Garland Canada Inc.

Roof Asset Management Program

RAMP

City of Prince Albert

City of Prince Albert - Police Station Roof Inspection

Prepared For

Don Cheeseman

June 09, 2022

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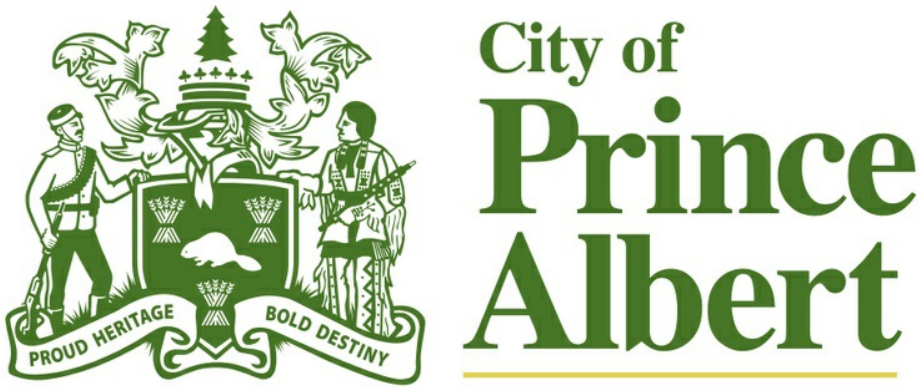
Client Data

Client: City of Prince Albert



Client Data

Name	City of Prince Albert		
Address 1	1084 Central Avenue		
City	Prince Albert	**Province**	Saskatchewan
Postal	S6V 7P3	**Country**	Canada

Contact Info

Contact Person	Don Cheeseman	**Title**	Facilities Project Coordinator
Mobile Phone:	-	**Office Phone:**	(306) 953-4800
Email:	dcheeseman@citypa.com		

Facility Summary

Client: City of Prince Albert

Facility: Police Station

Facility Data

Address 1	45 15 St W
City	Prince Albert
Province	Saskatchewan
Postal	S6V 3P4
Type of Facility	Municipal
Square Footage	13,496
Contact Person	Don Cheeseman

Asset Information

Name	Date Installed	Square Footage	Roof Access
Entire Roof	~1985	13,496	Attached Ladder

ROOF MEASUREMENT REPORT

45 15 St W, Prince Albert, SK S6V3P4

Report Contents

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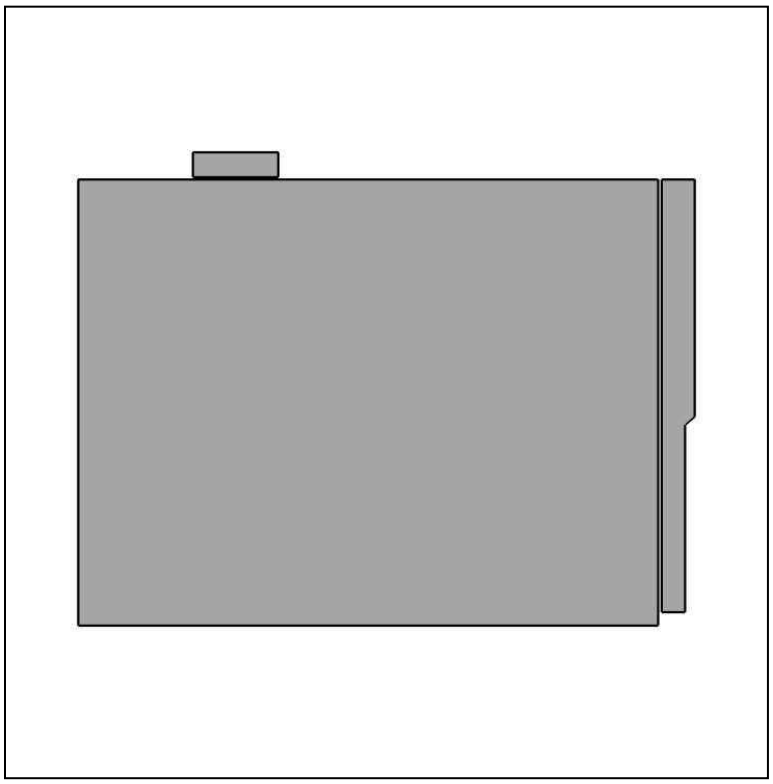
Report Details

Date:	05/26/2022
Report:	46280535

Roof Details

Total Area:	13,496 sq ft
Total Roof Facets:	3
Predominant Pitch:	0/12
Number of Stories:	>1
Total Ridges/Hips:	0 ft
Total Valleys:	0 ft
Total Rakes:	0 ft
Total Eaves:	0 ft
Total Penetrations:	41
Total Penetrations Perimeter:	281 ft
Total Penetrations Area:	316 sq ft



In this 3D model, facets appear as semi-transparent to reveal overhangs.

Contact Us

Contact: Brett Foote

Company: Garland Company Inc.

Address: 3800 East 91St
Cleveland OH 44105

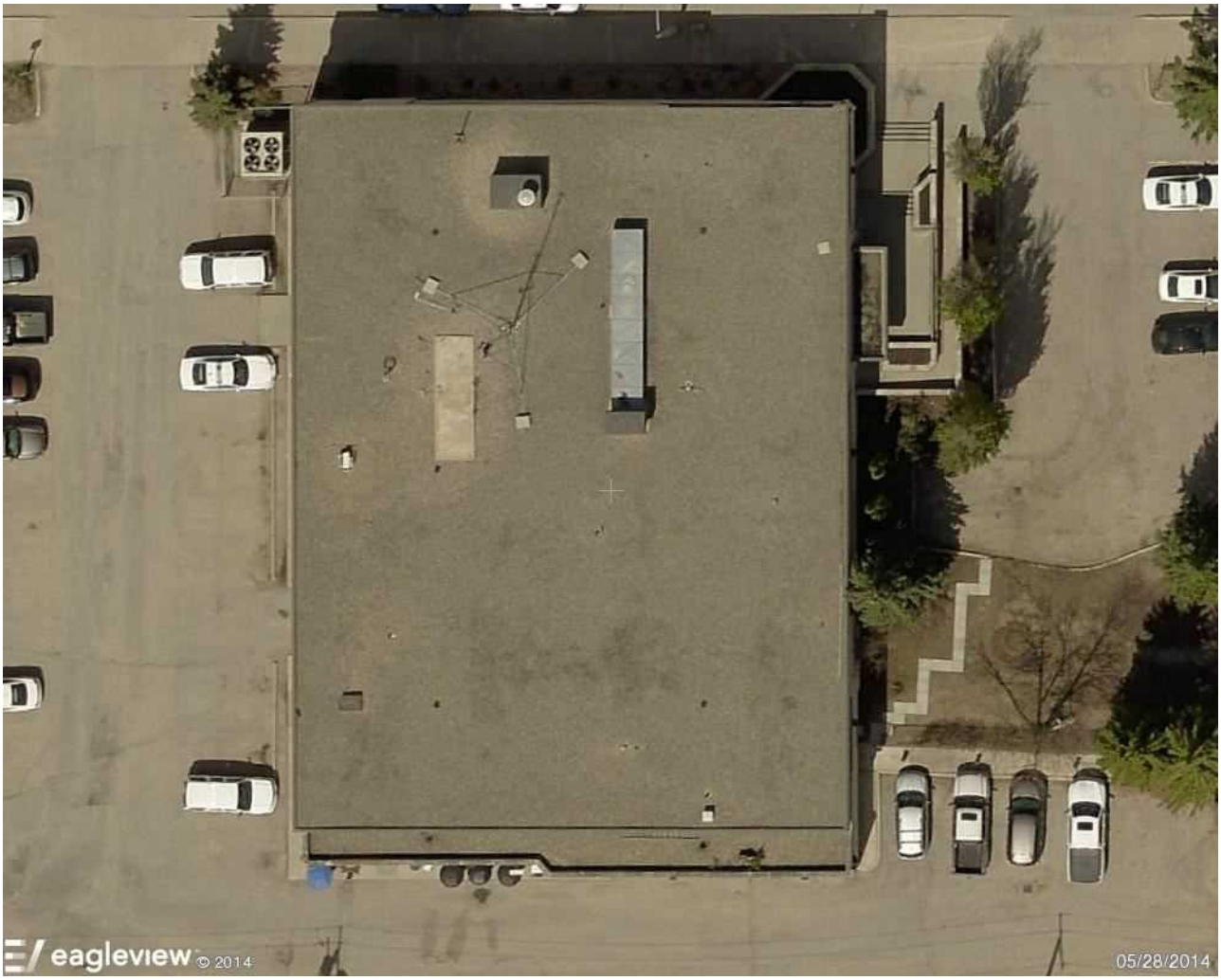
Phone: 306-914-3514

Measurements provided by www.eagleview.com

Certified Accurate
www.eagleview.com/Guarantee.aspx

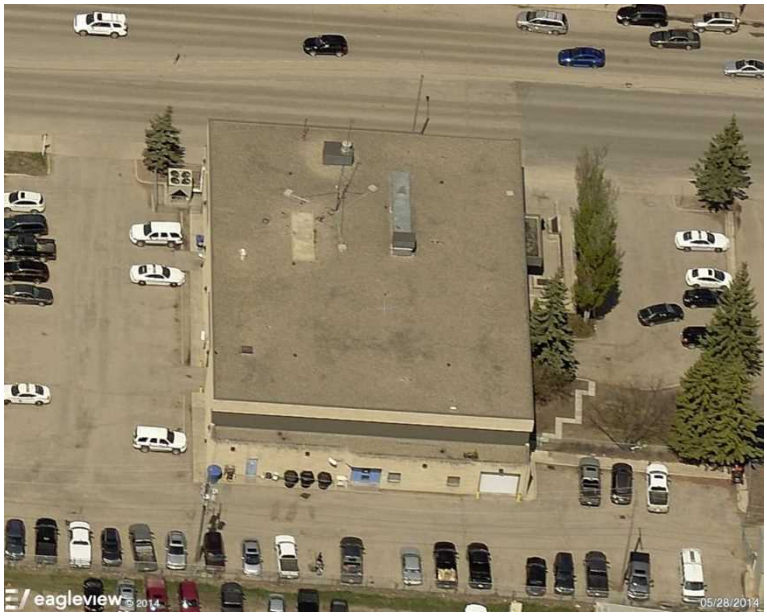
REPORT IMAGES

The following aerial images show different angles of this structure for your reference.

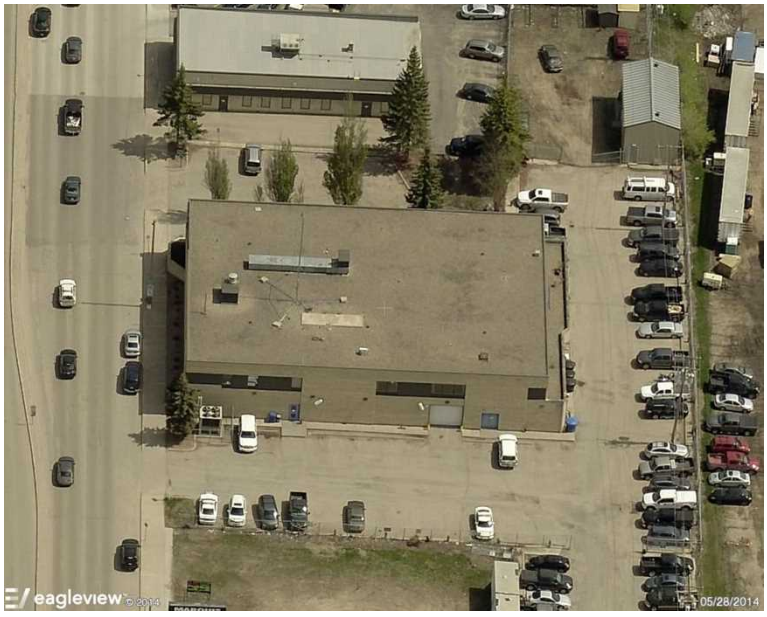


Top View

REPORT IMAGES

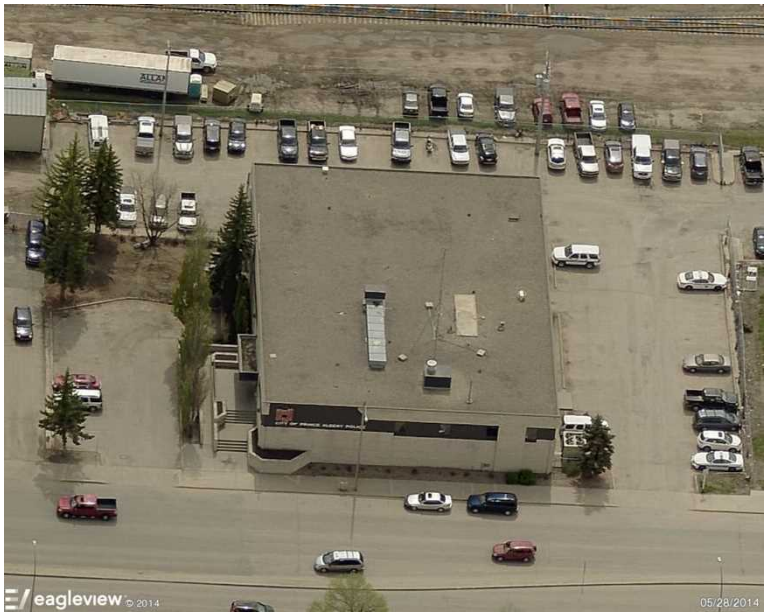


North View

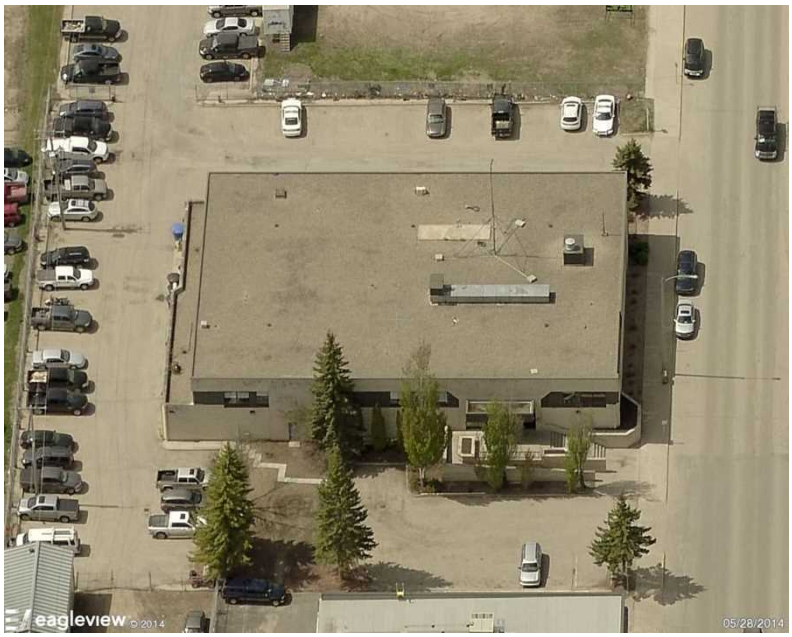


East View

REPORT IMAGES



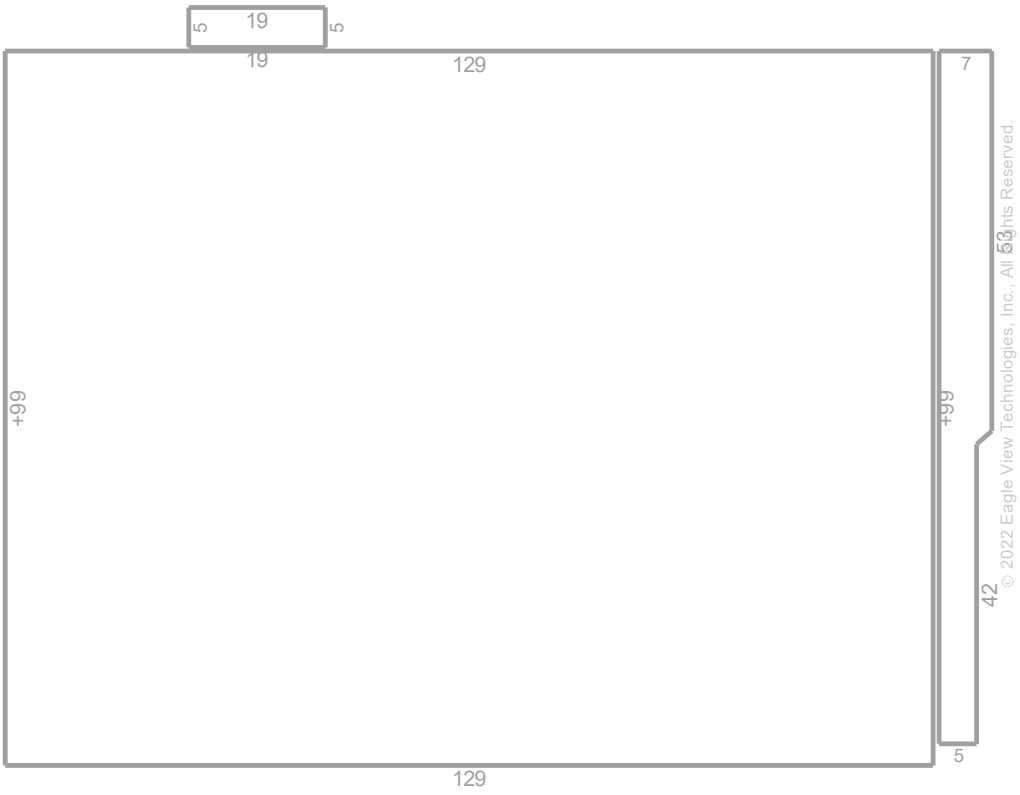
South View



West View

LENGTH DIAGRAM

Total Line Lengths:				
	Ridges = 0 ft	Valleys = 0 ft	Flashing = 0 ft	Eaves = 0 ft
	Hips = 0 ft	Rakes = 0 ft	Step flashing = 0 ft	Parapets = 711 ft



Note: This diagram contains segment lengths (rounded to the nearest whole number) over 5 feet. In some cases, segment labels have been removed for readability. Plus signs preface some numbers to avoid confusion when rotated (e.g. +6 and +9).

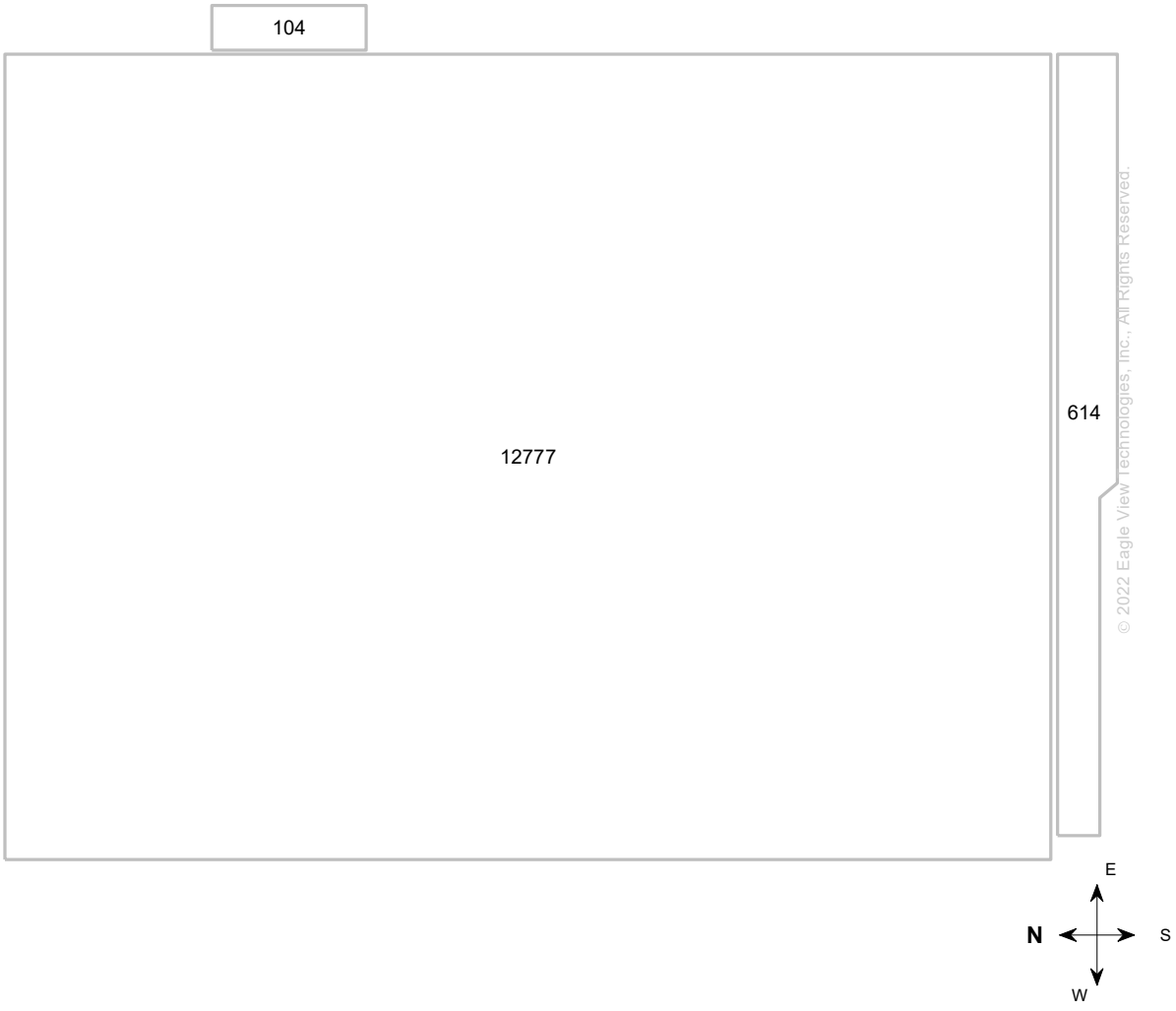
PITCH DIAGRAM

Pitch values are shown in inches per foot, and arrows indicate slope direction. The predominant pitch on this roof is 0/12.

Note: This diagram contains labeled pitches for facet areas larger than 20 square feet. In some cases, pitch labels have been removed for readability. Gray shading indicates flat, 1/12 or 2/12 pitches. If present, a value of "F" indicates a flat facet (no pitch).

AREA DIAGRAM

Total Area = 13,496 sq ft, with 3 facets.



Note: This diagram shows the square feet of each roof facet (rounded to the nearest foot). The total area in square feet, at the top of this page, is based on the non-rounded values of each roof facet (rounded to the nearest square foot after being totaled).

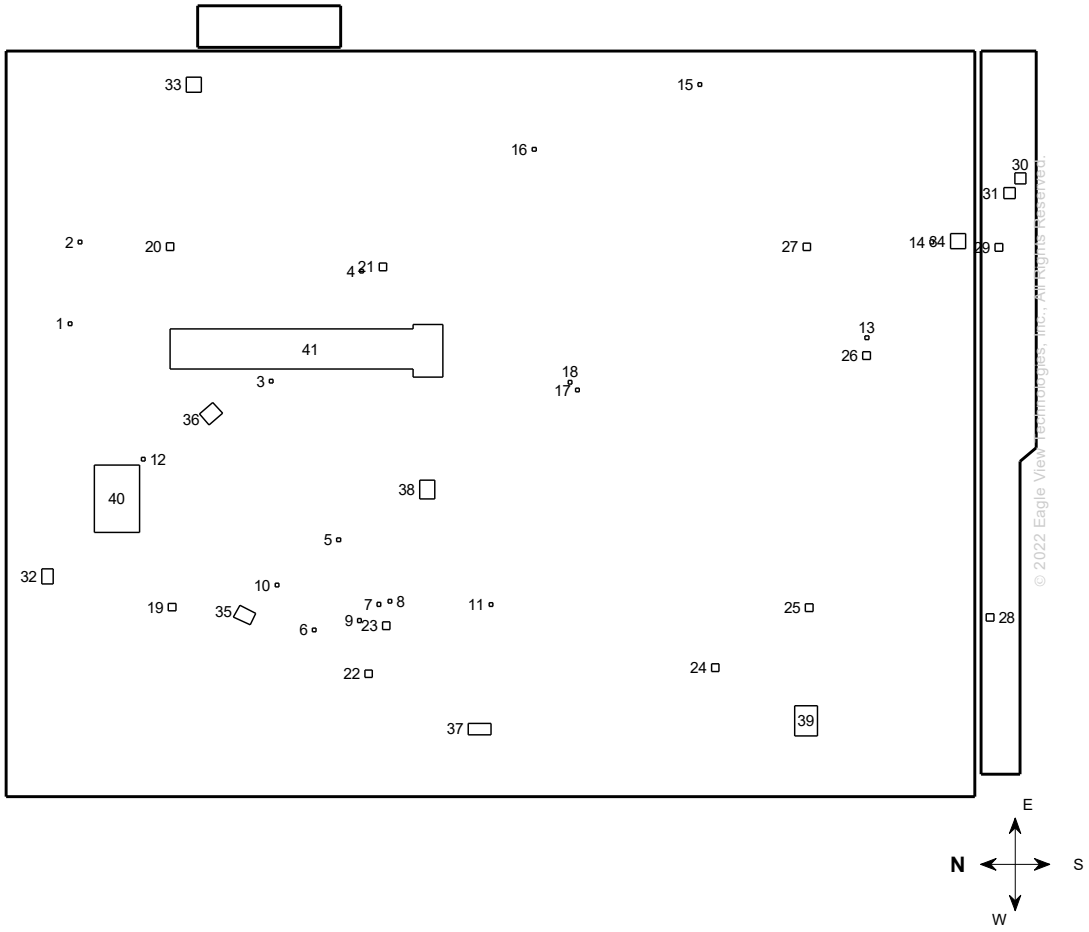
PENETRATIONS

Penetrations Notes Diagram

Penetrations are labeled from smallest to largest for easy reference.

Total Penetrations: 41
Total Penetrations Perimeter = 281 ft

Total Penetrations Area: 316 sq ft
Total Roof Area Less Penetrations = 13,180 sq ft



Note: Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

NOTES DIAGRAM

Roof facets are labeled from smallest to largest (A to Z) for easy reference.

Property Info

Property Location

Longitude = -105.7554977 Latitude = 53.1991115

Online map of property:
http://maps.google.com/maps?f=g&source=s_q&hl=en&geocode=&q=45+15+St+W,Prince+Albert,SK,S6V3P4

Property Info

Year Built:

Effective Year Built: *

*.

Notes

This was ordered as a commercial property. There were no changes to the structure in the past four years.

REPORT SUMMARY

Below is a measurement summary using the values presented in this report.

Lengths, Areas and Pitches

Ridge .....0 ft (0 Ridges)
Hips.....0 ft (0 Hips)
Valleys .....0 ft (0 Valleys)
Rakes* .....0 ft (0 Rakes)
Eaves/Starter**.....0 ft (0 Eaves)
Drip Edge (Eaves + Rakes) .....0 ft (0 Lengths)
Parapet Walls.....711 ft (14 Lengths)
Flashing .....0 ft (0 Lengths)
Step Flashing .....0 ft (0 Lengths)
Total Area .....13,496 sq ft
Total Penetrations Area.....316 sq ft
Total Roof Area Less Penetrations.....13,180 sq ft
Total Penetrations Perimeter.....281 ft
Predominant Pitch.....0/12

Total Roof Facets = 3

*Rakes are defined as roof edges that are sloped (not level).
** Eaves are defined as roof edges that are not sloped and level.

Areas per Pitch

Roof Pitches	0/12
Area (sq ft)	13495.8
% of Squares	100%

The table above lists each pitch on this roof and the total area and percent (both rounded) of the roof with that pitch.

Waste Calculation Table

Waste %	0%	10%	12%	15%	17%	20%	22%
Area (sq ft)	13,496	14845.6	15115.5	15520.4	15790.3	16195.2	16465.1
Squares	135.0	148.5	151.2	155.2	157.9	162.0	164.7

This table shows the total roof area and squares (rounded up to the nearest decimal) based upon different waste percentages. The waste factor is subject to the complexity of the roof, individual roofing techniques and your experience. Please consider this when calculating appropriate waste percentages. Note that only roof area is included in these waste calculations. Additional materials needed for ridge, hip, valley, and starter lengths are not included.

Parapet Calculation Table

Wall Height (ft)	1	2	3	4	5	6	7
Vertical Wall Area (sq ft)	711	1422	2133	2844	3555	4266	4977

This table provides common parapet wall heights to aid you in calculating the total vertical area of these walls. Note that these values assume a 90 degree angle at the base of the wall. Allow for extra materials to cover cant strips and tapered edges.

Penetration Table	1-18	19-29	30-31	32	33-34	35	36	37	38	39
Area (sq ft)	0.2	1	2.2	3	4	4.2	4.5	4.5	5	12
Perimeter (ft)	2	4	6	7	8	8.4	8.6	9	9	14

	40	41
Area (sq ft)	54	201.2
Perimeter (ft)	30	86.6

Any measured penetration smaller than 3x3 feet may need field verification. Accuracy is not guaranteed. The total penetration area is not subtracted from the total roof area.

5/27/2022

Re: CLEAR Program Test Results
Project: RD-414-417

Dear Brett,

Thank you for sending your roof core samples for testing through the CLEAR program. We have completed comprehensive testing of your sample and the results are included with this package. Your test results may include the analysis of the items requested, such as:

- Tensile Strength
- Inter-ply/Surface Bitumen Softening Point/Penetration
- Ply/Bitumen and Scrim Type
- Number of Plies
- Bitumen Weight/Application Rate
- Flexural Strength

Now that you have the results, as a reminder, some objectives of this program are to help you to answer questions like:

- Is the roof failing? Why?
- Expected remaining useful life, approximately?
- Does this sample indicate that this roof needs replaced? Or is this a possible restoration candidate?
- Were there application errors during installation?

If you are looking to restore the roof and these results show this to be a potential candidate, but you need to truly determine if this is a good option for the client, the next steps are:

- Reference the Restoration warranty System Overview document on the Garland HQ.
- Full visual inspection of the rest of the roof and if conditions are suitable
- A quality moisture survey (Infrared or Nuclear) to determine whether the roof is dry enough and what areas of the roof need to be replaced
    - Less than 30% moisture contained within the system is a good benchmark for a cost-effective option versus a replacement
    - A stamped engineering report is best, if possible
- Determine whether the flashings and penetration points need to be replaced, rather than only coated to make the desired restoration warranty period
- Consider which Garland restoration systems make sense. If you are unsure, reach out to the Product Management Team for assistance.

If you have questions about these test results, feel free to call Derek Scavuzzo at 216-430-3520.

Sincerely,
The Garland Laboratory Team

since 1895

The Garland Company, Inc.
www.garlandco.com
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Police Station

Property	*Core Sample*	*Test Method*	*Notes*
Core Size	13” x 11.5”	ASTM D2829	N/A
Core Weight	2.51 lbs	ASTM D2829	N/A
Surfacing Type	IRMA	Visual	N/A
Ply Type	Felt Paper Felt Paper Felt Paper Felt Paper	ASTM D2829	N/A
Number of Plies	4	ASTM D2829	N/A
Bitumen Type	Asphalt	Solvent Test	N/A
Interply Softening Point	206.2 °F	ASTM D3461	Out of range per type III asphalt
Flood Coat Softening Point	225.2 °F	ASTM D3461	Out of range per type IV asphalt
Pen	20 dmm/ 5 sec	ASTM D5	Within range per type III asphalt
Flexural Strength	N/A	NBS	N/A
Puncture	102.8 lbf	NBS	Exceeded recommended 5 lb minimum
Tensile Strength	N/A	ASTM D2523	N/A
Elongation	N/A	ASTM D2523	N/A

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Police Station Conclusion

The 30 year old core sample is from a 4 ply inverted roofing membrane assembly (IRMA) with felt paper interplies in an asphalt adhesive. The interplies were very easily delaminated by hand as shown in Figure 9. The interplies and overall thickness of the core imply that the system was installed at a lower than specified temperature resulting in thick, viscous layers. The thickest point of adhesive was measured at 125 mils. A typical interply thickness when installed correctly is between 32-40 mils. Due to the overall thickness of the core, specimens could not be cut for tensile, elongation, and flexural strength. A surface coating was used on the membrane, which is unusual for an IRMA system. Instead, a final layer such as paving stones typically protect the membrane from the elements. The softening point and pen tests show that the asphalt adhesive and flood coat responsible for keeping the system intact has lost its oils over time, causing the system to become more brittle. The sample performed well when undergoing puncture testing, implying that the system can withstand foot traffic and most weather phenomena.

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Figure 7: Police Station top view.

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Figure 8: Police Station bottom view.

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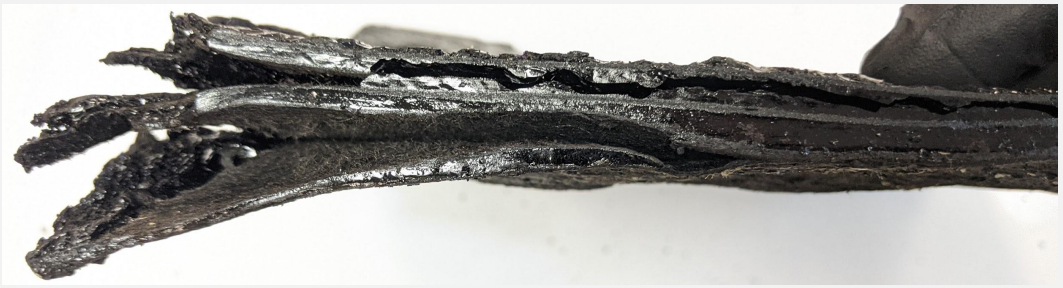
Figure 9: Police Station side profile.	 

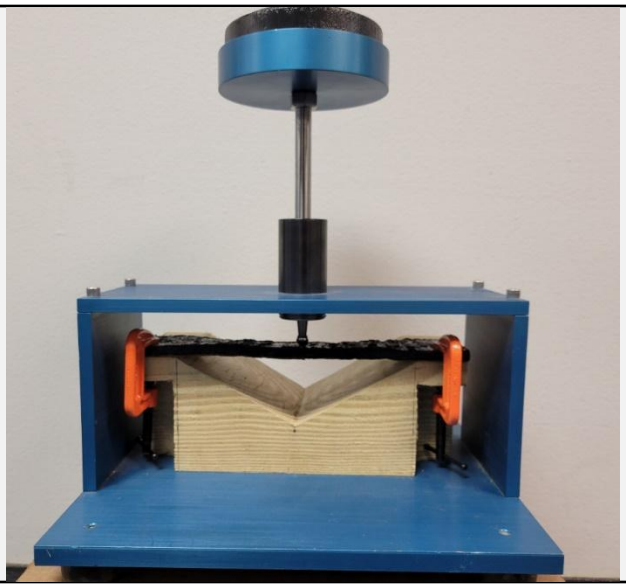
Figure 17: Sample image of the flexural strength testing apparatus.	

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Photo Report

Client: City of Prince Albert
Facility: Police Station
Roof Section: Entire Roof

Report Date: 05/26/2022
Title: Police Station Initial Inspection

Photo 1

Roof Section - I.R.M.A.

In a protected membrane roof, also known as an **inverted roof membrane assembly** (IRMA), the insulation is installed on top of the membrane.

CLEAR Analysis: The 30 year old core sample is from a 4 ply inverted roofing membrane assembly (IRMA) with
felt paper interplies in an asphalt adhesive. The interplies were very easily delaminated by hand as shown in Figure 9. The interplies and overall thickness of the core imply that the system was installed at a lower than specified temperature resulting in thick, viscous layers. The thickest point of adhesive was measured at 125 mils. A typical interply thickness when installed correctly is between 32-40 mils.
Due to the overall thickness of the core, specimens could not be cut for tensile, elongation, and
flexural strength. A surface coating was used on the membrane, which is unusual for an IRMA system.
Instead, a final layer such as paving stones typically protect the membrane from

the elements. The softening point and pen tests show that the asphalt adhesive and flood coat responsible for keeping the system intact has lost its oils over time, causing the system to become more brittle. The sample performed well when undergoing puncture testing, implying that the system can withstand foot traffic and most weather phenomena.

Photo 2

Insulation: Extruded polystrene insulation beginning to shrink from exposure to UV and other elements. EPS also experiences post- molding shrinkage; it shrinks dimensionally from its molded size after processing.

Photo 3

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

Photo 4

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

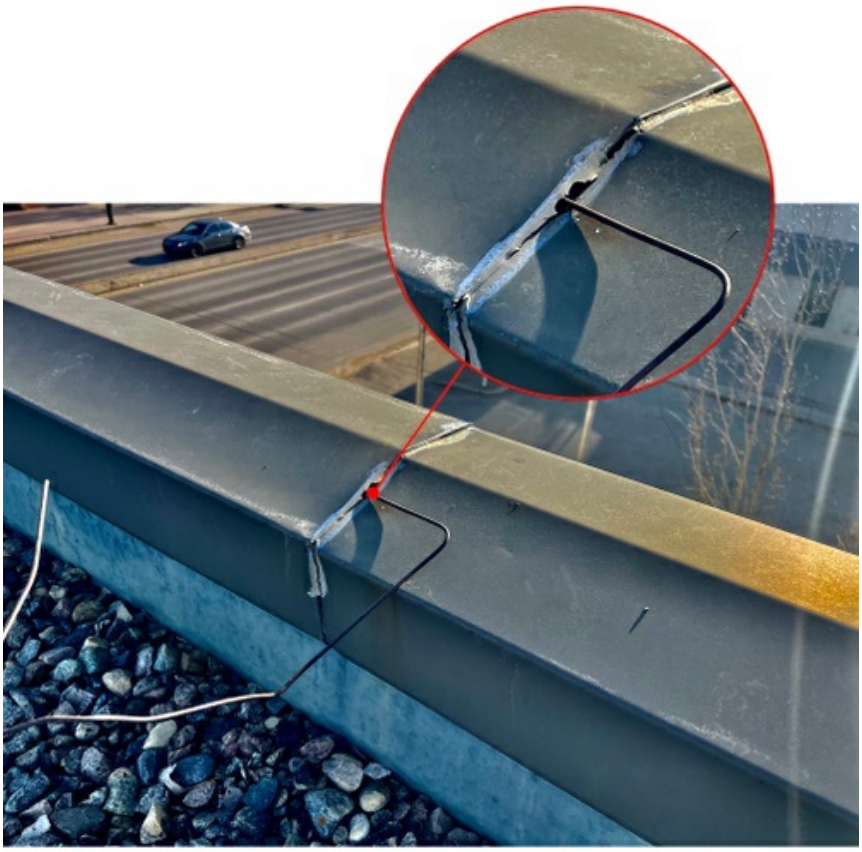

Photo 5

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

Photo 6

Drain Screen: Cracked

Photo 7

Insulation: Extruded polystrene insulation beginning to shrink from exposure to UV and other elements. EPS also experiences post- molding shrinkage; it shrinks dimensionally from its molded size after processin

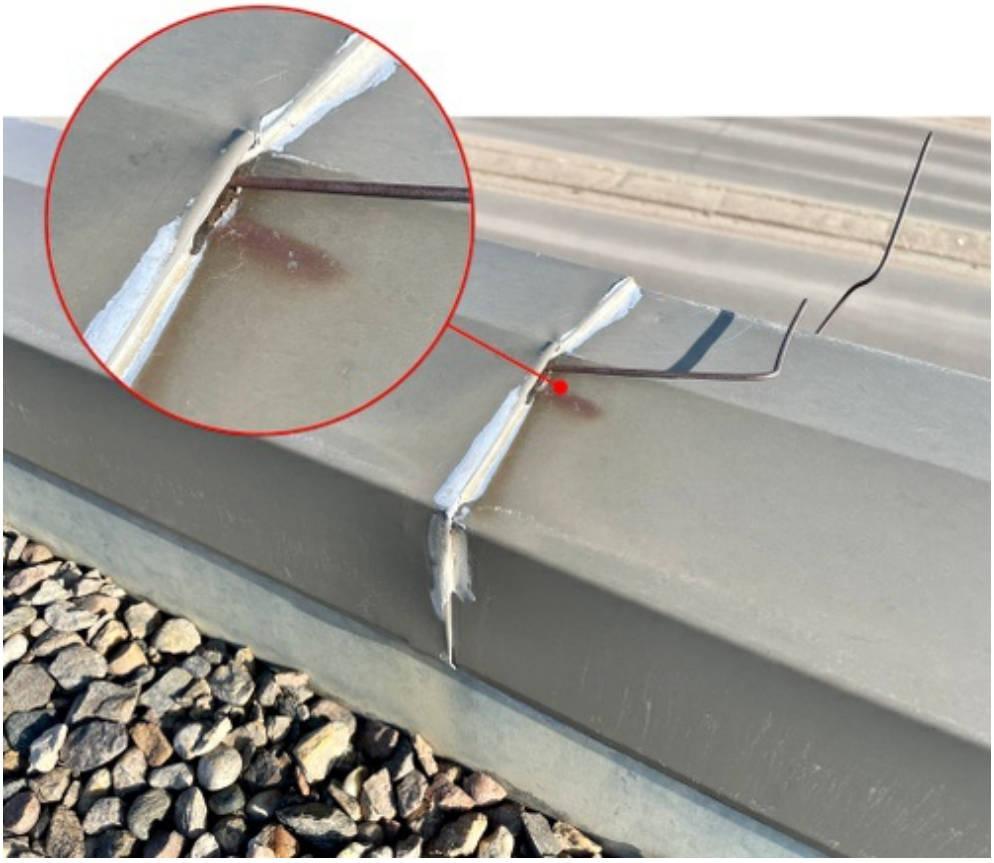

Photo 8

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

Photo 9

Caulking Deterioration: As caulking is exposed to UV rays and temperature fluctuations it loses its flexibility and develops cracks. Once this occurs splits develop allowing water to penetrate walls and buildings causing damage as well as leaks.

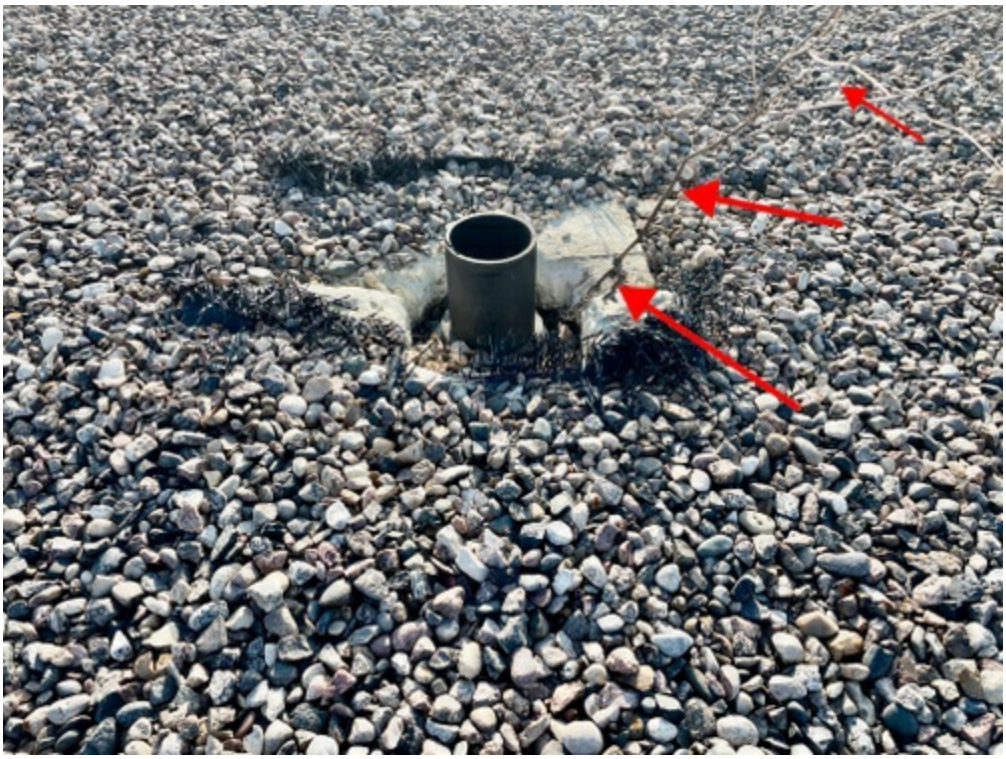

Photo 10

Insulation: Extruded polystrene insulation beginning to shrink from exposure to UV and other elements. EPS also experiences post- molding shrinkage; it shrinks dimensionally from its molded size after processing.

Photo 11

Insulation: Extruded polystrene insulation beginning to shrink from exposure to UV and other elements. EPS also experiences post- molding shrinkage; it shrinks dimensionally from its molded size after processing.

Photo 12

CLEAR Membrane Analysis: Fire extinguisher present when torch is being used

Photo 13

CLEAR Membrane Analysis: Removal of EPS insulation to get to water proofing membrane

Photo 14

CLEAR Membrane Analysis: Removal of waterproofing membrane

Photo 15

CLEAR Membrane Analysis: Properly cleaning and drying area before repair

Photo 16

CLEAR Membrane Analysis: Repairing CLEAR membrane sample

Photo 17

CLEAR Membrane
Analysis: EPS put back into place

Photo 18

CLEAR Membrane
Analysis: Covered with gravel and returned to its previous condition

Solution Options

Client: City of Prince Albert

Facility: Police Station

Roof Section: Entire Roof

Replace Options			
Solution Option:	Replace	**Action Year:**	2024
Square Footage:	13,496	**Expected Life (Years):**	30
Budget Range:	$390,000.00 - $455,000.00		

Scope of Work: Replacement

1. Remove all roof components to roof deck;
2. Install new vapour barrier, cold applied with adhesive;
3. Install new polyisocyanurate insulation, set in hot asphalt;
4. Install new wood fiberboard, set in hot asphalt;
5. Install new SBS modified bitumen generic base sheet, set in hot asphalt;
6. Install new SBS modified bitumen cap sheet, set in hot asphalt;
7. Install new surfacing of gravel adhered in hot asphalt;
8. Install new drains, vents, and steel flashings.