



NORTHERN COLORADO REGIONAL AIRPORT COMMISSION

4900 EARHART ROAD • LOVELAND, CO 80538

SPECIAL MEETING AGENDA

THURSDAY MARCH 2, 2023

8:30AM – 10:30AM

CALL TO ORDER

ROLL CALL

PUBLIC COMMENT

REGULAR AGENDA

1. HANGAR LEASES DISCUSSION AND POSSIBLE EXECUTIVE SESSION CONSISTENT WITH C.R.S. 24-6-402(4)(a), C.R.S. 24-6-402(4)(b), and/or C.R.S. 24-6-402(4)(e)(I)

Executive Session ---- 8:30-9:30 a.m.

Public Session ----- 9:30-10:30 a.m.

PULLED CONSENT AGENDA ITEMS

ADJOURN



NORTHERN COLORADO REGIONAL AIRPORT

4900 Earhart Rd • Loveland, Colorado 80538

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ITEM NUMBER: 1

MEETING DATE: March 2, 2023

PREPARED BY: Aaron Ehle, Planning & Development Specialist
Claire Goodwin, Fort Collins Risk Manager
Jason Smitherman, Loveland Risk Manager

TITLE

Hangar Leases Discussion and Possible Executive Session Consistent with C.R.S. Sections 24-6-402(4)(e)(I), 4(a), and 4(b)

RECOMMENDED AIRPORT COMMISSION ACTION

Move to recess into executive session to discuss and consider the status of hangar leases, lease negotiation options, and provide direction to staff regarding the leases of hangars owned by the Cities.

BUDGET IMPACT

Unknown

SUMMARY

The Airport/Cities own 58 T-hangar units that are rented out on a month-to-month basis for basic light aircraft storage. Planning for redevelopment of this area began with the 2007 Master Plan and was reiterated in the 2020 Master Plan update. In 2020, ownership of all of the units reverted to the Airport/Cities, where 1/3 had been privately owned since constructed in the late 1970's. In 2021, the Airport Commission issued a request for proposals (RFP) in response to Fort Collins-Loveland jetCenter (FCLJC) unsolicited proposal to redevelop the area. This RFP was closed with no award in 2022. However, during the RFP negotiation process a structural analysis was completed by a third-party engineering consultant. It identified concerns needing evaluation by the Cities risk departments.

Matters relating to this item were discussed in executive session at the February 16th Airport Commission meeting. The Commission directed staff to complete additional investigation and schedule this special meeting to address the status of existing leases.

ATTACHMENTS

Ditesco Structural Analysis Report

DATE: September 20, 2022

TO: Aaron Ehle - Northern Colorado Regional Airport

FROM: Jill Burrell, PE - Ditesco
Kelsey Madsen, PE - Ditesco

RE: Northern Colorado Regional Airport
T-Hangar Structural Analysis

Background & Purpose

When Airport ground leases expire at Northern Colorado Regional Airport (Airport or FNL), ownership of the improvements on the land reverts to the Cities of Fort Collins and Loveland, which jointly own the Airport. In 2019, the Airport/Cities gained total ownership of the farthest west three rows of T-hangars. Four hangar buildings occupy this area, with a total of 58 hangar units. The hangars buildings range from approximately 45 to 57 years of age and have varying levels of structural degradation. These hangars are rented out on a month-to-month basis to aircraft owners and operators.

The Airport has been planning to redevelop the area occupied by the aging T-hangars in alignment with the Airport Master Plan. The redevelopment will most likely occur in phases over several years. Potential lease agreements associated with this redevelopment may be structured in ways that anticipate revenue generation from the hangars until they are demolished.

The purpose of this structural assessment is to visually observe the general conditions of the four T-hangar buildings. The assessment will inform FNL of the current conditions of each hangar, including a photo log of observations, and a summary of conclusions.

The four hangars evaluated for this technical memorandum will be referenced as Hangars 4920-A, 4910-B, 4930-C, and 4960-C. Page 1 of Appendix A can be referenced for a map of the hangars.

Summary of Condition

Ditesco performed a structural evaluation of the four hangars on August 18, 2022. Due the high-level approach of this report, only select units were inspected in detail, as shown in Figure 1. The conditions observed in the select units were assumed to be representative of the hangars in their entirety.

FNL does not have any historic record drawings of the buildings. Observations generated within this report are based upon visual inspections and general understanding of the site conditions.

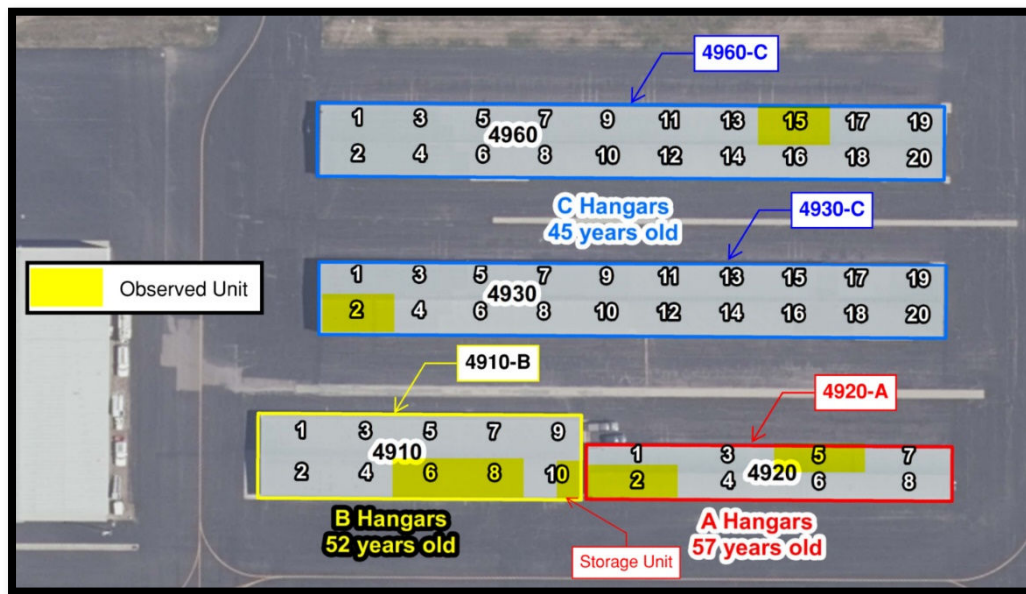


Figure 1

Hangar 4920-A

Hangar 4920-A has been in service at FNL for approximately 57 years and contains eight units. The units are configured in a standard nested “T” and are approximately 980 square feet each. This hangar building is pre-engineered metal with a frame primarily constructed of a steel double howe truss assembly and two four-inch hat channels for the columns. It was communicated that this structure was relocated from its initial location, however the details of the relocation means and methods are unknown.

For the structural evaluation, hangar units 2 and 5 were inspected in detail. The structural steel generally did not show any major signs of corrosion and all fasteners were in place and remained snug. However, several structural members appeared to be deflected and or torqued. Cosmetic damage appeared on some of the exterior metal wall panels due to lack of protection from large equipment and/or vehicles.

Unit 5 had some retrofit structural components incorporated. There were additional members connected to the main roof truss and additional columns constructed out of wooden 2 x 4's. A piece of rebar was also welded to one of the z-shaped wall girts. It is unknown when or why these additions were constructed.

Many of the issues observed with this structure appeared to be a result of subgrade issues. The building is proximate to a site with assumed similar soils, which are known to be expansive, where extensive geotechnical measures were taken to mitigate foundation and structural issues. The combination of expansive soils and an assumed undersized foundation system has caused movement of the structure and settlement of the asphalt floor. This settlement has yielded inconsistent movement of the structure, ultimately compromising the frame. More specifically, this has caused deflection in the upper roller track of the suspended hangar doors resulting in poor operation of the

roller mechanism on the sliding doors and sometimes leading to failure. FNL maintenance staff also reported that the doors have been blown off under windy conditions.

Reference page 2 through 5 for hangar measurements and photo documentation in Appendix A.

Hangar 4910-B

Hangar 4910-B has been in service at FNL for approximately 52 years and contains ten units. The units are configured in a full-nested “T” and are approximately 980 square feet each. This hangar building is pre-engineered metal supported by a tapered web I-beam and W8x10 sections for columns.

For the structural evaluation, the southwestern storage unit and hangar units 6 and 8 were reviewed in detail. Both units indicate that the structure is in poor condition, primarily due to the failed column to foundation connections and compounding effects from this poor connection. The following scenarios were observed, sometimes in combination, during the evaluation:

- The column is not anchored with the intended four anchor bolts to the caisson. Some columns were observed to not be anchored at all to the caisson.
- The nuts on the anchor bolts are not properly tightened and/or missing entirely.
- The column is not bearing its load on the center of the caisson. The minimum edge distance from the bolt to the edge of concrete is not maintained.
- The column is bearing on a shim plate, or other material, and is not properly balanced.
- The holes in the column are significantly larger than the anchor bolt, allowing excess movement.
- The concrete caisson is failing by concrete spalling and pullout, resulting in loose anchors.

Based on the frequency and severity of the items summarized above, the structure is not adequately secured to its foundation. The lack of connectivity poses a significant risk to the stored property and the human lives that access the hangars. This risk is assumed to increase particularly under windy conditions where the structure is subject to additional uplift from the lateral forces. Consequentially, the hangar’s structural members have been deflected, torqued, or shifted entirely.

The FNL maintenance staff reported various challenges with the operation of the doors of the hangars. The doors have wheels mounted to the bottom where it bears its weight. The doors are mobilized by a two-rail system cast into a concrete pad. A C-channel (location 1) is mounted to the top of the door where the legs are intended to hold the door in place on the beam (location 2), as shown in Figure 2.

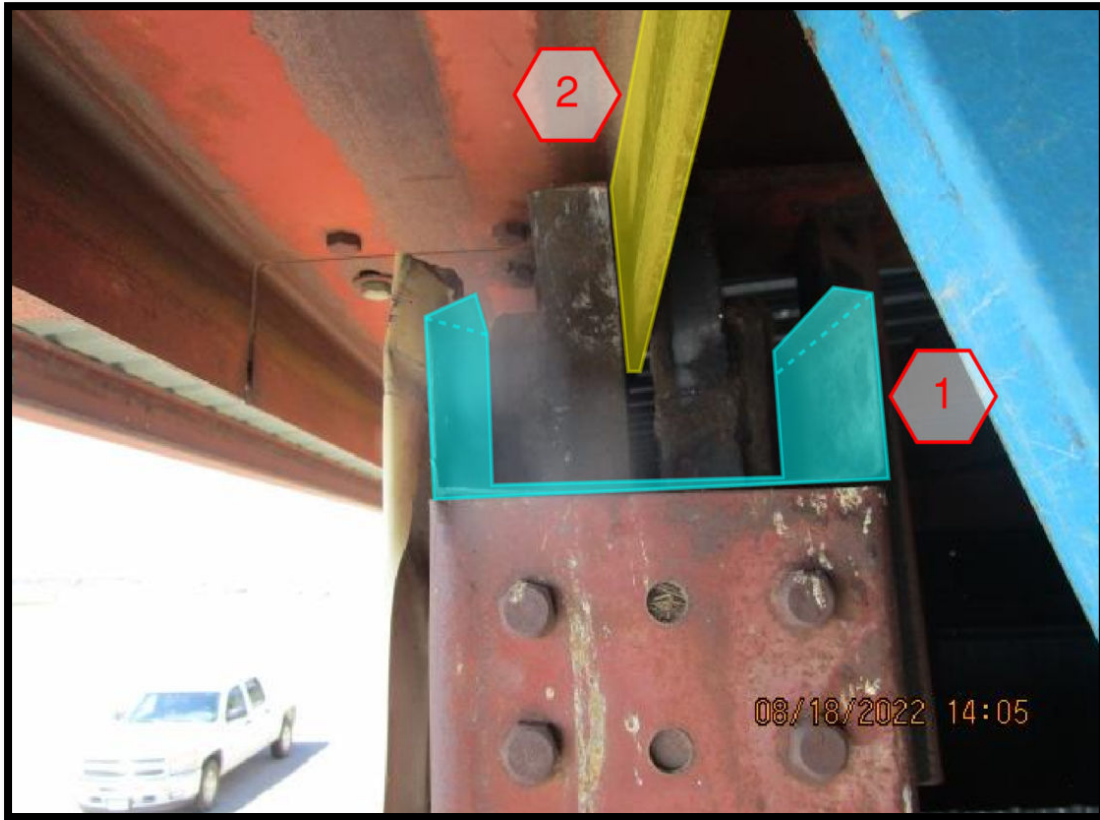


Figure 2

There are on-going issues where the doors are failing as a direct result of the movement and uplift of the structure from its failed foundation connections. The FNL maintenance staff has retrofitted the doors using three methods to mitigate this issue and prevent damage to tenant property housed in the hangars. The three repairs can be referenced in Photo 17, 22, and 28 of Appendix A. While these repairs may be temporarily effective, they do not address the greater issue associated with the hangars and are not recommended as a future repair method.

Additionally, it was observed that the hangar was constructed incorrectly. In Hangar 4910-B (Unit 8) it was observed that the shop-fabricated members were not fully fastened. However, it is unclear if full attachment is necessary based on the original design. Additionally, at the connection between the column and wall girt, there is a welded bracket on the column, as shown in Figure 3. The girt (location 1) has been connected to the underside of the bracket (location 2) and secured with one bolt. Instead, it is assumed that the girt should have been installed on top of the bracket so that the loads would be transferred through the weld and column, rather than relying solely on the bolt. It is also likely that this connection was intended to be fastened with more than one bolt, however without the original plans, this cannot be confirmed. This condition was observed in several instances throughout both units and is assumed to be consistent for the building in its entirety.

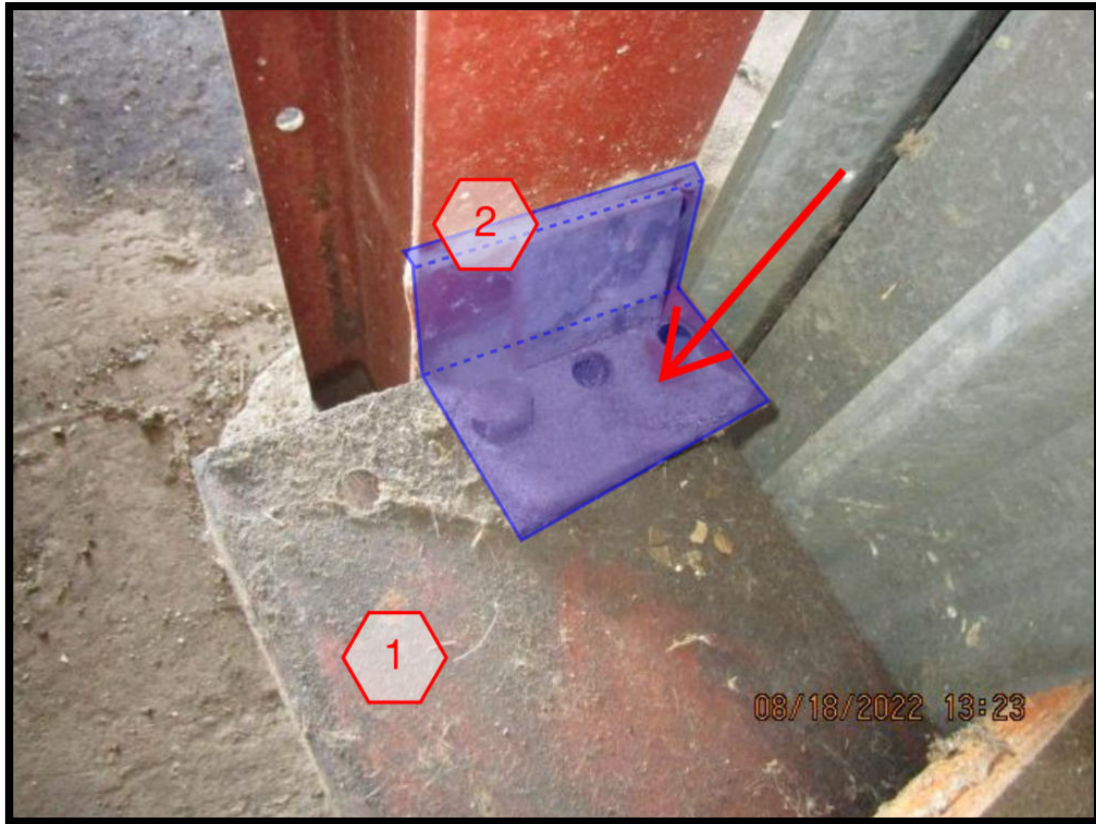


Figure 3

Reference page 6 through 12 for hangar measurements and photo documentation in Appendix A.

Hangars 4930-C and 4960-C

Hangars 4930-C and 4960-C have been in service at FNL for approximately 45 years and contain 20 units per hangar. The units are configured in a standard nested “T” and are approximately 980 square feet each. Both structures are constructed out of a tapered web I-beam and two C-shaped sections for the columns.

For the structural evaluation, unit 2 (4930-C) and unit 15 (4960-C) were evaluated. In general, the steel structure was in poor condition. Degradation of the steel was apparent, resulting in failed structural members and column to foundation connections.

Corrosion was present on the steel columns, anchor bolts, and the hangar door track. In some instances, the corrosion at the column led to pitting of the steel creating an oversized hole at the anchor bolt connection, as shown in Photo 35 of Appendix A. The oversized hole allows excess movement of the structure, or in the most severe cases, provide no connectivity to the foundation. In Hangar 4930-C (Unit 2), the column at Gridline B4 had an anchor bolt completely removed from the foundation. The anchor bolt was severely corroded and assumed to be undersized compared to current industry standards. Additionally, in Hangar 4960-C (Unit 15), the corrosion of the steel resulted in a failed weld at the tension rod connection to the column at Gridline B4.

Another issue was observed as a result of the FNL pavement maintenance. FNL has performed a mill and overlay on the taxilanes adjacent to the hangars. This has resulted in the exterior grade being

higher than the hangar's finish floor elevation, preventing any drainage out of the hangar units. Once water enters the unit through the unsealed roof or perimeter, it has no exit path, leading to a build-up of condensation on the interior of the structure. Excess moisture, in combination with poor ventilation, is assumed to accelerate corrosion of the steel members in the hangar.

Reference page 13 through 16 for hangar measurements and photo documentation in Appendix A.

Conclusions

All four of the structures were observed to have significant issues with the subgrade, foundation, anchorage, and structural members. The structural framing members are not salvageable due to the on-going damage from wind, snow loading, soil heave, and poor foundational connection and support. The members have been compromised and are torqued, deflected, buckled, and are no longer square. Due to the cumulative effects of the issues observed, there is not an opportunity to implement an isolated repair without addressing the structure in its entirety.


Given the aged structure and observed conditions, it is Ditesco's professional opinion that Hangars A, B, and C have met or exceeded their service life and are not candidates for retrofit to meet current codes. There are no recommendations for remediation to safely extend the lifespan of the hangars.

Appendix A

T-Hangar Observation Report Log

FNL T-Hangar Structural Evaluation



 Observed Unit

4960-C

1	3	5	7	9	11	13	15	17	19
2	4	6	8	10	12	14	16	18	20

C Hangars
45 years old

4930-C

1	3	5	7	9	11	13	15	17	19
2	4	6	8	10	12	14	16	18	20

4910-B

1	3	5	7	9					
2	4	6	8	10					

4920-A

1	3	5	7
2	4	6	8

B Hangars
52 years old

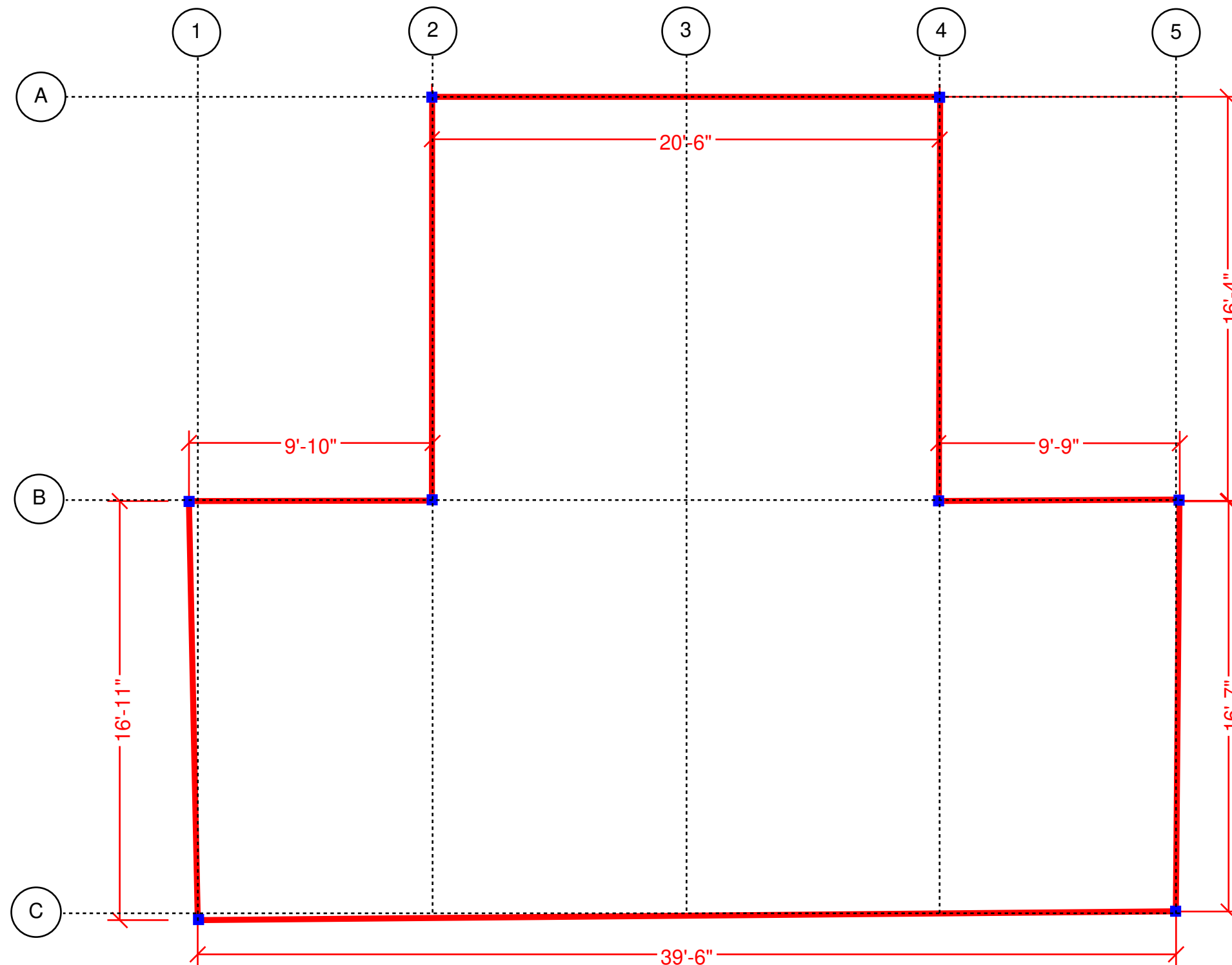
A Hangars
57 years old

Storage Unit



HANGAR 4920-A UNIT 5

SITE LAYOUT



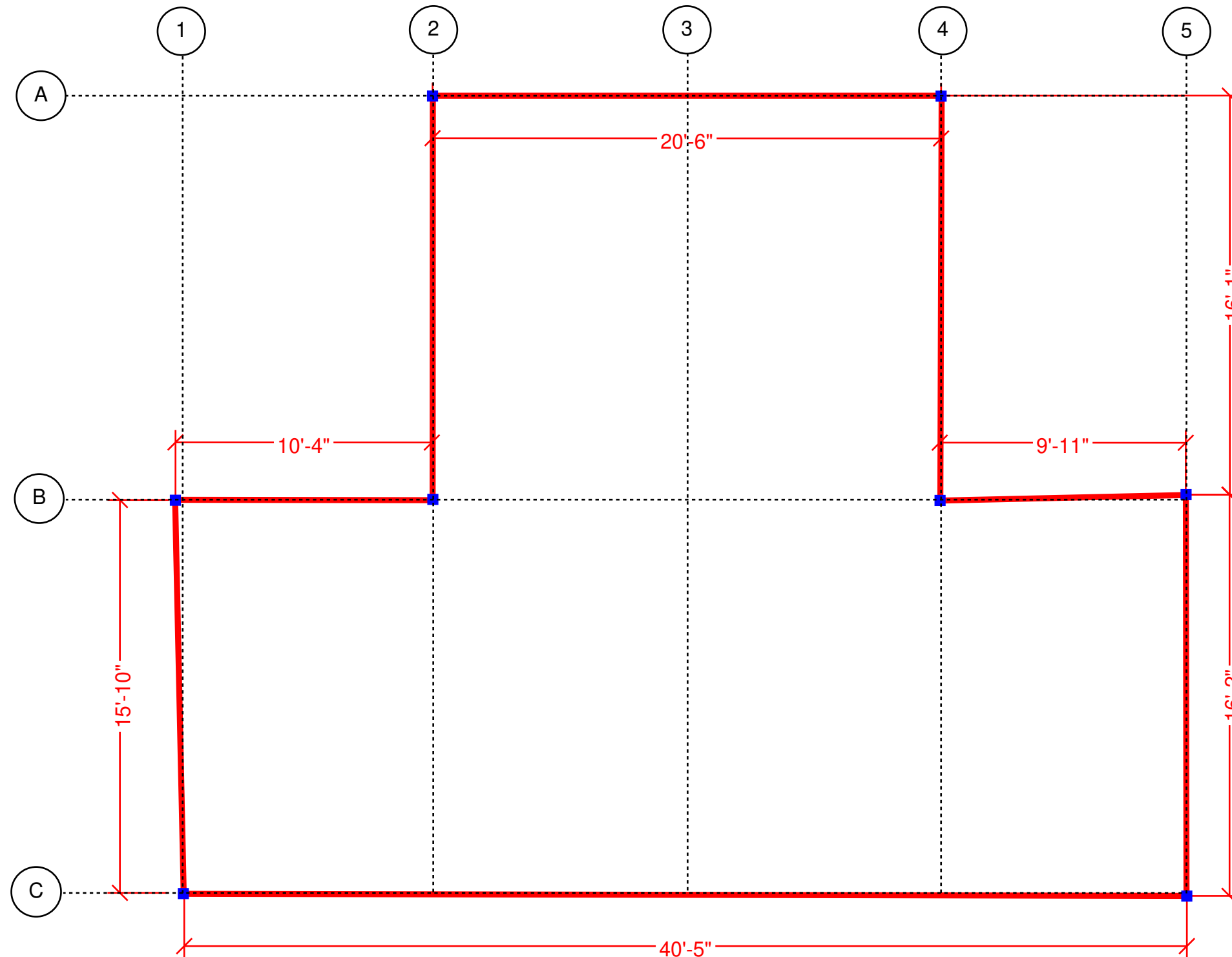
<div>PHOTO 1</div> <div>Gridline C</div> <div> <p>Unsuitable, expansive soils are causing the pavement to heave.</p> </div>		<div>PHOTO 4</div> <div>Entire Structure</div> <div> <p>Roof is not properly sealed allowing water infiltration.</p> </div>	
<div>PHOTO 2</div> <div>Gridline A</div> <div> <p>After market remediation repairs completed. Rebar has been welded to wall girt along its length.</p> </div>		<div>PHOTO 5</div> <div>Gridline B2</div> <div> <p>20-inch diameter caissons with two anchors connected to the column. Depth of foundation is unknown.</p> </div>	
<div>PHOTO 3</div> <div>Gridline C</div> <div> <p>The door roller mechanism is in poor condition with misaligned track.</p> </div>		<div>PHOTO 6</div> <div>Gridline A</div> <div> <p>Damage to exterior metal panels.</p> </div>	

HANGAR 4920-A UNIT 5

PHOTO LOG

HANGAR 4920-A UNIT 2

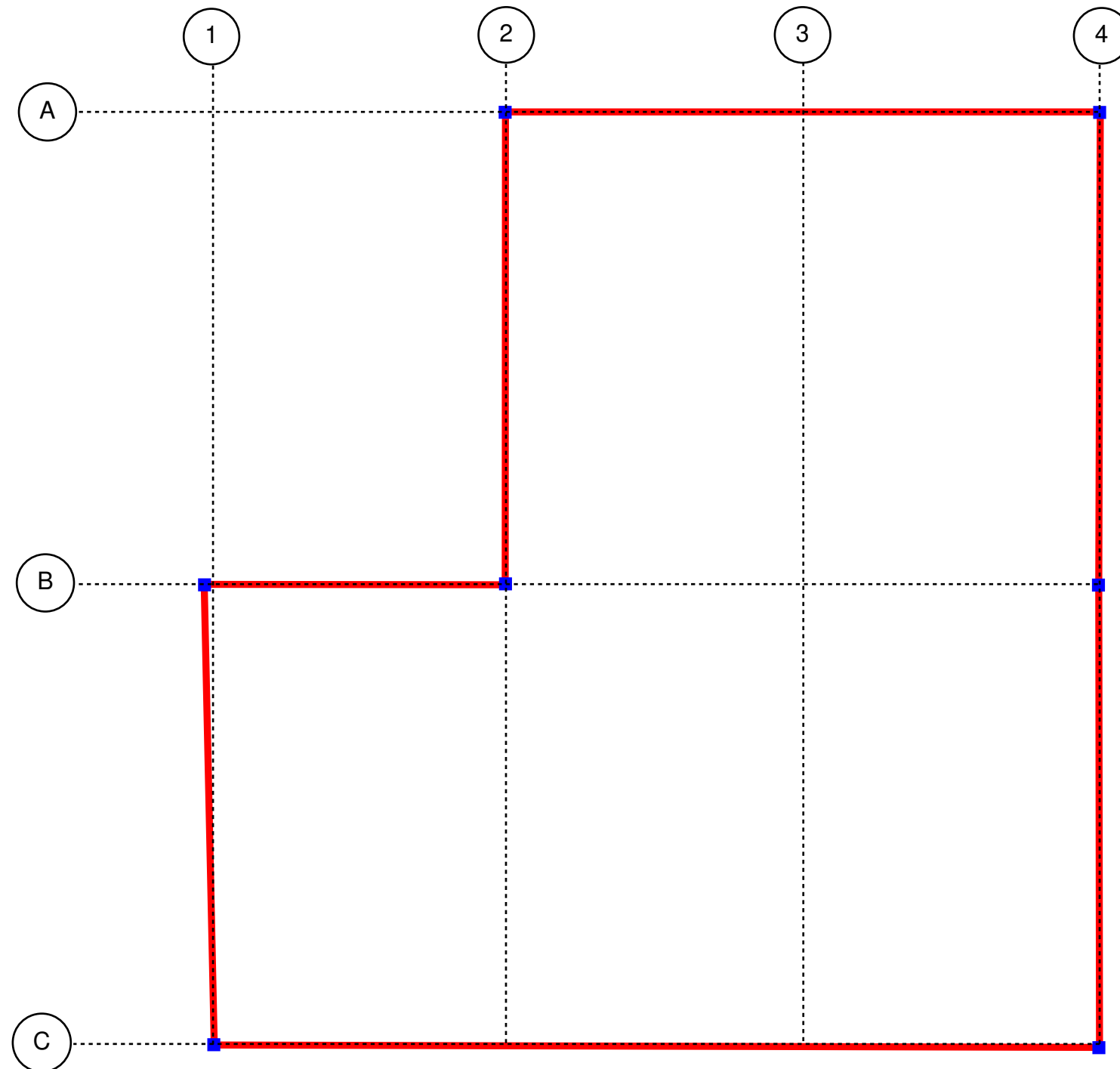
SITE LAYOUT








<div>PHOTO 7</div> <div>Gridline A2</div> <div>Damage to structural member. Column observed to be torqued in the upper third.</div>		<div>PHOTO 10</div> <div>Gridline B4 to B5 and B5 to C5</div> <div>After market remediation repairs completed. Additional 2 x 4's installed as stiffeners for the columns.</div>		<div>HANGAR 4920-A UNIT 2</div> <div>PHOTO LOG</div> <div>  <div>NORTHERN COLORADO REGIONAL AIRPORT</div>  </div>
<div>PHOTO 8</div> <div>Gridline A</div> <div>20-inch diameter caissons with two anchors connected to the column. Depth of foundation is unknown.</div>				
<div>PHOTO 9</div> <div>Gridline B4 to C4</div> <div>After market remediation repairs completed. Additional truss members have been added to the double howe truss.</div>				

HANGAR 4910-B STORAGE UNIT

SITE LAYOUT



NOTES:
1. Dimensions of the storage
unit were not documented at
the time of observation.

<div>PHOTO 11</div> <div>Gridline C4</div> <div>Deterioration of foundation and missing anchors.</div>		<div>PHOTO 14</div> <div>Gridline A2</div> <div>16-inch caisson at column connection. Anchors are missing the nut and washer. Hole in column is oversized for anchor allowing additional movement. Column is incorrectly bearing on the shim.</div>	
<div>PHOTO 12</div> <div>Gridline B2</div> <div>16-inch caisson at column connection. Missing anchors and incorrectly bearing on shim.</div>		<div>PHOTO 15</div> <div>Gridline A4</div> <div>Concrete failure of foundation at anchor location. Anchor is missing nut and washer. Hole in column is oversized for anchor allowing additional movement.</div>	
<div>PHOTO 13</div> <div>Gridline B2</div> <div>Incorrect installation of structural members. Wall girt should be bearing on welded bracket.</div>			

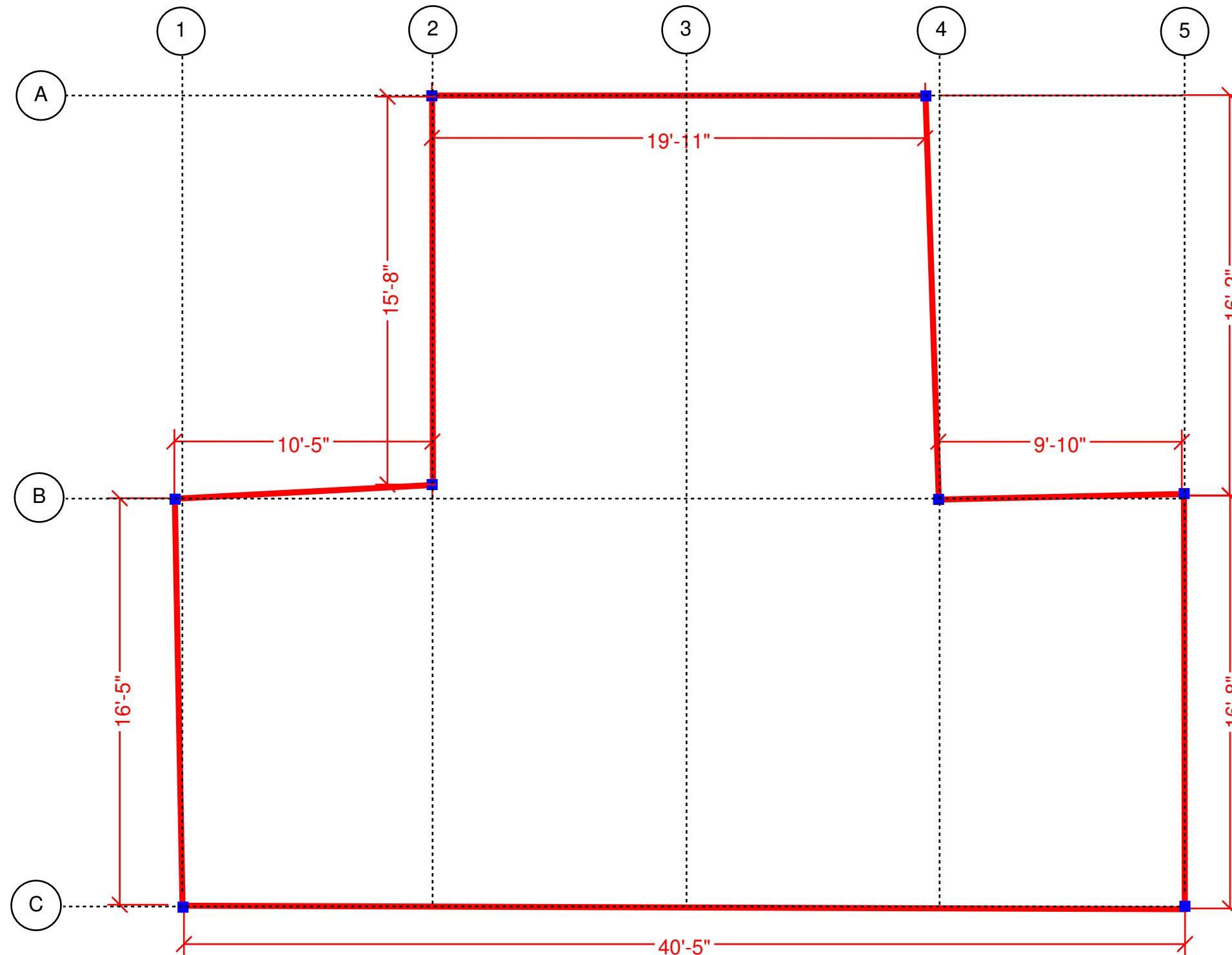
HANGAR 4910-B






STORAGE UNIT

PHOTO LOG

HANGAR 4910-B UNIT 6

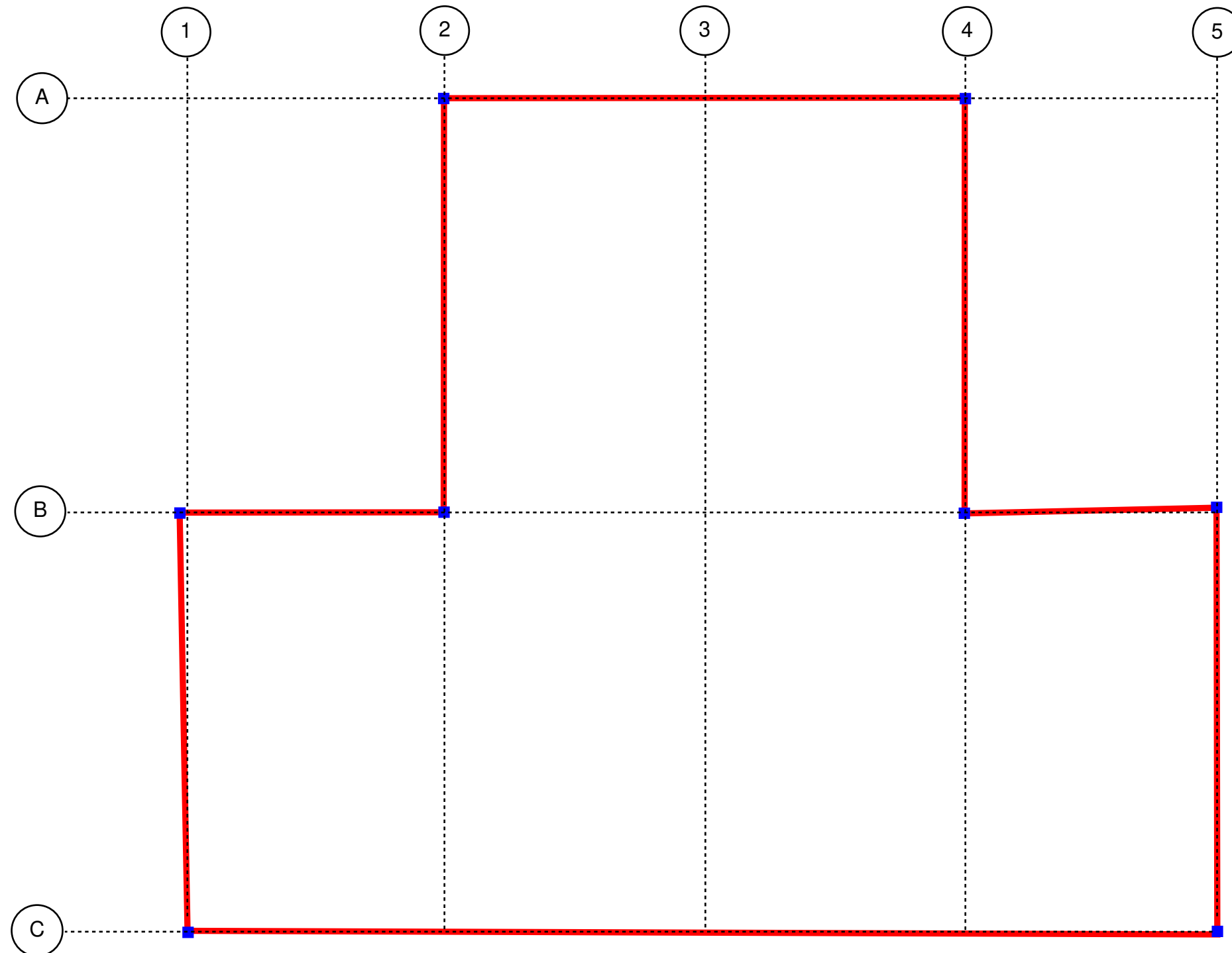
SITE LAYOUT



<div>PHOTO 16</div> <div>Gridline C</div> <div>Poorly maintained wheel roller mechanism.</div>		<div>PHOTO 19</div> <div>Gridline C</div> <div>Poorly maintained rail system for door operation. Concrete degradation adjacent to rails.</div>		<div>HANGAR 4910-B UNIT 6</div> <div>PHOTO LOG</div> <div>  </div>
<div>PHOTO 17</div> <div>Gridline C4</div> <div>After market remediation repairs. Cable installed from floor to beam to prevent doors from falling into hangar.</div>				
<div>PHOTO 18</div> <div>Gridline B4</div> <div>Concrete failure of 16-inch caisson at column connection. Anchor embedment is compromised. Anchors are missing washer and nut. Column is incorrectly bearing on the shim plate.</div>				







HANGAR 4910-B UNIT 8

SITE LAYOUT



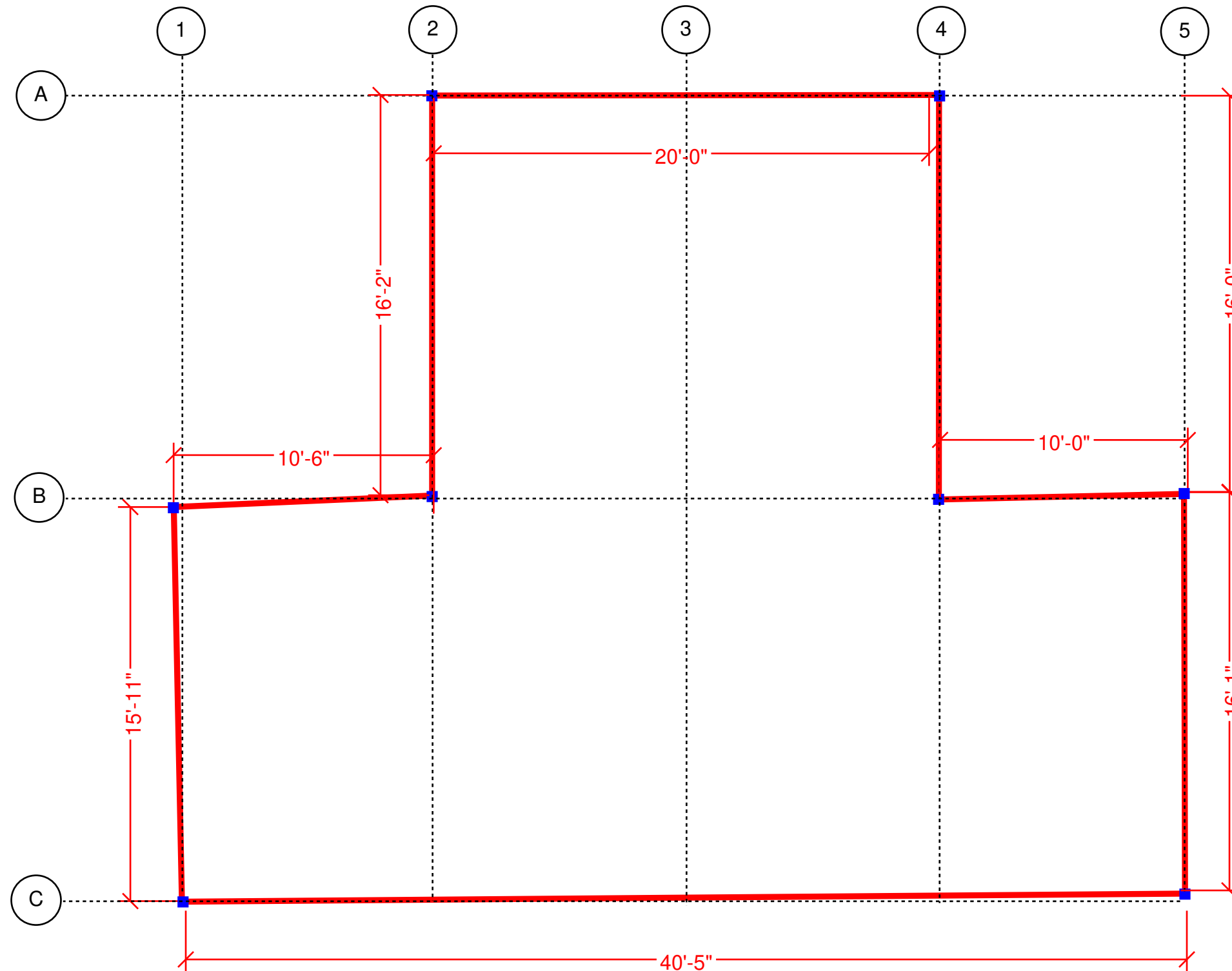
NOTES:
1. Dimensions of the storage unit were not documented at the time of observation.






<div>PHOTO 20</div> <div>Gridline C</div> <div>Poorly maintained rail system for door operation. Concrete degradation adjacent to rails.</div>		<div>PHOTO 23</div> <div>Gridline B1</div> <div>Column is not centered on foundation, preventing proper load transfer. A single anchor bolt is cast in the concrete and the minimum edge distance is not maintained.</div>		<div>HANGAR 4910-B UNIT 8</div> <div>PHOTO LOG</div> <div>   </div>
<div>PHOTO 21</div> <div>Gridline C</div> <div>Shop-fabricated members are not fully fastened. Unclear if full attachment is necessary based on original design.</div>		<div>PHOTO 24</div> <div>Gridline B2</div> <div>Failed concrete causing imbalanced heaving of column. Anchor bolts are corroded and entirely removed from column connection.</div>		
<div>PHOTO 22</div> <div>Gridline C</div> <div>After market repairs to prevent door failure. Additional steel plates were welded on either side of door frame to prevent door from caving in or falling outward.</div>		<div>PHOTO 25</div> <div>Gridline B2</div> <div>Failed concrete causing imbalanced heaving of column. Anchor bolts are corroded and entirely removed from column/concrete connection.</div>		

<div>PHOTO 26</div> <div>Gridline B4</div> <div>Failed concrete causing imbalanced heaving of column. Anchor bolts are corroded and entirely removed from column/concrete connection.</div>		<div>PHOTO 29</div> <div>Gridline C2</div> <div>Corrosion of structural members.</div>		<div>HANGAR 4910-B UNIT 8</div> <div>PHOTO LOG</div> <div> </div>
<div>PHOTO 27</div> <div>Gridline B4</div> <div>Failed concrete causing imbalanced heaving of column. Anchor bolts are corroded and entirely removed from column/concrete connection.</div>				
<div>PHOTO 28</div> <div>Gridline A</div> <div>After market repairs to prevent door failure. Additional HSS tubes were welded on either side of door frame to prevent door from caving in or falling outward.</div>				

HANGAR 4930-C UNIT 2

SITE LAYOUT



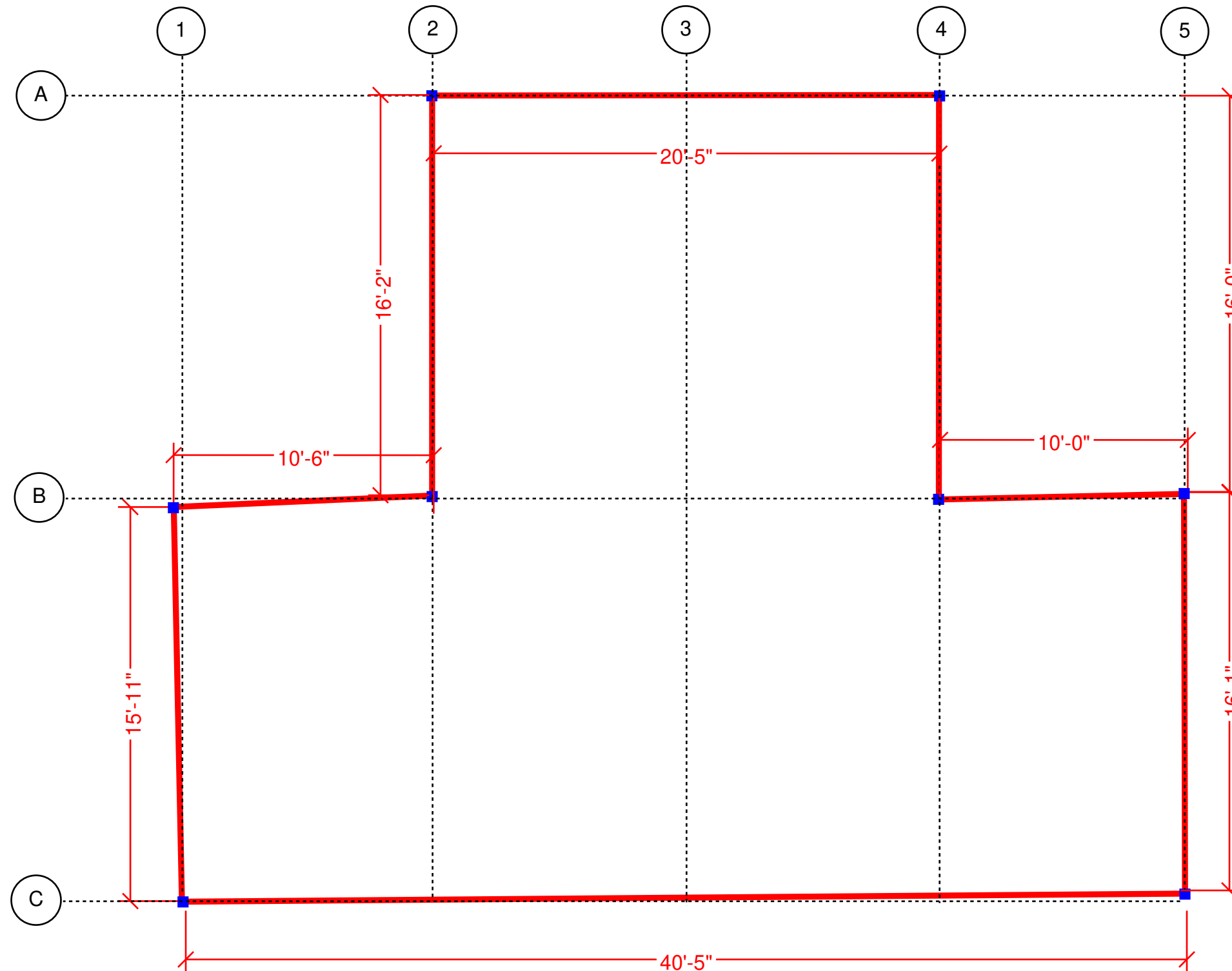
<div>PHOTO 30</div> <div>Gridline C</div> <div> <p>Mill and overlay maintenance has resulted in taxilane grade higher than hangar finish floor, resulting in poor drainage.</p> </div>		<div>PHOTO 33</div> <div>Gridline B4</div> <div> <p>Anchor completely removed from connection. Anchor is corroded and likely undersized.</p> </div>	
<div>PHOTO 31</div> <div>Gridline C1</div> <div> <p>Corrosion of steel. Column loads bear poorly on foundation.</p> </div>		<div>PHOTO 34</div> <div>Gridline B4</div> <div> <p>Corrosion of steel at column to foundation connection.</p> </div>	
<div>PHOTO 32</div> <div>Gridline A</div> <div> <p>Corrosion of steel.</p> <p>After market remediation repairs to maintain functionality of the doors.</p> </div>			

HANGAR 4930-C UNIT 2

PHOTO LOG

HANGAR 4960-C UNIT 15

SITE LAYOUT



<div>PHOTO 35</div> <div>Gridline C1</div> <div>Corrosion of steel column resulting in oversized hole at anchor bolt location. Column is not anchored to concrete at this location.</div>		<div>PHOTO 38</div> <div>Gridline B4</div> <div>Top view of failed weld at tension rod connection to column.</div>	
<div>PHOTO 36</div> <div>Gridline B4</div> <div>Corrosion of tension rod and column.</div>		<div>PHOTO 39</div> <div>Gridline C5</div> <div>Corrosion of tension rod.</div>	
<div>PHOTO 37</div> <div>Gridline B4</div> <div>Side view of failed weld at tension rod connection to column.</div>		<div>PHOTO 40</div> <div>Gridline C5</div> <div>Corrosion of column and anchor bolt. Column load bears poorly on foundation.</div>	

HANGAR 4960-C UNIT 15

PHOTO LOG

Delivery by email
Aaron.ehle@cityofloveland.org

February 5, 2023

Mr. Aaron Ehle
City of Loveland
Northern Colorado Regional Airport
4900 Earhart Road
Loveland, CO 80538

RE: FNL T-Hangar Structural Evaluation
Additional Engineering Inspection

Dear Aaron:

This letter follows Ditesco's site investigation of the T-Hangars at FNL Airport in August 2023 and subsequent Technical Memorandum dated September 20, 2022. As identified in the referenced Technical Memorandum, the T-Hangars have significant structural issues including:

- Concrete structural foundation failure
- Column to foundation anchorage failure
- Untreated subgrade
- Missing or damaged hardware
- Misplaced structural column load bearing
- Deformed structural members
- Failed tension rod connections
- After-market structural additions such as additional angle and stiffeners
- Additional issues, as identified in the Technical Memorandum

Following this memorandum, FNL staff has been requested to procure additional engineering investigation to complete a more comprehensive structural condition sampling within the T-Hangars. Engineered metal buildings, such as the T-Hangars, are designed with engineered loads distributed across the entire structure. With the structural conditions witnessed during the initial field inspection, it is highly anticipated that similar conditions exist throughout the remaining structure.

It is our professional opinion that regardless of condition in the remaining T-Hangars, the condition witnessed in the inspected units is not salvageable and the structures are not candidates for retrofit. Based upon the observed condition of the T-Hangars, it is our professional opinion that the T-Hangars have met or exceeded their useful design life and additional analysis of the T-Hangars will yield the same result.

Sincerely,



Jill Burrell, PE

Cc: Kelsey Madsen, PE