Project Progress Report

Midland Court House

605 Yonge St, Midland, ON L4R 2E1, Canada

Rainscreen Installation System

MITREX™

mitrex.com

Introduction

Mitrex improved the aesthetics of the 605 Yonge St building while transforming the structure into a green, energy-generating power plant. The improved area on the building utilizes Mitrex Solar Facades with a wood pattern spanning over 10,000 SQFT and generating energy with a system size of over 160kW.

The structure features an improved building envelope while seamlessly generating solar energy.

About Mitrex

At Mitrex, we envision a world where solar energy is generated by any surface touched by the sun. We have developed ways for aesthetically pleasing solar panels to be directly integrated into building facades. Our revolutionary building-integrated photovoltaic (BIPV) systems offer architects, engineers, building owners, and investors the opportunity to embrace and profit from solar energy without compromising beauty. Our Mission is to be the catalyst that accelerates the adoption of sustainable, energy-generating, human-made structures.

Table Of Contents

Project Journey Summary

Preparation & Logistics

1. Customer Agreement & Contract

Signing contract and agreement with customer, and distribution of scope of work.

2. Samples Approval By Customer

The samples are shared with the client to confirm design, colour, texture and final shape.

3. Project Design

- Panel layout
- Electrical design
- Shop drawing

4. Application For Electrical Connection & Engineering Design

CIA, ESA plan review, IFC, system design.

5. Preparation Of Bill Of Material & Procurement

According to the system and electrical design, the procurement team prepares and procures the project's bill of material which include materials for fabrication, installation and electrical connection.

Installation

6. Panel Fabrication

The panels are fabricated according to the approved project design and panel layout.

7. Installation Plan & Scheduling

The installation plan is prepared by the project management team, including the number of installers, timeline, required area, etc.

8. On-Site Wall Preparation By Installer

The material required for the project is transported to the job site and the preliminary wall preparation is set.

9. Insulation & Blue Skin (If Needed)

If the project requires it, insulation and blue skin will be installed.

10. Leveling & Plumbing The Wall

The wall is leveled and plumbed to make sure there is an even surface to install Mitrex Solar Facade Panels. Once this is done, the wall is framed.

11. ESA Inspection

The Electrical Safety Authority entity will inspect the job site to make sure all the electrical code requirements are being met.

12. Panel Installation

The installers will proceed with the installation and connection of the panels.

13. DC Connection Between Panels & Home Run Wiring

The entire system will be connected to the inverter.

14. Electrical Connections To The Building

The final electrical connections to the main building electrical panel is made.

- Setting the inverters
- Rapid shutdown
- Monitoring system
- Meter installation
- Transformer connection
- Installation and connection of electrical panel.

15. Flashing & Caulking

The flashing and caulking is installed to get an aesthetically pleasing look on the unions and edges of the wall.

Final Output

16. Commissioning By Hydro Provider

The commissioning by a local electrical supplier is done.

17. Green Building Ready

The building is now green and ready to generate clean energy.

Conceptual Render

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
1	Project Management		
1.1	Project planning, construction management on site and construction meeting and reporting construction meeting and reporting.	X	X
1.2	Progress reporting.	X	
1.3	General Coordination of the project with Client.	X	
1.4	Health and safety management.	X	X
1.5	Coordination between Employer, subcontractors, and authorities (including hydro company).	X	X
1.6	Construction site insurance.	X	X
1.7	Construction signage (transportation, warnings).	X	X
2	Documentations		
2.1	Safety Induction Documentation.	X	
2.2	Method Statement & Risk Assessment for Installation.	X*	
2.3	HSE Compliance Documentation.	X*	
2.4	Hydro Commissioning Documentation.	X	
2.5	Markup of IFC drawings for any changes to be incorporated into the as-built drawings.	X	
3	Permits		
3.1	Relation and permitting with municipality regarding building permits.		X
3.2	Relation and permitting with ESA.	X	
3.3	Relation and permitting with hydro company.	X	
3.4	Hydro Permitting: Engineering, drawings, and documentation.	X	
3.5	Hydro Permitting: Information gathering and coordination.	X	X
3.6	All local and federal government building permit charges.		X

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
3.7	Negotiations with hydro to turn off the high-tension lines and obtain any necessary permits. Assumption of responsibility for the delays occurred because of this omission to do so and payment of any fees relating to that.	X	X
4	**Design**		
4.1	DC Works Engineering		
4.1.1	General and detailed wiring layout design.	X	
4.1.2	Detailed execution drawings design (including earthing layout).	X	
4.1.3	Communication design (protocols and wires).	X	
4.1.4	Definition of metering devices dedicated to control system and located at Point of Interconnection.	X	
4.1.5	Panel and string connection scheme.	X	
4.1.6	Inverters & Transformers definition.	X	
4.1.7	AC/DC cables definition wiring with calculation note.	X	
4.2	AC Works Engineering		
4.2.1	Basic Design.	X	
4.2.2	Detailed execution drawings design.	X	
4.2.3	Equipment and protection definition (included AC Junction Box).	X	
4.3	Other Engineering		
4.3.1	Shop drawings, engineering - All engineering for panel systems, including calculations stamped by a professional engineer in Toronto.	X	
4.3.2	Trenches design (if applicable)	X	
4.3.3	Full shading analysis	X	
4.3.4	Update of the Structural study provided by the client that the additional load capacity will not affect the structure.	X	
4.3.5	Temporary facilities layout (if needed).	X	

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
5	Procurement		
5.1	Photovoltaics Modules		
5.1.1	Photovoltaic railings.	X	
5.1.2	Fenced allocated storage area on site for PV modules.	X	
5.2	Electrical Equipment		
5.2.1	LVDB, rapid shutdown, panel board, and disconnect.	X	
5.2.2	String inverters, transformer (if needed).	X	
5.2.3	Monitoring system.	X	
5.3	Structure & Mechanical		
5.3.1	Anchorage, mounting accessories, and fasteners.	X	
5.3.2	HSE permanent protections.		X
5.3.3	Window sill flashing.		X
5.3.4	Thru-wall or counter flashings.		X
5.4	Bulk (Cabling and Miscellaneous)		
5.4.1	Cable trays and conduits.	X	
5.4.2	DC cables (String to PV inverter).	X	
5.4.3	AC cables (Inverter to Point of Interconnection).	X	
5.4.4	Communication cables.	X	
5.4.5	Earthing cables.	X	
5.4.6	Protections (Fuses, MCB).	X	
5.5	Grid connection		
5.5.1	LV panel extension works.		X

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
6	Construction		
6.1	System Installation		
6.1.1	Installation of cable trays/conduits.	X	
6.1.2	Installation of photovoltaic railings including mechanical anchoring and mounting.	X	
6.1.3	Cutting and patching of slab edges.		X
6.1.4	Installation of wood backing or blocking.		X
6.1.5	Installation of any exterior lighting, cameras, conduits, and all other electrical components.		X
6.1.6	Any / all structural anchors and fasteners.	X	
6.1.7	Substrate framing, structural supports, structural steel and metal stud framing, structural steel studs, sheathing products (DensGlass, plywood, etc.), top parapet, top parapet flashing. System depth passing 8" will be considered as a structural component.		X
6.1.8	Leveling the structure and existing walls		X
6.1.9	Supply or installation of windows or doors		X
6.1.10	Removal of any overhead obstacles (trees, electrical wiring, cables etc.), exterior lighting, cameras and others which could interfere with the installation of the system.		X
6.1.11	Provisions and maintenance of work areas, storage areas with worksite access and security, and sufficient loading capacity at any time to allow for vehicle and equipment circulation for storage of materials, and removal of snow preventing the access during winter season.		X
6.1.12	Supply or installation of miscellaneous metals such as support shelves, access ladders, railings, bollards and/or fencing, exterior or interior stairs.	X	
6.1.13	Provision of security of panels and other materials at the job site.		X
6.2	Electrical Installation		
6.2.1	Electrical material installation (including inverter, monitoring system, etc).	X	
6.2.2	Stringing & PV panel interconnection.	X	
6.2.3	DC and AC wiring.	X	

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
6.2.4	Earthing & all protections system wiring.	X	
6.2.5	Meter and interface protection installation.	X	
6.3	Other Works		
6.3.1	PPE and safety harness.	X	
6.3.2	Tools & consumables.	X	
6.3.3	Scaffolding.	X	
6.3.4	Material unloading and shifting to offloading area.	X	
6.3.5	Material distribution from offloading area.	X	
6.3.6	Temporary site facilities (Toilet, etc).	X	
6.3.7	Material handling equipment for unloading and offloading.	X	
6.3.8	Materials site storage.	X	
6.3.9	Removal of temporary site facilities upon completion.	X	X
6.3.10	Cleaning of the site upon project completion.	X	X
6.4	Testing and Commissioning		
6.4.1	Mechanical acceptance.	X	
6.4.2	Tests with & without interconnection for hydro commissioning.	X	
6.4.3	Testing and commissioning.	X	
6.4.4	Performance test.	X	
7	Other (Delivery, Production, etc)		
7.1	Delivery and packing, crating FOB to job site.	X	

Project Agreement Inclusions & Exclusions

Item No.	Tasks	Mitrex	Client
7.2	Attic stock.		X
7.3	Road access, crane operation area, or parking permits.		X
7.4	Traffic diversion/control fees.		X
7.5	Architectural responsibility pertaining to fire, sound, and insulation. (remains in architect's scope of work).		X
7.6	Independent inspections such as geotechnical conditions, concrete, reinforcing steel (re-bar), related materials, mortar, etc.		X
7.7	Perimeter foaming.		X
7.8	Performance mock-up.		X
7.9	Smoke seal.	X	
7.10	Acoustic sealants.		X
7.11	Costs associated with use of the material hoist and crane.		X
7.12	Construction of or supply of spray racks, chambers, water supply or any other material for field testing.		X
7.13	Final cleaning of railings, including removal of stickers/labels, and protective films.	X	X
7.15	All hoarding permits and public protection.		X
7.16	Supply and installation of any signage and provision to accommodate the same.		X
7.17	Provisions for acoustic insulation and sound dampening materials, either floor-to-floor or room-to-room.		X
7.18	Supply of exhaust boxes and vents. Connection of any mechanical components.		X
7.19	Responsibility of garbage disposal from site, maintenance of container, and container available on site.		X
7.20	Repair of damages made to products/structures by other sub-trades.		X
7.21	Preparation of installation areas covered by grass, interlocking, etc.		X

Project Overview & Expected Outcomes

- CATEGORY:
Government Building
- STATUS:
Completed

- AREA:
10,000 SQFT

- SAVING IN 30 YEARS:
$ 624,000

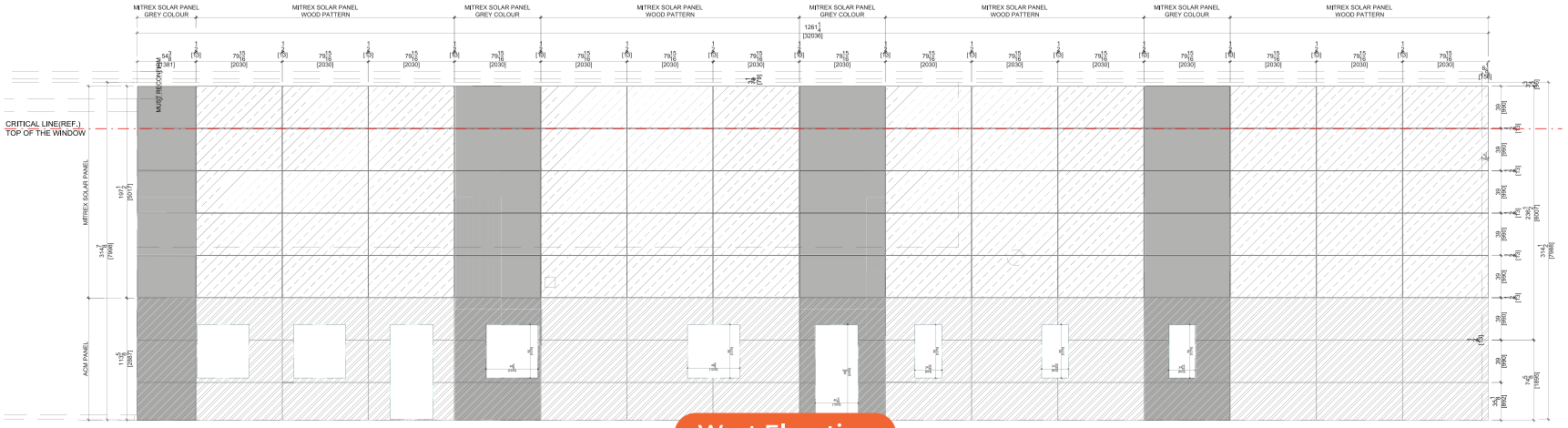
- SYSTEM SIZE:
160 kW

Sample Approval

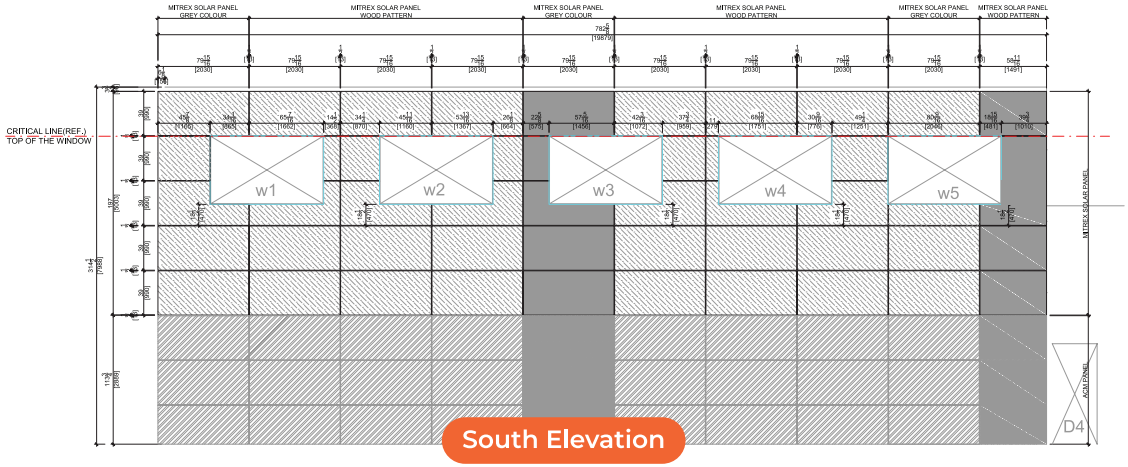
CATEGORY:
Solar Wood
NAME:
Nocciola

CATEGORY:
Solar Solid Colours
NAME:
Dark Grey

Architectural Drawing

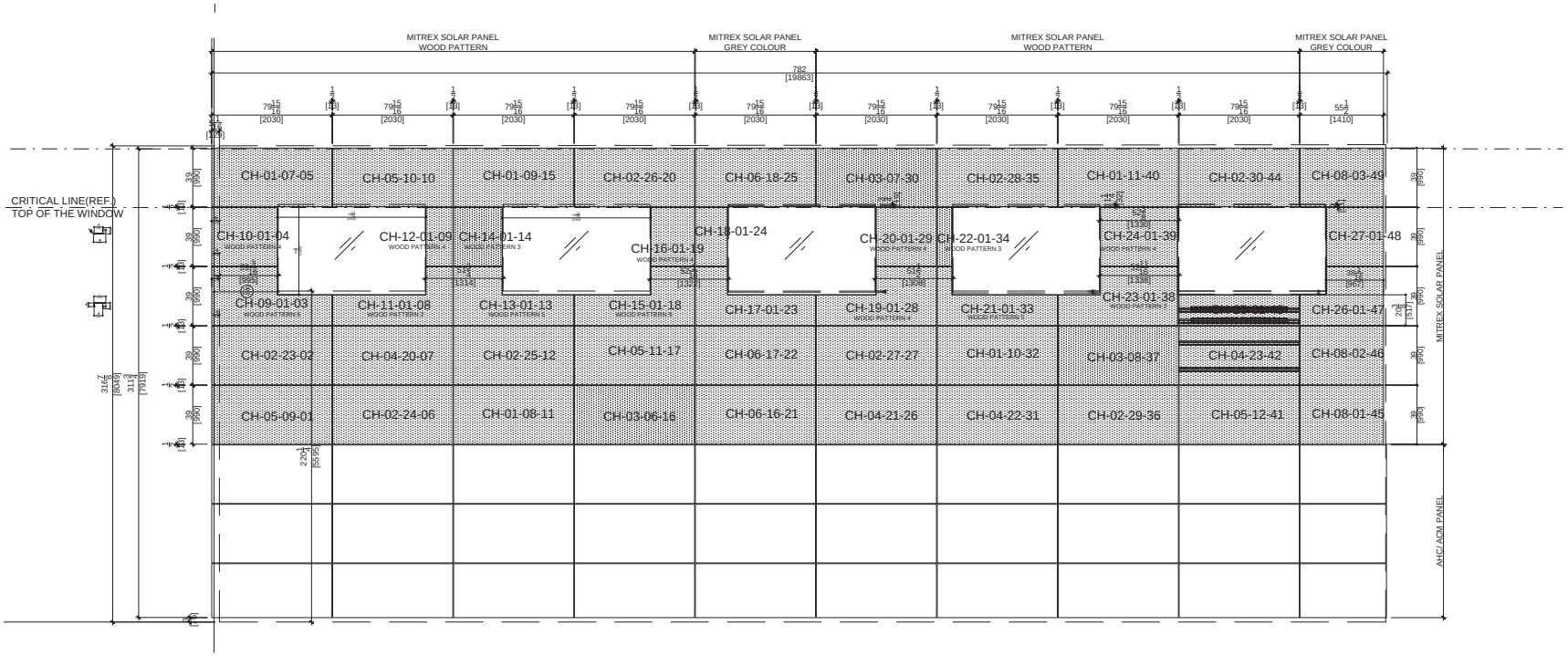


West Elevation

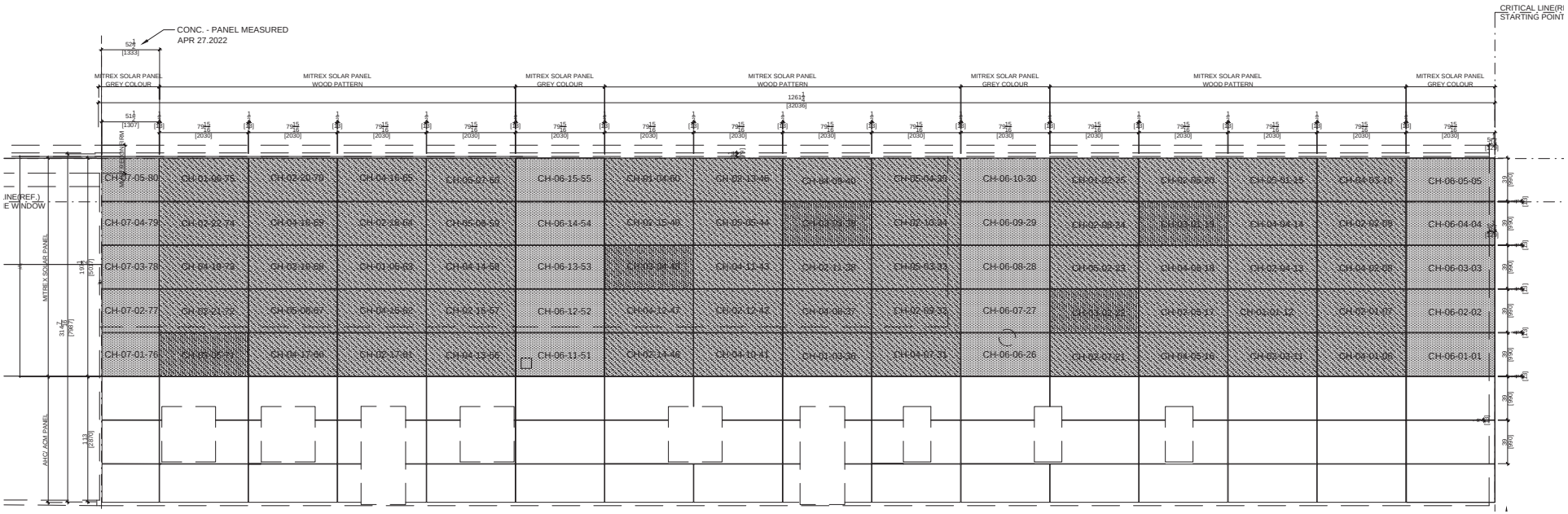


South Elevation

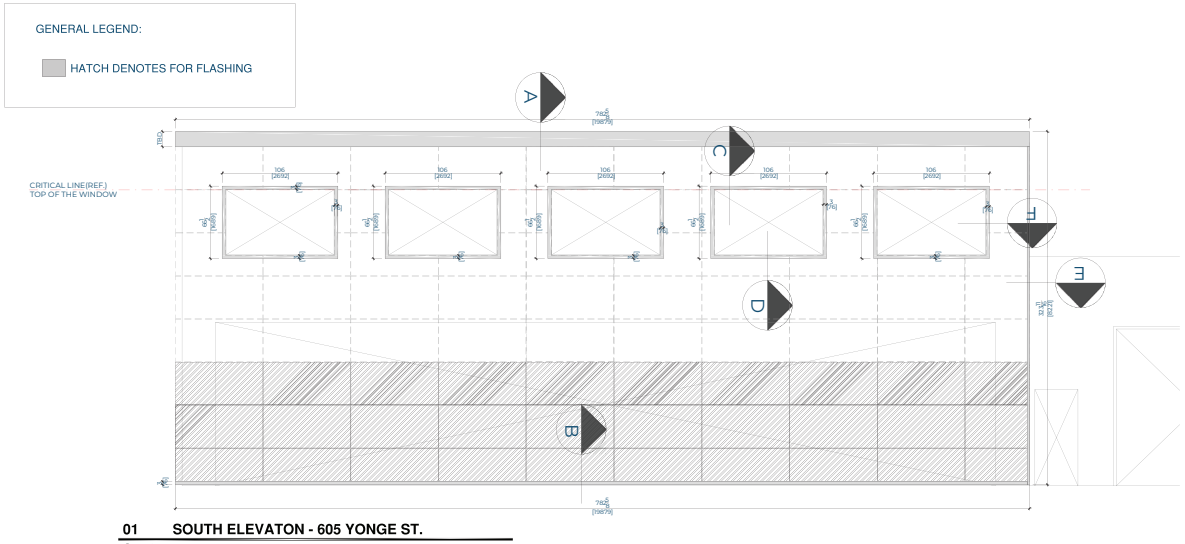
Panel Layout: South Elevation

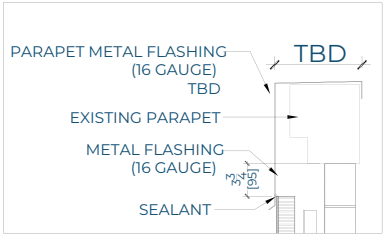


Panel Layout: West Elevation



Flashing & Window Technical Drawing: South Elevation





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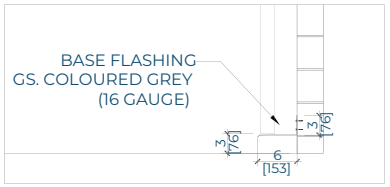

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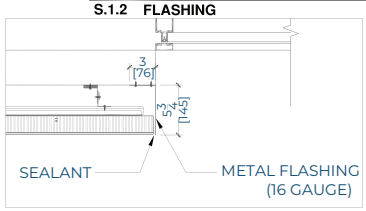

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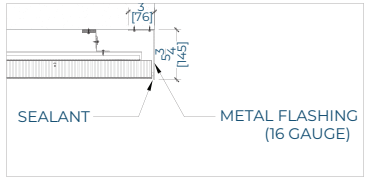

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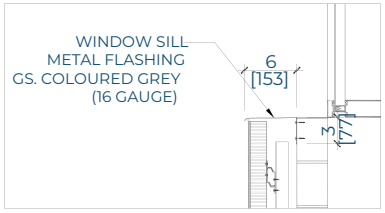

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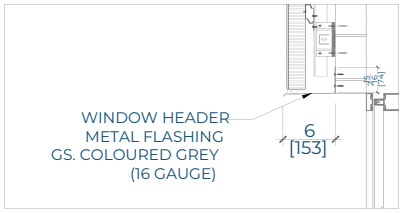
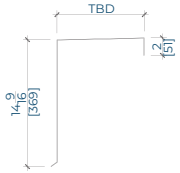
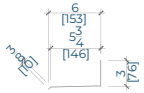


VIEW SECTION C

S.1.2	FLASHING

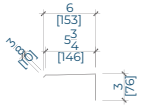


PARAPET FLASHING
66 LINEAR FEET

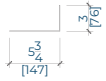


BASE FLASHING
66 LINEAR FEET

WINDOW HEADER FLASHING
45 LINEAR FEET

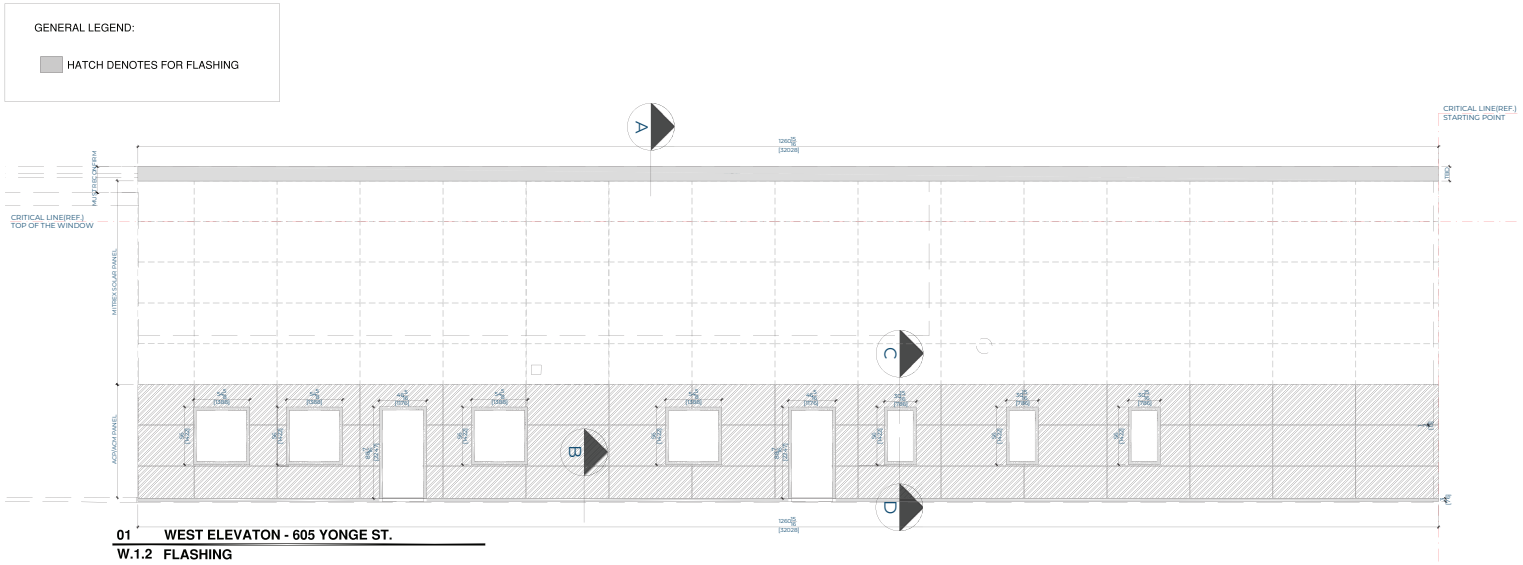


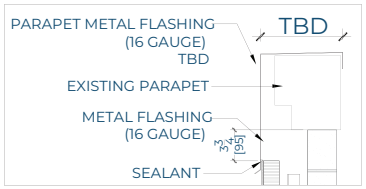
WINDOW SILL FLASHING
45 LINEAR FEET



WINDOW SIDES FLASHING
56 LINEAR FEET

Flashing & Window Technical Drawing: West Elevation





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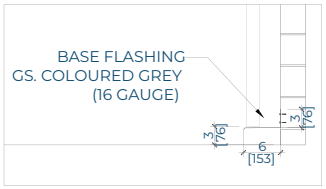

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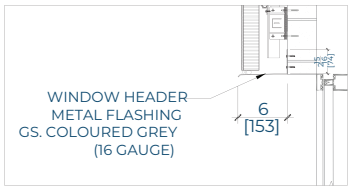

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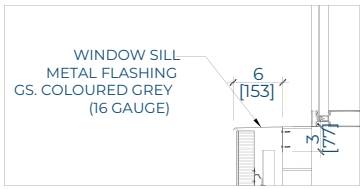
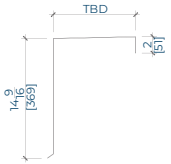
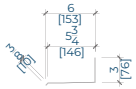


VIEW SECTION D

W.1.2	FLASHING

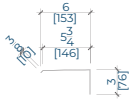


PARAPET FLASHING
106 LINEAR FEET

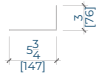


BASE FLASHING
106 LINEAR FEET

WINDOW HEADER FLASHING
34 LINEAR FEET

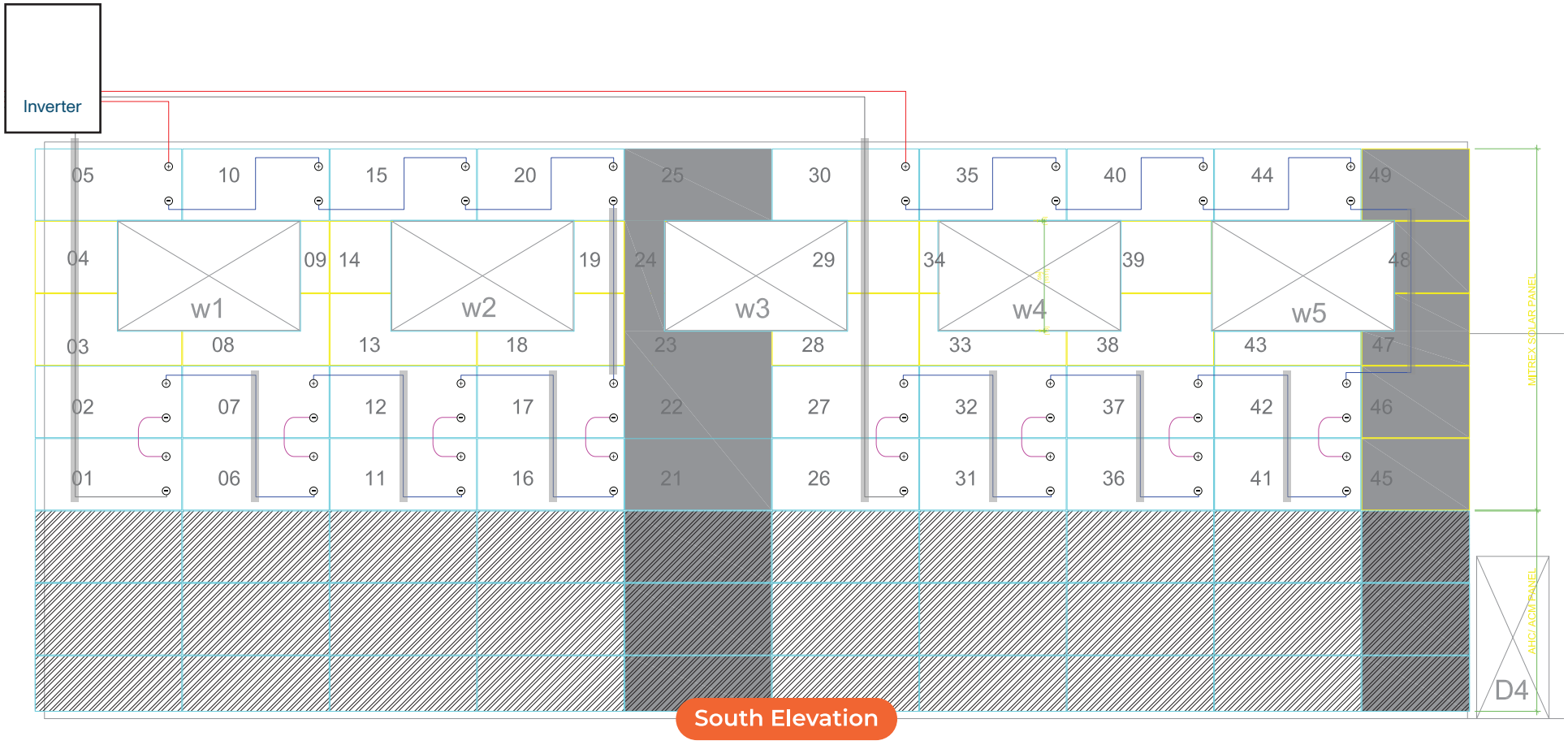


WINDOW SILL FLASHING
27 LINEAR FEET

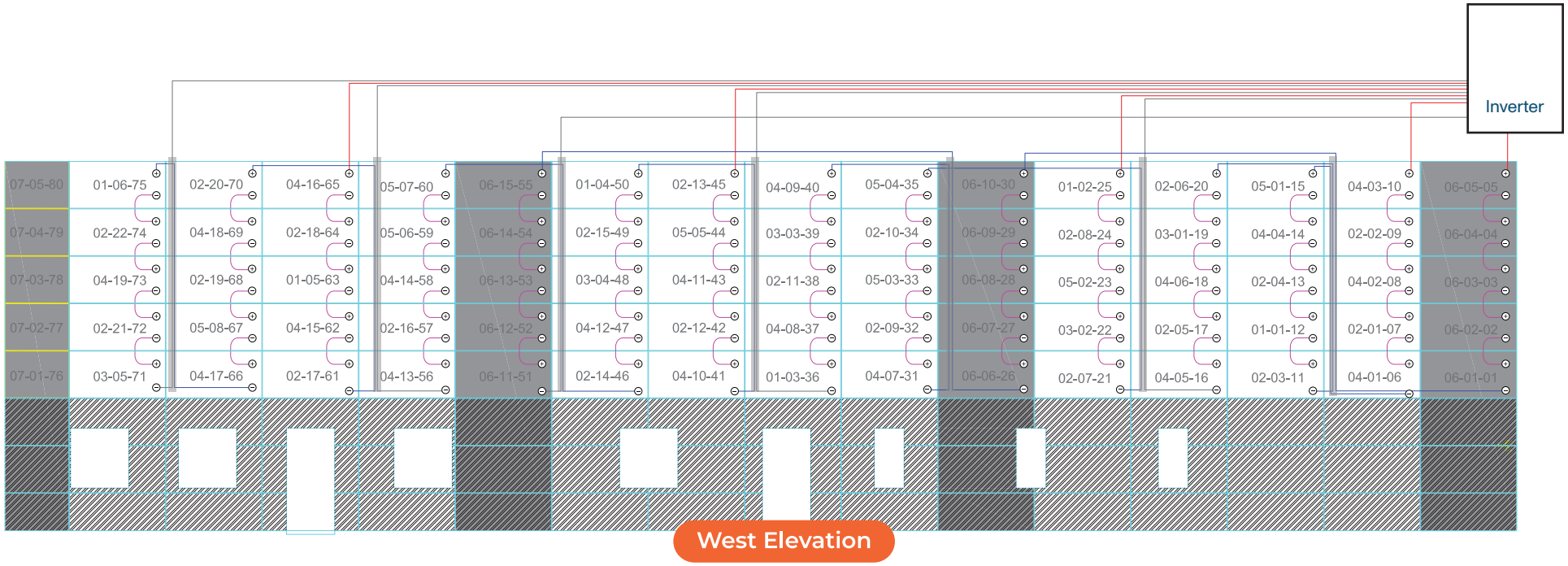


WINDOW SIDES FLASHING
95 LINEAR FEET

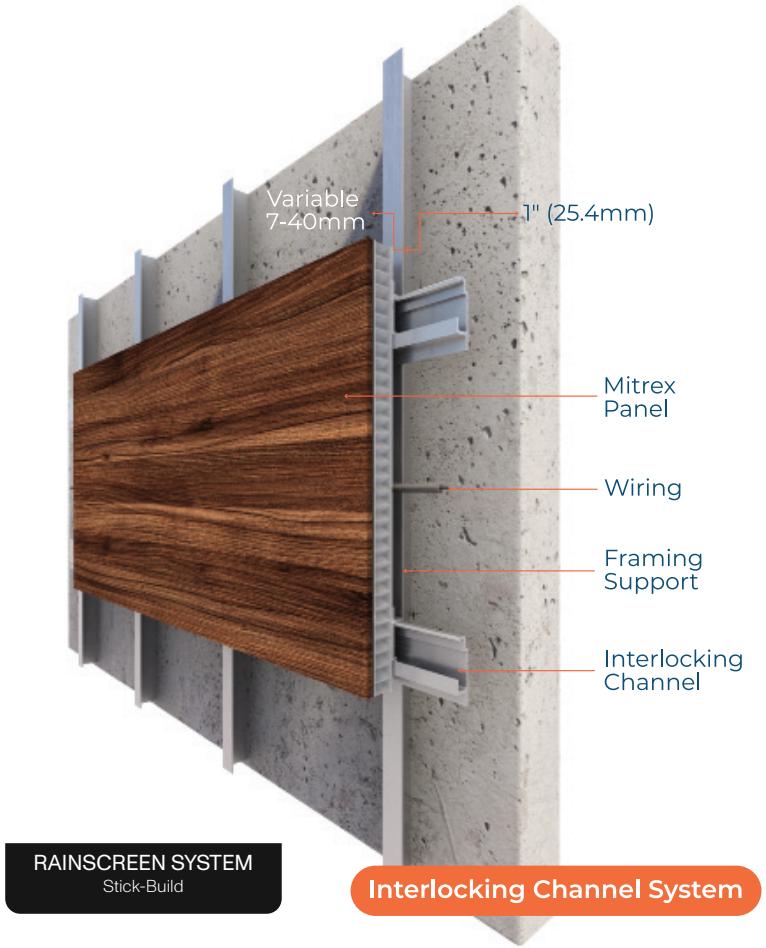
Electrical Design &Wiring Plan: South Elevation



Electrical Design & Wiring Plan: West Elevation



Mechanical Design: Rainscreen System



Application For Electrical Connection & Engineering Design

Application Name	Submitted To / Done By
1.1. Pre-Assessment	Local Distribution Company (LDC)
1.2. Current Impact Analysis (CIA)	Local Distribution Company (LDC)
1.3. Electrical Safety Authority (ESA) Plan Review	Local Electrical Safety Authority (ESA)
1.4. Issue For Construction (IFC)/ Electrical Drawing	Registered Electrical Engineer
1.5. ESA Permit	Local Electrical Safety Authority (ESA)
2.1. Connection Authorization	
2.2. Final Certificate By ESA	
3.1. Commissioning	Local Distribution Company (LDC)
3.2. Final Connection And Meter Installation	Local Distribution Company (LDC)

Bill Of Material & Procurement

PROJECT:	605 Yonge St. Midland ON. - COURTHOUSE			V4
				Date: 3/22/2022

PANELS:

SYS. DEPTH (INCH)	MATERIALS	DESCRIPTION	MAX. SIZE	SQ.FT
6 1/8	MITREX GLASS PANEL(WOOD PATTERN)	1/8" THICK - Q=95 PCS.	39"X79 15/16"	1,893
6 1/8	MITREX GLASS PANEL(GREY COLOUR)	1/8" THICK - Q=35 PCS.	39"X79 15/16"	659
		TOTAL		2,552

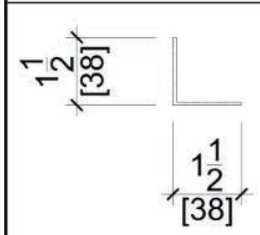
* Ref. shop drawings based on measurements

SYSTEM SUB-FRAMING:

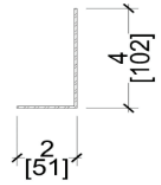
SYSTEM SUB-FRAMING	DESCRIPTION	QTY	
INTERLOCKING CHANNELS FOR PANEL	1 " ALUMINIUM - ALLOY 6063 T6	1,520	L.F.
INTERLOCKING CHANNELS FOR WALL	1 " ALUMINIUM - ALLOY 6063 T6	1,685	L.F.
THERMALLY BROKEN BRACKET	TYPE 1	835	PCS
L-ANGLE	1.5" X 1.5"	1,485	L.F.
L-ANGLE	4"X2"	840	L.F.
TAPCON FROM L-BRACKET TO WALL-CONCRETE/BRICK	HEX HEAD 410 STAINLESS TAPCON -HEAD 1/2", LENGTH 1-3/4"	2,900	PCS
SCREWS FROM L-BAR TO L-BRACKET	HEX HEAD # 10-3/4" - STAINLESS STEEL/NON CORRISON/EPOXY COATED	2,200	PCS
SCREWS FROM L-BAR(4") TO L-BAR(4")	HEX HEAD # 10-3/4" - STAINLESS STEEL/NON CORRISON/EPOXY COATED	420	PCS
SCREWS FROM INTERLOCKING CHANNEL TO L-BAR	HEX HEAD # 10-3/4" - STAINLESS STEEL/NON CORRISON/EPOXY COATED	1,892	PCS
SCREWS FROM INTERLOCKING CHANNEL TO MITREX PANEL	BUTTERFLY RIVET 3/4" BALI-06-04. 3/16" GRIP RANGE 105-6MM	2,600	PCS

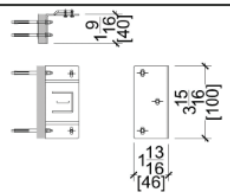
To View All Fasteners, Choose From Drop-Down Menu...

METAL MEMBER SPECIFICATION:

L-ANGLE	LOCATION	LENGTH	DESCRIPTION	QTY (10 ft)	
	WEST & SOUTH ELEVATION	1.5"X1.5"	16 Gauge GS	149	PCS

Bill Of Material & Procurement

L-ANGLE	LOCATION	LENGTH	DESCRIPTION	QTY (10 ft)	
	SOUTH ELEVATION	4"X2"	16 Gauge GS	84	PCS

THERMALLY BROKEN BRACKET	LOCATION	LENGTH	DESCRIPTION	QTY	
	WEST & SOUTH ELEVATION	3 15/16"X1 13/16"X1 9/16"		835	PCS

INSULATION:

INSULATION	TYPE	DESCRIPTION	QTY	
N/A				SQFT
.				

SPRAY COLOR	SQFT.
N/A	

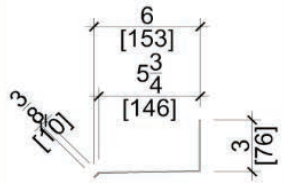
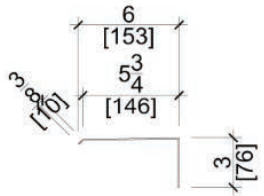
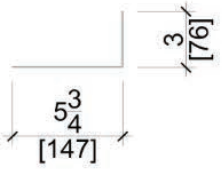
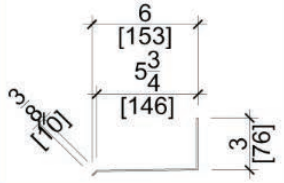
MEMBRANE / WATER PROOFING:

VPB	QTY	
	N/A	

TAPE FLASHING | TAPE SEAL | CAULKING SEALANT	QTY	
SEALANT - DOWSILL CONTRACTING	1100	LNFT.
CAULKING		
CAULKING-COLOURED TBD	1500	LNFT.

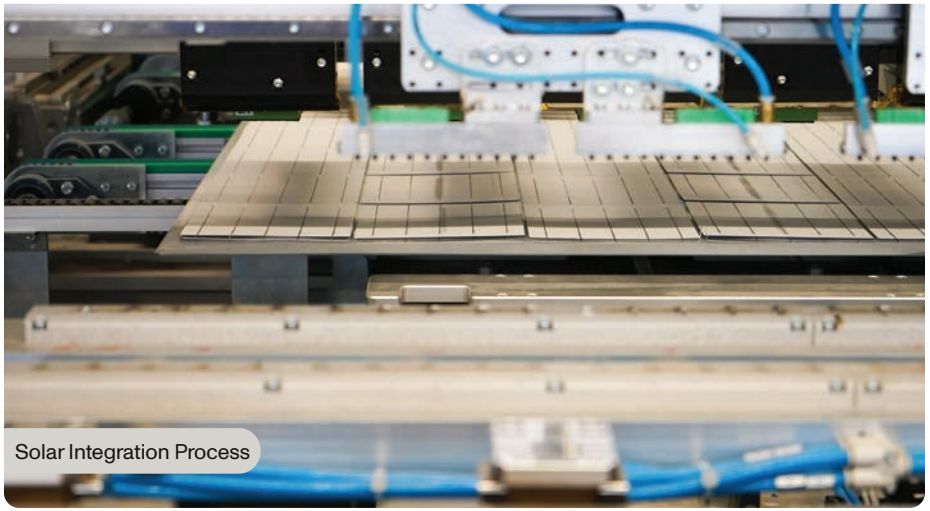
Bill Of Material & Procurement

METAL FLASHING:

TYPE	MEASUREMENTS	LOCATION	DESCRIPTION	QTY LFT	FINISH
F1		BASE FLASHING 16 GAUGE GALVANIZED STEEL	6" X 3"	220 L.F	
F2		WINDOW SILL FLASHING - 16 GAUGE ALUMINIUM - COLORED IN DARK GRAY	6" X 3"	90 L.F	
F3		WINDOW SIDES/ RETURNS FLASHING - 16 GAUGE - ALUMINIUM COLORED IN DARK GRAY	5 3/4" X 3"	170 L.F	
F4		WINDOW HEADER FLASHING - ALUMINIUM - COLORED IN DARK GRAY	6" X 3"	90 L.F	

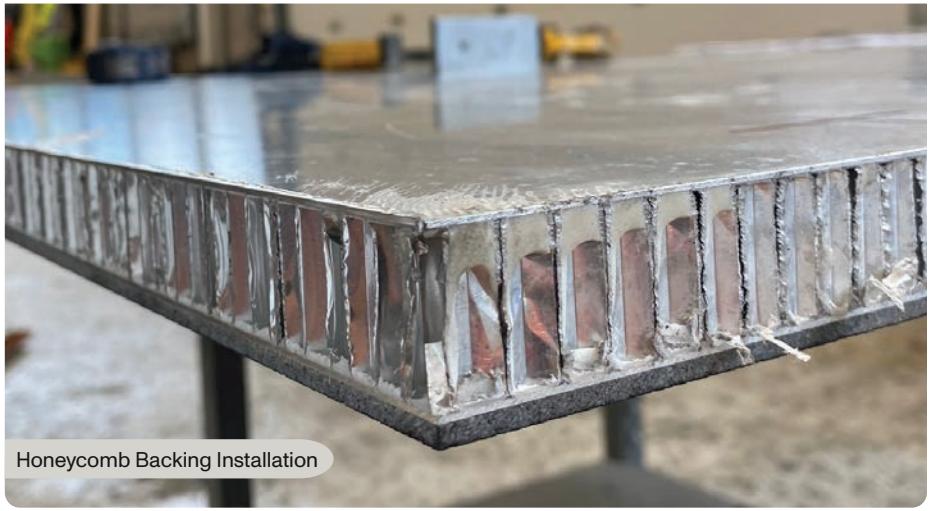
Fabrication

Glass Preparation



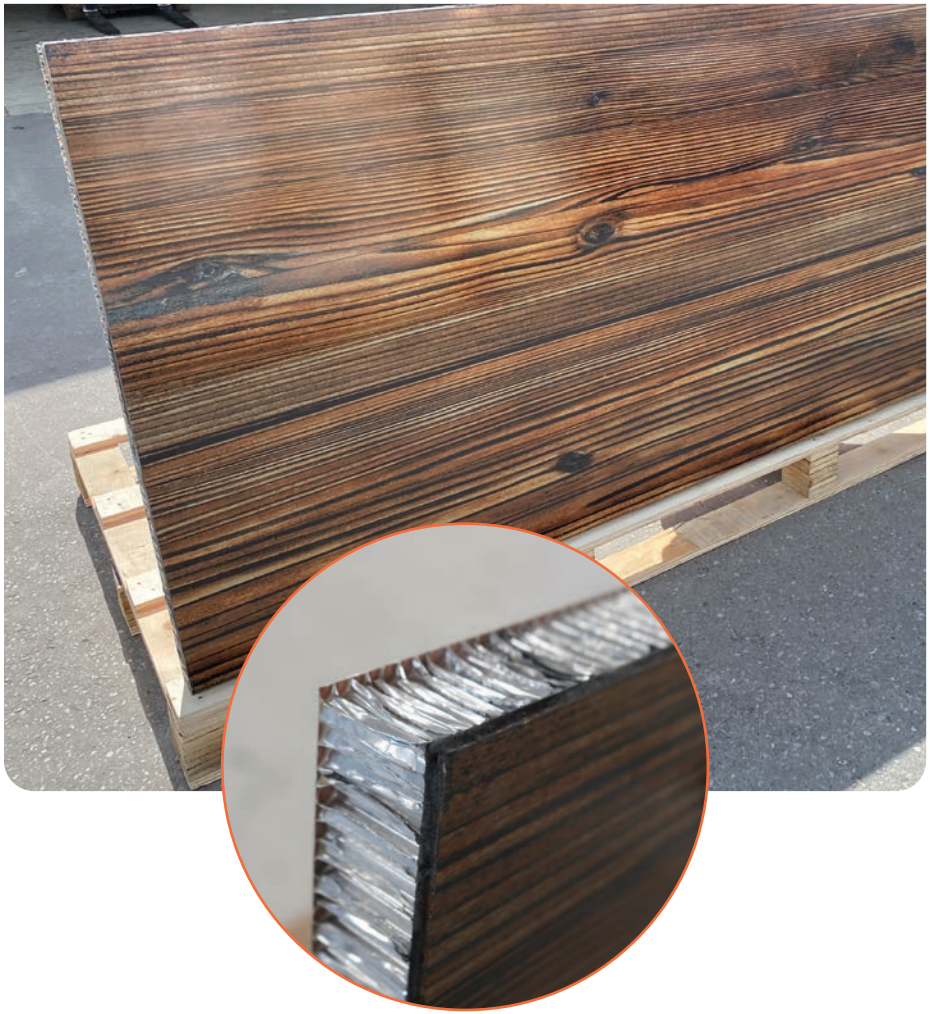
Solar Integration Process

Lamination



Honeycomb Backing Installation

Produced Panel



Packaging & Transformation

Truck Transportation

Box Packaging

Box Packaging

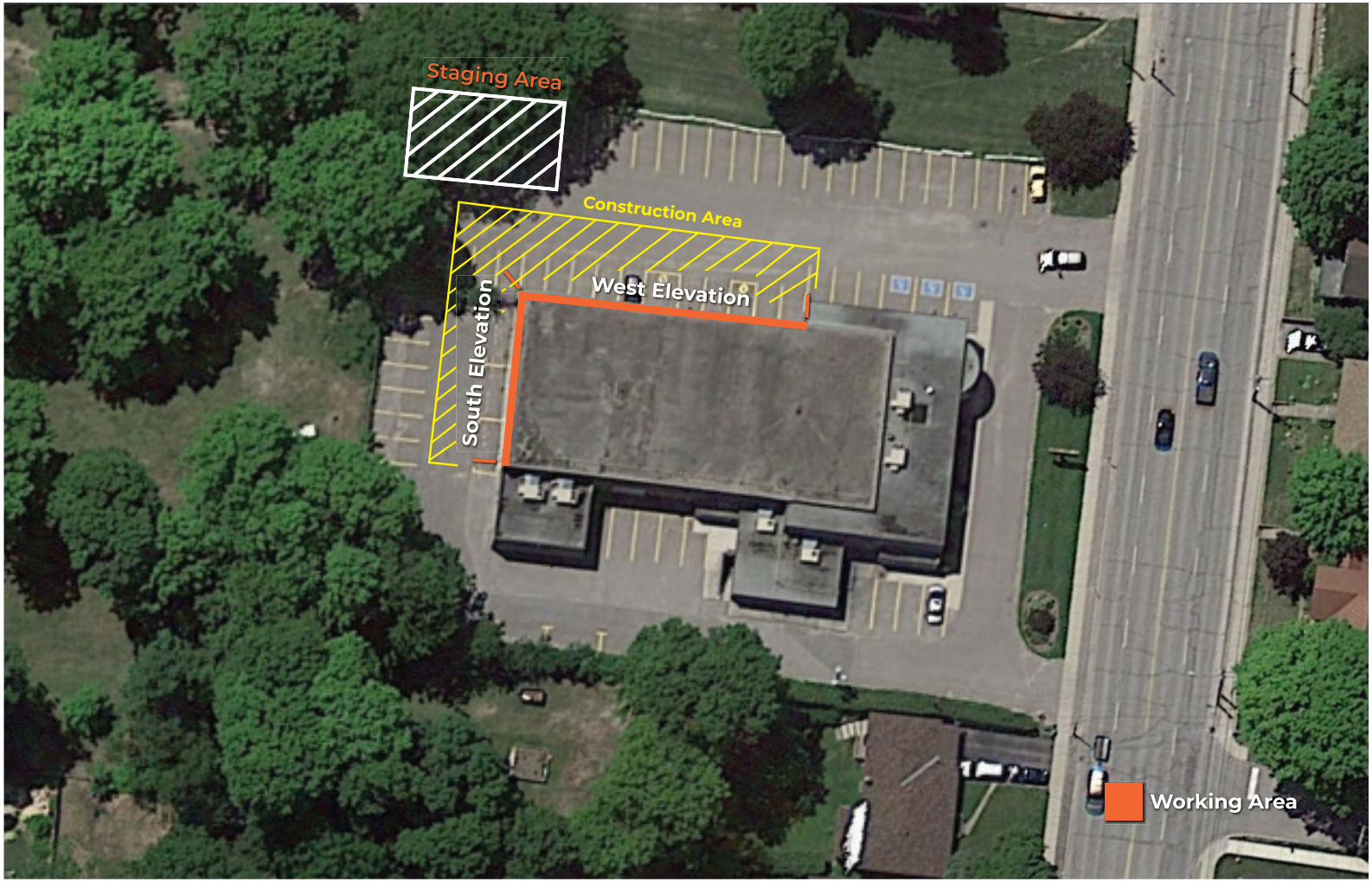
On-Site Machinery Required

40’ Scissor Lift

With a raised height of 40’ and a large platform workspace– this Scissor Lift will assist our installers during the installation process for quick and easy access.

On-site machinery requirement depends on the project.

Job Site Planning & Staging Area



Insulation & Wall Preparation

Insulation and wall preparation if needed.

Thermally Broken Bracket Installation

Vertical L-Angle Installation

16 Gauge GS - 1.5” x 1.5” L-Angle

Interlocking Channel Installation

1” Aluminum - ALLOY 6063 T6

Space between wall and interlocking channel for wiring.

Conduit Installation

DC cable for panel connection.

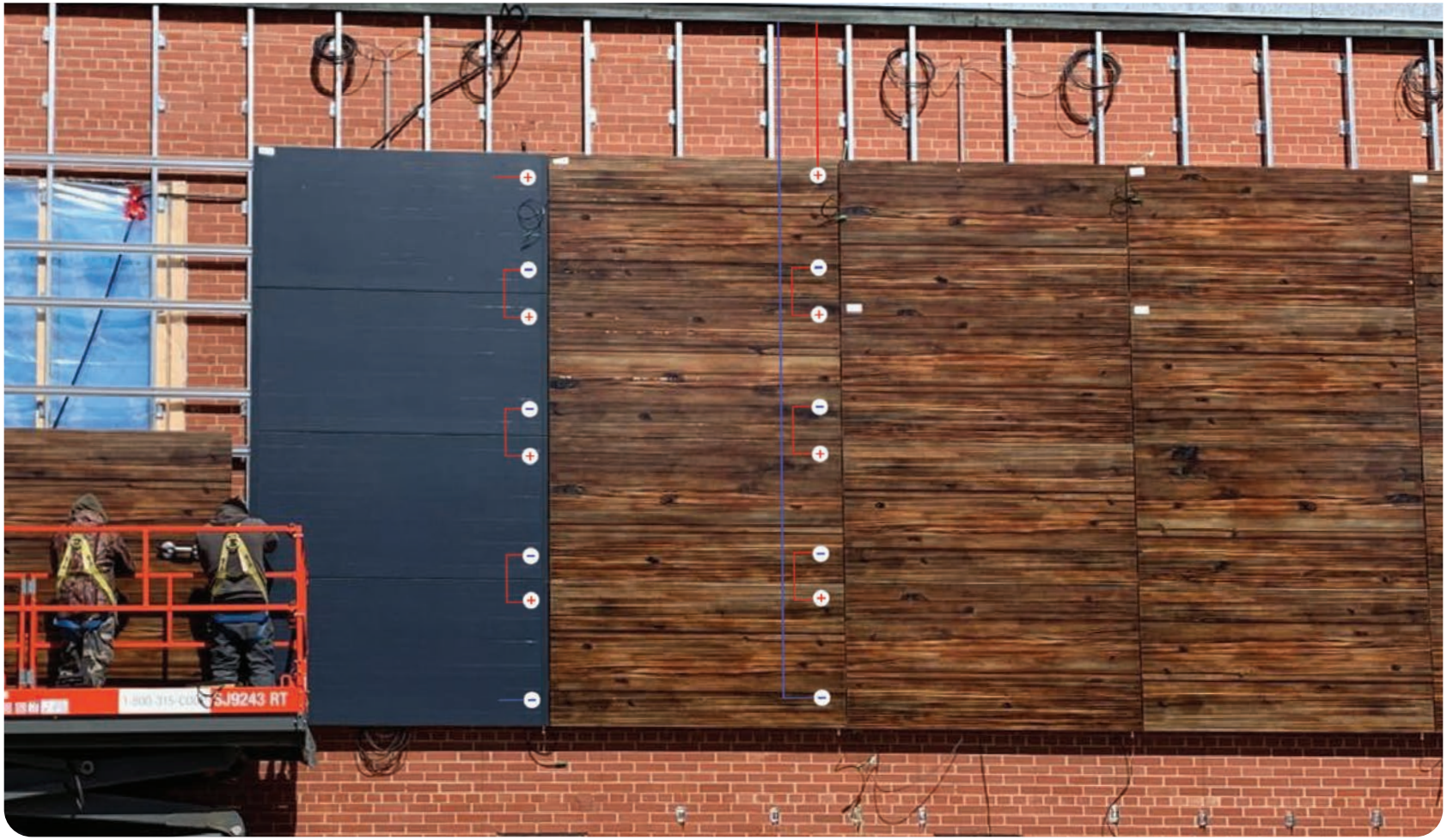
1 1/4” PVC electrical conduit.

Conduits Installation

Panel Installation

Interlocking Channels Attachment System.

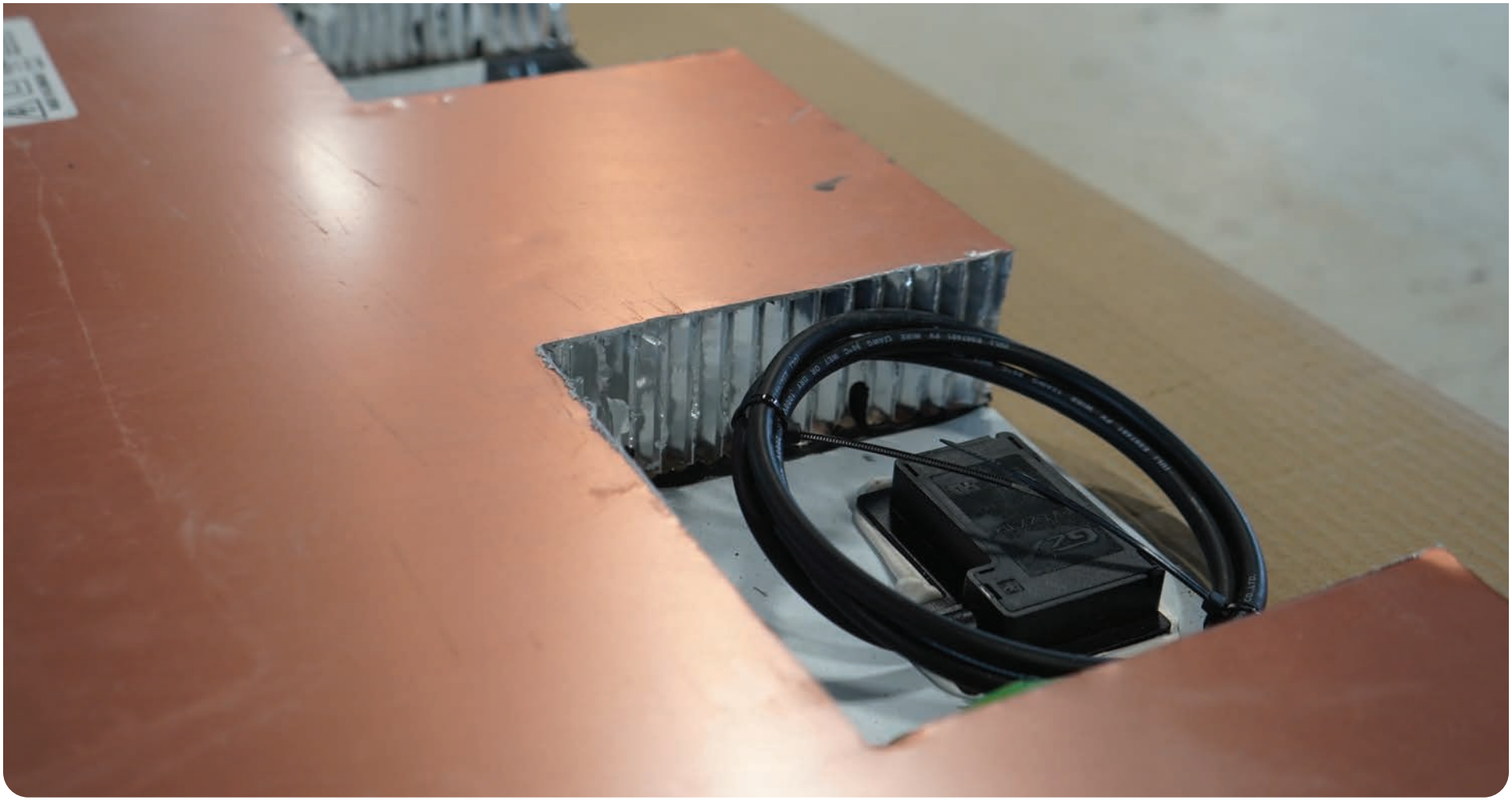
Electrical Connection Between Panels



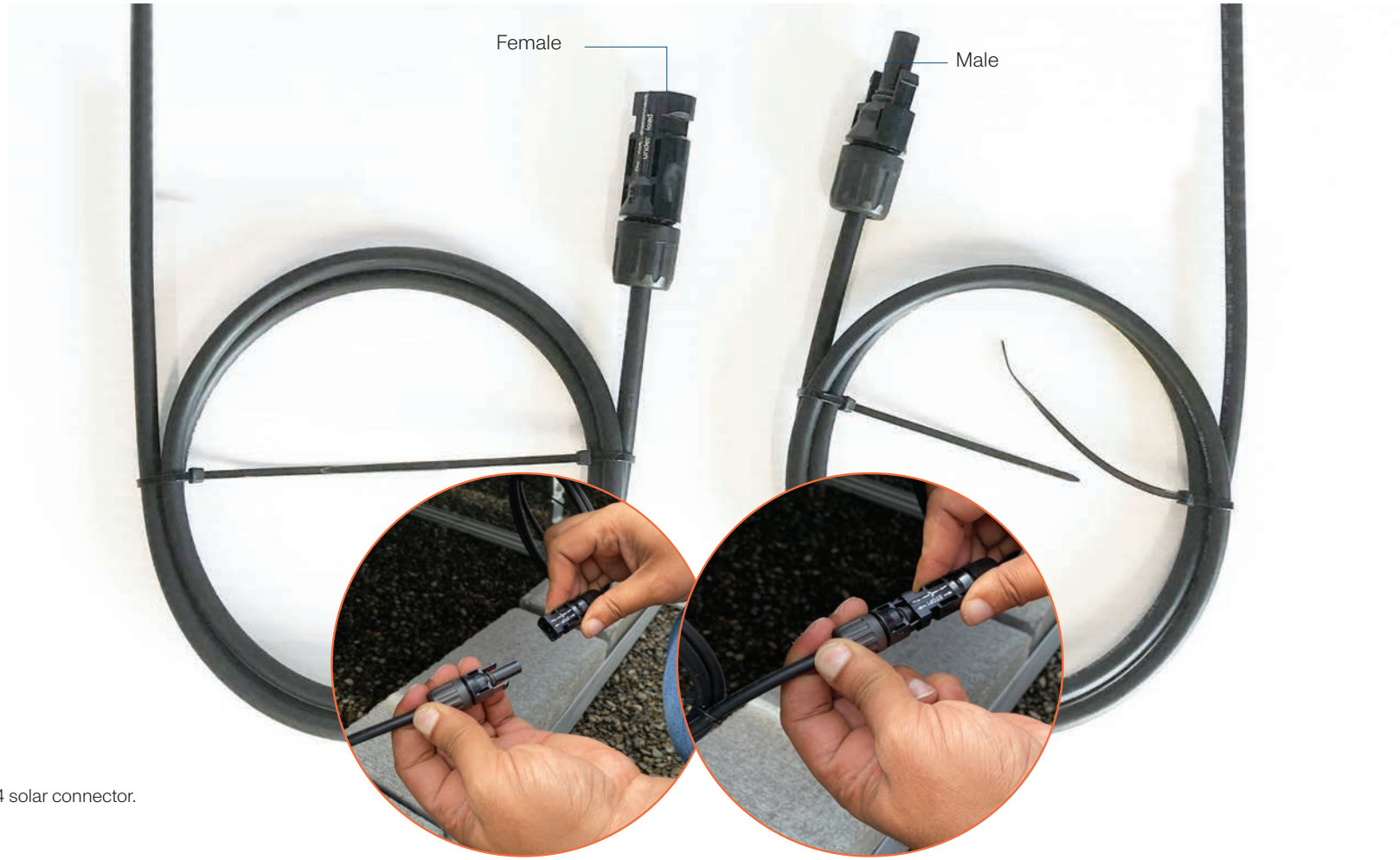
Grounding The Panels

Grounding methods

Panel Wiring



Electrical Connections - Panel To Panel



MC4 solar connector.

Electrical Connections - Panel To Panel

Electrical Connections - Installation

Electrical Connections - Installation

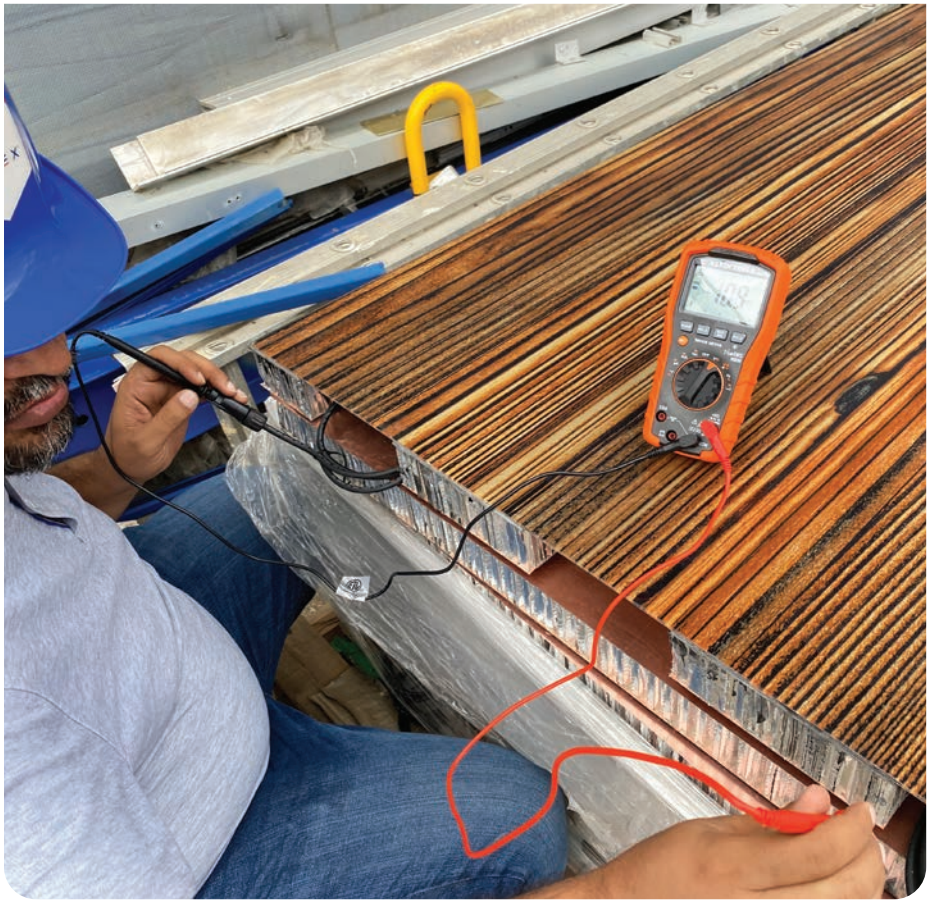
Panel to panel wiring hid behind the panels & run through conduit.

Home Run Cable To Inverter Connection

Panel to panel wiring run to the roof, through the conduits.

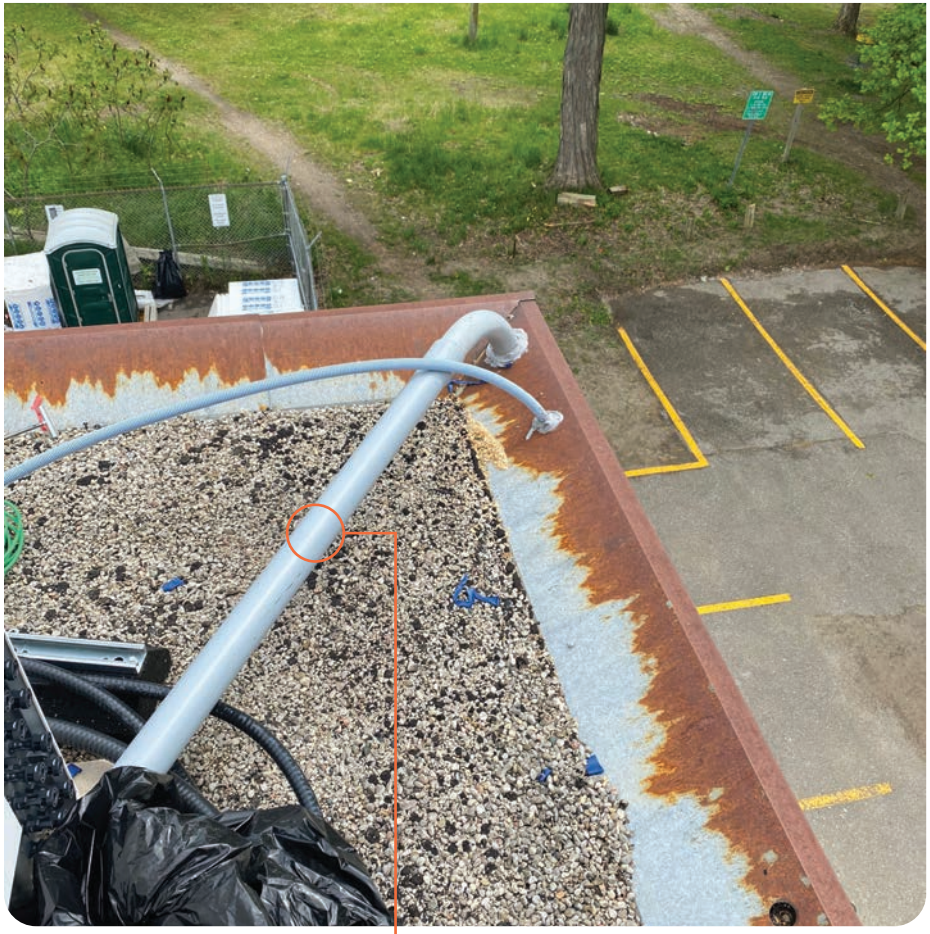
Home Run Cable To Inverter Connection Location

Electrical System Verification



Testing Voc of Facade Solar Panels

Electrical Connections - Panel To Inverter



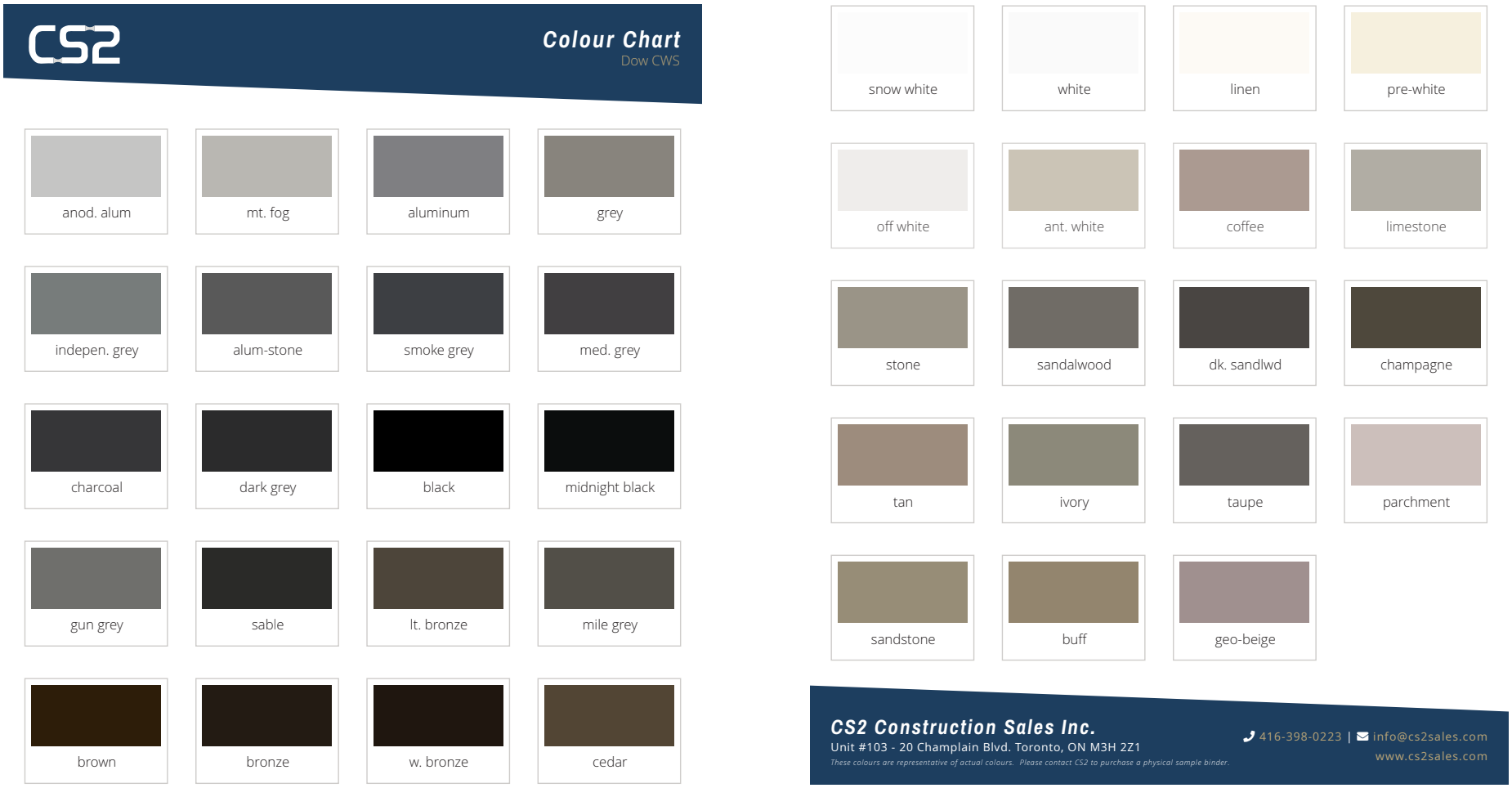
Wiring Set Up To The Building

Electrical Connections - Electrical Room

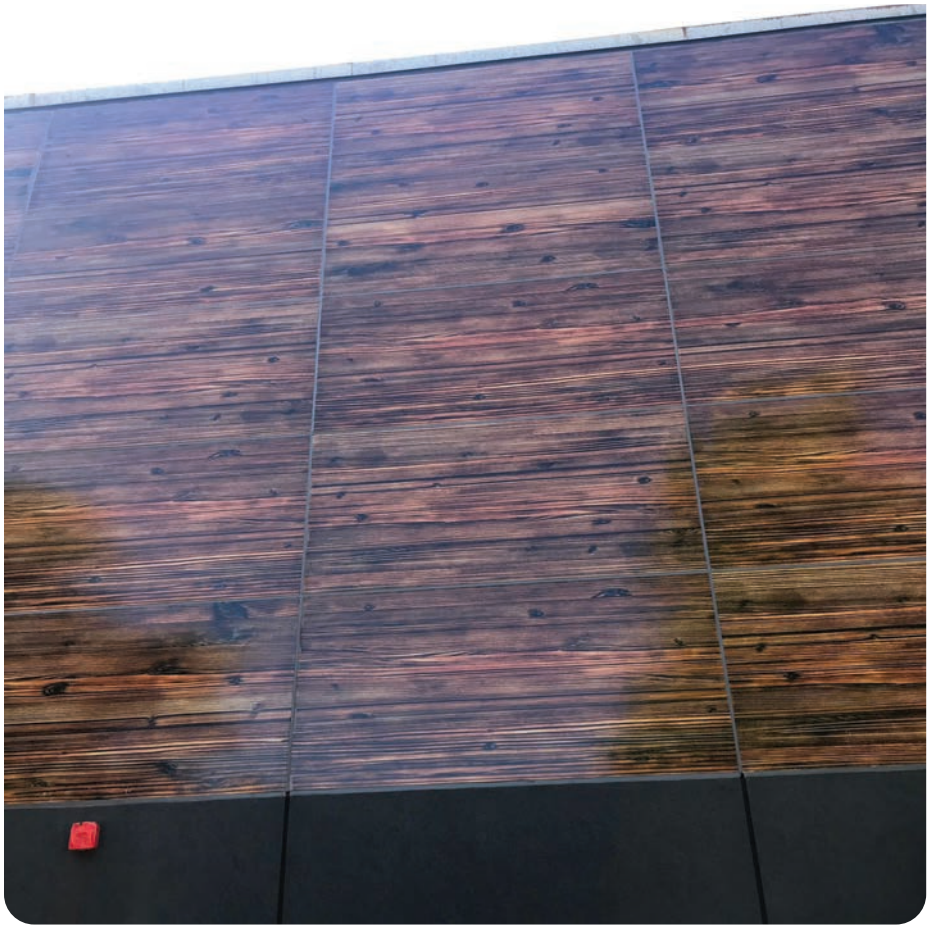
Wiring run to the electrical room.

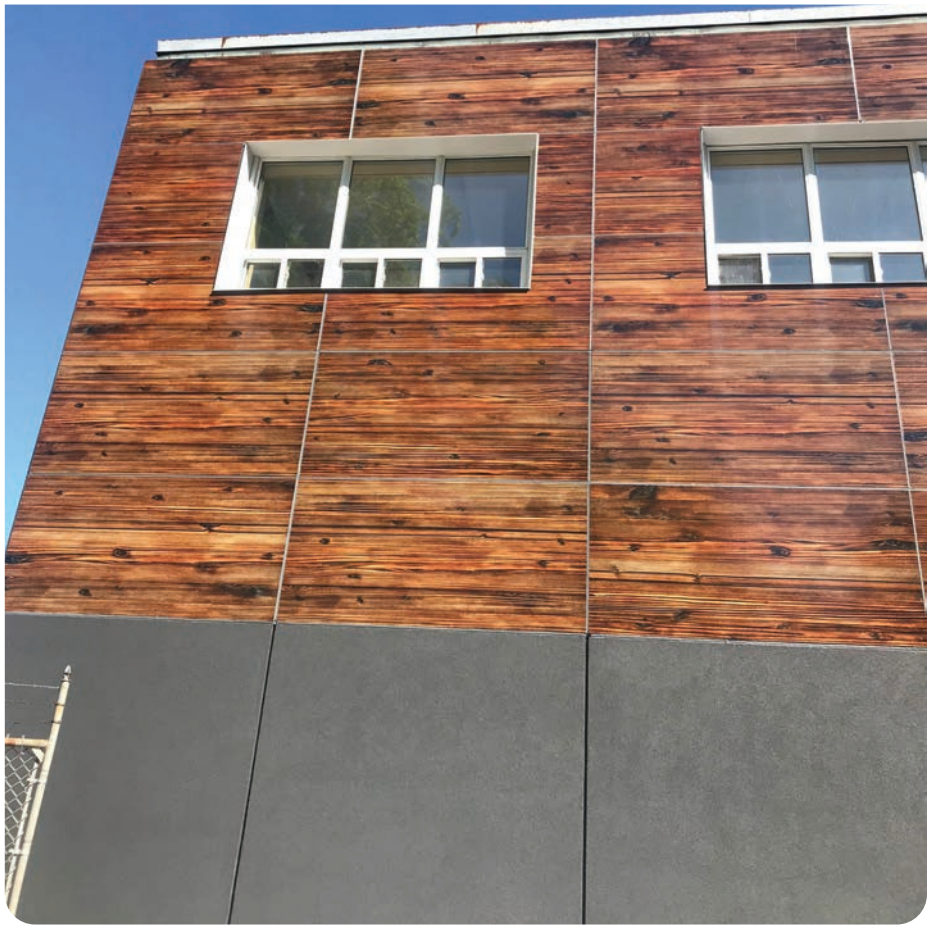
Installation Of Other Areas (If Needed)

Joints & Caulking: Different Options Available



Joints & Caulking: Different Options Available





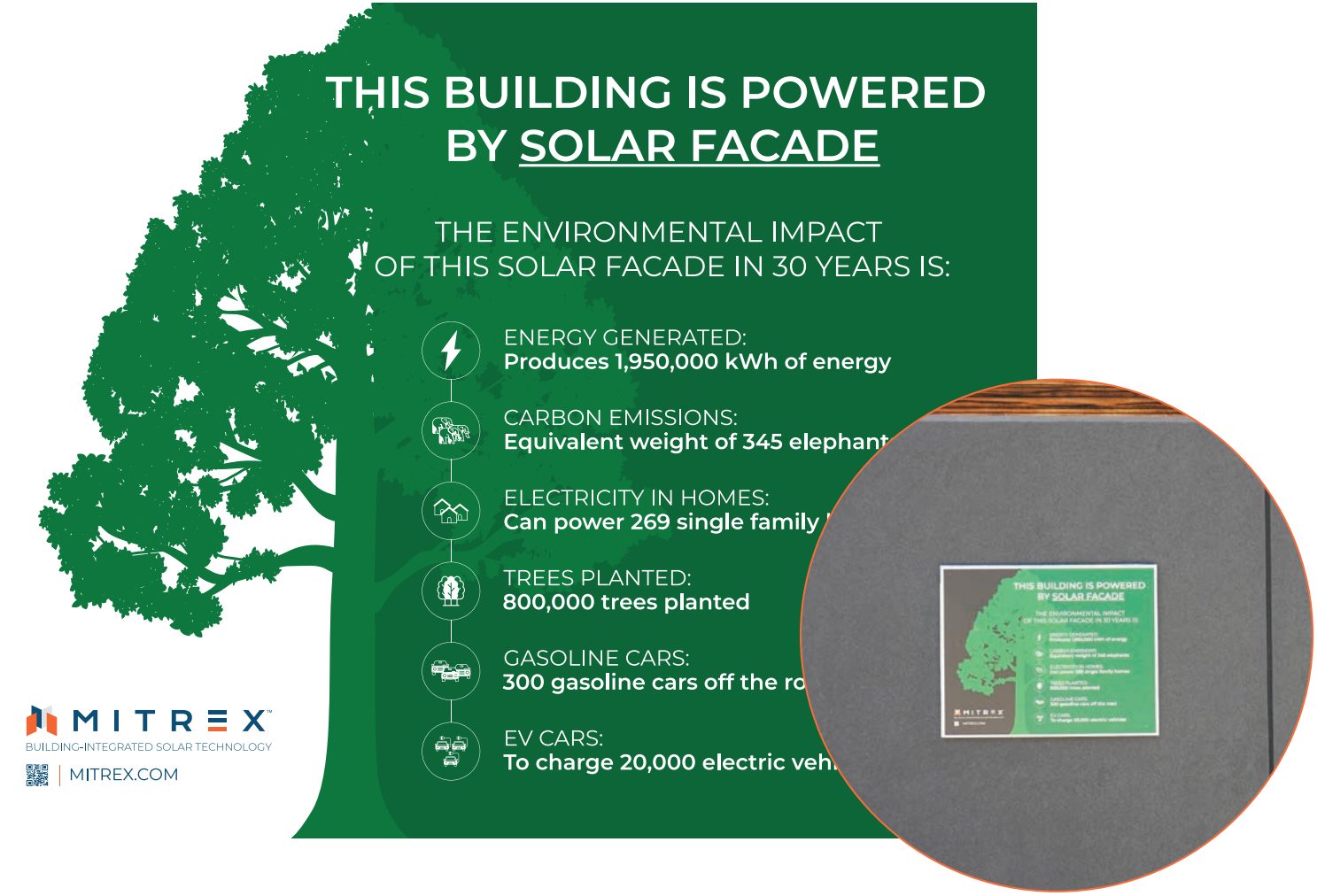
Where the Electricity Goes

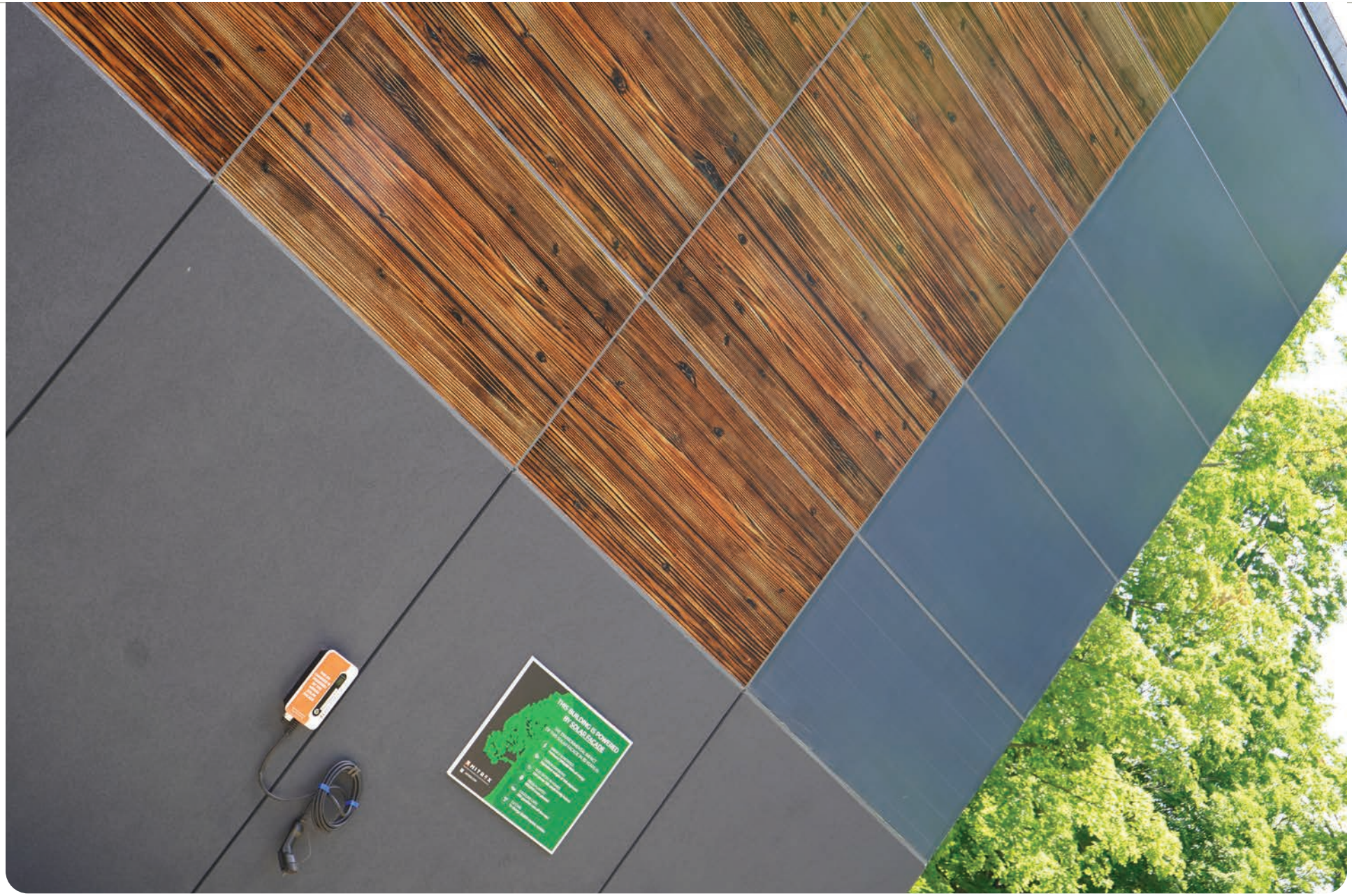
Electricity grid.

Goes back to the building.

Other applications - EV charger.

Environmental Impact

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