream Morphology																																		
Site Length (m): ~75m agri ~300+m forest		Bank Stability:																																
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th colspan="2">Channel Dimensions</th> <th colspan="2"></th> </tr> <tr> <th>a</th> <th>f</th> <th>a</th> <th>f</th> </tr> </thead> <tbody> <tr> <td>Mean Wetted Width (m):</td> <td>1.5 1.5</td> <td>Mean Bankfull Width (m):</td> <td>2.5 2.5</td> </tr> <tr> <td>Mean Wetted Depth (m):</td> <td>0.2 0.15</td> <td>Mean Bankfull Depth (m):</td> <td>0.6 0.55</td> </tr> </tbody> </table>		Channel Dimensions				a	f	a	f	Mean Wetted Width (m):	1.5 1.5	Mean Bankfull Width (m):	2.5 2.5	Mean Wetted Depth (m):	0.2 0.15	Mean Bankfull Depth (m):	0.6 0.55	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th></th> <th>Stable</th> <th>Slightly unstable</th> <th>Moderately unstable</th> <th>Unstable</th> </tr> </thead> <tbody> <tr> <td>Left Bank</td> <td>☒ a</td> <td>☒ f</td> <td>☐</td> <td>☐</td> </tr> <tr> <td>Right Bank</td> <td>☒ a</td> <td>☒ f</td> <td>☐</td> <td>☐</td> </tr> </tbody> </table>			Stable	Slightly unstable	Moderately unstable	Unstable	Left Bank	☒ a	☒ f	☐	☐	Right Bank	☒ a	☒ f	☐	☐
Channel Dimensions																																		
a	f	a	f																															
Mean Wetted Width (m):	1.5 1.5	Mean Bankfull Width (m):	2.5 2.5																															
Mean Wetted Depth (m):	0.2 0.15	Mean Bankfull Depth (m):	0.6 0.55																															
	Stable	Slightly unstable	Moderately unstable	Unstable																														
Left Bank	☒ a	☒ f	☐	☐																														
Right Bank	☒ a	☒ f	☐	☐																														
Flow Description:																																		
-> in some areas of the forest the banks were not vegetated so minor erosion occurring -> visible flow																																		
Notes:																																		

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

both
Si, Cl, dt, sa > gr > co, bo
fine

forest
~~forest~~

Morphological Structure (%)

Pool	Riffle	Run	Flat
	10	70	20

Notes:

- riffle areas appeared to be due to built up of stone + debris → no run or pools necessarily followed

agri
80-run
20-flat

Habitat

Instream Cover (%) agr - 40% forest - 50%

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other: detritus
	a=5 f=10	f=5	f=5	a=95 f=70		f=10

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

emergent, submergent, grasses, shrubs in stream

Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



Types of Cover (% cover)

Trees f=50

Shrubs f=30

Grasses a=30

Herbaceous f=10

f=10

Man-made structures

Other

Notes:

as the stream ran through the forest it had open canopy + meadow surrounding it with mature forest further out.

Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

Culverts 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

→ not for adjacent property

C124

AECOM

Sep 27/11

~~AT&T CHH~~

Page 3 of 4

Other General Comments Regarding the Study Area:

Forested section of stream seemed to be trenched

Photo log

Picture #	Description	Picture #	Description
96	Field Portion of Stream	107	" "
97	Thick Veg. in Stream Channel	108	" "
98	Watercress in stream channel	109	" "
99	open canopy along stream channel	110	" "
100	Thick veg. along stream channel	111	" "
101	Culvert at stream crossing		
102	Culvert at stream crossing		
103	closed canopy / stream channel		
104	open canopy stream channel		
105	Stream channel		
106	thick veg. along stream channel		

Study Area:

Jericho

Goshen

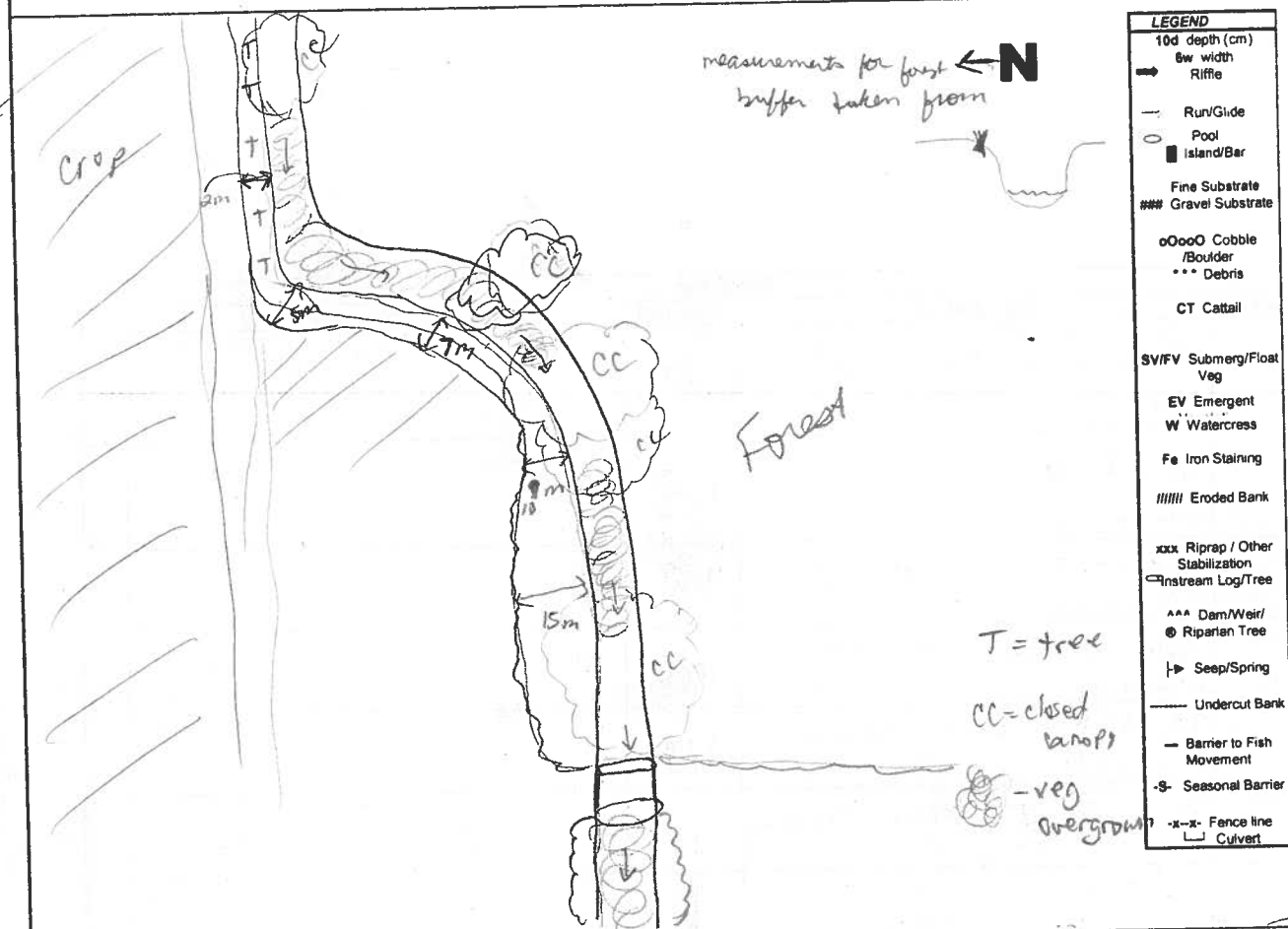
Bluewater

nd Parcel#

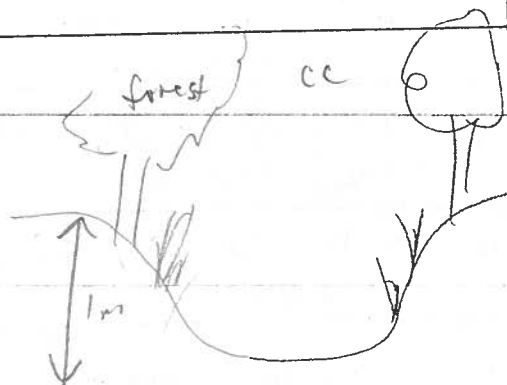
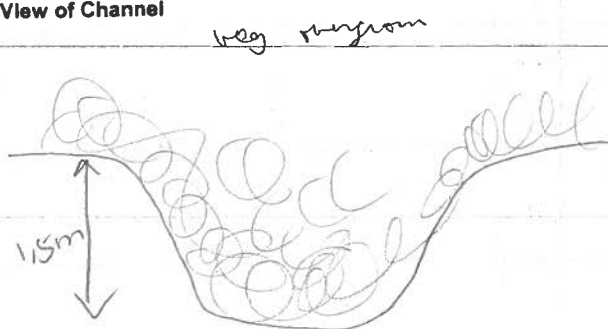
1758

Turbine #

~~Gen C 41~~



Horizontal View of Channel



AECOM

Page 1 of 4

Field Crew: Ferris + Dart

General Information

Study Area: Jericho Goshen Bluewater Land Parcel# 6SH1758 Turbine # C124
 Date: Nov 18, 2011 Start time: 12:50 End Time: 13:20

Weather Conditions:

C124

Field Notes By:

Dart

Site Location

Blackbush

UTM Co-ordinates

Easting: 446990 Northing: 4795732 Description: C124
 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)

Agriculture on both sides.

In-Situ Water Quality

WT (°C): 5.2 AT (°C): 0°C
 pH: 7.02 Cond (µs/cm): 635
 Water Clarity: Clear ☒ Turbid ☐

Ground Water Indicators

Watercress ☒ Bank Seepage ☐
 Iron Staining ☐ None ☐
 Bubbling ☐ Other ☐

Notes: water chem taken east of road D/S of tile drain.

WC @ tile drains ups + d/s + throughout reach

Stream Morphology

Site Length (m):

Bank Height = 1.6m Bank width = 4.0m

Channel Dimensions

Mean Wetted Width (m): 1.3 Mean Bankfull Width (m): 2.5
 Mean Wetted Depth (m): 0.06 Mean Bankfull Depth (m): 0.80

Bank Stability:

	Stable	Slightly unstable	Moderately unstable	Unstable
Left Bank	☐	☒	☐	☐
Right Bank	☐	☒	☐	☐

Flow Description:

Flowing west ~ 65/m

Notes:

4 tile drains east of road - only 2 flowing (perched).

CSP not perched under road

vegetated banks - grass + cattails Buffer on top of bank

~ 3m south side, 1.5m north side.

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

S > C > Sa

Notes:

Morphological Structure (%)

Pool	Riffle	Run	Flat
10		70	20

Habitat

Instream Cover (%)

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

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

watercress + cattail

Canopy Cover (% closed cover):

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

Types of Cover (% cover)

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

Notes:

very few trees - small diameter - seasonal
overhanging grass

Obstructions to Fish Passage

No Obstructions ☐ Man-Made ☐
Natural ☒

Description:

some woody
debris, but still
passable

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

C124

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log			
Picture #	Description	Picture #	Description
197- 203	C124 v/s + p/s of road		
204	WC		
211	C124 v/s		

C124

AECOM

Watercourse Sketch

Study Area:

Jericho

Goshen

Bluewater Land Parcel#

GSH1758

Turbine #

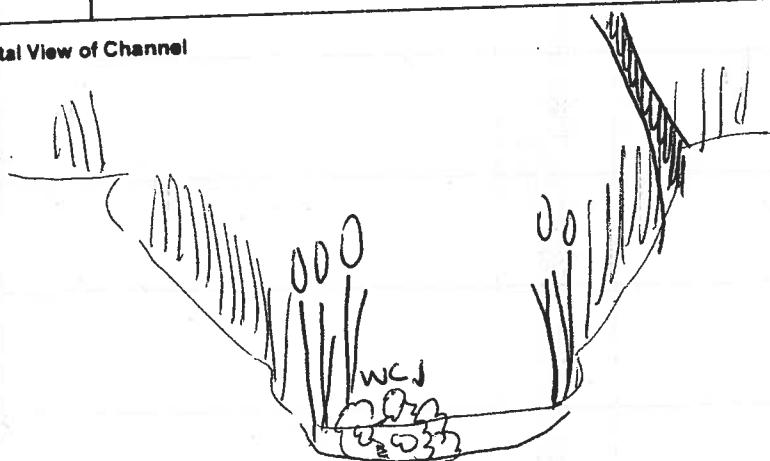
C124

N ↑

LEGEND	
10d depth (cm)	
6w width	
Rifle	
Run/Glide	
Pool	
Island/Bar	
Fine Substrate	
Gravel Substrate	
Cobble	
Boulder	
Debris	
CT Cattail	
SV/FV Submerge/Float Veg	
EV Emergent	
W Watercress	
Fe Iron Staining	
HHH Eroded Bank	
RRR Riprap / Other Stabilization	
Instream Log/Tree	
*** Dam/Weir	
● Riparian Tree	
Seep/Spring	
Undercut Bank	
Barrier to Fish Movement	
Seasonal Barrier	
Fence line	
Culvert	

CT = cattail
WC = watercress

Horizontal View of Channel



Goston.
Property ID: 2133, 2141 (C127) Date: Dec 9/11

Property Access: ROE Start Time: 14:30
End Time: 15:10

Field Investigators: CB, MD Weather: Light Snow

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 ☐

GPS 0451942, 4795260 $\pm 3m$
 $\hookrightarrow$ start of watercourse

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

- agri field tile drained, outfall of tile
drainage is $\sim 125m$ from tree line

$\hookrightarrow$ watercourse then channelized, $\sim 2m$ MWW, MWD = 0.25
MBD = 0.75 MSW = 3m

high aquatic veg, tile drains fish
passage obstructed

Photograph Numbers: _____

Can't on back $\rightarrow$

- walked Alt 3 line - no features observed

Pics

70 - from Kirkton towards 2133 (watercourse area)

71 - from tree line towards 2141

72 - "

73 - start of watercourse

74 - watercourse

75 - " - not watercourse

76 - like drain inputs

77 - Alt 3 area towards Kirkton

- Spoke w man who had a "Honey do Maintenance" truck

↳ asked what we were doing but did not seem interested
only interested

AECOM

Page 1 of 4

Field Crew: DART + Ferris

General Information

Study Area: Jericho

Goshen

Bluewater

Land Parcel# GSH1509

Turbine #

C137

Date: 18-Nov-2011

Start time: 10:00

End Time: 11:00

Weather Conditions:

Sunny, 0°C

Field Notes By:

DART

Site Location

C137

UTM Co-ordinates

Easting: 446121

Northing: 4791967

Description: C1372. Start (west end)

Easting: 446379

Northing: 4791907

Description: C137b Start (west end)

Easting: 446495

Northing: 4791827

Description: C137c end of wood section (22)

Easting:

Northing:

Description:

Surrounding Landuse/Pollution Sources

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

WT (°C): 2.9

AT (°C): 0°C

pH: 7.01

Cond (µS/cm): 675

Water Clarity: Clear



Turbid



Ground Water Indicators

Watercress



Bank Seepage



Iron Staining



None



Bubbling



Other



Notes:

water chem. taken @ C1372

Stream Morphology

Site Length (m):

FIELD

Bank Stability:

Stable

Slightly unstable

Moderately unstable

Unstable

Bank Height = 2.7

Bank width = 50

Channel Dimensions

Mean Wetted Width (m):

2.30

Mean Bankfull Width (m):

2.9

Mean Wetted Depth (m):

0.30

Mean Bankfull Depth (m):

1.3

Left Bank



Right Bank



Flow Description:

Flowing south/west ~ 65/m. Hard pan clay streambed
Flowing south/west ~ 85/m.

Notes:

vegetated banks through field section - grasses w some trees
exposed clay banks - eroding - near stream levelField =
Woods =

Field =

Woods = banks having some exposed soil - Mostly tree.

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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

In field $Gl > Si > Sa$
In woods $Sa > Gr > Si$

Morphological Structure (%)

Pool	Riffle	Run	Flat

Notes:

In Field = 30% Riffle 60% Run 10% Flat
In woods = 30% Riffle 50% Run 20% Flat

Habitat

Instream Cover (%)

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

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

WOODS = woody debris = 3%

Field = woody debris = 7%, undercut bank = 50% of banks were undercut

Canopy Cover (% closed cover):

100-90%



30-1%



90-80%



0%



60-30%



Types of Cover (% cover)

Trees

Shrubs

Man-made

Grasses

Herbaceous

structures

Other

Notes:

WOODS = 100-90% = Seasonal trees (100%)
Field = 60-30% = 50% shrub, 50% grass

Obstructions to Fish Passage

No Obstructions



Man-Made



Natural



Description:

woody debris, but
not a complete barrier

Drainage Features within Study Area

Observations of Land Topography within 120 m buffer area:

Flat - slight slope from east

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

within WOODLOT, none seen in
field

C137

AECOM

Page 3 of 4

Other General Comments Regarding the Study Area:

Didn't continue further than C137c (east edge woodlot) as it was uniform throughout reach.

Photo log

Picture #	Description	Picture #	Description
164- 166	C1372		
167- 171-	stretch b/w C1372 + Tile Drain		
171- 173	Tile drain corner b/w C1372 + b		
174- 175	east end of C1372		
176 177	in woodlot		
178- 180	in woodlot		

C137

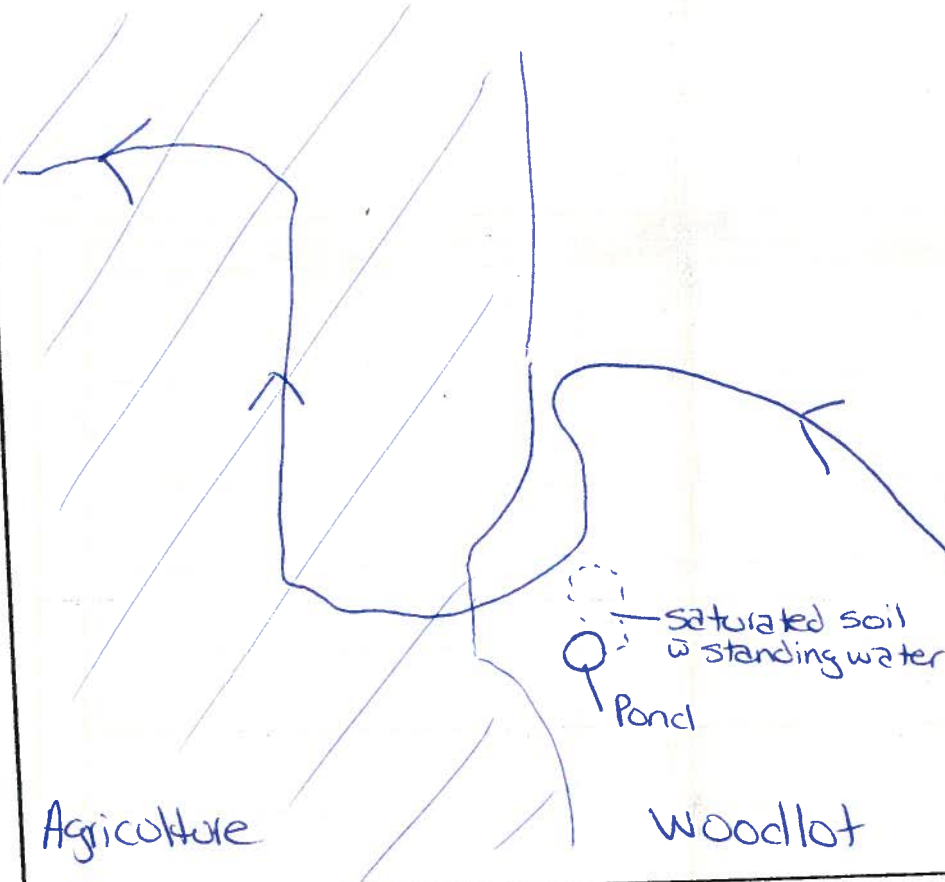
AECOM

Watercourse Sketch

Study Area: Jericho Goshen Bluewater Land Parcel# GSH1509 Turbine # C137



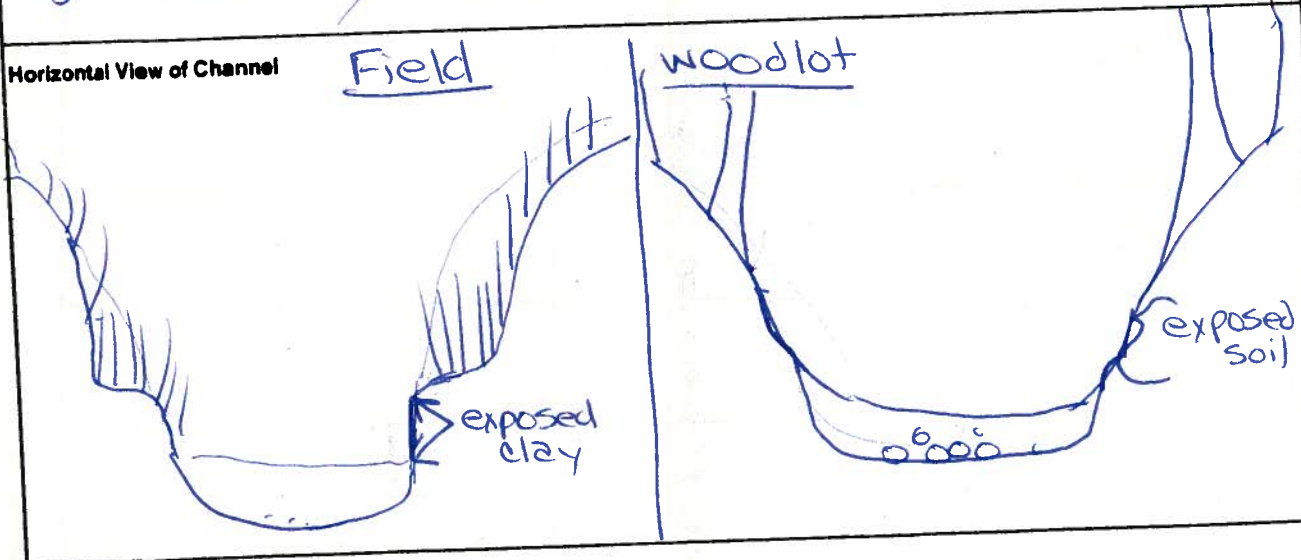
LEGEND	
10d depth (cm)	low width
→	Riffle
—	Run/Glide
○	Pool
■	Island/Bar
—	Fine Substrate
—	Gravel Substrate
o o o o	Cobble / Boulder
...	Debris
CT	Cattail
SV/FV	Submerge/Float Veg
EV	Emergent
W	Watercress
Fe	Iron Staining
	Eroded Bank
xxx	Riprap / Other Stabilization
—	Instream Log/Tree
AAA	Dam/Wall
●	Riparian Tree
↳	Seep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
-B-	Seasonal Barrier
-x-x-	Fence line
—	Culvert



Horizontal View of Channel

Field

Woodlot



C139

AECOM

Page 1 of 4

Field Crew:

A. Dart, G. Ferris

General Information

Study Area: Jericho Goshen Bluewater Land Parcel# GSH2163 Turbine # C139A C57
 Date: 18-NOV-2011 Start time: 8:20 End Time: 8:50

Weather Conditions:

Sunny 1°C

Field Notes By:

DART.

Site Location

C139

UTM Co-ordinates

Easting: 452411Northing: 4792445Description: C139AEasting: 451982Northing: 4792648Description: C139B

Easting:

Northing:

Description:

Easting:

Northing:

Description:

Surrounding Landuse/Pollution Sources

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)

Agri. field both sides of creek

In-Situ Water Quality

WT (°C): 2.4AT (°C): 1.0pH: 7.01Cond (µ/cm): 725Water Clarity: Clear ☐Turbid ☒

Ground Water Indicators

Watercress ☐Bank Seepage ☐Iron Staining ☐None ☒Bubbling ☐Other ☐

Notes: Both tile drain flowing

Stream Morphology

Site Length (m):

Bank Stability:

Bank Height: 5m, Bank width: ~20m

Channel Dimensions

Mean Wetted Width (m): 3.5Mean Bankfull Width (m): 6.5Mean Wetted Depth (m): 0.75Mean Bankfull Depth (m): 1.5Stable ☐Slightly unstable ☒Moderately unstable ☐Unstable ☐

Left Bank

☐☒☐☐

Right Bank

☐☒☐☐

Flow Description:

Flowing south. 11sec/1m

Tile drain discharges into channel @ C139A - flowing

Notes: and @ C139B - north bank on both

vegetated banks w grasses + shrubs - the odd tree

~ 1.5m wide buffer on top of bank

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

Silt/Clay

Morphological Structure (%)

Pool	Riffle	Run	Flat
			100

Notes:

Habitat

Instream Cover (%)

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
					2%	15% overhanging shrubs + grasses

*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 100% of Shrubs
Grasses cover is tree Herbageous

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:

Fairly flat, but slope from S/W!

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

C57

AECOM

C139

Page 3 of 4

Other General Comments Regarding the Study Area:

Photo log

Picture #	Description	Picture #	Description
146-150	C139A (TD)		
151-154	C139B (TD)		

C57

AECOM

Watercourse Sketch

Study Area:

Jericho

Goshen

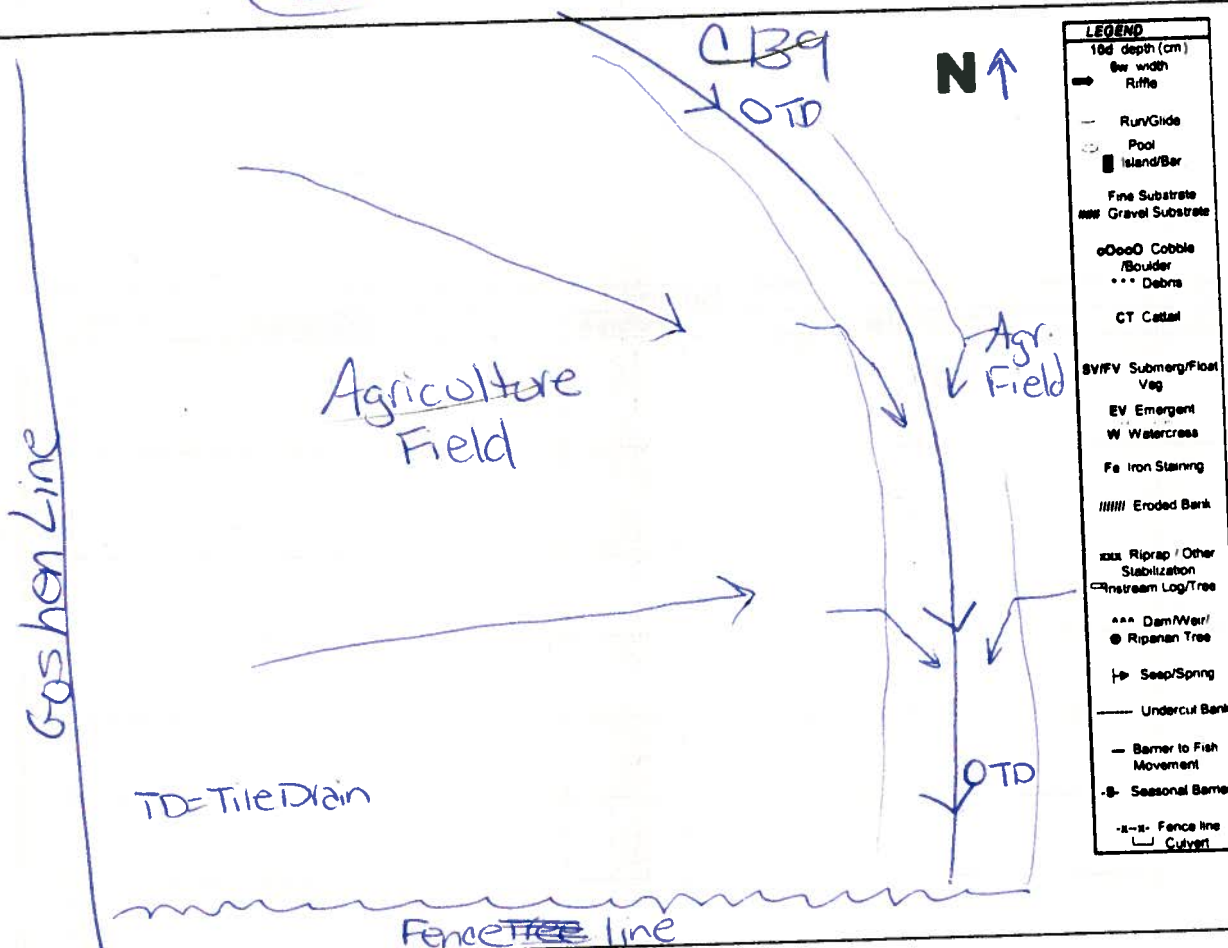
Bluewater Land Parcel#

GSH2163

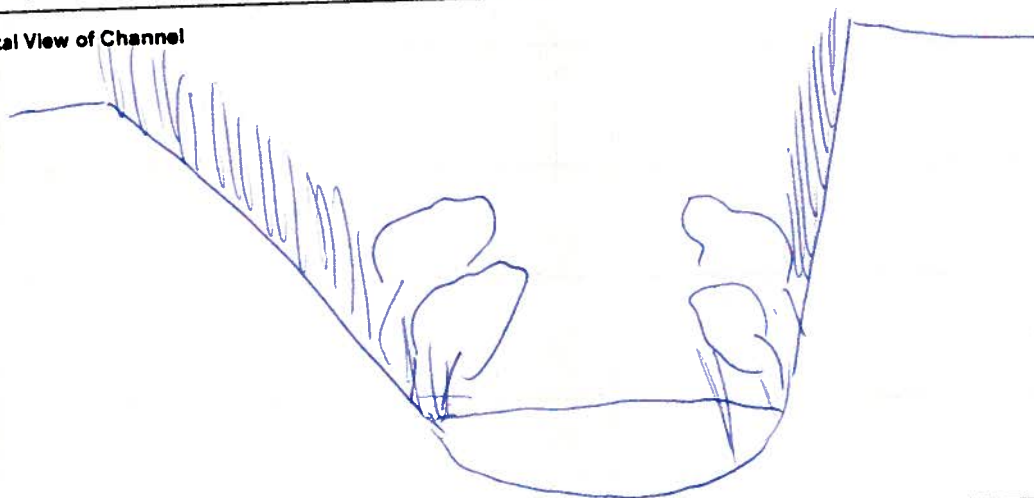
Turbine #

C139

C587



Horizontal View of Channel



C139

AECOM		Page 1 of 4	
Field Crew: CB, AS		General Information	
Study Area: Jericho	Goshen Bluewater	Land Parcel# 2162	Turbine # 625 157
Date: Oct 6/11	Start time: 8:10	End Time: 9:00	
Weather Conditions:		Field Notes By: CB	
Site Location			
east of Goshen, South of Crediton			
UTM Co-ordinates			
Easting: 0451786	Northing: 4793121	Description: North end	start end
Easting: 0451857	Northing: 4792794	Description: South of bridge	
Easting:	Northing:	Description:	
Easting:	Northing:	Description:	
Surrounding Landuse/Pollution Sources		Type of Watercourse	
Residential ☐	Meadow ☐	Intermittent ☐	Channelized ☒
Agriculture ☒	Wetland ☐	Permanent ☒	Natural Channel ☐
Forest ☐	Livestock ☐	Ephemeral ☐	
Other:			
Notes: (Include any inputs into the system i.e. tile drainage, seepages, overland flow)			
- no tile drains noted			
In-Situ Water Quality		Ground Water Indicators	
WT (°C):	AT (°C):	Watercress ☐	Bank Seepage ☐
pH: /	Cond (s/cm): /	Iron Staining ☐	None ☒
Water Clarity: Clear ☐	Turbid ☒	Bubbling ☐	Other ☐
Notes: water turbid but could see the bottom in some locations			
Stream Morphology			
Site Length (m): ~ 200m 250m		Bank Stability:	
Channel Dimensions			
Mean Wetted Width (m): 2.5	Mean Bankfull Width (m): 3	Stable	Slightly unstable
Mean Wetted Depth (m): 0.3	Mean Bankfull Depth (m): 0.9	Moderately unstable	Unstable
		Left Bank	Right Bank
		☐ ☒ ☐ ☐	☐ ☒ ☐ ☐
Flow Description: → moderate flow			
Notes: → some bank slumping + erosion			

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

si, cl >> mk, dt

Morphological Structure (%)

Pool	Riffle	Run	Flat
/	/	100	/

Notes:

Habitat

Instream Cover (%)

40

None	Woody Debris	Boulders	Cobble	Aquatic Vegetation*	Undercut Bank	Other:
	10			85		detritus/garbage
						5

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

emergents, grasses

Canopy Cover (% closed cover):

100-90%



30-1%



90-60%



0%



60-30%



Types of Cover (% cover)

Trees

20

Shrubs

50

Grasses

30

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

Terrestrial features Present

Yes

No

Terrestrial Recon Form Filled out

Yes

No

AECOM

C139

Page 3 of 4

Other General Comments Regarding the Study Area:

- bridge where proposed road is

Photo log

Picture #	Description	Picture #	Description
269	overview	281	taken South of bridge
270	stream +		
271	channel		
272	"		
273	aquatic veg		
274	landuse		
275	stream		
276	" w/ + veg		
277	"		
278	Bridge - channel N		
280	" " S		

C57

C139

AECOM

Page 4 of 4

Watercourse Sketch

Study Area:

Jericho

Goshen

Bluewater

Land Parcel# 2162

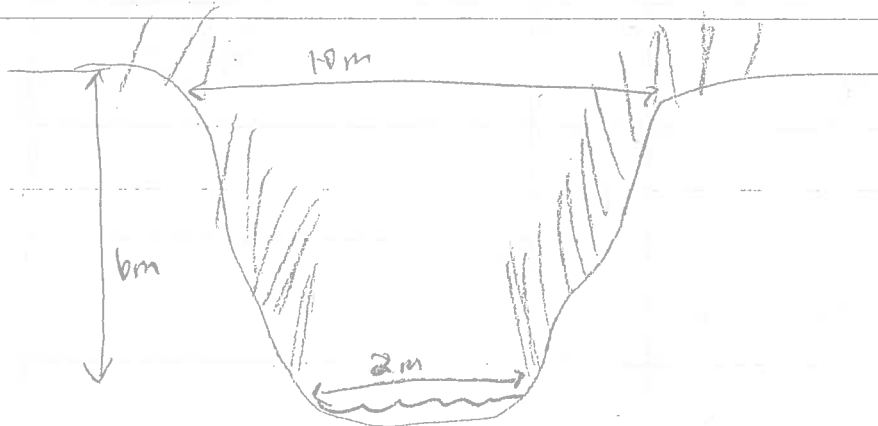
Turbine #

GWS C57



LEGEND	
10d depth (cm)	Sw width
→	Riffle
—	Run/Glide
○	Pool
■	Island/Bar
Fine Substrate	
###	Gravel Substrate
oOooO	Cobble / Boulder
***	Debris
CT	Cattail
SV/FV	Submerg/Float Veg
EV	Emergent
W	Watercress
Fe	Iron Staining
	Eroded Bank
xxx	Riprap / Other Stabilization
—	Instream Log/Tree
AAA	Dam/Weir/
⊗	Riparian Tree
↳	Seep/Spring
—	Undercut Bank
—	Barrier to Fish Movement
-8-	Seasonal Barrier
-x-x-	Fence line
└┐	Culvert

Horizontal View of Channel



AECOM

Page 1 of 4

Field Crew: CB, TS

General Information

Study Area: Jericho

Goshen

Bluewater

Land Parcel# GSH 2016

Turbine # C144

Date: Dec 16, 2011

Start time: 11:15

End Time: 11:45

Weather Conditions:

Cloudy, 1°C

Field Notes By:

CB

Site Location

Goshen Ln, South of South Rd.

*only east side investigated
west roadside

UTM Co-ordinates

Easting: 0451895

Northing: 4791020

Description: at stream edge.

Easting:

Northing:

Description:

Easting:

Northing:

Description:

Easting:

Northing:

Description:

Surrounding Landuse/Pollution Sources

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)

- Tile drains flowing (east side)

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: wg not working, water brown

Stream Morphology

Site Length (m):

Bank Stability:

Channel Dimensions

Mean Wetted Width (m):

5

Mean Bankfull Width (m):

6.5

Mean Wetted Depth (m):

n/a

Mean Bankfull Depth (m):

n/a

Stable

Slightly unstable

Moderately unstable

Unstable

Left Bank

☒☐☐☐

Right Bank

☒☐☐☐

Flow Description:

slow flow, mod level

Notes: depth measurements not possible - from edge measured depth of 0.80 m.