



## **B O N O   C O N S U L T I N G , I N C .**

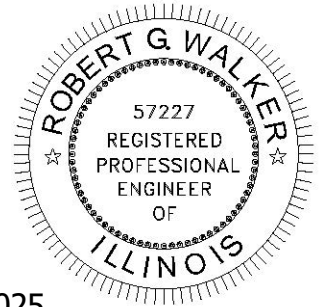
Initial Submittal September 17, 2025

### **Preliminary Stormwater Submittal**

I hereby certify that the following preliminary stormwater submittal was prepared by me or under my direct personal supervision and that I am a duly licensed professional engineer under the laws of the state of Illinois.

A handwritten signature in blue ink, appearing to read 'R. Walker', is positioned above the printed name.

Robert G. Walker, P.E.  
License expires 11-30-2025



### **Orchard Solar, Jericho Road at Bertram Road**

#### **Narrative**

My client is looking to develop a community solar farm in unincorporated Sugar Grove Township. Total property area is 278.58 acres and is currently mostly ag fields with an on-site farmstead at the southeast corner. An existing farm road runs north. The property has rolling topography with a large low area in the middle.

Access to the site will be from a new entrance directly across from Bertram Road. The existing farm entrance will be removed. A new pervious (CA-7) gravel road will provide maintenance and fire access to the site. Solar panels are laid out in a grid pattern.

Refer to engineering plans for existing and proposed grading and drainage.

A final stormwater management report will be prepared during final engineering.

#### **Proposed Stormwater Management**

Stormwater management is required by the Kane County Stormwater Ordinance.

Stormwater Detention is not required as there is less than 25,000 sq ft of new impervious area and the hydrologically disturbed area is under 3 acres. On-site gravel access roads are proposed to be pervious, using CA-7 clean crushed stone.

Stormwater Mitigation/BMPs are required. Kane County uses the Minnesota method to compensate for the hydrologically disconnected surfaces of the solar panels.

## To determine the average horizontal length beneath the solar panel

### Minnesota Disconnected Impervious Area Calculations for Solar Panels

#### Average Horizontal Length Beneath the Panel

##### Ahnway Series Bi-55-520 to Bi-55-550 Solar Panels

Length	2272 mm	7.45 ft
Width	1133 mm	3.72 ft
Spacing		10.00 ft
Max Angle	60 degrees	1.04719755 radians
Min Angle	0 degrees	0 radians

$$Z = (\cos(\text{max angle}) \times \text{length} + \cos(\text{min angle}) \times \text{length}) / 2$$

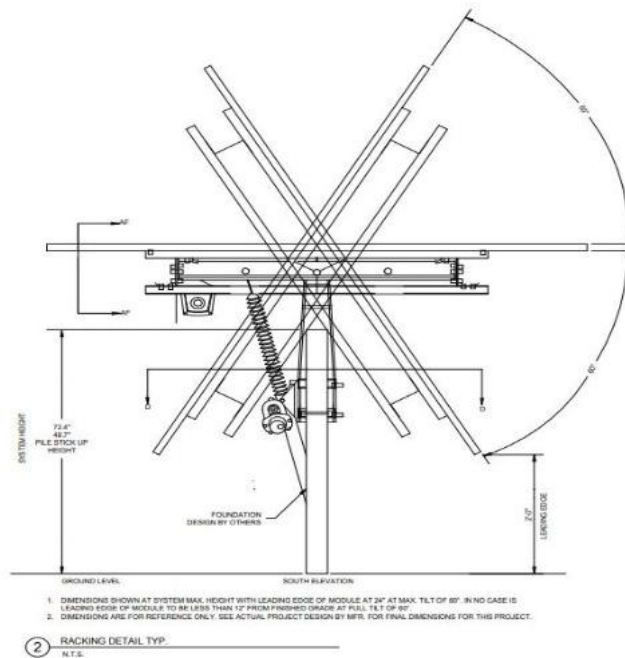
$$Z = 5.59 \text{ ft}$$

$$\text{Impervious Area of Solar Panel} = Z \times \text{Width}$$

$$\text{Imp Area} = 20.78 \text{ sq ft}$$


$$\text{Pervious Area per Solar Panel} = (\text{Length} + \text{Spacing}) \times \text{Width}$$

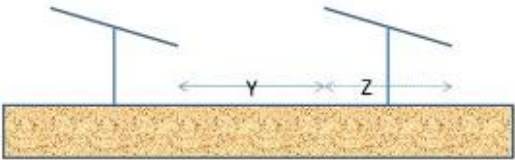
$$\text{Perv Area} = 64.88 \text{ sq ft}$$

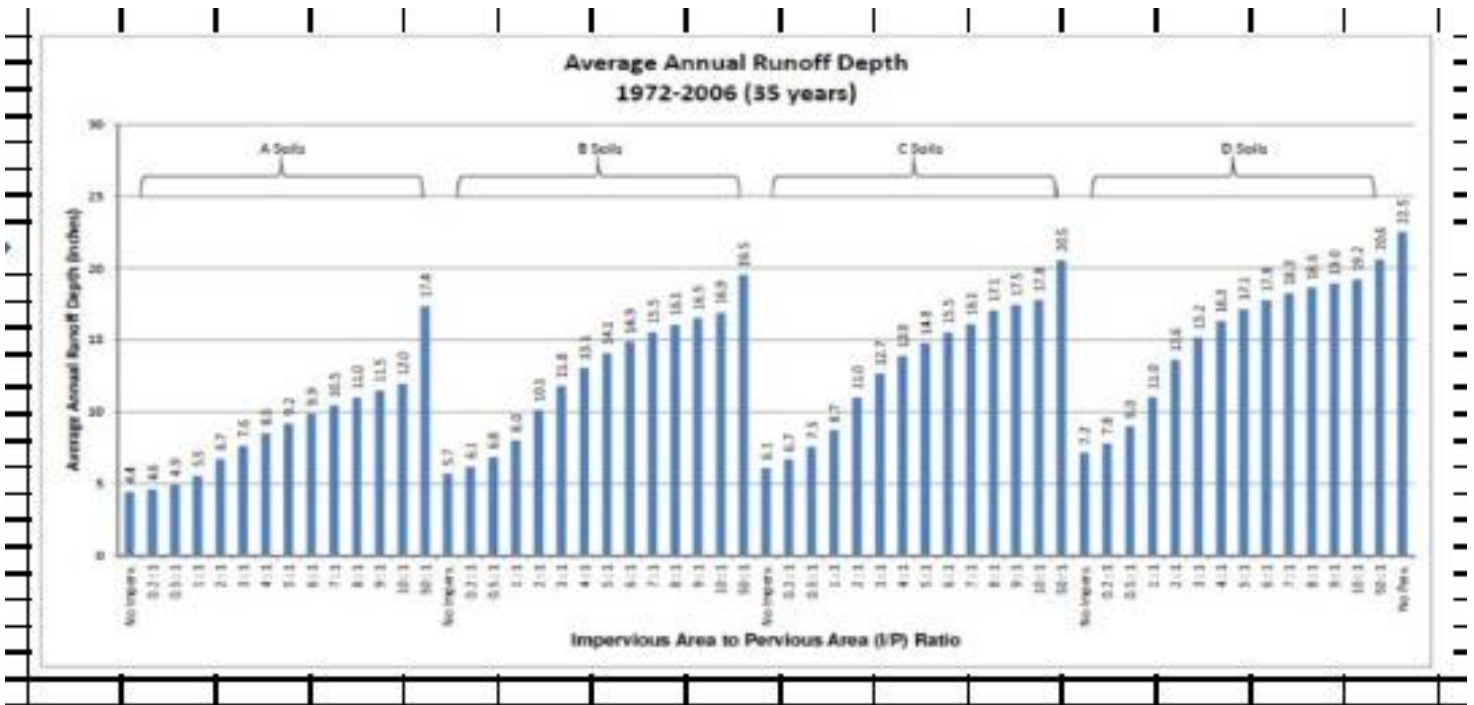


To determine the water quality volume per panel

**This spreadsheet makes calculations for an individual solar panel.**

Enter values in blue cells			
Soil	C		select from dropdown; determine soil on site
I/P ratio	0.320		calculated
Term	Value	Units	
Pervious area	64.88	square feet	user entered; determine on site
Impervious area (area of solar panel)	20.78	square feet	user entered; determine on site
Runoff depth from pervious areas	6.10	inches	default = 4.4 for A soil, 5.7 for B, 6.1 for C, 7.2 for D
Redirected runoff depth from solar panel (called average annual runoff depth)	7.10	inches	determine from plot called <b>Average annual runoff depth</b> 
Runoff depth from solar panel	22.50	inches	default = 22.5 inches
Performance goal	1.00	inches	
<b>SUMMARY</b>			
<b>Pre-disconnection</b>			
Runoff from impervious	39	ft3	calculated
Runoff from pervious	33	ft3	calculated
Total runoff	72	ft3	calculated
<b>Post-disconnection</b>			
Total runoff	51	ft3	calculated
Total runoff reduced	21	ft3	calculated
Runoff from pervious	33	ft3	calculated
Runoff from impervious	18	ft3	calculated
Adjusted impervious	9.441	square feet	calculated
<b>Performance Goal Summary</b>			
Performance goal	1.73	ft3	calculated
BMP volume credit (BMP volume credit)	0.94	ft3	calculated
% of performance goal achieved	54.6	%	calculated
Remaining water quality volume to be treated (per panel)	0.79	ft3	calculated
Pervious area = (Y + Z) * W; where W is the width of the solar panel and Z is the average horizontal distance of the panel			
Impervious area = Z * W; where W is the width of the solar panel and Z is the average horizontal distance of the panel			





To determine the water quality volume for the site, multiply by the number of panels

Minnesota Disconnected Impervious Area Calculations for Solar Panels

Orchard Road Solar Panels

Total 39,096 panels

Water Quality Volume To Be Treated Per Panel 0.77 cu ft  
from MN spreadsheet

BMP Volume for Panels (MN method) 30,104 cu ft

Impervious area (equipment pads) 4770 sq ft

BMP Volume = 1" x Imp Area 398 cu ft

Total BMP Volume Required 30,501 cu ft  
0.70 ac-ft

NW BMP - Bioswale - Berm up ~ 690 elevation to hold water - drained by likely existing field tile

Field tile to be confirmed with tile survey

Captures ~ 1/6 site area

Stores ~ 1/6 volume required (0.1 ac-ft)

SW BMP - Bioswale - Berm up ~ 663 elevation to hold water - if no existing field tile, add new

Field tile to be confirmed with tile survey

If no field tile exists - install ~ 500 lf tile within bioswale and 225 lf tile to outlet at culvert

Captures ~ 1/6 site area

Stores ~ 1/6 volume required (0.1 ac-ft)

East BMP - Bioswale - excavate to ~ 659 elevation to hold water - If no existing field tile, add new

Field tile to be confirmed with tile survey

If no field tile exists - install ~ 1200 lf tile within bioswale and 260 lf tile to outlet at culvert

Captures ~ 2/3 site area

Stores ~ 2/3 volume required (0.4 ac-ft)

Detailed design to be provided with final engineering.

The proposed BMPs to be sized and final engineered with building permit plans.

## **Unmapped Floodplain**

Per Kane County Stormwater staff, the low area in the middle of the site is unmapped floodplain. For final engineering and building permit, a Base Flood Elevation Study (BFE) will be required to determine the BFE. No fill will be allowed under the BFE and water must be allowed to flow through the site unimpeded. The proposed access road is proposed to be at grade in this area.

## **Wetlands**

A wetland delineation study has been done for the property. Two small wetlands are located on the subject property. Both will be avoided with the construction of the solar farm.

## **Drain Tile Survey**

There is known drain tile on the subject property. A large tile is located through the low area in the middle of the property and there is evidence of a branch running north through the existing grass waterway between the proposed solar panels and the wooded area. Pattern drain tile is likely in this location. A drain tile survey will be required with final engineering and building permit.

## **Overland Flood Routes**

There will be minimal site grading. All existing overland flood routes will be maintained.

## **Erosion Control**

The final engineering plans must include appropriate soil erosion and sedimentation control (SESC) measures in compliance with the Kane County Stormwater Ordinance and Illinois EPA regulations. A cover crop is recommended to maintain a minimum 80% vegetative cover.

As the disturbed area exceeds 1 acre, the project will require the submission of a Notice of Intent (NOI) to obtain coverage under the National Pollutant Discharge Elimination System (NPDES) permit.