W E T H E R H O L T A N D A S S O C I A T E S , I N C .

FIDALGO MARINA
ROOF EVALUATION
SEPTEMBER 6TH, 2024

for

Fidalgo Marina
3101 V Place
Anacortes, Washington 98221

Attn: Ed Stubbs

October 4, 2024

2408-04A1

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October 4, 2024
2408-04A1

Fidalgo Marina
3101 V Place
Anacortes, Washington 98221

Phone #: 425-466-7409

Attn: Ed Stubbs

Sent via email: edst@msn.com

Ref: Fidalgo Marina – Roof Evaluation
3101 V Place
Anacortes, Washington 98221

Greetings,

At the request of Ed Stubbs, this writer and Mike Caniglia (Wetherholt), met with him and Tim (Fidalgo Marina Maintenance) on September 6th, 2024, at Fidalgo Marina in Anacortes. The purpose of our visit was to evaluate the condition of the sheet metal roofs covering the boat slips.

The marina roofs were accessed via a fixed caged ladder and roof hatch.

Weather conditions during the site visit included clear skies and approximately 77ºF. to 83ºF. temperatures.

Items of Understanding

- Project drawings, dated 6/16/92, were provided to Wetherholt by Mr. Stubbs.
- The metal panel roofs were reportedly replaced in 1996 due to snow damage.
- We understand that during the 1996 installation of the existing roof, several sheet metal panels stored on the roof blew off and required replacement with other similar roof panels.
- Roof related leakage was reported mainly along the gutter edge, with some sporadic leaks observed in the field.
- The existing insulation condensate blanket installed on the underside of the roof has fallen off in areas or has been manually removed by maintenance staff due to ongoing bird damage.
- Mr. Stubbs requested Wetherholt review the existing sheet metal roofs to determine approximately remaining life and provide options for repair or replacement.
- We understand that increased daylighting of the Fidalgo Marina roofs will be required by 2034, based upon Department of Natural Resources lease requirements.

Observations

The marina structure reportedly covers 55 boat slips and is primarily oriented north to south with a central ridge line. The south-most roof is oriented east to west and connects to the south end of the primary roof area. The south roof steps up slightly higher along the peaked ridge.

The roof is accessed via a more recently installed centrally located fixed ladder and roof hatch, stamped with date of 10/10/2021. There is cricket to promote drainage around the roof hatch.

The roof is configured with 39-inch-wide 24-gauge exposed fastener prefinished corrugated sheet metal roof panels secured to steel Z-purlins attached to a steel structure.

Sheet metal roof panels are typically installed two panels per run with a sealed end-lapped transitions. Sealant applied within the sidelaps and endlaps of the sheet metal panels was observed to be deteriorated and unadhered in several areas.

Panels fasteners include rubber gasketed hex head screws, installed through the sidelaps and in the field of the panels. Various fasteners are observed to be corroded, covered with sealant, missing, or backed out.

The roofs slope approximately ½-inch per foot.

The roof is drained via external hung box-style gutters with 10-foot endlapped sections that are reliant upon sealant. Gutter expansion joints configured at approximately 40-feet on center. The gutter is in poor condition and leaks, due to extensive corrosion occurring in the bottom surface and ongoing deterioration of sealant reliant joints.

Gutter downspouts terminate at the dock, and discharge into the sound. The bottom ends of the downspouts appear to include filter socks.

The underside of the roof panels is covered with a condensate blanket consisting of fiberglass batt insulation and a white membrane vapor retarder secured with sheet metal straps, and taped at the seams. Several areas of the condensate blanket were missing, due to reported blow off or manual removal. The white vapor retarder was observed to be deteriorated in areas.

An approximately 5-foot strip of corrugated prefinished sheet metal soffit panels are installed along the underside of the eave.

The metal roof panels are terminated at the ridge with prefinished ridge cap, or prefinished transition flashings at vertical step-up transitions, both secured with gasketed fasteners placed through the flashings into the top flutes of the corrugated panels. Foam closures are lacking between the ridge flashings and the metal roof panels.

A bellows type expansion joint, with sheet metal side flanges, is installed between the main north/south oriented roof and the south roof. The expansion joint is secured through the metal flanges to the adjacent sheet metal flashings. The metal flanges of the expansion joint are corroded, breaking through the fasteners utilized to secure the flanges.

At the south roof step up transitions, prefinished roof-to-wall sheet metal flashing is installed extending approximately 12-inches onto the lower roof panels and tucks under the sheet metal rake flashing. The roof-to-wall flashing is secured with neoprene gasketed fasteners through the top flute of roof panel and vertical flashing overlap. Laps of the roof-to-wall flashing appear to be missing sealant and have large gaps.

Surface algae and lichen was observed to be relatively widespread on the sheet metal roof panels. Seashells are present throughout the roof, most notably at the south facing roof.

Several scrapes and scratches were observed on the roof panels that exhibited surface corrosion of exposed steel.

Existing translucent roof panels are installed on the same plane as the sheet metal panels, and integrated shingle fashion, with sealant reliant laps. Translucent panel surfaces appeared to be deteriorated, with exposure of reinforcing fibers.

Discussion and Recommendations

The condition of the prefinished roof panels appears fair. However, the overall roof condition is considered poor due to the following:

- Long term wear and tear of existing components, penetrations, and transitions.
- Existing sealant in the sheet metal laps and transitions is unadhered and deteriorated, resulting in increased leaks.
- Gasketed fasteners are aged and will continue to lose their seal between the gaskets and sheet metal panels, resulting in increased leaks.
- Sheet metal gutters are corroded and leaking, including at the lap joints between 10-foot sections.
- The condensate blanket is deteriorated and susceptible to ongoing bird damage.
- Surface deterioration observed on the existing translucent roof panels.

The sheet metal roof system is approximately 28 years old and nearing the end of its useful life. Based upon existing conditions observed, we suggest the roof be replaced within 3-5 years.

If requested, we would be happy to review options with the owner to perform repairs that may help extend the roof life for 5 or more years, until the 2034 requirement imposed by the Department of Natural Resources need to occur. However, the cost associated with a relatively extensive repair effort may not make sense if the roof will need to be replaced in less than 10 years.

Suggested roof options to consider are as follows:

Option #1: Reroof including full removal of the existing metal panel roof and transition flashings, full removal of the condensate blanket from underside of the roof panels, installation of a new metal panel roof assembly and new condensate blanket. New sheet metal roof panels should be structural and recommended by the manufacturer for installation over the existing slopes. New sheet metal roof panels and related coatings should be recommended by the manufacturer for installation in marine environments, with no warranty exclusions.

Option #2: Recover including leaving the existing sheet metal roof panels in place, spot removal and replacement of any corroded metal roof panels, and installation of a single ply membrane overlay system with profile ribs providing a sheet metal roof appearance, coverboard, and flute filler (expanded polystyrene insulation) infilling the panel corrugations.

We believe Option #2 to be more practical, in lieu of full removal and replacement of the existing sheet metal panel system. However, Option #2 will likely reduce the extent of roof daylighting that can be implemented, which may require review and approval with the Department of Natural Resources.

Should the owner wish to consider single ply roofing for Option #2, we suggest a minimum 60 mil PVC or KEE membrane, such as manufactured by Sarnafil and FiberTite. These single ply systems will typically provide the owner with approximately 25 years of service life, if properly designed, installed, and regularly monitored and maintained.

Prior to choosing a roofing direction, the structure should be reviewed by a professional structural engineer, to verify it will accommodate any additional loading attributed to the new roof system, and to determine any recommended repairs, including but not limited to existing areas of corrosion.

General items to consider for both roof Options 1 and 2:

1. The existing structure should be reviewed by a professional coating consultant, who can provide recommendations for addressing current areas of corrosion and reducing ongoing corrosion.
2. Proper flashing transitions should be designed and installed at roof-to-wall transitions, roof eave transitions, roof hatch transitions, other roof-related transitions, and all roof penetrations.
3. Proper seismic joints should be designed and installed where required.
4. The gutters should be replaced with a new prefinished gutter assembly, properly designed to accommodate ongoing movement of the building structure and regular expansion/contraction.
5. Roof daylighting requirements should be carefully reviewed with the Department of Natural resources and the roof designed accordingly. For roof Option #1, this may include approved translucent panels properly integrated with sheet metal panels. For Option #2, we suggest reviewing options to install skylights on regularly spaced curbs, which may require supplemental roof structure for support. It is important to note that all roof daylighting options, including extent, should involve a professional structural

engineer. Furthermore, integration of translucent roof panels with sheet metal panels may increase the number of sealant dependent laps, which will increase leakage potential over time.

6. Review options to replace the existing condensate blanket with a similar system that includes a more robust membrane, as necessary to reduce bird related damage over time.
7. If the owner wishes to install new fall safety anchors on the roof, we suggest contracting directly with a fall safety specialist such as Guardian Fall Protection, who can provide engineering/consulting services, as well as products, or an approved structural engineer.
8. Walk pads should be installed at roof access points (Option 2).
9. Prefinished sheet metal soffit panels along the eave-lines should be removed and replaced with new prefinished sheet metal soffit panels, similar to existing.
10. Existing roof related sealants should be tested for asbestos. All bidding contractors should be notified of the results of asbestos testing performed by the owner, and proper abatement performed as necessary.

Between now and reroof, the roof should be monitored and maintained on a regular basis. Any leakage that occurs between now and reroof should be addressed on a case-by-case basis.

All reroof and/or recover work should be performed according to the manufacturer's instructions and current industry standards (including NRCA).

Any cost estimates requested by the owner should be provided by an outside estimating firm or contractor.

Enclosed are photographs and notes taken during our site visit for your review. These photographs and notes may provide additional information to that discussed above and should be considered as part of this report.

We trust the above discussion has been of assistance. If you have any questions, or if we may be of further service, please do not hesitate to call.

Respectfully,

Roman Cherkasov, RRO, REWO
Field Engineer
Wetherholt and Associates, Inc.

Reviewed by,

Mike Caniglia, RRO, RBEC
Senior Field Engineer
Wetherholt and Associates, Inc.

Enclosures: photographs

Please note that this evaluation is provided at the request of Ed Stubbs. No liability, warranty of merchantability, or guarantee of roofing, waterproofing, or building envelope service life is accepted or implied. Wetherholt and Associates, Inc., is a neutral roofing, waterproofing, and building envelope consulting firm specializing in resolving building envelope and moisture related issues.

This general evaluation report should not be considered sufficient for reroof or recover bidding purposes. If requested, Wetherholt and Associates, Inc. would be happy to assist with preparation of bid documents.

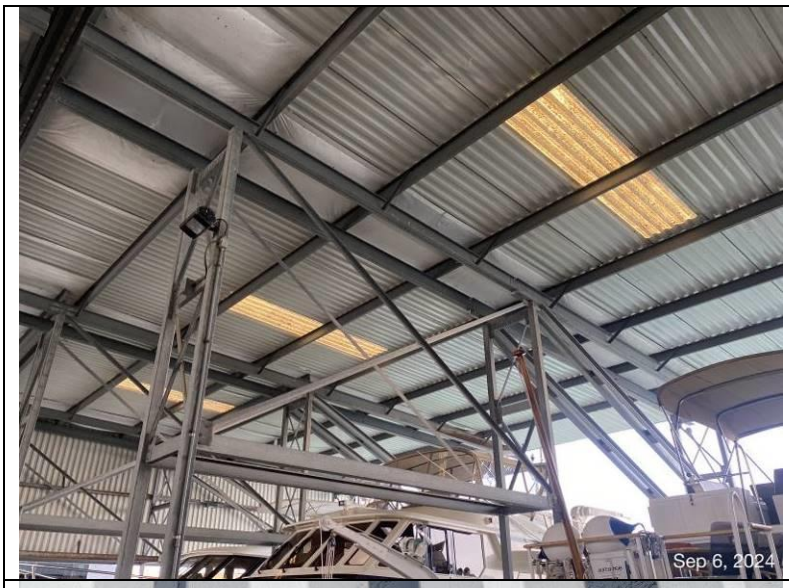
Photograph 1: Overview of the project building, as viewed from the southwest.

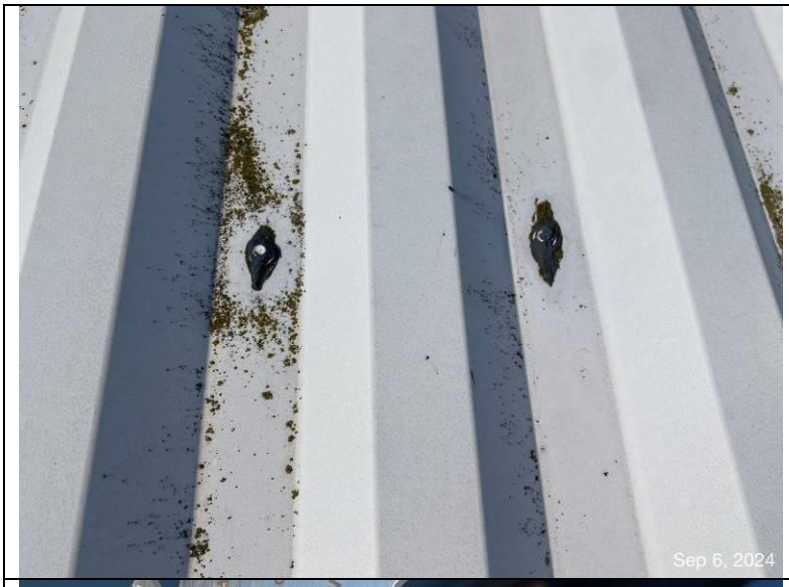
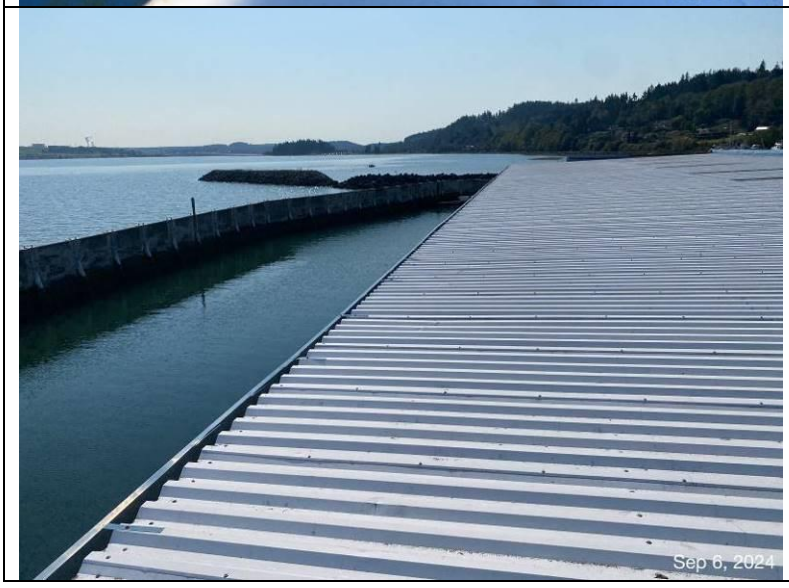
Photograph 2: Overview of the main roof, east facing slope, looking north.

Photograph 3: Overview of the south roof, looking southwest.

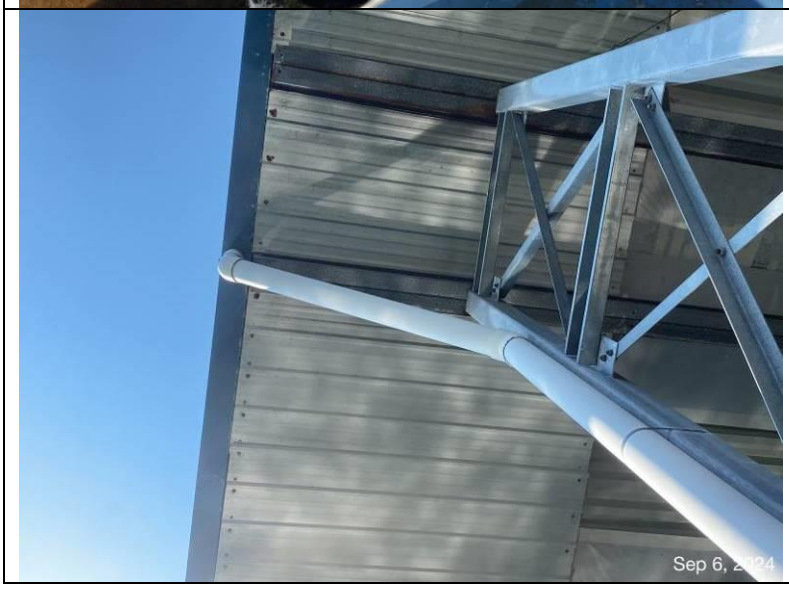
	Photograph 4: View of the access to the roof through a hatch, centrally located on the east slope.
	Photograph 5: View of the downslope flange of the hatch extending under the roof panels.
	Photograph 6: View of the open edge of the roof panels below the hatch infilled with sealant.

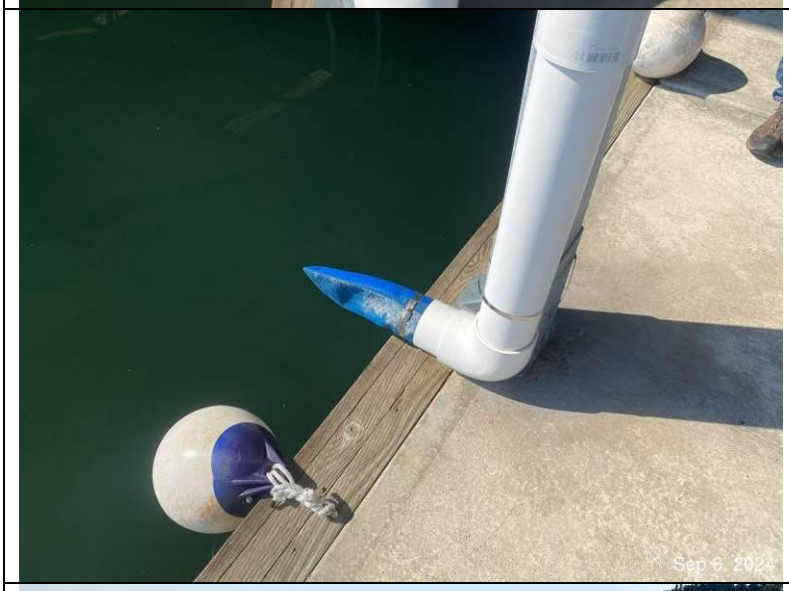
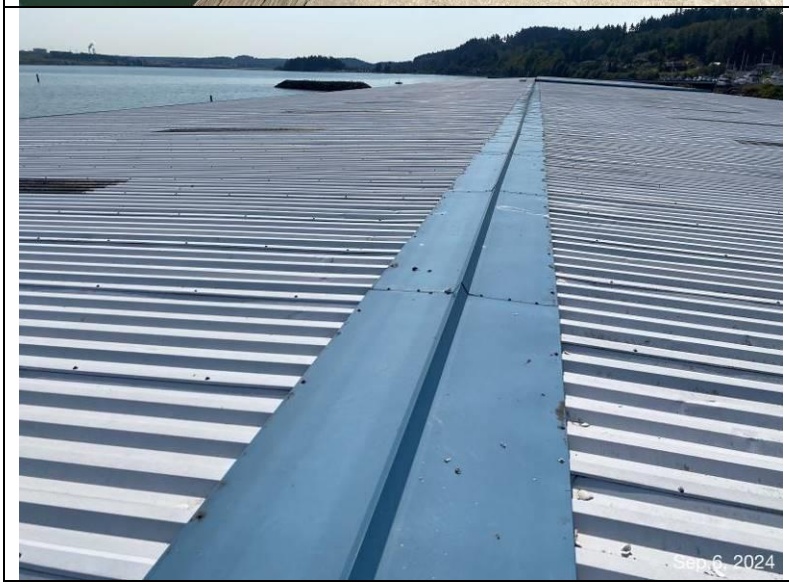
	Photograph 7: View of the roof hatch flanges secured through a flat plate with non-gasketed screws embedded in sealant.
	Photograph 8: View of a sticker on the roof hatch dated October 10th, 2021.
	Photograph 9: View of the field of the roof, showing metal and translucent roof panels.

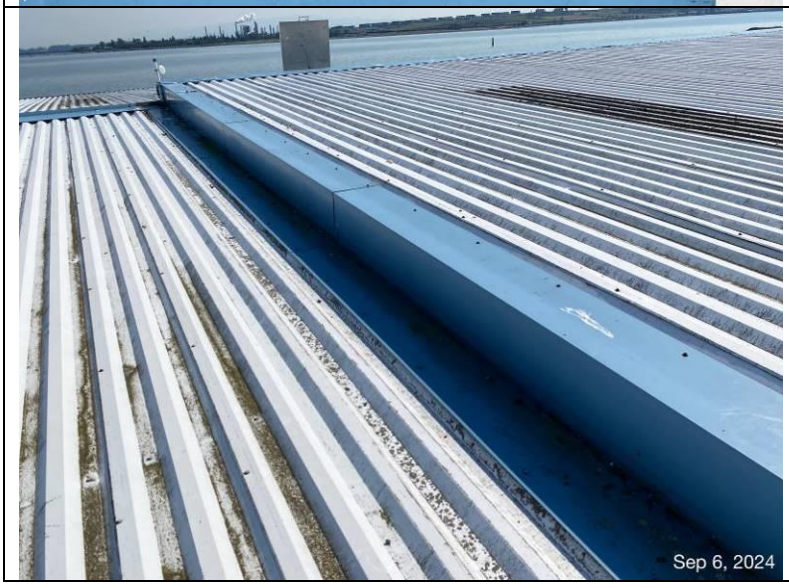
	Photograph 10: View of the translucent roof panels from the underside. Note areas where the condensate blanket has been removed.
	Photograph 11: Fastener spacing in the field of the roof panels measuring at approximately 8-inches on-center.
	Photograph 12: Fastener spacing at the overlaps of the roof panels measuring at approximately 4-inches on-center. Note: Surface corrosion of the exposed fasteners.

	Photograph 13: Fasteners in the field of the roof sealed with sealant.
	Photograph 14: Metal roof panels with a metal gauge inserted at the end of the panel measuring at 24-gauge.
	Photograph 15: View of the eave of the roof, showing the roof draining into a perimeter gutter.

	Photograph 16: View of the inside of the gutter, including debris and corrosion along the bottom surface.
	Photograph 17: View of the gutter flange under the metal roof panels. Note the flashing at the eave of the roof extending into the gutter missing at some locations.
	Photograph 18: View of gutter laps with flat plate on the inside of the gutter, embedded in sealant and secured with rivets.

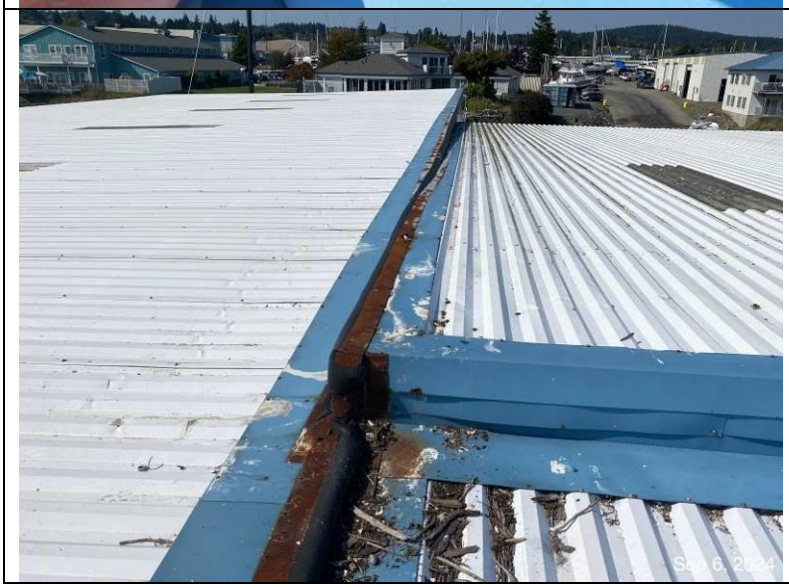
	Photograph 19: View of the gutter expansion joint without a cover.
	Photograph 20: View of the end of the gutter with the closure plate sealed with sealant. Note the strainer missing at the downspout dropdown.
	Photograph 21: View of the downspout and prefinished metal soffit panels.

	Photograph 22: View of the downspout measuring at 4-inches in diameter.
	Photograph 23: View of the downspout discharging into the marina.
	Photograph 24: View of the ridge flashing mechanically fastened to the top flutes of the roof panels.

	Photograph 25: View of the ridge flashing lapping onto the rake flashings.
	Photograph 26: View of the ridge flashing secured directly through the laps at approximately 6-inches on-center, not allow for expansion/contraction. Note corrosion of fasteners.
	Photograph 27: View of transition flashings at the roof plane changes.

	Photograph 28: View of the roof-to-wall flashing tucking under the rake flashing.
	Photograph 29: View of sealant knife fully inserted into the lap of the roof-to-wall flashing.
	Photograph 30: View of the rake flashing secured directly through the laps causing the metal to buckle.

	Photograph 31: View of missing fasteners at the rake to roof-to-wall overlap.
	Photograph 32: View of sheet metal flashing with a metal gauge inserted at the end of the flashing measuring at 24-gauge.
	Photograph 33: View of the expansion joint at the northeast corner of the south roof.

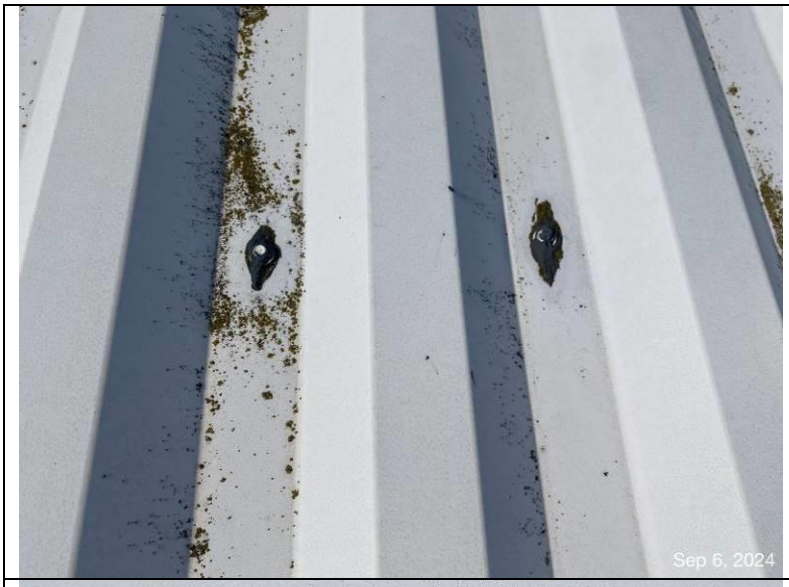
	Photograph 34: View of the vertical-to-horizontal transition of the expansion joint.
	Photograph 35: View of sealant knife inserted into plane transition corner, indicating saddle flashings were not installed.
	Photograph 36: View of the expansion joint between the south and north roof areas.

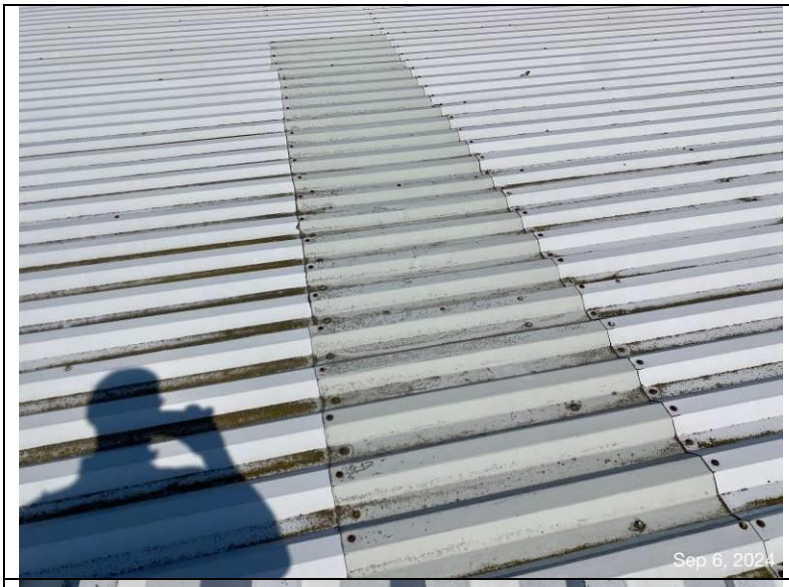
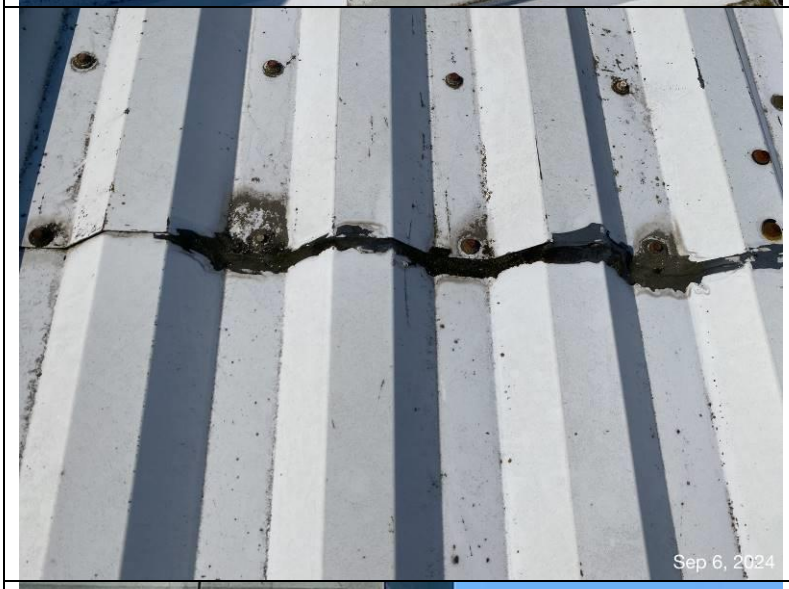
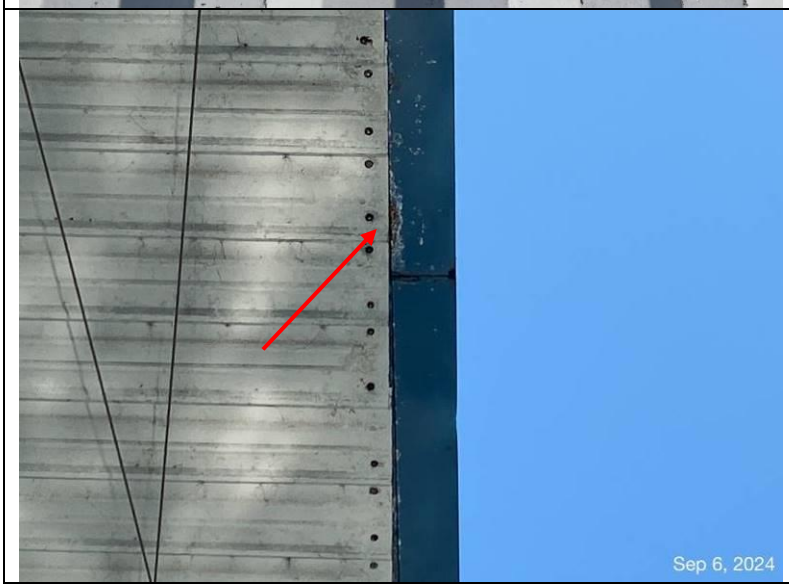
	Photograph 37: View of open laps in the expansion joint membrane.
	Photograph 38: View of damage in the expansion joint membrane.
	Photograph 39: Expansion joints flanges secured to the sheet metal flashings at approximately 8-inches on-center.

	Photograph 40: View of corroded expansion joint flanges.
	Photograph 41: Alternative view of corroded expansion joint flanges.
	Photograph 42: View of an antenna penetration at the roof plane change, secured through the roof-to-wall transition flashing.

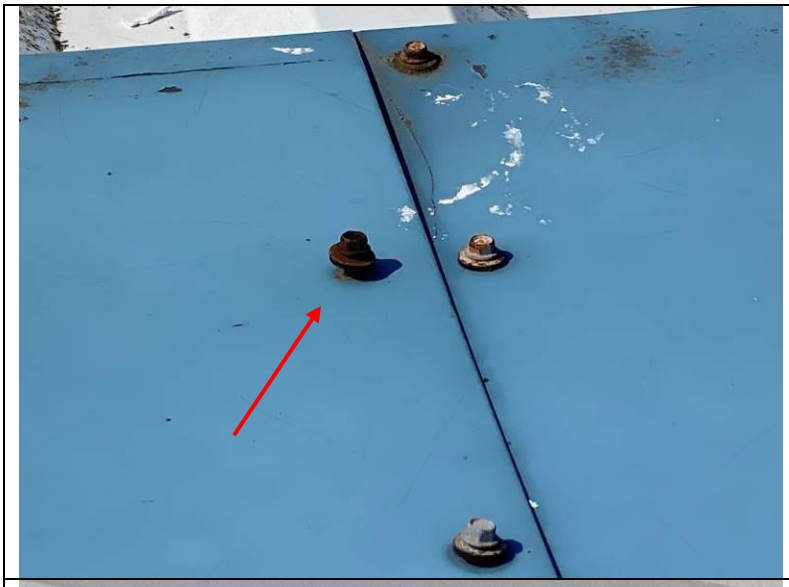
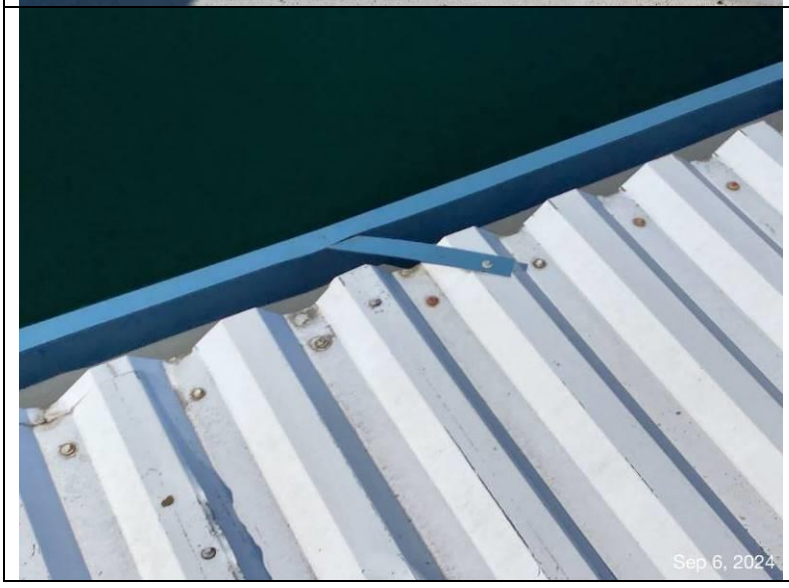
	Photograph 43: Close-up view of an antenna penetration.
	Photograph 44: View of an antenna penetration secured through the roof-to-wall transition flashing with neoprene gasketed fasteners.
	Photograph 45: View of the antenna conduit extending under the roof-to-wall transition.

	Photograph 46: View of the underside of the roof panels with condensation blanket removed at some locations.
	Photograph 47: View of damaged condensation blanket.
	Photograph 48: Alternative view of damaged condensation blanket.

	Photograph 49: View of the fasteners in the field of the roof sealed with sealant.
	Photograph 50: View of the fasteners in the field of the roof sealed with sealant and a new fastener placed adjacent to the old fastener.
	Photograph 51: View of the roof with supplemental roof panels, reportedly installed when several panels stored on the roof blew off during 1996 roof replacement. Note the color difference.

	Photograph 52: Alternative view of supplemental roof panels.
	Photograph 53: View of end lap of the field roof panel lifted and sealed with sealant.
	Photograph 54: View of roof panel eave edge corroded at the fastener penetrations, as well as corroded gutter edges.

	Photograph 55: View of damaged roof panels with slight corrosion.
	Photograph 56: View of damaged roof panels with slight corrosion.
	Photograph 57: View of damaged roof panels with slight corrosion.

	Photograph 58: View of fasteners backing out at the ridge of the roof.
	Photograph 59: View of missing fastener in the field of the roof panel.
	Photograph 60: View of loose gutter straps with missing fasteners.

	Photograph 61: View of surface corroded steel beams.
	Photograph 62: Alternative view of corroded steel beams.
	Photograph 63: View of lichen and organic growth on the surface of the roof panels.

	Photograph 64: View of debris pile-up on the roof.
	Photograph 65: View of seashells on the roof.

End of Report