



Conceptual Stormwater Management Plan Report

February 2017



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ACRONYMS AND ABBREVIATIONS

CN	Curve Number
CSWM	Conceptual Stormwater Management
ECA	Environmental Compliance Approval
E & S	Erosion and Sediment
GS	Generating Station
ha	Hectares
HEC-HMS	Hydrologic Engineering Center – Hydrologic Modeling System
HSG	Hydraulic Soil Group
I_a	Initial Abstraction
IDF	Intensity Duration Frequency
m	Meter
mm	Millimeter
MTO	Ministry of Transportation
min	minutes
OPG	Ontario Power Generation
SCS	Soil Conservation Service
SWM	Stormwater Management

EXECUTIVE SUMMARY

Arcadis Canada Inc. (Arcadis) was retained by Nanticoke Solar LP to conduct a conceptual stormwater management (CSWM) plan report for a proposed solar farm to be constructed on and near the existing OPG Nanticoke Generating Station (GS) site in Haldimand County, Ontario. The Project is located on four (4) parcels of property in Haldimand County, Ontario including the former Nanticoke GS site and lands nearby. The stormwater management plan focuses on two main development areas: the former coal pile area located east of Nanticoke GS, and three land parcels (east, west, and central) located to the northeast of Nanticoke GS.

The proposed CSWM plan will utilize existing stormwater drainage patterns and features in order to minimize downstream impacts. Since solar panels do not increase the impervious area of the land surface, minimal changes to the quantity and quality of the stormwater runoff are anticipated. The impervious areas for the proposed development (i.e. gravel access roads) account for less than 1.5% of the project area.

Former Coal Pile CSWM Plan

The former coal pile area currently utilizes an existing stormwater management (SWM) system consisting of catch basins, culverts, ditches and lagoons licensed under Environmental Compliance Approval Number 4953-99FLYS. In general, the post-development plan for this area is to utilize the current SWM infrastructure as is. The proposed development area grading and drainage is anticipated to be improved since the coal pile is removed and the area will be covered with vegetation to promote treatment and infiltration. No anticipated increase in stormwater runoff is expected for the proposed development of the coal pile area.

East, West and Central Parcel Lands CSWM Plan

Existing drainage patterns, grades as well as final discharge points will be maintained, where possible. Minor alterations to site grading will be implemented to ensure the proposed development plan area is not impacted by the 100-year flood. In addition, the proposed development area will be covered with grass to promote treatment and infiltration. Minimal changes in stormwater runoff is expected for this proposed development area. Incremental increase of peak flow from the outlets of the proposed development area are maintained below 1%. Since the main discharge outlet of the proposed site area is Hickory Creek which immediately thereafter drains to Lake Erie, there are no anticipated issues posed by the marginal increase in stormwater runoff.

Erosion and Sediment Control

Temporary erosion and sediment (E&S) control measures will be implemented during the construction phase of this project. In general, light duty silt fences will be implemented along the perimeter of the site as well as any waterways within the proposed site development area. Additionally, straw bales will be placed around any catch basins and culverts located within the proposed site development area. Mud mats will be utilized on site entrance ways which are directed to local roadways. Once the construction phase has been completed and the vegetation has grown within the proposed development area, the temporary measures will be removed and vegetation will provide long-term E&S control.

1.0 SITE DESCRIPTION

Nanticoke solar electricity generation project (herein referred to as “The Project”) is located on four (4) parcels of property in Haldimand County, Ontario including the former Nanticoke G.S. site and lands nearby as show in Figure 1. The Nanticoke GS lands compromises of a former coal pile area. The East and West parcels are currently former agricultural lands, and the central parcel consists of planted prairie vegetation.

1.1 Existing Site Soil Conditions and Topography

Geotechnical reports were completed by Arcadis (formerly SENES Consultants) in March 2015. The site mainly consists of silt and clay. The hydraulic soil group (HSG) classification for the site is Group D, consisting mainly of low infiltration soils.

In general, the East, West and Central Parcel lands consists of exposed soils with fairly flat undulating hills with majority of the slopes ranging from 1 to 5% with slightly steeper slopes near the creek embankments.

2.0 STORMWATER MANAGEMENT PLAN

The primary objective of a stormwater management plan is to identify appropriate water quantity and quality control measures of the post-development stormwater runoff flows with a view to manage stormwater quality prior to discharge and minimizing the risk of flooding and erosion. The stormwater management plan for this project location will ensure that the storm drainage pattern for the post-development condition is consistent with the pre-development condition.

2.1 Quantity Control

Although quantity control measures may not be required due to the close proximity and size of the final discharge location, Lake Erie, the conceptual stormwater management (CSWM) plan will maintain existing drainage patterns where possible and control any incremental changes of the peak post-development stormwater runoff flows to within 1% of pre-development conditions for a 100-yr design storm event.

Former Coal Pile Area

Existing stormwater management (SWM) facilities such as the ditches and lagoon system licensed under ECA Number 4953-99FLYS will be maintained as is to ensure pre-development stormwater runoff flows.

East, West and Central Parcel Lands

Existing drainage patterns will be maintained, where possible. Grading will ensure equivalent or improved slope across the proposed development areas. Section 2.3 provides details for the pre- and post-development peak flow calculations.

2.2 Quality Control

The proposed development areas will be grass covered with less than 1.5% impervious area, and as a result there are no anticipated negative impacts to the current site drainage/infiltration patterns. Quality control will be provided via the overland flow across the proposed grass covered areas.

As for the former coal pile area, additional quality control will be provided by the existing lagoon system.

2.2.1 Temporary Quality Control

Prior to the start of the construction phase and until the vegetation has fully grown across the site area, light duty silt fencing will be installed and maintained across the site perimeter as well as any watercourse within the site boundary. Silt fencing will minimize the off-site transfer of sediments during the construction phase as well provide sediment reduction until the vegetation across the site area is fully grown.

2.3 Methodology

2.3.1 Hydrologic Modelling

A single event hydrologic modeling software has been used to simulate the stormwater runoff rates for post-development and pre-development conditions for the project site.

2.3.2 Model Selection

The Hydrologic Engineering Center – Hydrologic Modeling System (HEC-HMS) is designed to simulate the precipitation-runoff processes, and is applicable in a wide range of geographic areas. It includes large river basin water supply and flood hydrology, and small urban or natural watershed runoff. The precipitation-runoff model HEC-1, predecessor of HEC-HMS 4.2, is a model recommended by the Ministry of Natural Resources. Considering the hydrologic processes involved, objective of the study and acceptance of the model, the HEC-HMS 4.2 model has been used to simulate the stormwater runoff rates for post-development and pre-development conditions.

2.3.3 Model Set-up

Hydrologic Modeling System (HEC-HMS 4.2) was used to model the East, West and Central Parcel Lands peak flows at different points of interest. Three components – basin model, meteorological and control specification were set up to model the study area. The basin model for pre-development condition includes five hydrologic elements: three sub-basins – sub-basin 1, 2 and 3, and two outlets – outlet 1 and 2, and the basin model for post-development condition also includes five hydrologic elements: three sub-basins – sub-basin 1A, 2A and 3A, and two outlets – outlet 1 and 2. The delineation of sub-basins was based on the provided survey information.

The Loss and Transform method used for this model are SCS curve number and SCS unit Hydrograph, respectively. The parameters required for these methods are initial abstraction (I_a), curve number (CN), percentage Impervious and lag time.

The following assumptions and methods were utilized to derive the parameters presented in the Table 1 and Table 2:

- The CN was estimated based on the hydrologic soil type and existing land use of the project area.
- For a basin that consists of several soil types and land uses, a composite CN is calculated as:

$$CN_{composite} = \frac{\sum A_i CN_i}{\sum A_i}$$

In which $CN_{composite}$ = the composite CN used for runoff volume computations; i = an index of basins subdivisions of uniform land use and soil type; CN_i = the CN for subdivision i ; and A_i = the drainage area of subdivision i

- For ungauged watersheds, lag time is calculated as a function of time of concentration. Time of concentration is the time it takes for the rain water to flow from the hydraulically furthest point in a sub-basin to the sub-basin outlet. The time of concentration was calculated using the Bransby Williams formula:

$$t_c = \frac{0.057 L}{(S_w^{0.2} * A^{0.1})}$$

t_c = time of concentration (min)

L = watershed length, m

S_w = watershed slope, %

A = watershed area, ha

The basin lag time (t_{lag}), defined as the time difference between the center of mass of rainfall excess and the peak of unit hydrograph:

$$t_{lag} = 0.6t_c$$

- An empirical relationship of I_a (initial abstraction) and S (potential maximum retention, a measure of the ability of a watershed to abstract and retain storm precipitation) was used to calculate initial abstraction (in mm):

$$I_a = 0.2 S$$

Where the maximum retention, S , and watershed characteristics are related through an intermediate parameter, the curve number as:

$$S = \frac{25400 - 254 CN}{CN}$$

Table 1: Pre-Development Conditions - Calculated Parameters

Sub-basin	Loss Method			Transform Method
	IA (mm)	CN	Impervious (%)	Lag Time (min)
Sub-basin - 1	8.3	86	0	38.79
Sub-basin - 2	8.3	86	0	31.64
Sub-basin - 3	8.3	86	0	31.58

Table 2: Post-Development Condition - Calculated Parameters

Sub-basin	Loss Method			Transform Method
	IA (mm)	CN	Impervious (%)	Lag Time (min)
Sub-basin – 1A	8.3	86	0.59	38.79
Sub-basin – 2A	8.3	86	1.96	14.02
Sub-basin – 3A	8.3	86	3.03	32.42

2.3.4 Design Storms

Design storm events from 2 to 100 year were retrieved by using IDF Curve Lookup, a web-based application provided by the Ontario Ministry of Transportation (MTO), are presented in Table 3. The SCS Type II distribution was used as a temporal distribution in meteorological model component in HEC-HMS. This distribution is suitable and has been adopted in Southern Ontario as mentioned in the MTO Drainage Management Manual. The 24-hour SCS storm is generally applicable to basins with low percentage of impervious area where peak flow rates are generally influenced by the total depth of rainfall.

Table 3: Storm Depths of Different Return Period for a 24-hour Duration Storm

Return Period	2 yr	5 yr	10 yr	25 yr	50 yr	100 yr
Storm Depth (mm)	56	76	89	106	118	130

2.4 Pre-Development Conditions

The pre-development East, West and Central Parcel lands is divided into three (3) sub-basins with two (2) main outlets as shown in Figure 2. The hydrologic soil type and land use of the site has been identified as Agricultural fields with HSG Group D soils (consisting mainly of low infiltration soils). The Central Parcel land being planted tallgrass prairie is considered to be akin to an agricultural field. The general topography of the site consists of fairly flat undulating hills with majority of the slopes ranging from 1 to 5%. The sub-basin drainage patterns are as follows:

- Sub-basin 1 drains via overland flow from north to south into a tributary branch of Hickory Creek which crosses the site. The drainage area of the sub-basin is approximately 47.5 ha.
- Sub-basin 2 drains into the south east corner of the site via overland flow through a seasonal drainage swale eventually combining with Sub-basin 3 flows prior to draining via overland flow to Hickory Creek. The drainage area of the sub-basin is approximately 28 ha.

- Sub-basin 3 drains mainly from north to south towards a wetland area bordering the south of the project site, which then eventually drains east overland to Hickory Creek. The drainage area of the sub-basin is approximately 25.3 ha.

The Hydrologic Modeling System (HEC-HMS 4.2) was used to simulate pre-development peak flows for each sub-basin as well as outlet location for various design storm events ranging from 2 to 100 year storms. The peak flows are presented in Table 4.

Table 4: Pre-Development Condition – Uncontrolled Peak Flows

Hydrologic Elements	Contributing Area (ha)	Peak Flow (m ³ /S) for Different Design Storm Return Period					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Subbasin - 1	47.46	1.75	2.93	3.73	4.8	5.56	6.33
Subbasin - 2	27.98	1.19	1.99	2.54	3.26	3.78	4.3
Subbasin - 3	25.29	1.07	1.8	2.3	2.95	3.42	3.89
Outlet 1	47.46	1.75	2.93	3.73	4.8	5.56	6.33
Outlet 2	53.27	2.26	3.79	4.83	6.22	7.21	8.2

2.5 Post-Development Conditions

Similar to pre-development conditions, the post-development site has been divided into three (3) major sub-basins – 1A, 2A, and 3A as shown in Figure 3. In general, the drainage patterns for the post development stormwater management plan will reflect the existing site drainage. The sub-basin drainage patterns are as follows:

- Sub-basin 1A will drain mainly from north to south into the tributary of Hickory Creek crossing the site. The drainage area of sub-basin 1A is approximately 47.5 ha, same as pre-development conditions.
- Sub-basin 2A will drain to the south east portion of the site via overland flow. The drainage area of the sub-basin 2A is approximately 16.5 ha and consists of the eastern portion of sub-basin 2 of the pre-development condition. Similar to pre-development conditions, Sub-basin 2A will eventually combine with Sub-basin 3A flows prior to draining via overland flow to Hickory Creek.
- Sub-basin 3A will drain mainly from north to south towards the wetland area bordering the south of the project site, which then eventually drains east overland to Hickory Creek. The drainage area of the sub-basin 3A is about 37 ha and consists of sub-basin 3 and the western portion of sub-basin 2 of the pre-development condition.

Similar to the pre-development model, two outlets have been set for the hydrologic model – one leaving the site from the tributary branch of Hickory Creek, and the other leaving the site from the south east corner over land. It should be noted that the final discharge location for all sub-basins is Hickory Creek, which immediately thereafter drains to Lake Erie.

The HEC-HMS model was used to simulate post-development peak flows for each sub-basin as well as outlet location for various design storm events ranging from 2 to 100 year storms. The peak flows are presented in Table 5.

Table 5: Post-Development condition – Uncontrolled Peak Flows

Hydrologic Elements	Contributing Area (ha)	Peak Flow (m3/S) for Different Design Storm Return Period					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Subbasin – 1A	47.46	1.76	2.94	3.74	4.81	5.57	6.34
Subbasin – 2A	16.34	1.17	1.93	2.45	3.14	3.63	4.12
Subbasin -3A	36.94	1.59	2.63	3.33	4.28	4.95	5.63
Outlet 1	47.46	1.76	2.94	3.74	4.81	5.57	6.34
Outlet 2	53.27	2.24	3.74	4.76	6.11	7.08	8.06

2.6 Impact Assessment

2.6.1 Former Coal Pile Area

As outlined in the ECA Number 4953-99FLYC, dated August 2013, the former coal pile area stormwater runoff is collected via a series of catch basins, culverts and ditches, and then pumped to the ash lagoon system located to the north west of the coal pile area. Although no previous survey information for the coal pile area was available, the pre-development conditions are assumed to include a large pile of coal located approximately in the centre of the site area.

The proposed plan for this area is to remove any existing coal and have a relatively flat slope (1-5%) draining to the existing SWM infrastructure. The development area will include grass cover with minimal gravel access roads. Adequately sized culverts will be added under any access roads crossing existing SWM infrastructure to ensure proper drainage, if required. These proposed alterations should improve on pre-development drainage conditions. Furthermore, the lagoon system was designed to treat the process water from the existing Nanticoke Generating Station in addition to the stormwater runoff from the coal pile area. Since the Nanticoke GS is no longer in operation, the available treatment capacity of the lagoon will increase. As a result, it is anticipated that there will be no negative impacts compared to pre-development conditions.

2.6.2 East, West and Central Parcel Lands

The hydrologic model results provided in Section 2.4 and 2.5 were analyzed to identify the variation of peak runoff flows from pre- to post-development to determine potential downstream sources, if any, that might be negatively impacted by the post-development site conditions. Table 4 and Table 5 provide a summary of the peak flows for the pre- and post-development conditions, respectively. In general, the post-development grading plan encompasses minor alterations to the drainage pattern of sub-basins 2 and 3 to improve peak flow conditions at outlet 2. These modifications to the drainage patterns ensure no negative impact to any downstream sources. The drainage patterns were improved to offset the lag time for the peak flow of each sub-basin to reach the outlet. In general, the change in area for sub-basin 2A shortened the flow path to outlet 2 which reduced the time for sub-basin 2A peak flow to reach outlet offsetting sub-basin 3A peak flow contributions. The incremental change in peak flows from pre- to post-development conditions of the site outlets are summarized in Table 6.

2.6.2.1 Changes to Sub-Basin 2A Drainage Areas

The post-development drainage area for sub-basin 2A is reduced from pre-development conditions to approximately 16 ha. This decrease in drainage area reduced the contributing peak flows.

2.6.2.2 Changes to Sub-Basin 3A Drainage Areas

The post-development drainage area for sub-basin 3A is increased from pre-development conditions to approximately 37 ha. The increase in the contributing drainage area for sub-basin 3A should have no negative impacts on downstream sources prior to discharge from outlet 2. This is due to the large low lying wetland area along the southern boundary of the site which sub-basin 3A directly drains to via overland flow. The low laying wetland covers approximately 49,500 m² of area with a minimum storage depth above the 100-yr flood plain of 0.5 m, resulting in an additional storage volume of approximately 24,750 m³ above the existing 100-yr flood plain. The drainage area for sub-basin 3A was increased by approximately 12 ha from pre-development conditions. Utilizing the 100-yr storm event rainfall depth of 130 mm, an additional rainfall volume of 15,600 m³ is anticipated to be drained to low laying wetland area. This accounts for only 30% of the additional available storage capacity of the low laying wetland area.

Table 6: Percentage Change in Peak Flow for Different Design Storm Return Period

Hydrologic Elements	Contributing Area (ha)	Percentage Change in Peak Flow for Different Design Storm Return Period (%)					
		2-yr	5-yr	10-yr	25-yr	50-yr	100-yr
Outlet 1	47.46	0.57	0.34	0.27	0.21	0.18	0.16
Outlet 2	53.27	-0.88	-1.32	-1.45	-1.77	-1.8	-1.71

3.0 PROVINCIAL POLICY STATEMENT, 2014

As per Section 2.2 of The Provincial Policy Statement, 2014, planning authorities shall protect, improve or restore the quality and quantity of water by:

- a. using the watershed as the ecologically meaningful scale for integrated and long-term planning, which can be a foundation for considering cumulative impacts of development;
- b. minimizing potential negative impacts, including cross-jurisdictional and cross-watershed impacts;
- c. identifying water resource systems consisting of ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas, which are necessary for the ecological and hydrological integrity of the watershed;
- d. maintaining linkages and related functions among ground water features, hydrologic functions, natural heritage features and areas, and surface water features including shoreline areas;
- e. implementing necessary restrictions on development and site alteration to:
 1. protect all municipal drinking water supplies and designated vulnerable areas; and
 2. protect, improve or restore vulnerable surface and ground water, sensitive surface water features and sensitive ground water features, and their hydrologic functions;

- f. planning for efficient and sustainable use of water resources, through practices for water conservation and sustaining water quality;
- g. ensuring consideration of environmental lake capacity, where applicable; and
- h. ensuring stormwater management practices minimize stormwater volumes and contaminant loads, and maintain or increase the extent of vegetative and pervious surfaces.

The proposed CSWM plan ensures all applicable criteria under this policy statement are satisfied. The proposed environmental buffer zone, ensures surface water and natural heritage features that are necessary for the ecological and hydrological integrity of the water shed are left undisturbed. In addition, the plan to maintain existing drainage pattern reduces any potential disturbance to the water shed integrity and minimizes potential negative impacts. The use of grass cover across the proposed development area will help minimize the stormwater water volumes as well as reduce the contaminant loads while increasing the extent of vegetative and pervious surfaces.

4.0 EROSION AND SEDIMENT CONTROL

4.1 Temporary E&S Control

In general, the E&S control plan will consist of silt fencing around the site boundaries, and will also utilize straw bales or geotextile lined check dams in culverts and ditches.

During the site preparation phase, in advance of construction and soil excavation, site grading activities will occur. These activities will expose a large portion of the site which could generate sediment-laden stormwater. Sediment control measures, in advance of significant earthwork, will include the installation of silt fencing in concert with the existing perimeter fencing around the site, local runoff protection including straw bales and ditch checks will be used in this transitory stage to minimize any sediment in runoff to adjacent properties from existing seasonal ditches.

During the construction phase, erosion and sediment controls will be implemented to minimize off-site deposition of site soils on adjacent properties, roadways, and Lake Erie. The *Erosion and Sediment Control Plan* for the construction phase is provided in Figure 4. The following key elements of E&S control will be followed during the construction phase:

1. Silt fencing consisting of permeable fabric fence material installed vertically and fastened to wooden stakes or existing chain link fencing at grade level downstream of stormwater drainage areas across the site to prevent loss of loose surficial soils via stormwater transport (sheet flow)
2. Hay bales or geotextile lined check dams will be used for existing culverts and ditches to prevent off-site soil deposition.
3. Erosion control blankets will be utilized on any constructed slopes steeper than 2H:1V.
4. Mud mats will be used on site entrances directed to local roadways to prevent off-site soil deposition from departing vehicles

4.1.1 E&S Maintenance

In order for proper function of the E&S control measures it is vital to perform routine maintenance and inspections to ensure the integrity of the control measures. E&S control measures shall be inspected on a weekly basis and after rainfall events. Any noted concerns in the integrity of an E&S control measure shall be rectified in a timely manner. E&S control measures shall be carefully cleaned as required. E&S controls 1 and 2, shall be maintained until the construction phase has been completed and grass cover has fully grown over the development area.

4.2 Permanent E&S Control Measures

Grass cover across the proposed development area will be utilized for permanent E&S control. Grass cover shall be fully grown and adequately maintained prior to removing the silt fencing.

5.0 CONCLUSION

5.1 Former Coal Pile Area

The proposed development for the former coal pile area will continue to utilize the existing SWM system consisting of catch basins, culverts, ditches and lagoons licensed under Environmental Compliance Approval Number 4953-99FLYS. The proposed development area grading and drainage is anticipated to be improved since the coal pile is removed and the area will be covered with grass to promote treatment and infiltration. No anticipated increase in stormwater runoff is expected for the proposed development of the coal pile area.

5.2 East, West and Central Parcel Lands

In general, pre- to post-development drainage patterns were maintained where possible to promote water quality control. Although minor drainage alterations are proposed within the sub-basins of the East, West and Central Parcel Lands, the outlet discharge volumes are not negatively impacted. In addition, the minimal use of access roads and impervious areas helps control the post-development impacts. The use of grass cover across the proposed site area will help control stormwater quality, minimize sediment transport, and promote infiltration. No negative impacts to any water courses, water bodies or downstream sources are anticipated from the proposed development.

Figures



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community



LEGEND:

- Property Line
- Coal Pile Area



- REFERENCE:**
1. Produced by ARCADIS under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2015.
 2. Spatial referencing UTM NAD 83.

**NANTICOKE SOLAR LP
NANTICOKE SOLAR PROJECT
NANTICOKE, ONTARIO
Site Area**

CREATED BY: HS	CHECKED BY:	FIGURE NO: 1
DATE: 27 Oct 2016	PROJECT No.: 351100	



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community



LEGEND:

- Project Location / Site Boundary
- Watercourse
- ➔ Flow Direction
- ID
Area Sub-Basin ID and Area
- Sub-Basin Delineation
- ★ Outlet



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2. Spatial referencing UTM NAD 83.

**NANTICOKE SOLAR LP
NANTICOKE SOLAR PROJECT
NANTICOKE, ONTARIO
Pre-Development Sub-Basins
and Drainage Patterns**

CREATED BY: HS	CHECKED BY:	FIGURE NO: 2
DATE: 27 Oct 2016	PROJECT No.: 351100	



Sources: Esri, DeLorme, NAVTEQ, TomTom, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo, and the GIS User Community



LEGEND:

- Project Location / Site Boundary
- Watercourse
- ➔ Flow Direction
- ID
Area Sub-Basin ID and Area
- Sub-Basin Delineation
- ★ Outlet














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2. Spatial referencing UTM NAD 83.

NANTICOKE SOLAR LP
NANTICOKE SOLAR PROJECT
 NANTICOKE, ONTARIO

Proposed Post-Development
 Sub-Basins and Drainage Patterns
 For East, West and Central Parcel Lands

CREATED BY: HS	CHECKED BY: ZM	FIGURE NO: 3
DATE: 27 Oct 2016	PROJECT No.: 351100	

LEGEND:

-  ENVIRONMENTAL BUFFER
-  PRIMARY LAYDOWN AREA
-  SECONDARY LAYDOWN AREA
-  INVERTER/MEDIUM-VOLTAGE TRANSFORMER BOUNDARY
-  MODULE ROWS BOUNDARY
-  SECURITY FENCE
-  PROPERTY LINE
-  OVERHEAD LINE
-  MAXIMUM EXTENT OF INTERIOR ACCESS ROADS
-  SILT FENCE
-  MUD MATS

AERIAL IMAGERY GENERATED FROM GOOGLE EARTH, DATED 10/18/2010



DRAFT

NANTICOKE SOLAR LP

NANTICOKE SOLAR PROJECT
NANTICOKE, ONTARIO

Fig.4 PRELIMINARY EROSION
AND SEDIMENT CONTROL PLAN