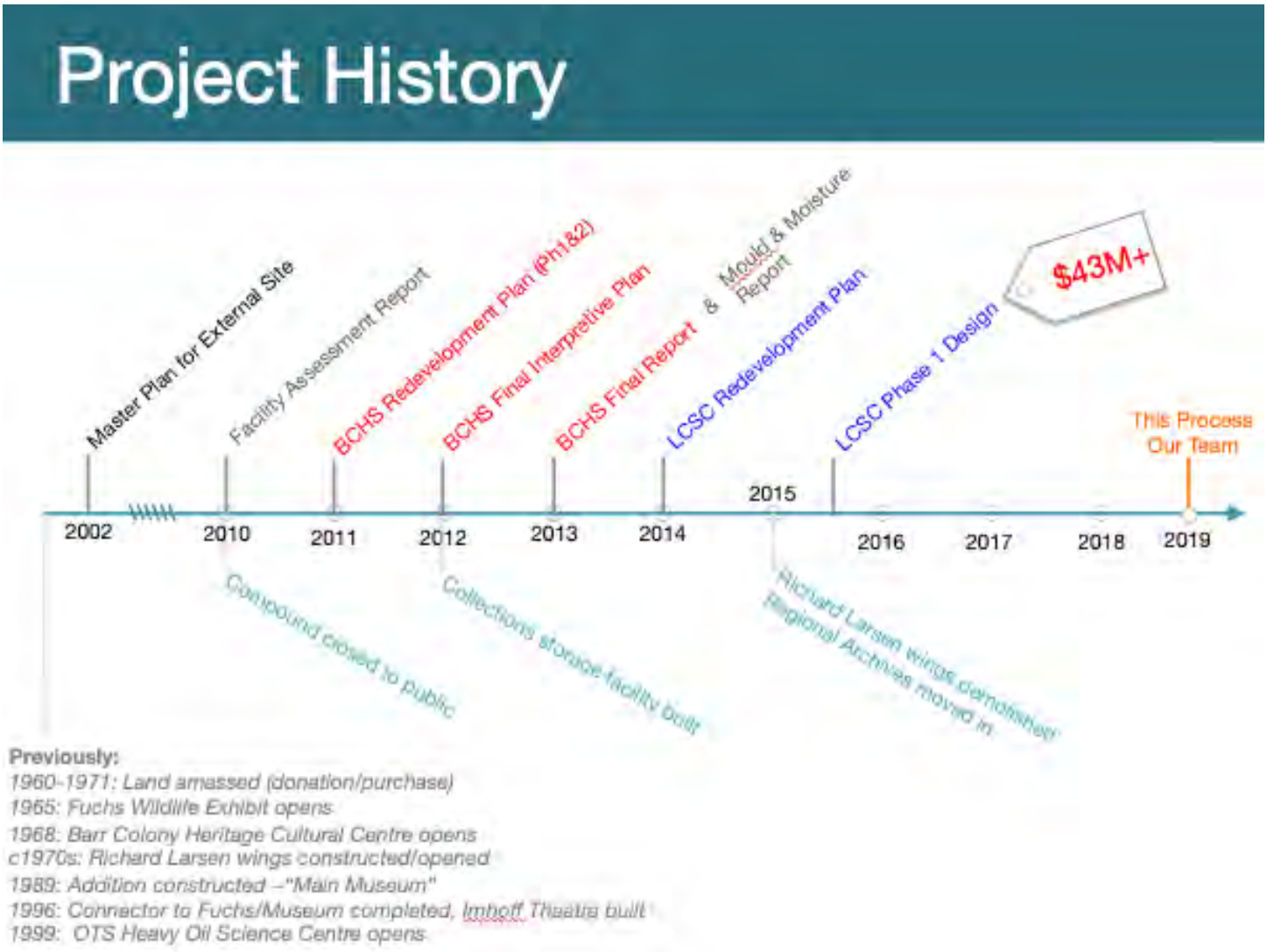
Appendices

Appendix A: LCSC Project Timeline

LCSC Timeline:



Previously:

1960-1971: Land amassed (donation/purchase)
1965: Fuchs Wildlife Exhibit opens
1968: Barr Colony Heritage Cultural Centre opens
c1970s: Richard Larsen wings constructed/opened
1989: Addition constructed –"Main Museum"
1996: Connector to Fuchs/Museum completed, Imhoff Theatre built
1999: OTS Heavy Oil Science Centre opens

Appendix B: APA Display Study

LCSC Visitor Experience Report

Prepared for the City of Lloydminster | Final Issue • July 11, 2019

ALDRICHPEARS ASSOCIATES

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1 Project Description

AldrichPears Associates Ltd. is part of a consultant team providing integrated studies for the Lloydminster Cultural and Science Centre (LCSC). The Centre is looking for recommendations for how to move forward with renewal in a manner that is attainable and meaningful to citizens of Lloydminster.

This document is the Display Study Working Paper, which will be reviewed along with the Spatial and Infrastructure Needs Studies to inform the development of conceptual options for a renewed LCSC.

The Display Study reviews and analyzes existing interpretive resources and existing experiences, incorporates information gathered from a site tour and visitor experience workshop, and provides sustainable recommendations for the LCSC based on interpretive best practices.

2 Summary of Activity

2.1 REVIEW OF PREVIOUS REPORTS & DOCUMENTATION

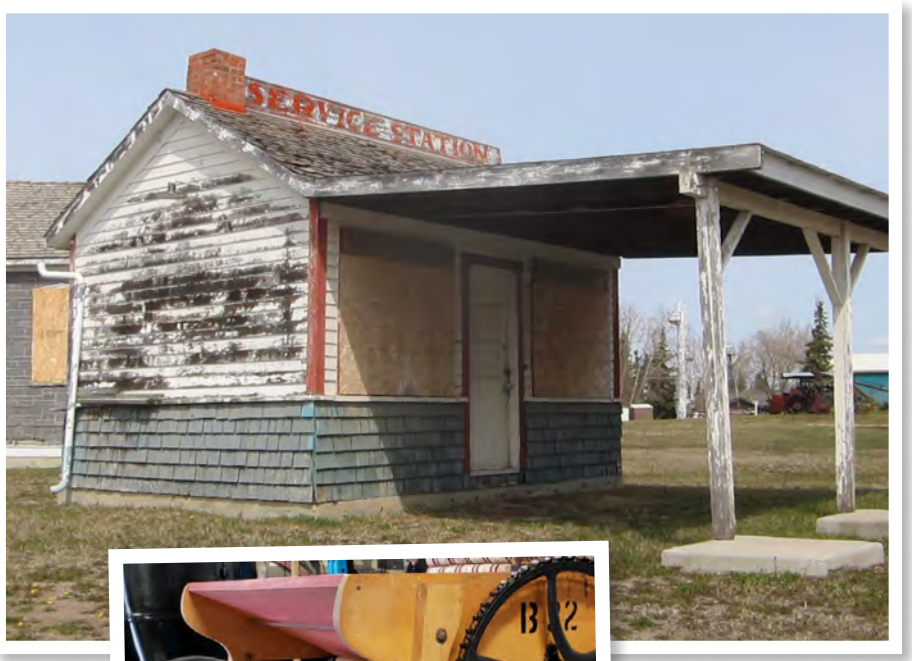
To date, the interpretive team has reviewed previous concept reports which made recommendations for the renewal of the LCSC. These reports include:

- Lloydminster Cultural & Science Centre Redevelopment Plan, S2, 2014
- Barr Colony Business Plan, Lord, 2013
- Interpretive Plan, Lord, 2012
- BCHCC Phase 2 Report, Lord, 2011
- BCHCC Phase 1 Report, Lord, 2011

We also reviewed summaries of current activities and reviewed documentation of artifact collections.

2.2 SITE TOUR

The team spent the morning of May 8 onsite touring the foyer, gift shop, archives, permanent and temporary exhibit areas, back of house storage and programming areas. We also toured the grounds, saw the exteriors of the heritage buildings, walked through the building currently housing the artifact collection, and learned about the cataloguing, storage and accessioning (including re-accessioning and de-accessioning) process.


SERVICE STATION


9
A
B


BULL DOG


MACLEOD'S
CANADA PROOF

2.3 VISITOR EXPERIENCE VISIONING WORKSHOP

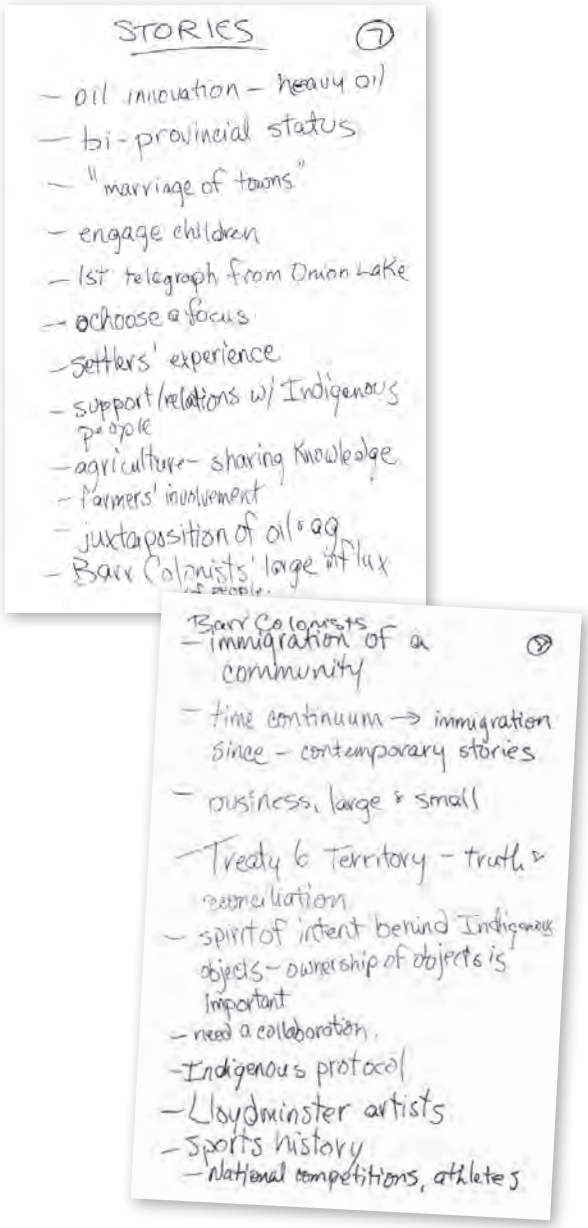
The team facilitated a visioning workshop on the afternoon of May 8. A group of 20 stakeholders reviewed best practices of interpretation, and were presented with a study of cultural and interpretive centres from communities of comparable size to Lloydminster. These centres tell the unique story of the community to visitors and serve as a point of pride for residents. The workshop continued with a SWOT analysis, brainstorming on the aspects of Lloydminster's story, and answering the focus question:

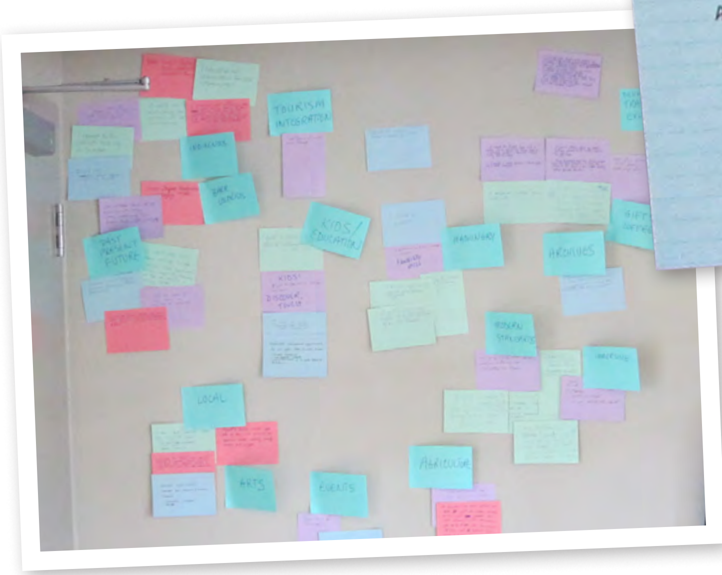
Imagine you walk into the redeveloped LCSC on opening day. What do you see, hear, touch, do while you are there?

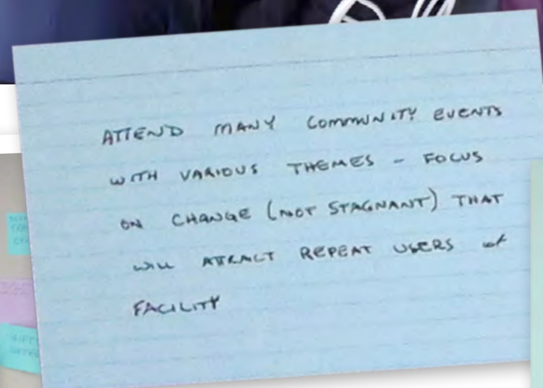
2.3.1 Key Workshop Results

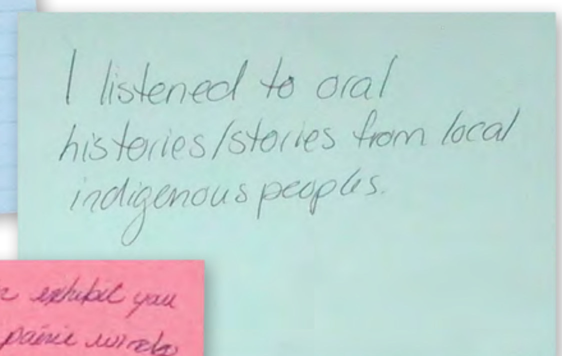
Notes from the complete workshop are provided in an addendum to this report. A summary of the key results that came out of the workshop are as follows:

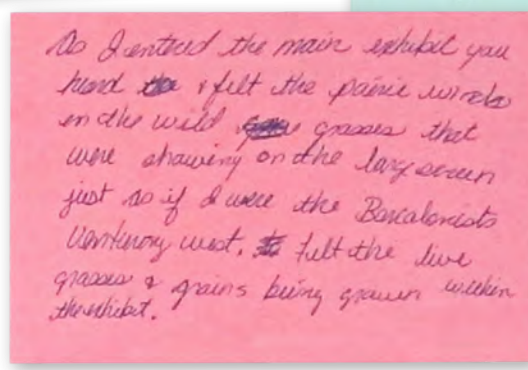
- There is a desire to do something beyond a band-aid solution, which modernizes the space, creates a sense of belonging for Lloydminster residents, and provides a mix of arts, programming and interpreting Lloydminster's history.
- A renewal plan must be financially feasible; the city will need to fund the majority of the costs.
- The stories told need to cover five important topics: Indigenous peoples, Barr Colonists, history of rural life, oil and gas, and the arts.
- There is a desire for the LCSC to be a community destination for special events for adults as well as a place for families to visit with something to attract visitors of all ages.






ATTEND MANY COMMUNITY EVENTS
WITH VARIOUS THEMES - FOCUS
ON CHANGE (NOT STAGNANT) THAT
WILL ATTRACT REPEAT USERS of
FACILITY


I listened to oral
histories/stories from local
indigenous peoples.


As I entered the main exhibit you
heard & felt the prairie winds
in the wild grasses that
were showing on the large screen
grasses & grains being grown within
the exhibit.

3 Situational Analysis + Recommendations

Based on our tours of the site and buildings, the visitor experience workshop, our understanding of museum and interpretive centre best practices and our conversations with staff and stakeholders, we have conducted the following analysis of collections, building and site.

3.1 COLLECTIONS

Collections currently on display in the LCSC are for the most part the Fuchs and Imhoff collections. In the case of the Fuchs collection, specimens are extremely aged and in many cases beyond repair.

The OTS Gallery interprets the story of oil and gas. This is a key piece of Lloydminster's history and scientific innovation; while the story definitely needs to be told, the exhibits are now 20 years old and very dated.

Historical collections relating to the history and culture of Lloydminster are currently in storage. The historical collection also includes large scale and iconic artifacts including vehicles and buildings.

3.1.1 Recommendations

The Fuchs specimens are not appropriate as a natural history exhibit. Their value lies in the fact that they are part of the collective memory of children in Lloydminster for the last 60 or more years. They have value as an historical point of reference as a common community experience. To that end, if there are a few specimens that are in good enough repair to be saved and put on display in a renewed space, there is opportunity in keeping them (the poker playing bunnies, for example). However, if they are not in good enough repair to move and re-display, the same experience could be repeated using photographs as part of a commemorative sign.

The Imhoff collection is similar in that in its entirety it does not represent the story of Lloydminster. One or two individual paintings do represent one of the founding families of the town, with the inclusion of the story that many of Imhoff's paintings can be found in churches across the northern prairies in Saskatchewan and North Dakota. Maintenance and display of the entire collection does not add to the experience or understanding of Lloydminster's heritage.

As OTS representative Adam Waterman said in our interview with him, "The industry is only 70 years old, so the last 20 years represents a significant part of the story." Any new interpretive displays should include the story of oil and gas, but the current exhibits in the OTS Gallery as they stand have reached the end of their useful life.

Regarding heritage collections, **any space allotted to the display of artifacts at the LCSC should prioritize heritage collections currently in storage and the stories that are tied to them.**

To summarize:

1. Any space allotted to the display of artifacts at the LCSC should prioritize the historical collections and stories tied to those collections.
2. The Imhoff and Fuchs collections are only relevant as historical reference points related to these founding families and the collective memory of the community.
3. If any Imhoff or Fuchs collections are to be kept to represent this historic reference point, they should be displayed in the context of the history of Lloydminster and interpreted as such.
4. While much of the OTS exhibit is dated and needs updating, there is an opportunity to repurpose exhibit cases in a renewed case.
5. Historical artifacts (including vehicles and buildings) can be used as icons that provide an entry point into stories about Lloydminster and its citizens.
6. Iconic artifacts that are currently outdoors (i.e., ESSO sign) could be very dramatic and impactful if brought indoors as part as the interpretive experience.

3.2 BUILDING FUNCTIONS

The LCSC building as it exists now is not ideal from an interpretive standpoint. If the spaces currently devoted to the Imhoff and Fuchs collections were cleared for display of historical artifacts and telling Lloydminster's story, this would be an improvement; however, changing humidity levels, risk of flooding lack of preparation and storage space would remain an issue.

3.2.1 Recommendations

Specific building recommendations will be included in the Spatial and Infrastructure Needs Studies. During our tours, interviews with staff and the visitor experience workshop, specific required building functions, relating to services and programming, were identified. The components are listed here, with connections to the experience types identified in the workshop, along with some suggestions for what those spaces might require.

COMPONENT	EXPERIENCES & STORIES (from workshop)	PRELIMINARY SPACE DESCRIPTION
Programming Areas	**Bigger space for programming** **Local Arts**	• Flexible seating • Space for large groups to congregate for classes • Storage for program supplies, tools, materials • Wet/dusty space for kilns, pottery preparation
Gathering spaces	**Space for community events**	• Snack bar/coffee bar • Seating areas
Renewed Exhibits	**Lloydminster: Past, Present and Future** **Kids/Education**	**Modern, interactive exhibits** • Multisensory (sound, sights, smells, things to touch) • Diverse media (graphics, AV, digital, hands-on, mechanical) for diverse audiences and age groups • Space for iconic artifacts (vehicles, ESSO sign)
Temporary Exhibit space	**Traveling and Temporary Exhibits**	• Open, light- and climate-controlled (strive for the highest environmental controls possible to meet traveling exhibit requirements) space that can accommodate traveling exhibits
Back-of-house	**To support key functions described above**	• Office space • Storage space • Preparation space
Revenue generation	**Gift Shop/Coffee**	• Gift store • Coffee shop/snack bar
Reception/tourism	**Integrate with existing tourism buildings**	• Pamphlets, maps, information • Reception/staff member to answer questions

3.3 SITE

While the site was primarily out of scope for the purposes of this study, it is important to note that there are several large artifacts and visitor experiences on the site, including the newly renovated Rendell House and vehicles currently in storage.

These site elements offer opportunities for interpretation, either as an outdoor experience that enhances the indoor exhibit experience, or as elements incorporated right into the indoor exhibit experience.

3.3.1 Recommendations

If the site is going to be part of the visitor experience, there are several issues that need to be addressed to address accessibility and safety on the site:

- Artifact storage areas must be cleaned up
- Drainage issues need to be addressed
- Undulating landscape will need to be smoothed out
- Smooth surfaces for walking would need to be built
- Outdoor exhibit destinations (buildings) would need to be clarified and interpreted in a consistent fashion.

3.4 MESSAGES

It was clear from our visit and workshop at the LCSC that one of the issues with the centre is a confusion in messaging. The centre carries the title of 'Cultural and Science Centre," but beyond the OTS Gallery there is very little interpretation of culture or science.

During the workshop there was some discussion about whether the title could be changed to something that more clearly represents the goal for the centre to focus on Lloydminster's unique culture, perhaps even adopting the local slang term "Lloyd" as part of the name.

3.4.1 Recommendations

It is beyond the scope of this project to recommend another name change to the centre; it is important to note, however, that there is a message in both decisions and non-decisions relating to the displays and visitor experiences offered by the centre.

By re-orienting towards telling Lloydminster's story and reflecting the identity of long-time residents to visitors and newcomers alike, the LCSC will earn its existing title. Discussions of changing the name to something more locally specific would also do well to support the message that this centre tells the story of Lloydminster's past, present and future.

4 Vision

While the Display Study does not go so far as an interpretive plan in developing a vision, interpretive goals and interpretive approach, the following are beginning to emerge as a pathway toward a centre whose collections and programming truly serve its community. The following vision, interpretive goals and suggested interpretive approach are a synthesis of the findings in our workshop, tour and subsequent interviews.

4.1 VISION STATEMENT

The following vision statement is a concise summary of discussions during the visioning workshop:

> **A renewed Lloydminster Cultural and Science Centre will provide a variety of experiences that share the story of the history, culture and uniqueness of Lloydminster with visitors of all ages.**

4.2 INTERPRETIVE GOALS

The following interpretive goals provide a 'North Star' to which the City of Lloydminster can orient when making future decisions about building requirements, programming, and collection management decisions. The following goals are a blend of best practices for community heritage interpretive centres which were presented at the visioning workshop, and which reflects the direction of the conversation among stakeholders.

- Visitors to "The Lloyd" will leave with a deeper understanding and appreciation of what makes the city and citizens of Lloydminster unique.
- Local citizens will feel a sense of pride in sharing their stories with visitors, and will see themselves reflected in the exhibits.
- The Lloyd will provide a variety of experiences that make use of its heritage artifact collection, including historic buildings and vehicles.
- Exhibitry will provide a beautiful and meaningful backdrop for programs offered through the City of Lloydminster.
- Create a flexible permanent exhibit area that allows interpreters to show various aspects of Lloydminster's history through a variety of lenses, using artifacts from the community or the collections.
- Create opportunities to build relationships and establish partnerships within the community through interpretation, display of collections, and programming.
- Create spaces that appeal to a wide variety of age groups, from young children to families to adults.

4.3 PROPOSED INTERPRETIVE APPROACH: A FLEXIBLE PERMANENT EXHIBIT SPACE

The heritage interpretive experience could be organized into a series of thematic 'islands' that provide a backdrop, cases, one or more featured item(s) and a permanent text panel introducing the theme. This would provide space for LCSC staff to create artifact-based displays on a wide variety of topics.

Each island would offer a mix of experiences, including something for children to do, touch or create. A small play space for smaller children could also be included to ensure that there is something for everyone.

Some of the themes allow for a broader exploration of a topic, while others, such as "Local Characters" would allow curators to explore a topic through a deep dive into the story with one important individual at the centre.

Larger artifacts and environmental backdrops could serve as 'connectors' between or 'frames' around the exhibit islands. These would be more permanent thematic spaces that provide visual impact and 'wow' factor while also supporting the stories told in the islands.

Some examples of connector/framing backdrops could be:

- An old truck pulled up to the old Husky gas station building
- A business storefront with an old heritage sign, and items on display in the windows
- Historic farm implements
- A natural landscape seen through an Indigenous lens, perhaps showing Grandfather rocks, Standing People (trees), an eagle or other sacred animal, or a bison skull appropriately displayed on sage and prayer cloth
- A recreated pioneer home scene, showing artifacts from the turn of the century.


IMPERIAL
ESSO
DEALER

4.3.1 Opportunities and Challenges for this approach

Opportunities:

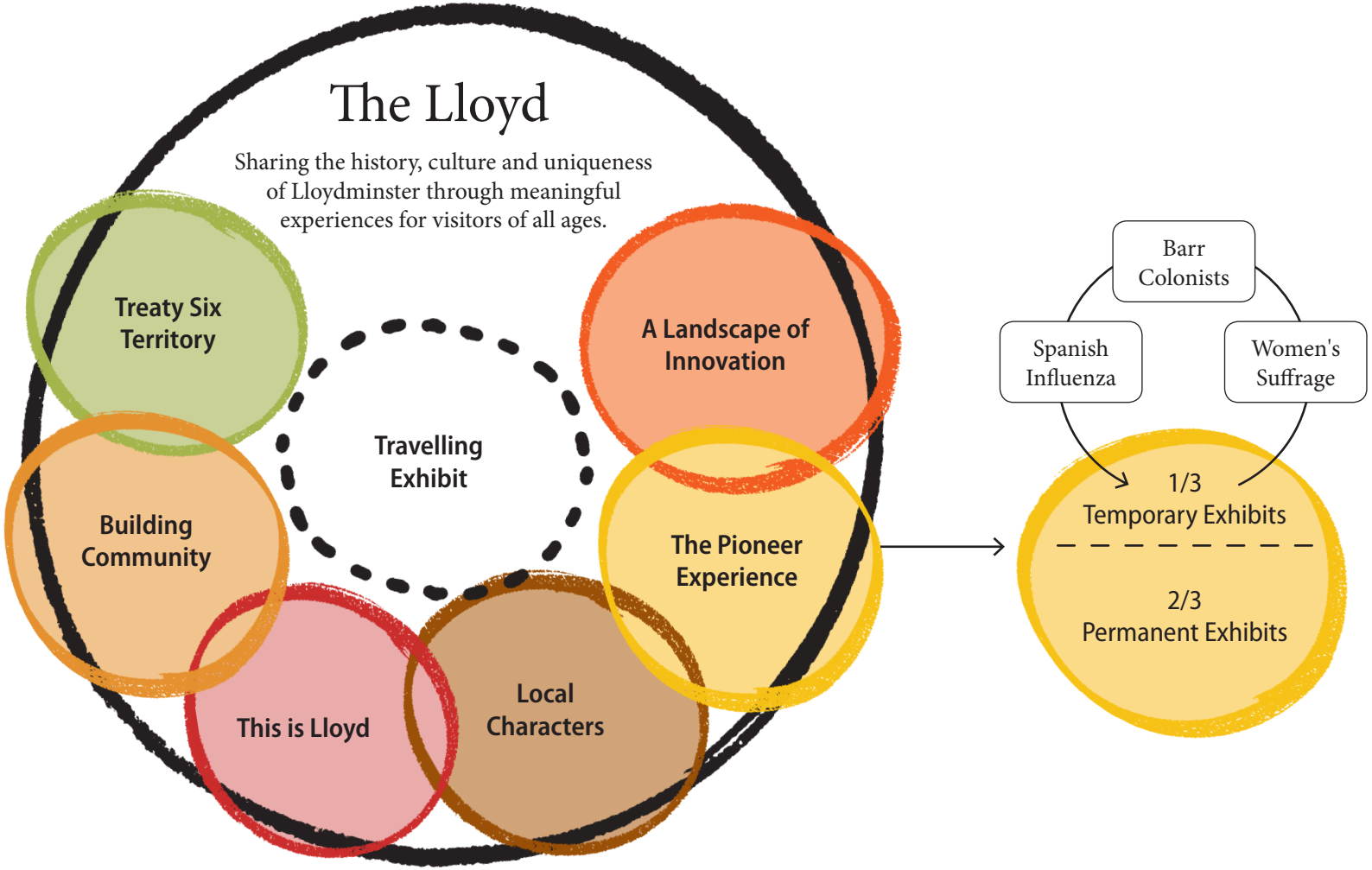
- creating community partnerships
- cycling artifacts out of storage
- regular schedule of changing exhibits
- the same story, i.e., Barr Colonists, could be told through various lenses such as Reverend Barr, or the pioneer experience, or interactions with Indigenous groups, etc.

Challenges:

- requires a commitment to planning, research and curation of a flexible exhibit schedule
- ongoing, but minor cost of production for new exhibits
- fixed framework to tell the story

4.3.2 Proposed themes, messages and exhibit topics

THEME	KEY MESSAGE	POTENTIAL EXHIBIT TOPIC
Treaty Six Territory	**We acknowledge that Lloydminster is located on Treaty Six Territory and the traditional homeland of the Métis. We acknowledge the ancestors of this place and reaffirm our relationship with one another.**	• partnerships with community groups • guest curators • reconciliation • historic events (NW Rebellion, residential schools, treaty negotiations) • nearby Nations
This is Lloyd	**Lloydminster is a city unique in Canada. It straddles the borders of two provinces, Saskatchewan and Alberta.**	• border story • newcomers • celebrations • demographics • ag/oil combination
The Pioneer Experience	**The community that became Lloydminster began as a temperance colony in 1903 when the Barr Colonists settled here. The pioneer experience here was influenced by Lloydminster's distance from a source of transportation as well as from major centres,**	• Barr Colonists • homesteading • other early immigrants • World War experiences
Building Community	**Lloydminster is a thriving community of entrepreneurs, the surrounding farming area, artists and involved citizens.**	• businesses and entrepreneurship • sports organizations • service groups • rural life • religion • World War experiences
Local Characters	**Descendents of Lloydminster's founding families, both Indigenous and of settler descent, still live in the area and contribute to the city's social, economic and political fabric.**	• Barr • Lloyd • Indigenous leaders/artists • pioneer families • Imhoff • Fuchs • Sports icons • Artists • Musicians
A Landscape of Innovation	**Lloydminster's economic foundation is a blend of agriculture and oil resources. The combination of these two active components of the economy have led to specific innovations in heavy oil and agriculture/animal husbandry taking place here.**	• Ag/Oil combination • cattle genetics • heavy oil • research projects (Lakeland College, others)


The Lloyd
Sharing the history, culture and uniqueness of Lloydminster through meaningful experiences for visitors of all ages.
Treaty Six Territory
A Landscape of Innovation
Travelling Exhibit
Building Community
The Pioneer Experience
This is Lloyd
Local Characters
Barr Colonists
Spanish Influenza
Women's Suffrage
1/3
Temporary Exhibits
2/3
Permanent Exhibits

4.4 COSTING THE VISION

Capital costs for new museum and interpretive centre exhibits are often calculated on a square footage basis. We keep these numbers in mind when trying to identify a manageable display area for a centre. The following sections outline the variations in costing for exhibit displays of varying complexity, and provides suggestions for the LCSC.

4.4.1 A brief outline of fabrication, installation and design costs

Generally, two factors determine exhibit costs: complexity and density. In any project there are simple exhibit units at a relatively low cost/sq. ft. and complex units at a higher cost/sq. ft. This mix is taken into account when average costs/sq. ft. are described and finally established as a target budget.

Fabrication and installation costs of good quality permanent museum exhibits today ranges between $350 and $800/sq. ft. The lowest figure buys static graphics and cases, yielding a result like thousands of small, ordinary museums across the country. The highest number buys complex interactive (visitor participatory technological exhibits), replicated environments and elaborate audio-visual exhibits, including custom film/video presentations in special theatres.

Assuming that the exhibits are installed in a serviced and finished architectural space (floor finish, painted walls and ceiling, completed HVAC, electrical distribution complete and service lighting installed), the typical cost vs. complexity range is as follows: (see chart)

COST ($ PER SQUARE FOOT)	FEATURES / COMPLEXITY
350 to 500	**Conventional cases, pedestals, panels with direct output graphics, mounted photographs and some artifacts. Simple AV in the form of audio repeater or very basic video from existing footage. Perhaps a few special constructed exhibits. Good use of photomurals and banner to create environmental effects. The higher range of the budet range may include simple dioramas, higher quality static exhibits, special artwork, some simple electronic interactive devices and audio/visual, such as basic video playback and a few computer interactives using purchased software.**
500 to 650	**Above, plus more elaborate dioramas or simple replicated environments, more frequent and/or complex interactive technological exhibits. More possibilities for audio/visual techniques including better video programming and limited special effects. Possibilities for upgraded wall and floor treatment, high end track lighting, some theatrical instruments. Excellent artifact presentation, casework and lighting.**
650 to 800	**Above, plus immersive environments, more complex electrical/mechanical interactive exhibits, special artwork, high quality casework, construction details and exhibit/theatrical lighting. Audio/visual possibilities become quite extensive with custom photography, special effects and a good range of video/computer exhibits.**

Design costs

Design fees and related disbursements can be expressed as a percentage of the fabrication budget. Throughout the museum exhibit industry, net design fees range between 20%-30% of the fabrication cost. Variables that affect design cost are scale (smaller projects cost more), complexity (many factors, including extensive research or stakeholder/community consultation), location (remote locations can cost more) and overall scope of work details. Disbursements, excluding travel, are typically 8%-12% of the fees. To get total project cost, add fabrication budget, design fees and related disbursements, and any applicable taxes.

4.4.2 Cost/Square Footage Recommendations for LCSC

When reviewing even the lowest cost/square footage for simple, low-tech exhibitry, it is clear that the amount of square footage currently devoted to display space at the LCSC (close to 10,000 square feet) is far more space than is likely affordable to fill when considering exhibit renewal.

Incorporating larger artifacts, such as buildings or vehicles would allow for a lower density exhibit experience, and fill more space for a lower cost per square foot. We recommend limiting dense/more complex exhibit areas to 1,500 to 2,000 square feet, with a similar sized space for traveling exhibits (the traveling exhibit space does not factor into capital exhibit costs—renting traveling exhibits is a more of an operating expense once the space is built). If there is more space available in the building, incorporating larger existing artifacts as the 'connectors' or 'frames' would offer an interesting and engaging space without the cost/square footage of more dense displays.

5 Conclusions and Next Steps

This document, along with the other studies undertaken during this project, will serve to inform future decisions on the LCSC site. A decision related to the preferred architectural concept option will help to give direction to display design, as we always recommend an integrated approach to architecture and exhibit design. While funding for construction of the entire project may take some time, there are steps that can be made in the interim.

5.1 STAKEHOLDER ENGAGEMENT

This display study can be used in conjunction with the other studies completed during this project to bring concepts for the LCSC to community stakeholders for feedback and buy-in for the next phases of the project.

The combined stakeholder feedback and design studies can then inform an interpretive planning process that should take place prior to building construction/renovation and exhibit design and fabrication.

5.2 INTERPRETIVE PLANNING

An interpretive plan is a roadmap for the future development of interpretation around a site. An interpretive plan for the LCSC would pick up where this study ends. It should include the following areas of study:

Comparable facilities Analysis

- Comparable local facilities, Comparable interpretive facilities

Project description

- Project goals, Scope, project process

Identification of Audience

- Current, target, visitor motivations, dwell time, accessibility requirements

Interpretive Plan

- Vision and goals, themes, messaging
- Visitor Experience
  - » Site experience: wayfinding, flow, amenities, circulation, visual identity
  - » Site plan/floor plan
  - » Interpretive Opportunities
  - » Visitor experience narrative walkthrough with sketches, images, potential experiences and high-level content distribution
  - » Design Approach: Preliminary materials, graphic approach, typicals
  - » Approach to multimedia
  - » Content matrices
  - » Programming opportunities

Implementation

- Schedule
- Budget
- Operational implications
- Basebuilding coordination

Optional as required

- Market analysis
- Stakeholder engagement
- Feasibility study
- Business plan
- Strategies for: Operations, partnerships, fundraising, evaluation, functional programs, revenue generation, marketing

*A note on costing: An interpretive plan for this project would likely include one or two workshop/review sessions with staff and stakeholders, along with more detailed interviews and collections assessment. Cost would range from $25k-$60k depending on requirements.

5.2.1 In-House vs. Consulting

An interpretive plan is typically more efficient and effective when completed as a collaboration between in-house staff and interpretive planning consultant.

In house staff bring the in-depth collections, institution, audience and story knowledge, but typically don't have the dedicated time to allocate to developing an interpretive plan, that can be used as a foundation for designing and building new exhibits.

A consultant brings the devoted time to allocate to the project, the diverse experience of other interpretive planning and exhibit design efforts at other institutions and an outside perspective, sometimes needed to overcome challenges, change direction or try something new.

5.3 DESIGN AND FABRICATION

When you have storylines, a design approach further defined in the interpretive planning process, and project funding in place, you will be ready to direct exhibit design and fabrication teams. Depending on your preference you can separate design and fabrication contracts, or set up the project as a design-build, which includes the entire project from design to installation (often involving a team of exhibit designers and exhibit fabricators).

This process occurs over several phases including schematic design, design development, construction documentation, shop drawings and print-ready file preparation, fabrication and installation. The exact phasing varies depending on the type of contract you choose and the exhibit design and fabrication team selected.

5.4 OPTIONAL STEPS

Other recommendations for vital interim steps may include:

- Fundraising
- Partnership development
- Business plan
- Membership strategy
- Programming plan

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Appendix C: Collections Details & Montel Art Rack Unit Information

Future Collections Details

Archives (LCSC)

The collections requirements for the Archives of LCSC (not to be confused the with LRA) are minimal. The expected growth for the archives will be the roughly 3 banker boxes worth of archival documents acquired per year (each box can fit ~400 documents yielding to 1200 documents per year). Over 20 years the LCSC can expect 24,000 archival documents to be acquired (equivalent to ~60 banker boxes). Such growth would take up ~7.5 SM of collection storage space (not factoring in a shelving efficiency). This collection should not be transferred to the LRA; however, the opportunity to have a shared digital database would be advantageous for both the LCSC and the LRA.

Art Storage – Imhoff

The future vision of the LCSC does not require the display of the Imhoff Collection, save for a handful of representative Imhoff paintings (~5%) to be kept as a historical reference point and likely to be part of a local character exhibit piece on Berthold von Imhoff. Assuming an average painting size of 7.5 SF or 0.7 SM (+30% hanging flex space), the remaining 5% (~13 pieces) of the Imhoff Collection will not have a significant impact on art storage requirements. For planning purposes, art is assumed be stored on mobile hanging racks (can be pulled out) of an Art Rack Unit[1]. Based on this storage method, the hanging space required for the remains of the Imhoff Collection take less than ½ of one Art Rack Unit. No growth will occur in the Imhoff Collection.

Art Storage (Evans / Holtby / Other)

Contemporary art and other artists (e.g. Holtby and the Evans Collections) will be retained. The expected growth of the Art Collection in its entirety is about 25 pieces acquired every 10 years, making the total works acquired in the project's 20-year planning horizon at 50. Using the average painting size of 7.5 SF or 0.7 SM, the total works onsite (150 acquired and retained works combined) is 1,463 SF or 135.9 SM of hanging space (includes +30% of hanging flex space). This equates to 4 Art Rack Units needed (for all art, including the few Imhoff pieces), 2 of which need pull-out space, while the other 2 do not. The total footprint for the 4 Art Rack Units is 216 SF or 20.1 SM. This number assumes a standard amount of art rack panels (6) – additional panels on the side can be installed to increase available hanging space with little to no impact on Art Rack Unit footprint.

Vehicle and Equipment Storage

At project start, only a few vehicles/equipment need to be removed, resulting in 97 vehicles/equipment items. Each vehicle/equipment item was assumed to be 175 SF / item (about the average size of a small John Deere Tractor + extra circulation space assuming vehicles will be placed at a reasonable density). Over the 20-year planning horizon, 4 items are expected to be acquired (acquiring 1 vehicle/equipment every 5 years) which equates to 101 items onsite. This amounts to 17,675 SF or 1,642 SM vehicle/equipment storage space needed (not including internal circulation space). Non-commercial vehicles should be kept in temperate storage.

Textiles

No textile items are to be removed at project start. Expected growth of the textile collection has been estimated to be 15 pieces / year. Over the 20-year planning horizon, a total of 300 pieces/items are expected to be acquired giving to a total of 2,300 items onsite. 5 items / SF is the assumed average size used in growth calculations. Using this figure, 230 SF or 21.4 SM is needed to house

[1] The Art Rack Unit used to calculate the requirements were based on the Montel ModulArt art rack unit structure, which supplies 576 SF of hanging space per art rack unit. 1 Art Rack Unit has a footprint of 36 SF or 3.3 SM.

	the entire textile collection (note: this does not include a shelving / storage efficiency).
Houseware Items	Upon project start, 3,250 items (or 25% of the collection) will be removed. 5 items / SF is the assumed average size used in growth calculations, with an assumed growth rate of 100 items acquired / year. Over the 20-year planning horizon then, 2000 items will be acquired, yielding a total onsite collection of 11,750 items. The footprint of the collection is 2,350 SF or 218.3 SM (note: this does not include a shelving / storage efficiency).
Books	There are 2000 books in the current collection. At project start, only 400 will be kept. 12 items / SF is the assumed average size used in growth calculations, with an assumed growth rate of 25 items acquired per year. Over the 20-year planning horizon, a total of 500 books will be acquired, yielding to a total onsite collection size of 900 books. The footprint of this collection is 75 SF or 7 SM (note: this does not include a shelving / storage efficiency).
Photographs	No photographs will be culled at project start (3,000 photographs/items at current). It is assumed that 400 items (photographs) can fit in 1 banker box. With an assumed growth rate of 3 banker boxes worth of photographs acquired per year (1200 photos), this gives to 24,000 photos acquired (or 60 banker boxes worth) over a 20-year planning horizon. This acquisition rate yields to a total collection size of 27,000 photos. With each banker box being slightly less than 1.5 SF each, the total collection footprint will be 91 SF or 8.5 SM (note: this does not include a shelving / storage efficiency).
Archaeological Artifacts	40 archaeological artifacts will be culled at project start. This will leave the total collection at 360 items with no growth over the 20-year planning horizon. 10 items / SF is the assumed size used in space calculations. The total footprint of 360 items is 36 SF or 3.3 SM (note: this does not include a shelving / storage efficiency).
Ethnographic Artifacts	20 ethnographic artifacts will be culled at project start. This will leave the total collection at 180 items with no growth over the 20-year planning horizon. 1 SF / item is the assumed artifact size used in space calculations. The total footprint of 180 items is 90 SF or 8.4 SM (note: this does not include a shelving / storage efficiency).
Taxidermy / Natural History	95% of the taxidermy collection items will be deaccessioned at project start due to their poor condition. This leaves only 25 items left from an original collection size of 500. 10 SF / item is the assumed item size. The 25 items will have an estimated footprint of 250 SF or 23.2 SM (note: this does not include a shelving / storage efficiency).

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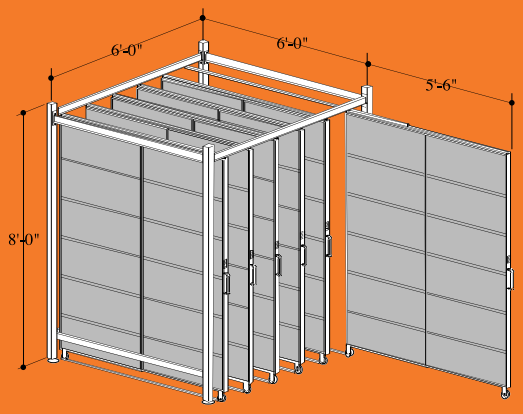

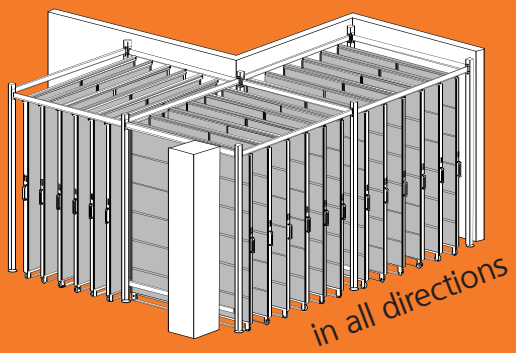

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Appendix D: AE Assessment Report

Associated Engineering | GLOBAL PERSPECTIVE. LOCAL FOCUS.

REPORT

Cornerstone Planning Group

Lloydminster Cultural and Science Centre Condition Assessment

JUNE 2019

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EXECUTIVE SUMMARY

Associated Engineering Alberta Ltd. (AE) carried out a visual review and condition assessment of the Lloydminster Cultural and Science Centre on May 8, 2019.

The objectives of this report are as follows:

- Evaluate the condition of the exterior parking lot, sidewalks and aprons, and grading around the building.
- Evaluate the condition of the structural systems of the building,
- Evaluate the condition of the building mechanical systems and components including ventilation, humidity control, heating, cooling and domestic water plumbing fixtures;
- Evaluate the condition of the electrical systems and components including the existing lighting system, emergency lighting, fire alarm system, security system, and electrical distribution;
- Review the existing parking lot lighting;
- Provide comments and observations regarding Alberta Building Code conformance of the building components;
- Compile site observations and provide a prioritized list of repairs with probable costs, and
- Determine the remaining life of the building.

Below is a list of findings of our review pertaining to the latest Alberta Building Code.

Non-compliance Related Items to Current Building Codes ($128,500)

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Barr Colony Centre	Replace Main MCC and Switchboard in Barr Colony Centre	Immediate	$70,000
Elec.	Barr Colony Centre	Replace receptacles located near sinks with GFI type in Barr Colony Centre	Immediate	$2,000
Elec.	OTS Building	Remove display located in front of main disconnect for access	Immediate	$1,000
Elec.	Richard Larson Building	Install Fire alarm devices as required per Code	Immediate	$5,000
Elec.	Barr Colony Centre	Install Fire alarm devices as required per Code	Immediate	$7,000
Elec.	OTS Building	Install Fire alarm devices as required per Code	Immediate	$5,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Richard Larson Building	Installation of additional exit sign and emergency lighting	Immediate	$4,000
Elec.	Barr Colony Centre	Installation of additional emergency lighting	Immediate	$10,000
Elec.	OTS Building	Installation of exit signs and additional emergency lighting	Immediate	$4,000
Elec.	Barr Colony Centre	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Main Museum	Medium	$10,000
Elec.	OTS Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in OTS	Medium	$3,500
Elec.	Richard Larson Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Richard Larson	Medium	$3,500
Elec.	Fuchs Wildlife Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Fuchs	Medium	$3,500
		TOTAL NON-COMPLIANCE RELATED ITEMS ALL BUILDINGS		**$128,500**

*It is assumed these items have met requirements at the time of construction and have been grandfathered to date. Conformance maybe required in the future by a major upgrade or if directed by the reviewing jurisdiction. It is best practice for Owners to update their buildings to the current codes especially when a considered a high risk to the public's health and safety.

After review of the **Fuchs Wildlife Building** and **OTS Heavy Oil Building**, it is suggested that these areas be considered for demolition. Recommendation items for these areas total **$397,500** where as demolition of this area is estimated at **$72,000**. The following table summaries items related to these areas.

Non-compliance and Condition Related Items to Current Building Codes – Fuchs Wildlife Building and OTS Heavy Oil Building ($397,500)

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	OTS Building	Remove display located in front of main disconnect for access	Immediate	$1,000
Elec.	OTS Building	Install Fire alarm devices as required per Code	Immediate	$5,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	OTS Building	Installation of exit signs and additional emergency lighting	Immediate	$4,000
Mech.	OTS Building	Full electronic control upgrade and pneumatic removal for OTS	High	$50,000
Mech.	Fuchs Wildlife Building	Full electronic control upgrade and pneumatic removal for Fuchs	High	$50,000
Elec.	OTS Building	Replace Exterior Receptacles with Weatherproof GFI type for OTS	High	$1,000
Elec.	Fuchs Wildlife Building	Replace Exterior Receptacles with Weatherproof GFI type for Fuchs	High	$1,000
Elec.	OTS Building	Removal of Electrical Power to rooftop condensing units no longer in use	High	$4,000
Elec.	OTS Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Elec.	Fuchs Wildlife Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Elec.	OTS Building	Replace Exterior Lighting and Controls for OTS	High	$2,500
Elec.	Fuchs Wildlife Building	Replace Exterior Lighting and Controls for Fuchs	High	$2,500
Mech.	OTS Building	Plan for replacement of all 4 furnaces in OTS Oil Building	Medium	$22,000
Mech.	OTS Building	Plan for replacement of 4 AC units connected to 4 furnaces in OTS.	Medium	$24,000
Elec.	OTS Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in OTS	Medium	$3,500
Elec.	Fuchs Wildlife Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Fuchs	Medium	$3,500
Mech.	Fuchs Wildlife Building	Wet Fire Suppression Sprinkler System in Fuchs (For Administration type building)	Low	$7,500
Mech.	OTS Building	Wet Fire Suppression Sprinkler System in OTS (For Administration type building)	Low	$7,500
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000
Elec.	Fuchs Wildlife Building	Install Functional Security Camera System to Fuchs	Low	$10,000
Elec.	OTS Building	Install Functional Security Camera System to OTS	Low	$10,000
Elec.	OTS Building	Install PA System to OTS	Low	$8,500
		TOTAL NON-COMPLIANCE AND CONDITION RELATED ITEMS FUCHS WILDLIFE BUILDING AND OTS HEAVY OIL BUILDING		**$397,500**

The review of the remaining **Richard Larson Building** it is suggested that this area also be considered for demolition. The expected costs for recommended items within this report total **$148,000** where as demolition of this area is estimated at **$25,000**. The following summaries items related to the Richard Larson Building:

Non-compliance and Condition Related Items to Current Building Codes – Richard Larson Building ($148,000)

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Richard Larson Building	Remove Utility feed, Replace West Wing Distribution Panels, Disconnect, and Splitter and re-feed to Main Switchboard	Immediate	$25,000
Elec.	Richard Larson Building	Install Fire alarm devices as required per Code	Immediate	$5,000
Elec.	Richard Larson Building	Installation of additional exit sign and emergency lighting	Immediate	$4,000
Elec.	Richard Larson Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Mech.	Richard Larson Building	Plan for replacement of both furnaces in Richard Larson (Subject to Building decommissioning)	Medium	$12,000
Elec.	Richard Larson Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Richard Larson	Medium	$3,500
Elec.	Richard Larson Building	Install Functional Security Camera System to Richard Larson	Low	$10,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Richard Larson Building	Install PA System to Richard Larson	Low	$8,500
		TOTAL NON-COMPLIANCE AND CONDITION RELATED ITEMS RICHARD LARSON BUILDING		**$148,000**

After review of the **Barr Colony Center**, including the **Imhoff Gallery** it is recommended this area be upgraded. The expected costs for recommended items related to this area total just under **$2.34 million.** A newly constructed museum of similar size would cost approximately **$6.1 million**. The following summaries items related to the Barr Colony Centre:

Non-compliance and Condition Related Items to Current Building Codes – Barr Colony Centre ($2,338,000)

Disc.	Asset	Work Description	Priority	Estimated Cost
Civil	Barr Colony Centre	Install downspouts and splash pads throughout building's exterior	Immediate	$3,000
Mech.	Barr Colony Centre	Air Handling Unit (AHU-1) system replacement, including ductwork and reheat coils	Immediate	$200,000
Mech.	Barr Colony Centre	Air Handling Unit (AHU-2) system replacement, including ductwork and reheat coils	Immediate	$500,000
Mech.	Barr Colony Centre	Whole Boiler system replacement, including system piping in Barr Colony Centre	Immediate	$400,000
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-1) system in Barr Colony Centre	Immediate	$40,000
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-2) system in Barr Colony Centre	Immediate	$80,000
Elec.	Barr Colony Centre	Replace Main MCC and Switchboard in Barr Colony Centre	Immediate	$70,000
Elec.	Barr Colony Centre	Replace 120/208V Distribution Panels	Immediate	$30,000
Elec.	Barr Colony Centre	Replace receptacles located near sinks with GFI type in Barr Colony Centre	Immediate	$2,000
Elec.	Barr Colony Centre	Install Fire alarm devices as required per Code	Immediate	$7,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Barr Colony Centre	Installation of additional emergency lighting	Immediate	$10,000
Struc.	Barr Colony Centre	Repair vertical crack in SE corner of Imhoff Gallery with an expansion joint intended for gypsum board finishes	High	$2,000
Struc.	Barr Colony Centre	Mold remediation of Barr Colony Centre (unknown quantity)	High	$60,000
Struc.	Barr Colony Centre	Repaint exterior steel framing at Main Entrance	High	$5,000
Mech.	Barr Colony Centre	Humidification system replacement, including piping	High	$250,000
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-1)	High	$8,000
Mech.	Barr Colony Centre	Electric and hot water heaters throughout building	High	$20,000
Mech.	Barr Colony Centre	Full electronic control upgrade and pneumatic removal throughout entire facility	High	$200,000
Elec.	Barr Colony Centre	Replace Exterior Receptacles with Weatherproof GFI type for Barr Colony Centre	High	$3,000
Elec.	Barr Colony Centre	Replace Exterior Lighting and Controls for Barr Colony Centre	High	$5,000
Elec.	Barr Colony Centre	Replace Interior Lighting Controls and Fixtures	High	$250,000
Elec.	Barr Colony Centre	Removal of DC Inverter	High	$4,000
Mech.	Barr Colony Centre	Plan for replacement of stainless steel sink and faucet replacement of Kiln Room, Staff Room, and Kitchen/Classroom	Medium	$8,500
Mech.	Barr Colony Centre	Plan for replacement of Drinking Fountain	Medium	$3,500
Mech.	Barr Colony Centre	Plan for replacement of Electric Domestic Hot Water Heater	Medium	$2,000
Mech.	Barr Colony Centre	Plan for replacement of Gas Fired Domestic Hot Water Heater	Medium	$16,500

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Barr Colony Centre	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Main Museum	Medium	$10,000
Mech.	Barr Colony Centre	Plan for replacement of Lavatory and Faucet	Low	$6,000
Mech.	Barr Colony Centre	Wet Fire Suppression Sprinkler System in Barr Colony Centre (For Administration type building)	Low	$50,000
Mech.	Barr Colony Centre	Plan for replacement of Water Closets	Low	$7,000
Mech.	Barr Colony Centre	Plan for replacement of Urinal replacement	Low	$2,500
Mech.	Barr Colony Centre	Plan for replacement of Make-Up Air unit (MUA-1)	Low	$20,000
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-2)	Low	$8,000
Elec.	Barr Colony Centre	Install Functional Security Camera System to Main Museum	Low	$30,000
Elec.	Barr Colony Centre	Install PA System to Main Museum	Low	$25,000
		TOTAL NON-COMPLIANCE AND CONDITION RELATED ITEMS BARR COLONY CENTRE		**$2,338,000**

The following items summaries recommendation items from the review of the exterior parking lot, sidewalks and aprons, and grading around the building:

Non-compliance and Condition Related Items to Current Building Codes – Site and Parking Lot ($671,000)

Disc.	Asset	Work Description	Priority	Estimated Cost
Civil	Parking Lot	Perform geotechnical study to confirm the structural condition of the pavement structure.	Immediate	$15,000
Civil	Site	Swale regrading, sodding and erosion control	Immediate	$16,000
Civil	Parking Lot	Asphalt surface Patching and Deep patching as temporary repairs to parking structure (pothole repair)	High	$20,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Civil	Site	Sidewalk replacements around the LCSC	High	$70,000
Civil	Parking Lot	Replace parking stall markings	High	$25,000
Civil	Site	Re-grading of site around the LCSC Building	High	$55,000
Civil	Parking Lot	Reconstruct sections of the parking lot based on results of the proposed geotechnical study.	Medium	$470,000
		TOTAL NON-COMPLIANCE AND CONDITION RELATED ITEMS SITE AND PARKING LOT		**$671,000**

The estimated costs for addressing the objectives expressed above with the recommendation of demolishing the Fuchs, OTS, and Richard Larson Buildings have been tabulated in the following summary table and broken down by discipline and ranking priority:

Table ES-2
Recommendation Summary

Disc. / Rank	Civil	Struct	Mech	Elec	Total
Immediate	$34,000	$0	$1,220,000	$163,000	$1,417,000
High	$170,000	$92,000	$578,000	$513,000	$1,353,000
Medium	$470,000	$72,000	$88,500	$20,500	$651,000
Low	$0	$0	$128,500	$102,000	$230,500
Total	**$674,000**	**$164,000**	**$2,015,000**	**$798,500**	**$3,651,500**

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1 INTRODUCTION

1.1 Background

The Lloydminster Cultural and Sciences Centre (LCSC) is considered to the community's hub for art, history and culture. The Centre's permanent exhibits consist of the Imhoff Art Gallery, Fuchs Wildlife Exhibit and the OTS Heavy Oil Science Centre. Its offers space for classes, special events and traveling exhibits from throughout the country, and local artists.

Figure 1-1
Lloydminster Cultural and Science Centre

Source: www.lloydminster.ca

The LCSC was originally opened in 1965 and has undergone many renovations and additions since then. The following is the list of the known construction history:

- 1963 – Original Fuchs Wildlife Museum
- 1967 – Richard Larson Building North Wing (since removed)
- 1968 – Richard Larson Building Central Wing (since removed)
- 1977 – Richard Larson Building South Wing (since removed)
- 1980 – Richard Larson Building East Wing
- Unknown – Richard Larson Building West Wing (since removed)
- 1988 – Barr Colony Heritage/Cultural Centre
- 1995 – Barr Colony Heritage/Cultural Centre Additions (Imhoff Gallery and Corridor Link)
- 1999 – OTS Heavy Oil Building Renovation (renovations to south portion of original Fuchs)

With the current state of the facility, the City of Lloydminster is anticipating rehabilitating and/or reconstructing the LCSC and is seeking direction on the Centre's future.

1.2 Scope of Work

AE carried out visual review of the LCSC on May 8, 2019. The assessment of the building was focused on the following scope:

- Evaluate the condition of the exterior parking lot, sidewalks and aprons, and grading around the building.
- Evaluate the condition of the structural systems of the building,
- Evaluate the condition of the building mechanical systems and components including ventilation, humidity control, heating, cooling and domestic water plumbing fixtures;
- Evaluate the condition of the electrical systems and components including the existing lighting system, emergency lighting, fire alarm system, security system, and electrical distribution;
- Review the existing parking lot lighting;
- Provide comments and observations regarding Alberta Building Code conformance of the observed building components;
- Compile site observations and provide a prioritized list of repairs with probable costs; and
- Determine the remaining life of the building.

Our team consolidated the site photos and field notes that have been compiled into this assessment report. The report also contains conceptual estimates of probable costs for the repair of deficiencies found within the facility, along with a priority ranking.

The recommendations are noted and ranked in order of priority as follows:

Table ES-1
Recommendation Ranking Chart

Rank	Urgency
Immediate Priority	Considered to be a risk to the public's safety or are considered urgent for the building's integrity
High Priority	Within 1 to 5 years
Medium Priority	Within 6 to 10 years
Low Priority	Within 11 to 20 years

2 CIVIL

2.1 Description

AE undertook a field assessment with the local Operations Team to understand the condition of the civil infrastructure for the Main Building at the LCSC. Figure 2-1 (see Appendix A) shows all of the defects observed during the assessment. The operational needs of the civil infrastructure were also identified. A visual assessment of the following civil infrastructure was undertaken of the following:

- Asphalt Parking Lot;
- Draining, grading and stormwater system;
- Sidewalks/Concrete Building Aprons
- Downspouts.

2.2 Parking Lot

The LCSC has a paved asphalt parking lot located north of the Main Building. The parking lot is a low-lying point and all surface flow from the LCSC canopy flows through the parking lot towards the municipal stormwater line. It is at a lower elevation when compared to Ray Nelson Drive.

A visual condition assessment was undertaken of the parking lot. The visual condition assessment was to identify surface defects. These include:

- Transverse Cracks;
- Longitudinal Cracks;
- Alligator Cracks;
- Shrinkage Cracks;
- Rutting;
- Corrugations;
- Raveling;
- Shoving and Pushing;
- Pot Holes;
- Excess Asphalt;
- Polished Aggregate; and
- Deficiency Drainage.

Based on a visual condition assessment of the parking lot, the pavement structure appears to be in fair structural condition. The pavement structure, however, has localized failures with some areas having potholes, transverse cracks, and alligator cracks. There is also evidence of moisture in the pavement structure. This may be a contributing factor to some of the surface failures observed. Some of the defects observed are as shown on Figure 2-2 and Figure 2-3.

Figure 2-2 Parking Lot: Alligator Cracks

Figure 2-3 Parking Lot: Moisture

The parking lot has 50 demarcated parking spots. Using the patron usage area of the main building (1473 m^2), the Land Use Bylaw of the City of Lloydminster of 2016 indicates that the minimum number of parking bays for the facility should be 147 parking bays. There is additional parking at the rear of the facility that may satisfy the stall count requirements however, this was not reviewed in detail due to scope limitations.

The parking lot has road surface markings which demarcate the parking bays. These markings have faded over time and they are no longer clearly visible as shown below on Figure 2-4.

Figure 2-4 Parking Lot: Faded Road Markings

The parking lot is bound by straight face concrete curbs. Based on a visual assessment, the curbs are generally in a good condition, however, some curbs have cracks, and some curbs have chips and some have edge breaks as shown on Figure 2-5 and Figure 2-6.

Figure 2-5 Parking Lot: Curbs with Edge Breaks

Figure 2-6 Parking Lot: Curbs with Edge Breaks

2.3 Sidewalks

The LCSC has concrete walkways leading to all entrances and exits of the Main Building. Areas with cracked sidewalks and sidewalks with trip hazards were identified during the assessment are as shown in Figure 2-1. Some of the defects observed are as shown on Figure 2-7 and Figure 2-8.

Some cracked sections of the walkways show evidence of settlement and pose a tripping hazard for pedestrians. It is likely that the substructure has failed due to any of or a combination of the following:

- Insufficient backfill during construction;
- Overloading; and
- Frost heave or soil saturation.

Figure 2-7 Parking Lot: Cracked Walkways

Figure 2-8 Rear Entrance: Cracked Walkways

2.4 Concrete Pads

There are cracked concrete pads at the main entrance as shown on Figure 2-9. These cracked concrete pads currently do not pose a tripping hazard.

Figure 2-9 Cracked Concrete Pads

2.5 Grading

It was observed that the LCSC facility is located in a depressed lot when compared to its surroundings. Significant portions of the site are graded towards the existing stormwater system along the parking lot.

Parts of the east section of the site slope towards Fuchs Wildlife Centre and Interactive Oil Displays as shown on Figure 2-1, Figure 2-10, and Figure 2-11.

The west side of the Main Building adjacent to the Imhoff Gallery is graded along the building. The grading is not uniform and landscaping features may be inhibiting flow. This may encourage ponding of water, increasing the likelihood of ingress of water into the building. The LCSC officials indicated that no ingress of water through the walls has occurred into the building.

Figure 2-10 Back Graded: East Section (Fuchs gallery)

Figure 2-11 Insufficent Grading:West Section (Imhoff gallery)

2.6 Swale Drain

A swale drain is located between the Fuchs Building and the Interpretive Building as shown on Figure 2-1. This swale collects surface runoff from the rear of the main building and discharges it into the stormwater system located across the parking lot. Based on a visual inspection, the drain does not comply with the minimum 1.5% slope requirements for grassed swales as per the City of Lloydminster Municipal Development Standards of 2014. Parts of the swale have been eroded while some parts are partially blocked as shown on Figure 2-12 and Figure 2-13.

The swale may also be contributing to moisture problems observed in the parking lot as it discharges onto the parking lot. Some of the runoff discharged from the swale maybe entering the subsurface portion of the pavement structure of the parking lot.

A 200 mm Corrugated Steel Pipe which discharges into the swale is partially blocked.

Figure 2-12 Swale

Figure 2-13 Eroded Swale Area Under Corridor

2.7 Storm System Surcharge

According to the LCSC officials, the existing stormwater system along Ray Nelson Drive surcharges during major storm events. During surcharge events, the onsite drainage cannot effectively discharge runoff from the site and the runoff from the Ray Nelson Drive discharges into the LCSC parking lot as it is at a higher elevation than the parking lot. This results in flooding of water in the parking lot during storm events.

The surcharge level of the storm main was observed by the officials to be 0.5 m above the parking lot level. At this depth, the door seals of regular cars parked in the parking lot would be submerged and may leak water into the passenger compartment. This water may damage major electronic components resulting in the vehicle being classified as a flood damaged vehicle with a “nonrepairable” status.

Due to scope limitations, the size, capacity and condition of the stormwater outfall could not be verified.

2.8 Downspouts and Splashpads

The Main Building has downspouts installed to convey water from the roof to the ground around the building as shown in Figure 2.1. Some of these downspouts were observed to be discharging adjacent to the main building as shown on Figure 2-14 and Figure 2-15. Some of the downspouts also do not have splash pads to dissipate the kinetic energy of

the water, some splash pads are misaligned and some splash pads direct water towards the building. Over time, the water from these downspouts may erode backfilled material surrounding the building. This may create local low points which encourage ponding of water near the building, increasing the likelihood of ingress of water into the building.

Figure 2-14 Misaligned Splashpads

Figure 2-15 Damaged Downspouts

2.9 Recommendations

2.9.1 Parking Lot

For the parking lot, we recommend that:

- A Geotechnical Study be undertaken to confirm the structural condition of the pavement structure. This study will potentially identify the cause of the surface moisture observed.
- Cracks be repaired by means of crack filling, potholes be patched, and alligator cracks be repaired by means of deep patching.
- Sections of the parking lot be reconstructed based on recommendations of the Geotechnical Study.
- Road markings be repainted.
- Damaged curbs be replaced.

2.9.2 Sidewalks

For the sidewalks, we recommend that:

- The cracked concrete be replaced with substructure improvements. We propose that the depth of the base be extended by excavating in situ material and replacing it with well-compacted gravel.

2.9.3 Grading

For grading, we recommend that:

- Continuous monitoring and maintenance be implemented to maintain grading.
- The east and west sections of the Main Building be regraded to direct surface runoff away from the building.

2.9.4 Swales

For the swale, we recommend that:

- The swale be reshaped, regraded and vegetated with grass.
- That erosion protection in the form of riprap be installed under the corridor connecting the Fuchs Building and the Interpretive Building.
- To address the ingress of water into the parking lot pavement structure from the drain, we propose that the swale be lined with concrete on the approach to the parking lot. To mitigate against ingress of water below the concrete liner, a clay plug should be constructed immediately before the liner.
- An effective and continuous operation and maintenance program be implemented to ensure timely unblocking of pipes and to ensure adequate landscaping of the swale is maintained.

2.10 Storm System Surcharge

For the storm system, we recommend that:

- The City of Lloydminster be contacted to discuss the surcharging of Ray Nelson D rive that caused flooding to the LCSC parking lot.
- A storm system study be undertaken by either the city or LCSC to determine capacity and bottlenecks in the system.

2.11 Downspouts and Splashpads

For the downspouts and splashpads, we recommend that:

- New downspout outlets with concrete splash pads be installed to ensure that discharge from these downspouts are directed away from the building wall.

2.12 Recommendations

Recommendations accompanied by ranking priority and an estimated probable cost related to civil work are presented below in Table 2-1. The costs are inclusive of 15% architectural consulting fee and 30% contingency. “Immediate” are considered risks to the public’s safety, “high” is within 1 to 5 years, “medium” is within the next 6 to 10 years, and “low” is within the next 11 to 20 years. Values are probable costs in 2019 dollars and are assumed to be combined with other scope items.

Table 2-1
Estimated Costs for Civil Upgrades

Disc.	Asset	Work Description	Priority	Estimated Cost
Civil	Barr Colony Centre	Install downspouts and splash pads throughout buildings exterior	Immediate	$3,000
Civil	Parking Lot	Perform geotechnical study to confirm the structural condition of the pavement structure	Immediate	$15,000
Civil	Site	Swale regrading, sodding and erosion control	Immediate	$16,000
Civil	Parking Lot	Asphalt surface Patching and Deep patching as temporary repairs to parking structure (pothole repair)	High	$20,000
Civil	Site	Sidewalk replacements around the LCSC	High	$70,000
Civil	Parking Lot	Replace parking stall markings	High	$25,000
Civil	Site	Re-grading of site around the LCSC building	High	$55,000
Civil	Parking Lot	Reconstruct sections of the parking lot based on results of the proposed geotechnical study	Medium	$470,000
		TOTAL CIVIL CONDITION ASSESSMENT ITEMS		**$674,000**

3 STRUCTURAL

3.1 Description

From reviewing record drawings, previous assessment reports, and our visual assessment of the structure, we understand the structural systems is as follows:

3.1.1 Fuchs Wildlife Museum

The Fuchs Wildlife Museum is the original structure consists of the following:

- Timber roof joists topped with sheathing to provide a flat roof structure;
- Timber framed exterior load bearing walls on concrete strip footings;
- Interior glulam beams bearing on steel pipe columns founded on concrete pier foundations; and
- Concrete slab-on-grade floor slab.

3.1.2 1980 Richard Larson Building – East Wing

The East Wing of Richard Larson structure comprises of the following:

- Timber trusses topped with sheathing to form a sloped roof;
- Standard timber stud exterior load bearing walls;
- Unknown concrete Concrete foundation (type unknown); and
- Concrete slab-on-grade floor slab.

3.1.3 1988 Barr Colony Heritage/Cultural Center

The main portion of the Museum is constructed from:

- A low slope roof consists of steel roof deck on open web steel joists (OWSJ) on steel pick-up beams. The steel pick-up beams are supported by steel columns;
- Timber infill walls span between steel columns;
- Concrete foundation consisting of concrete grade beams and concrete piles; and
- Concrete slab-on-grade floor slab.

3.1.4 1995 Barr Colony Heritage/Cultural Center Addition

The Imhoff Gallery structure comprises of:

- Steel roof deck on open web steel joists (OWSJ) on steel pick-up beams. The steel pick-up beams are supported by steel columns;
- Timber infill walls span between steel columns;
- Concrete foundation consisting of concrete grade beams and concrete piles; and
- concrete slab-on-grade floor slab.

The Corridor link:

- Timber roof joists and sheathing;
- Timber stud load bearing walls;

- Concrete grade beam and concrete pile foundation;
- Concrete slab-on-grade floor slab; and
- Suspended floor structure of steel deck and concrete topping.

3.1.5 1999 Heavy Oil Building

Our understanding is that the Heavy Oil Building was provided by a renovation to a portion of the Original Fuchs Building in 1999. The building consists of:

- Timber roof joists topped of sheathing to provide a flat roof structure;
- Timber framed exterior load bearing walls on concrete strip footings;
- Interior glulam beams bearing on steel pipe columns founded on concrete pier foundations; and
- Concrete slab-on-grade floor slab.

3.2 Assessment

3.2.1 Foundations

As noted above, the structure's foundations consist of reinforced concrete footings or reinforced concrete grade beams and piles.

The foundations were not visible for inspection due to their location in soils. With no visible signs of concern, it is assumed that these items are in satisfactory condition.

It appears that a groundwater collection system is not provided around the buildings perimeter. A structure without a collection system has a greater risk of soil saturation and frost heave. Our understanding is that there has been no history of frost heaving of the structure and therefore, has been performing adequately.

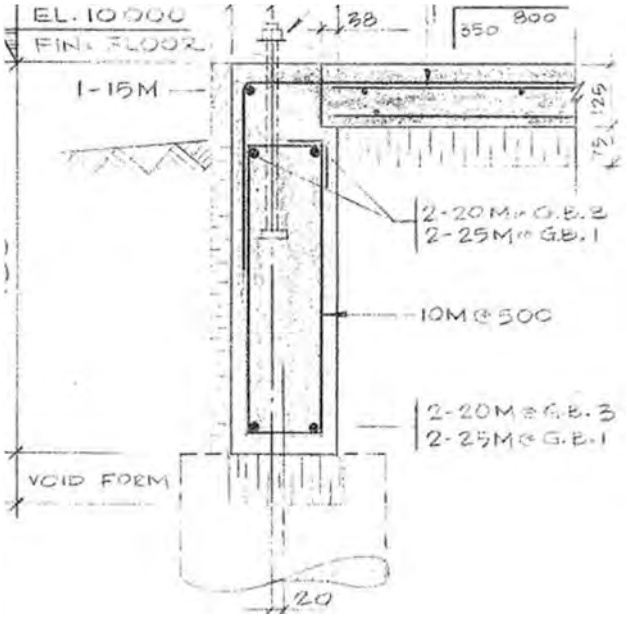


Figure 3-1 Example of Concrete Grade Beam on Pile

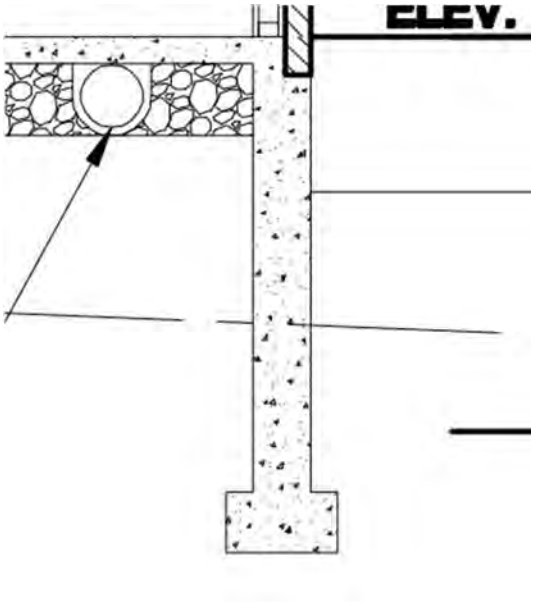


Figure 3-2 Example of Concrete Footing

3.2.2 Grade Supported Concrete Slabs

Floor surfaces of the facility are provided by concrete slabs-on-grade bearing on compacted granular backfill. The majority of the floor surfaces are covered in floor finishes; therefore, were not visible for inspection. Only typical cracking was visible at exposed surfaces and can be considered normal. The slabs appeared to be flat and leveled with no sings of differential settlement.

Site representative indicated that water ingress is common at the northwest corner of the remaining East Wing of Richard Larson Building. This area was currently used for storage and access to the flooded zone was unavailable. It is recommended that any cracks or gaps to be sealed, and a subgrade water collection system to be installed below the exterior grade to mitigate groundwater infiltration.

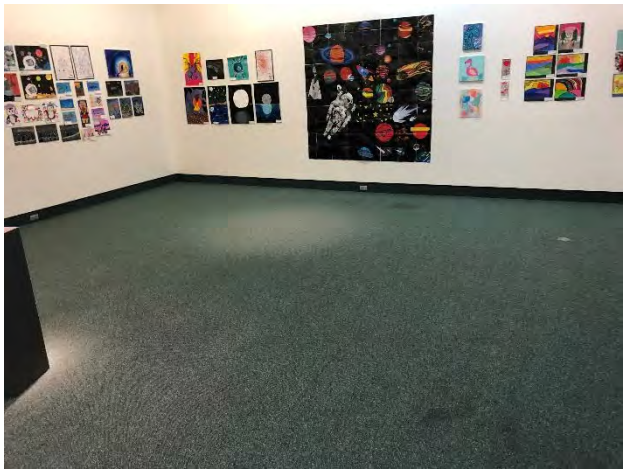


Figure 3-3 Floor Slab in Gallery Three

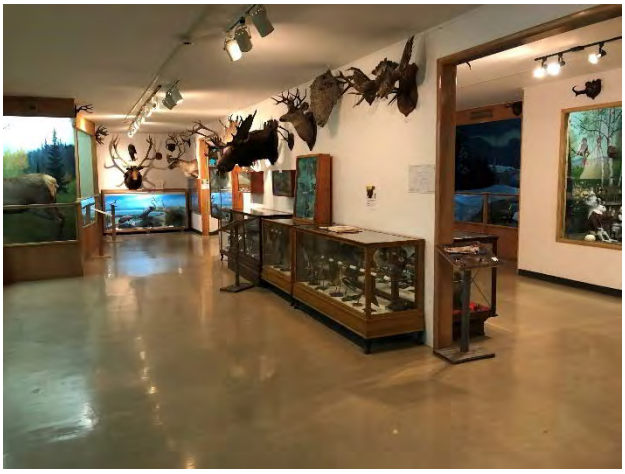


Figure 3-4 Floor Slab in Fuchs Building

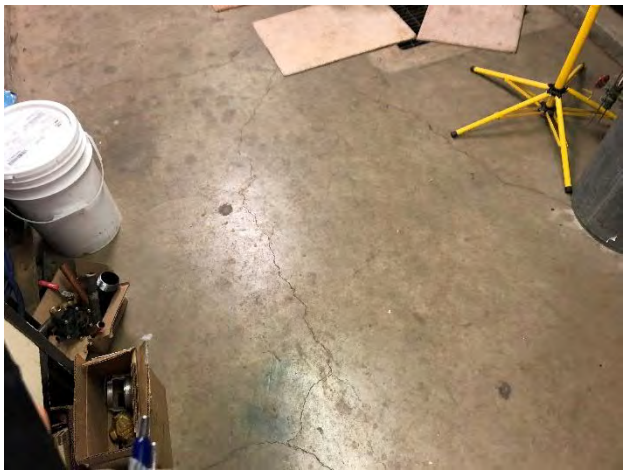


Figure 3-5 Typical Crack in Main Mechanical Room Slab

Figure 3-6 Typical Cracking in Richard Larson Slab

3.2.3 Structural Concrete Slabs

Structural concrete slabs are provided at three entrance vestibules within the Main Museum area (1988 construction. Drawings indicate that void form is present beneath 150 mm concrete slab, which will protect the element from expected uplift forces. No concerns were noted.

The suspended slab within the Corridor Link spans over an exterior drainage trench. This structure comprises of steel decking and a concrete topping. The top surface was covered by a tile floor finish, and the underside by aluminum soffit; due to restrictive visibility the structural elements could not be directly assessed. No obvious signs of concern were noted.

Figure 3-7 Corridor Link Suspended Slab

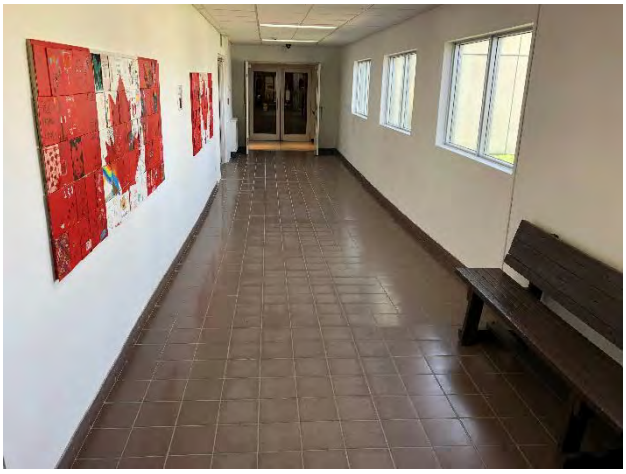


Figure 3-8 Interior of Corridor Link

3.2.4 Load Bearing Wall Systems

The structures wall systems comprise of load bearing timber stud walls, as well as structural steel framing with timber infill walls (non-loading bearing). The following sections describe their conditions.

3.2.4.1 Timber Wall Framing

The Fuchs, Heavy Oil, Richard Larson Buildings and Corridor Link consist of standard load bearing timber stud wall construction, while the main museum consists of infill non-loading bearing infill walls between steel columns.

Although the timber elements of the walls are hidden behind wall finishes, the conditions of the timbers were not visible and could not be fully determined. AE reviewed their visible finishes to determine their expected conditions to our best judgement.

Water damage was seen on wall surfaces in the following locations:

- The Mechanical Room of the Heavy Oil Building;
- The south wall near the west exit of the Corridor Link; and
- The Kitchen and classroom of the Main Museum.
- South wall of Imhoff Gallery;

- Although not confirmed, expected behind exhibits of the Fuchs building due to backfill that is in contact with the exterior walls.

Prolonged period of moisture accumulation can result in mold growth and wood decay. AE has the understanding that molds have been identified in the 2013 mold and moisture assessment. The following areas have tested positive for mold during air samples in the 2013 assessment:

- Kitchen and classroom of the Main Museum;
- Imhoff Gallery;
- Vault;
- Corridor Link; and
- Heavy Oil Building.

Areas of positive mold samples from 2013 match many of the visible signs of moisture staining. It is recommended that the 2013 Mold and Moisture assessment be reviewed, and the recommendations be followed to the areas of the Main Museum to remediate any mold.

Currently, the extent of mold with in the East Wings (Fuchs, Heavy Oil Building and Corridor) are unknown as the 2013 assessment did not perform intrusive testing. These structures have served their expected lives, and with the potential damages and remediation costs of expected mold, it not be feasible to maintain the structures. It is recommended that planning of demolition be considered.

Figure 3-9 Viewing Water Damage in Heavy Oil Mechanical Room

Figure 3-10 Viewing Water Damage to Corridor Link

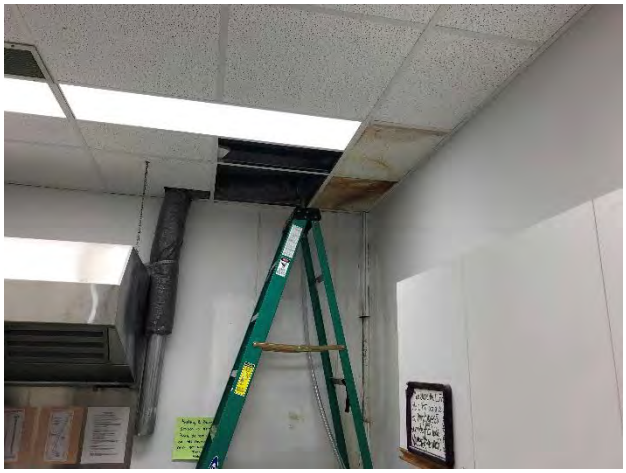


Figure 3-11 Viewing Water Damage in Link

- A crack in the gypsum board finish has developed in the southeast corner of Imhoff Gallery. It was explained by representatives that the crack opens in winter conditions creating a wide gap. No evidence of heaving was identified. It is possible that the gap develops from differential thermal movements from adjoining infill walls at the corner column. It is likely that this is not a structural concern, and more aesthetic. A vertical expansion joint intended for gypsum board could be installed at this location to allow for movement.

Figure 3-12 Viewing Crack in SE Corner of Imhoff Gallery

- The walls of Richard Larson Building have been identified in the past to be overloaded. Additional timber framing has been constructed in the building as temporary measures. Water staining was also seen in this area. This

portion of the building is considered to be of low quality construction and at its intended life expectancy of about 40 years. It is recommended that this area be planned for demolition.

Figure 3-13 Water Staining on Richard Larson Wall

The remainder of the timber walls are assumed to be fair condition.

3.2.4.2 Structural Steel Framing

Most of the structural steel framing is hidden within walls. Visible columns were assessed and appeared to be in good condition with one exception; exterior columns of the main entrance have minor surface corrosion. These surfaces shall be prepared and recoated for protection.

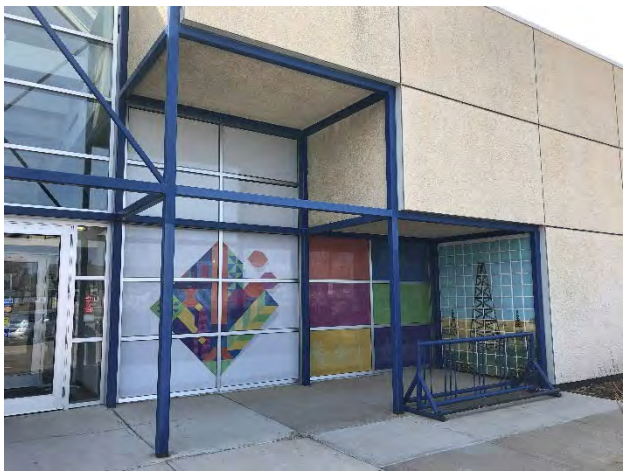


Figure 3-14 Viewing Main Entrance Framing

Figure 3-15 Viewing Corrosion at Bottom of Exterior Columns

3.2.5 Roof Framing

The facilities roofs comprise of structural steel and timber systems. The following sections describe their conditions.

3.2.5.1 Steel Roofing Systems

The 1988 and 1995 Main Museum roofing is of steel roof decking, open web steel joists, and pick-up beams.

Substantial staining from a roof leak is present in the kitchen area of Main Museum. The roofing above is covered by a polyester tarp as a temporary means of protection. The steel structure appears to be in adequate condition from below, although it should be confirmed during re-roofing time. No other obvious concerns were noted and the systems are considered to be in good condition.

Figure 3-16 Viewing Roof of Kitchen Area

Figure 3-17 Viewing Condition of Roof Structure in Kitchen

3.2.5.2 Timber Roofing Systems

The roofs of Fuchs, Heavy Oil, and Corridor Link are constructed of timber sheathing on dimensional roof joists bearing on either timber stud walls or glue-laminated beams. The roof systems are entirely enclosed within the ceiling and their conditions could not be determined. There was little to no staining on the ceilings in these areas, which indicated wood rot is unlikely. The ceilings and roofs appeared to be performing as intended with no evidence of severe deflections.

The roofing of the West Wing of Richard Larson Building comprises of oriented stand board (OSB) on timber trusses spaced at 24 inches. While performing roof top assessment considerable deflection was noted in the sheathing. The material also felt to be somewhat soft and spongy, indicating roof sheathing is likely subject to moisture damage, which is also supported by visible staining on much of the interior ceilings. This area is considered to be of low quality construction and has fulfilled its expected life expectancy of 40 years. It is recommended that this area be planned for decommissioning.

Figure 3-18 Viewing Richard Larson Roof

Figure 3-19 Temporary Timber Framed Supports

Figure 3-20 Water Damage to Richard Larson Ceiling

Figure 3-21 Water Damage to Richard Larson Ceiling

3.3 Recommendations

Recommendations, accompanied by ranking priority and an estimated probable cost related to structural work are presented below in Table 3-1. The costs are inclusive of 15% engineering consulting fee and 30% contingency. “Immediate” are considered risks to the public’s safety, “high” is within 1 to 5 years, “medium” is within the next 6 to 10 years, and “low” is within the next 11 to 20 years. Values are probable costs in 2019 dollars and are assumed to be combined with other scope items.

Table 3-1
Estimated Costs for Structural Upgrades

Disc.	Asset	Work Description	Priority	Estimated Cost
Struc.	Barr Colony Centre	Repair vertical crack in SE corner of Imhoff Gallery with an expansion joint intended for gypsum board finishes	High	$2,000
Struc.	Barr Colony Centre	Mold remediation of Barr Colony Centre (unknown quantity)	High	$60,000
Struc.	Richard Larson Building	Plan to demolish the remaining East Wing of the Richard Larson Building	High	$25,000
Struc.	Barr Colony Centre	Repaint exterior steel framing at Main Entrance	High	$5,000
Struc.	Fuchs Wildlife Building	Plan to demolish the Fuchs Wildlife Building	Medium	$33,000
Struc.	OTS Building	Plan to demolish the OTS Heavy Oil Building	Medium	$39,000
		TOTAL STRUCTURAL CONDITION ASSESSMENT ITEMS		**$164,000**

4 BUILDING MECHANICAL

4.1 Description

The building mechanical assessment included the heating, ventilation and plumbing systems of the building. The mechanical review includes age, function and general condition of the existing building system and identify area of concern from an integrity and code compliance perspective.

AE has reviewed the existing systems drawings and spoken with the local operations team to understand the existing systems. The buildings that were reviewed are:

- 1988 Barr Colony Heritage Cultural Centre (including Imhoff Gallery and Larson);
- 1963 Fuchs Wildlife Exhibit; and
- 1963 OTS Heavy Oil Science Centre.

4.2 Plumbing System

4.2.1 Domestic Water Overview

A 2" building water main found at the south side of the building is brought in from the City. The waterline runs into the Mechanical Room with backflow prevention and provides domestic water for plumbing fixtures through out the Main Building. The site does not have a sprinkler system. The domestic hot water heater is located in the Main Mechanical Room, the assessment of the water heater and other plumbing fixtures is located below.

Generally, the plumbing system appears to be in fair working order. Almost all of the plumbing equipment works as intended with the exception of the cold water tap in the Kiln Room.

4.2.2 Domestic Water Equipment Assessment

4.2.2.1 Lavatory

Figure 4-1 Typical LAV Found in Men and Women's Washroom by Main Entrance

This type of lavatory and sink are found in the Men and Women's Washroom near the main entrance and in the Barrier-Free Washroom located in the corridor between the old Larson Building and Pottery Area.

- Lavatory sinks appear to be in good condition (no visible cracks).
- UBERHAUS faucets appear to be newer and functioning as intended.
- Replace only when damaged.
- 2015 Building Code requires lavatories be supplied with faucets capable of automatically shutting off.
- Low Priority.

4.2.2.2 Water Closets

Figure 4-2 Barrier-Free Washroom Near Pottery Area

Figure 4-3 Typical Toilet Found in Men and Women's Washroom Near Main Entrance

There are two types of water closets found in the Men and Women's Washroom near the main entrance and in the Barrier-Free Washroom located in the corridor between the old Larson Building and Pottery Area.

- TOTO water closets in the Men's and Women's Washrooms are 6 LPF.
- Penguin water closet in the Barrier-Free Washroom is 4.2 LPF.
- All water closets tested to flush and appear to be in fair working order.
- Both types of water closets appear to be newer.
- Upgrading to 1.2 LPF toilets is recommended for the Men's and Women's Washrooms to reduce water consumption.

- Replace only when damaged.
- Low Priority.

4.2.2.3 Urinals

Figure 4-4 Urinal in Men's Washroom Near Main Entrance

One urinal found in the Men's washroom near the main entrance.

- Delta low-flow (0.5-1.9LPF adjustable) manual flush valve with vacuum breaker.
- Urinal bowl appears to be an American Standard Washbrook.
- Urinal flush valve was tested and appears to be working.
- Both flush valve and urinal bowl appear to be in fair working condition.
- Replace only when damaged.
- Low Priority.

4.2.2.4 Stainless Steel Sinks

Figure 4-5 Sink Found in Kiln Room

Figure 4-6 Double Sink Found in Staff Area

Sinks were found in the Kiln Room, Staff Area, and Pottery Area.

- Cold water tap in the Kiln Room was found to be non-operational.
  - Cold tap would not turn.
  - Replacement of faucet is recommended.
  - Medium Priority.
- Other sinks in the building were tested and found to be operational.

4.2.2.5 Drinking Fountain

Figure 4-7 Drinking Fountain Near Barrier-Free Washroom by Pottery Area

Drinking fountain appears to be in fair working order.

- Water appears to be refrigerated.

  - Drinking water has sour metallic taste after 1 minute of water running at time of visit
- Water cooled water chiller life span expected to be 15 years.
- Remaining service life of unit is 6 years.
- Medium Priority for replacement.

4.2.2.6 Electric Domestic Hot Water Heater

Figure 4-8 Electric Water Heater in the Kiln Room

Figure 4-9 Electric Water Heater Nameplate Data

The electric water heater in the Kiln Room is assumed to be the same age as the other equipment within the room, approximately 9 years old, according to the Operations Team.

- Space saver water heater appears to be in fair working order and provides hot water for the Kiln Room.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Electric hot water heater at 15 years.
- Estimated remaining life at 6 years.
- Medium priority for replacement.

4.2.2.7 Gas Fired Domestic Hot Water Heater

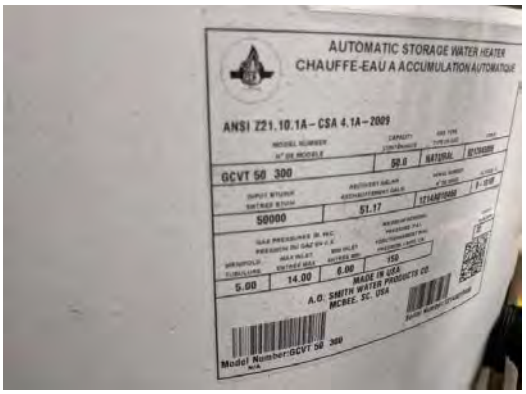


Figure 4-10 Gas Fired Domestic Water Heater Data

Figure 4-11 Gas Fired Domestic Water Heater System

The gas fired water heater in the Mechanical Room was replaced in 2012.

- AO Smith water heater appears to be in fair-working order and provides hot water for the Barr Colony Cultural Centre.
- General domestic water piping in Mechanical Room appear to be corroded.
- Service life estimate for gas fired water heaters to be 15 years.
- Estimated remaining life at 8 years.
- Medium Priority for replacement.

4.2.2.8 Sanitary and Storm Drainage

Figure 4-12 Rainwater Leader

- Operators did not note any concerns with the sanitary system.
- All buildings use scuppers and exterior rain water leaders to drain rainwater.

4.2.2.9 Natural Gas

Figure 4-13 Cultural Centre/Richard Larson Gas Meter

Figure 4-14 OTS Building Gas Meter

- Operators did not note any concerns with the gas system.

4.3 HVAC System

4.3.1 HVAC Overview

The main cultural center that houses the Imhoff Gallery is served by two air handing systems located in the Mechanical Room. The Operations and Maintenance Team has expressed concerns over the amount of airflow and humidification system as targets are usually not met with humidity level swings. The operators leave the doors open to reach their targets better.

4.3.2 HVAC Equipment Assessment

4.3.2.1 AHU-1 System (1988, Original Engineered Air – Air Handling System)

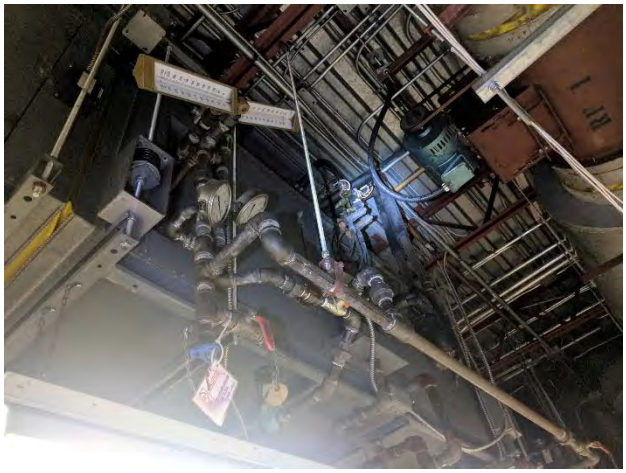


Figure 4-15 AHU-1 Suspended From Roof

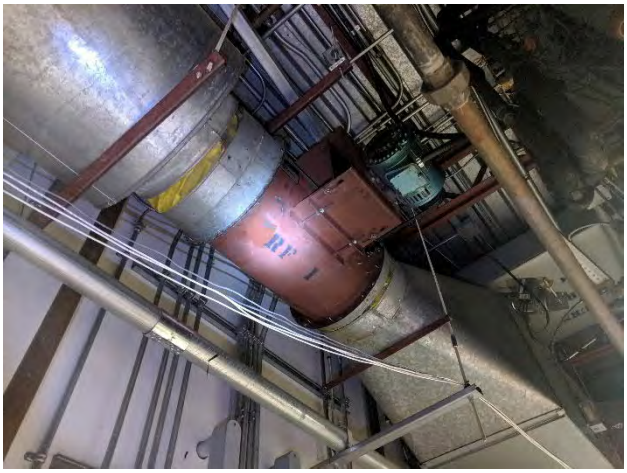


Figure 4-16 RF-1 Suspended From Roof

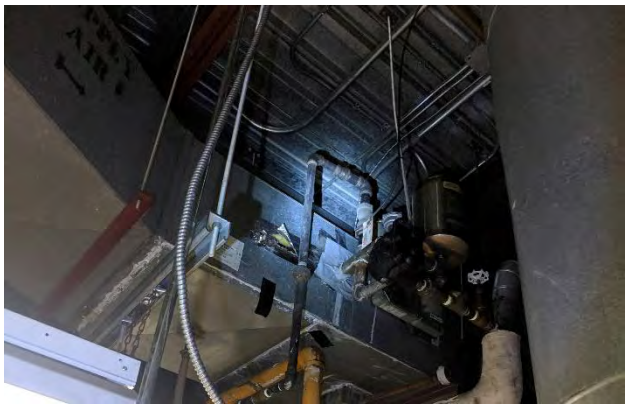


Figure 4-17 AHU-1 Steam Section with Ductwork Tear Visible

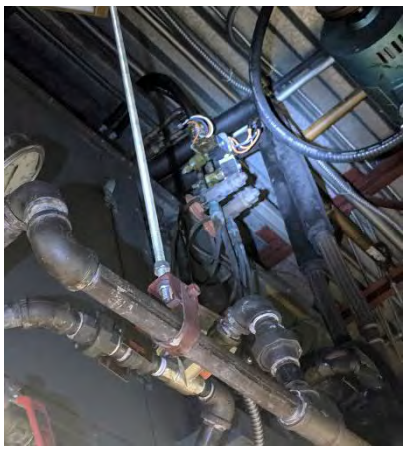


Figure 4-18 AHU-1 DX Coil Corrosion Visible

Original to building Engineered Air – Air handling system with separate return fan section, separate filter section, separate mixing section and return silencer. The air handling equipment is estimated to be 31 years old.

- Engineer Air - Air handler appears to be operating.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Centrifugal fans at 25 years.
  - Axial Fans at 20 years.
  - Steam, DX and Water coils at 20 years.
- Supply and return fan serving AHU-1 has exceeded useful service life.
- Both supply and return fans appear to be operating in fir working order.
- Ductwork is original to building is likely to be leaky.
- Heating and cooling coils serving AHU-1 has exceeded useful service life
  - The heating and cooling coils appear to be in fair working order.
  - Cooling capacity of air handler was noted to be insufficient by operator.
  - Humidification capacity of air handler was noted to be insufficient by operator.
- Immediate replacement of whole system is recommended.

4.3.2.2 AHU-2 System (1988, Original Engineered Air – Air Handling System)

Figure 4-19 AHU-2 on Pad

Figure 4-20 RF-2 Suspended From Roof, Not Easily Accessible

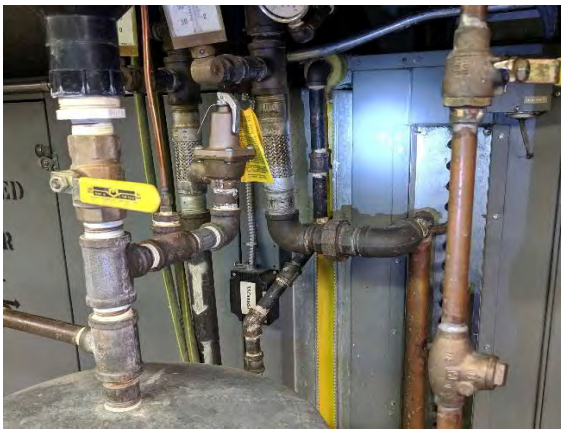


Figure 4-21 AHU-2 Heating Coil

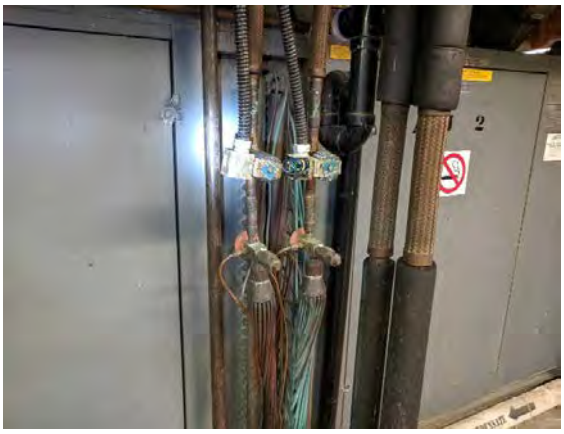


Figure 4-22 AHU-2 DX Coil Corrosion Visible

Figure 4-23 AHU-2 Nameplate

Figure 4-24 AHU-2 Heating 3-Way Control Valve

Original to building Engineered Air – Air handling system with separate return fan section, separate filter section, separate mixing section and return silencer. The air handling equipment is estimated to be 31 years old.

- Engineered Air - Air handler appears to be operating.
- Zone reheat coils were not accessed/accessible and assumed to be original.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Centrifugal fans at 25 years.
  - Axial Fans at 20 years.
  - Steam, DX and Water coils at 20 years.
- Supply and return fan serving AHU-1 has exceeded useful service life.
  - Both supply and return fans appear to be operating in fir working order.
- Zone reheat coils are original to building.
  - Zone reheat coil controls is likely original to building.
  - Miscellaneous HVAC section covers controls replacement.

- Heating and cooling coils serving AHU-1 has exceeded useful service life.
  - The heating and cooling coils appear to be in fair working order.
  - Cooling capacity of air handler was noted to be insufficient by operator.
  - Humidification capacity of air handler was noted to be insufficient by operator.
- Immediate replacement of whole system is recommended.

4.3.2.3 MUA-1 (2015, Kiln Room Make Up Air)

Figure 4-25 MUA-1 Outside Kiln Room

Figure 4-26 MUA-1 Serial Number 14357468

New to building, equipment is installed at the same time as EF-2.

- Greenheck - MUA-1 appears to be in good working order.
- MUA-1 was operating at time of visit.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Centrifugal fan at 25 years.
  - Burners at 21 years.
- The remaining service life is 18 years.
- Operator noted that MUA-1 has to run all the time since it also provides heating to Pottery Area, and not just the Kiln Room.
- Low Priority for replacement.

4.3.2.4 Boiler System (1988, Original SuperHot – Primary-Secondary Gas Fired Boiler System)

Figure 4-27 Typical B1/B2 Boiler

Figure 4-28 SuperHot Logo

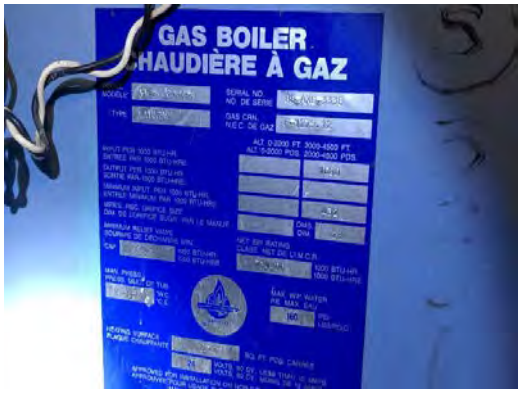


Figure 4-29 B1 Nameplate Model AAE-1080-N-M, Serial 88-AXG-3338

Figure 4-30 B2 Nameplate Model AAE-1080-N-M, Serial 88-AXG-3339

Figure 4-31 P1 and P2 System Pumps

Figure 4-32 P5 Boiler Pump

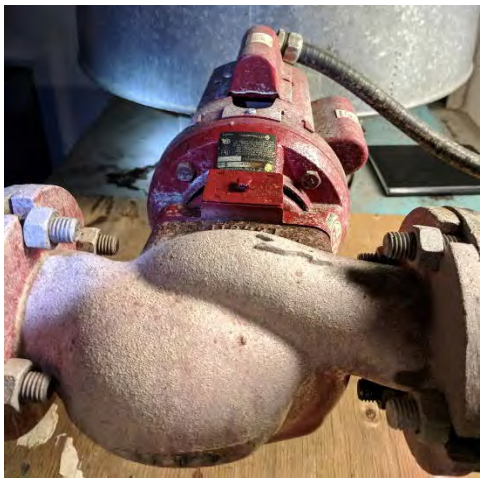


Figure 4-33 P6 Boiler Pump

Figure 4-34 Glycol Storage Tank

Original to building – Primary secondary boiler system. The boiler system including pumps, piping, and tanks are estimated to be 31 years old. Some pumps appear to have been replaced in the past but still appear to be old. P3 and P4 serving the air handler coils appears to have been replaced with a 3-way control valve.

- SuperHot Boilers and Armstrong pumps appears to be in poor but working condition.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Boilers at 25 years.
  - Base mounted Pumps at 20 years.
  - Pipe mounted pumps at 10 years.
- The entire boiler system has exceeded its useful service life.
  - Higher efficiency boiler units and a redesign of the pumping system is highly recommended to meet current code and lower energy footprint at the same time.
- The burners on the boilers were noted to have been replaced in the past (date unknown).
- Immediate replacement of whole boiler plant is recommended.
  - Failure of the boiler system in winter will put the contents of the facility at risk.
  - To meet new code, higher efficiency boilers are recommended as a replacement at a minimum.

4.3.2.5 Humidification (2019)

Figure 4-35 Steam Boiler in Mechanical Room

Figure 4-36 Condensate Collection Tank

Steam boiler replaced in June of 2018 due to failure. Humidification piping is all original to building except a few elbows on the condensate lines which have corroded and failed causing leaks. Condensate tank also replaced in 2019 due to failure.

- Weil McLain steam boiler and condensate tank appear to be working since they are new.
- Condensate piping and steam piping is original to building and is corroded.
  - Immediate replacement is recommended.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Cast iron boiler at 30 years.
- Loud pinging noise at condensate tank was noted at time of visit.
  - Operator explains that this is condensate dripping within the tank creating the noise.
- Steam distribution tubes were replaced in the last 5 years as noted by operators due to corrosion.
- Although steam system has been replaced due to recent failure of equipment, steam system redesign is highly recommended as operator has noted humidity targets are not being met and not consistent.
- Access to existing steam distribution tubes will provide challenge as most are in tight spaces.
- High replacement and redesign of steam system is recommended.

4.3.2.6 CH-1 System (1988, Original Air-Cooled Packaged Condensing Unit)

Figure 4-37 CH-1 on Roof

Figure 4-38 CH-1 on Roof

Original to building, equipment is considered to be 31 years old.

- 8 ton condensing unit was noted to still operate.
- Unknown make and model, no nameplate.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Air cooled condensers at 20 years.
- Condensing unit has exceeded useful service life.
  - Cooling capacity was noted to be insufficient by operator.
  - Condensing unit performance may have degraded over time.
  - Condensing unit noted to contain R22 ozone depleting refrigerant.
- Immediate replacement of whole cooling system is recommended.
  - To meet new code, replacement of chiller should utilize new refrigerants and higher efficiency units.

4.3.2.7 CH-2 System (1988, Original Air-Cooled Packaged Condensing Unit)

Figure 4-39 CH-2 on Roof

Figure 4-40 CH-2 Field Built Coil Water Cooling System

Original to building, equipment is considered to be 31 years old.

- 40 ton condensing unit was noted to still operate.
- Unknown make and model, no nameplate.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Air cooled condensers at 20 years.
- Condensing unit has exceeded useful service life.
  - Cooling capacity was noted to be insufficient by operator.
  - Operator has noted that water must be fully running to meet load.
  - Condensing unit performance may have degraded over time.
  - Condensing unit noted to contain R22 ozone depleting refrigerant.
- Immediate replacement of whole cooling system is recommended.
  - To meet new code, replacement of chiller should utilize new refrigerants and higher efficiency units.

4.3.2.8 EF-1 (1988, General Washroom Exhaust)

Figure 4-41 EF-1 on Roof

Figure 4-42 EF-1 Serial Number 88J02793

Original to building, equipment is considered to be 31 years old.

- Greenheck Exhaust fan appears to be in fair working order.
- Exhaust fan control switch located in vestibule to Men's Washroom.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Ventilating roof exhaust at 20 years.
- No noted operating problems.
- High priority replacement of the exhaust fan is recommended.

4.3.2.9 EF-2 (2011, Heat Capture Hood Exhaust)

Figure 4-43 EF-2 on Roof

Figure 4-44 EF-2 Serial Number 14357290

New to building, equipment is installed at the same time as MUA-1.

- Greenheck Exhaust fan appears to be in good working order.
- Exhaust fan was operating at time of visit.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Ventilating roof exhaust at 20 years.
- No noted operating problems.
- Low replacement priority.

4.3.2.10 FUCHS, OTS and Richard Larson Furnaces (2010)

Figure 4-45 Fuchs and OTS Backside of Furnaces (Four Downdraft Furnaces with Humidifier in Back)

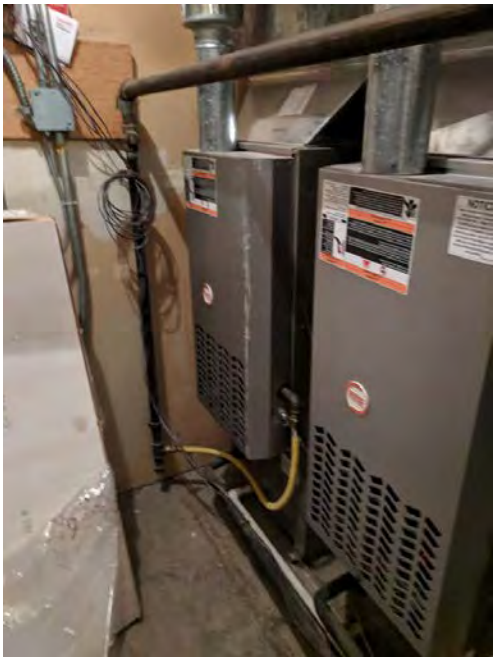


Figure 4-46 Typical Payne Downdraft Furnace Found in OTS Mechanical Room

Figure 4-47 Richard Larson Mechanical Room with Payne Furnaces (Two Downdraft Furnaces)

The furnaces are relatively new compared to the building. These were noted to have been replaced around 8-9 years ago as mentioned by the operations team.

- All Payne furnaces are noted to be in good working order.
- Operator has expressed that these furnaces are good and does not cause any trouble.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Gas furnaces at 18 years.
- No noted operating problems.
- Medium replacement priority.

4.3.2.11 OTS A/C Units (Original)

Figure 4-48 Typical Indoor Unit in OTS

Figure 4-49 Newer Condensing Unit Serving the OTS Extension

Figure 4-50 Condensing Unit Serving the Residential Portion of OTS

Figure 4-51 Typical Condensing Unit Near Edge of Building (not used anymore)

Majority of condensing unit and indoor units are original to the building.

- Five of the existing United Technologies Carrier A/C split units in the OTS building is no longer being used.
  - New split AC coil and condensers were added to the OTS furnaces to address cooling issues.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Split DX at 15 years.
- The original units should be disposed of as they contain R-22 ozone depleting refrigerant.
  - The existing ac units drain condensate through the exterior wall right behind each indoor unit, the exterior wall will have to be repaired when the units are removed.
- Removal of split units recommended.
- Low Priority.

4.3.2.12 OTS A/C Units (New)

Figure 4-52 New OTS Outdoor Units (4 Units)

New OTS outdoor condensing units are installed in the last 10 years.

- No noted problems noted by operator.
- ASHRAE HVAC Applications 2015 service life estimates.
  - Split DX at 15 years.
- AC units appear to be in good working condition.
- AC units are estimated to be 9 years old.
- Medium Priority for replacement.

4.3.2.13 Miscellaneous HVAC

Figure 4-53 Return Grilles in OTS/Fuchs

Figure 4-54 Original Cabinet Unit Heater in Corridor to Fuchs

Figure 4-55 Electric Unit Heater in Pottery Closet

Figure 4-56 Electric Unit Heater in Kiln Room

Figure 4-57 Pneumatic to Digital Control Panel

Figure 4-58 Typical Fire Extinguisher(s) - Both Semi-Recessed and Surface Mount Found

- ASHRAE HVAC Applications 2015 service life estimates.
  - Electric unit heaters at 13 years.
  - Hot water unit heaters at 20 years.
  - Pneumatic controls at 20 years.
- Diffusers and grilles appear to be in fair working order, no replacement recommended.
- Electric heaters in pottery closet and kiln room was tested at time of visit and appear to work. Equipment is estimated to be 9 years old. Medium priority for replacement.
- Hot water heaters in corridor and pottery area vestibule was tested at time of visit and appears to work. Equipment is estimated to be original. High priority replacement.
- All electronic control system upgrade, phasing out of pneumatic system is recommended. High priority replacement.

- Although not required by code, installing a fire suppression system such as sprinklers is best practice. This has been considered a low priority item.
- Fire extinguishers appears to be inspected yearly.

4.4 Recommendations

Recommendations have been prioritized in the following Table 4-1, accompanied by ranking priority and an estimated probable cost related to mechanical work. The costs are inclusive of 15% engineering consulting fee and 30% contingency. “Immediate” are considered risks to the public’s safety, “high” is within 1 to 5 years, “medium” is within the next 6 to 10 years, and “low” is within the next 11 to 20 years. Values are probable costs in 2019 dollars and are assumed to be combined with other scope items.

Table 4-1
Estimated Costs for Building Mechanical Upgrades

Disc.	Asset	Work Description	Priority	Estimated Cost
Mech.	Barr Colony Centre	Air Handling Unit (AHU-1) system replacement, including ductwork and reheat coils	Immediate	$200,000
Mech.	Barr Colony Centre	Air Handling Unit (AHU-2) system replacement, including ductwork and reheat coils	Immediate	$500,000
Mech.	Barr Colony Centre	Whole Boiler system replacement, including system piping in Barr Colony Centre	Immediate	$400,000
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-1) system in Barr Colony Centre	Immediate	$40,000
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-2) system in Barr Colony Centre	Immediate	$80,000
Mech.	Barr Colony Centre	Humidification system replacement, including piping	High	$250,000
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-1)	High	$8,000
Mech.	Barr Colony Centre	Electric and hot water heaters throughout building	High	$20,000
Mech.	Barr Colony Centre	Full electronic control upgrade and pneumatic removal throughout entire facility	High	$200,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Mech.	OTS Building	Full electronic control upgrade and pneumatic removal for OTS	High	$50,000
Mech.	Fuchs Wildlife Building	Full electronic control upgrade and pneumatic removal for Fuchs	High	$50,000
Mech.	Barr Colony Centre	Plan for replacement of stainless steel sink and faucet replacement of Kiln Room, Staff Room, and Kitchen/Classroom	Medium	$8,500
Mech.	Barr Colony Centre	Plan for replacement of Drinking Fountain	Medium	$3,500
Mech.	Barr Colony Centre	Plan for replacement of Electric Domestic Hot Water Heater	Medium	$2,000
Mech.	Barr Colony Centre	Plan for replacement of Gas Fired Domestic Hot Water Heater	Medium	$16,500
Mech.	OTS Building	Plan for replacement of all 4 furnaces in OTS Oil Building	Medium	$22,000
Mech.	Richard Larson Building	Plan for replacement of both furnaces in Richard Larson (Subject to Building decommissioning)	Medium	$12,000
Mech.	OTS Building	Plan for replacement of 4 AC units connected to 4 furnaces in OTS.	Medium	$24,000
Mech.	Barr Colony Centre	Plan for replacement of Lavatory and Faucet	Low	$6,000
Mech.	Fuchs Wildlife Building	Wet Fire Suppression Sprinkler System in Fuchs (For Administration type building)	Low	$7,500
Mech.	OTS Building	Wet Fire Suppression Sprinkler System in OTS (For Administration type building)	Low	$7,500
Mech.	Barr Colony Centre	Wet Fire Suppression Sprinkler System in Barr Colony Centre (For Administration type building)	Low	$50,000
Mech.	Barr Colony Centre	Plan for replacement of Water Closets	Low	$7,000
Mech.	Barr Colony Centre	Plan for replacement of Urinal replacement	Low	$2,500

Disc.	Asset	Work Description	Priority	Estimated Cost
Mech.	Barr Colony Centre	Plan for replacement of Make-Up Air unit (MUA-1)	Low	$20,000
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-2)	Low	$8,000
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000
		TOTAL BUILDING MECHANICAL CONDITION ASSESSMENT ITEMS		**$2,015,000**

5 ELECTRICAL

5.1 General

The electrical assessment included all general electrical and lighting systems for end-of-life, functionality and general power distribution layout. Lighting systems were reviewed for power efficiencies with respect to chosen light systems. In general, the existing electrical panels are dated and need to be replaced. The existing camera security system is not functional and the public address (PA) system is also not functional. Both of these items are not required per Code, but recommended for a public place. The fire alarm system appears to be in good working order, however, there are areas that will require additional devices. Some areas will require additional emergency lighting as well as exit signs will need to be installed on all exit doors.

5.2 Utility Power

The building currently has three main incoming services:

1. **West Wing**: 120/240V, 200A, 1-phase located in the Richard Larson Wing, fed from a pole-mounted utility transformer.
2. **Main Museum**: 120/208V, 800A, 3-phase, located in the Main Mechanical Room, fed from a pad-mounted transformer.
3. **East Wing**: 120/240V, 150A, 1-phase, located in a cabinet on the south wall of the interactive displays area. It is fed from a pole-mounted utility transformer.

Figure 5-1 Utility Pole Mounted Transformer for West and East Wing Power

Figure 5-2 Pad Mounted Transformer for Main Museum Power

The existing sizes of the utility transformer are unknown and would need to be verified with the utility.

Currently, there are two utility power feeds of the same voltage provided to the building. This does not meet Section 6-102 of the CEC, where two or more supply services of the same voltage shall not be run to any building. There are deviations to this requirement, however the buildings are not self-contained occupancies and are considered

one building. It was mentioned at site that the West Wing was planned to be demolished but has not been completed yet. It is recommended this is completed to meet Code requirements.

5.3 120V/208V-240V Distribution

In general, exterior receptacles were old and falling apart or disconnected from the wall. The majority of the exterior receptacles were not GFI, and it was not confirmed if they were powered from a GFI breaker. It is recommended they are replaced with weatherproof GFI type receptacles. New exterior receptacles must have GFI protection and a weatherproof cover as per CEC Section 26-708.

Figure 5-3 West Wing Main Distribution

5.3.1 West Wing (Richard Larson)

The 120/240V distribution appears to be in working order, though they were not tested for functionality. The main utility power feeds a 200A 120/240V single phase disconnect which then feeds a splitter. The splitter subfeeds two 120/240V panels, which are both located in the West Wing. The most recent renovations appear to be in 1980, therefore the equipment is more than 30 years old. A rule of thumb for breaker end of life is 30 years with regular maintenance. Once equipment has reached their approximate end of life, the probability of failure increases with time. For example, after 30 years, approximately one out of 20 breakers may not function as intended. With proper maintenance, the electrical distribution equipment may remain operational for the next 10 years, but it is recommended to replace the main electrical distribution equipment (panels, disconnects, splitter, etc.) within the next five years. The existing cables can remain in place and be re-used as long as they are sized properly as per CEC.

However, it was mentioned that it is intended for Richard Larson Wing to be completely removed. If this is completed, no electrical upgrades will be required.

If the West Wing is not demolished, the utility fed should be removed and the main disconnect fed from the main building switchboard.

Figure 5-4 West Wing Main Distribution

Figure 5-5 West Wing Panel A

5.3.2 Main Museum (Main Building)

The 120/208V distribution appears to be original. The main utility power feeds an 800A 120/208V 3-phase switchboard. The switchboard feeds five 120/208V panels, mechanical equipment, and an MCC. As this building was constructed in 1988, the equipment is almost 30 years old and reaching its end of life. A rule of thumb for breaker end of life is 30 years with regular maintenance. Once equipment has reached their approximate end of life, the probability of failure increases with time. For example, after 30 years, approximately one out of 20 breakers may not function as intended.

During discussion with the head electrician, it was noted that the MCC has two faulty disconnects and do not function as per Code. The main switchboard and MCC are the brand name “Commander”, which doesn’t exist anymore and replacement parts are difficult to come by. As this equipment is already failing, it is highly recommended the MCC and switchboard be replaced immediately. It was also noted that one of the phases from the utility drops occasionally resulting in starter coils to burn out prematurely, further investigation is required to confirm the reasoning for the phase dropping. For the new MCC replacement, phase loss relays should be considered in the design. The existing cables can remain in place and be re-used as long as they are sized properly as per CEC.

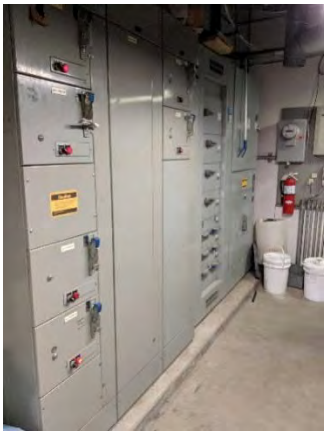


Figure 5-6 MCC and Main Distribution (Main Museum)

Figure 5-7 Panel D

The existing 120/208V panels appear original and are of the brand name “Commander”. Presently, they are nearing their end of life. The head electrician noted that the bus in Panel D had failed and needed to be replaced. There is a high risk this issue will happen to the remaining panels. Since the panel manufacturer does not exist and replacement parts are difficult to come by, it is highly recommended all the 120/208V panels be replaced. The existing cables can remain in place and be re-used as long as they are sized properly as per CEC.

Receptacles located within 1.5 m of a sink must have GFI protection, currently none of the receptacles within 1.5 m have GFI protection. It is recommended to replace these receptacles with GFI type receptacles.

Figure 5-8 Receptacles Without GFI Protection

Figure 5-9 Receptacles Without GFI Protection

5.3.3 East Wing

The 120/240V distribution appears to be original. The main utility power feeds a 150A 120/240V single phase disconnect. The disconnect feeds a splitter which sub feeds one 120/240V single phase panel located in the East

Wing Mechanical Room. It should be noted that the above items were not confirmed at site as the main disconnect was not accessible. The information is pulled from the last building assessment report.

The existing main disconnect for the incoming service was unable to be accessed as it was located behind a floor-mounted display. Currently, this does not meet Section 2-308 of the CEC, a minimum of 1 m working space must be provided and maintained in front of electrical equipment. The existing must be moved further away from the cabinet to meet Code.

Figure 5-10 No Access to Main Disconnect for East Wing

Figure 5-11 East Wing Distribution

As this equipment was likely updated in the 1999 renovation, the equipment is less than 30 years old and still has some life left. With proper maintenance, these panels could be fully functional for the next 10 - 20 years.

5.3.4 HVAC Power

All newer exterior AC and CU units have a local disconnect installed as per CEC. Currently, there are five rooftop condensing units on the East Wing that are not in use and have not been removed. It is recommended these items are removed and electrical power is demolished back to the power source. For any new HVAC units located on the roof that need to be replaced, they will require a local disconnect and must be installed within 3 m of each unit as well as a 20A dedicated receptacle (GFI protected) must be located within 7.5 m of a rooftop-mounted HVAC unit (as per CEC 28-604 (5) and 26-710 requirements).

Currently, exhaust fan EF-2 does not have a local disconnect switch or receptacle nearby. If this item is to be replaced, it will require a disconnect and dedicated 20A receptacle.

5.4 Security System, Fire Alarm Devices, and Communications

5.4.1 Security System

An existing ADT security system is installed with motion detectors located in common areas. Door contacts appear to be in place, but not on all doors. There are cameras located throughout, however, the main recording device has been disconnected. Currently, there is not an active camera in the facility. Building security is not a Code requirement; therefore, this is up to the client if it should be replaced. However, as the facility houses valuable items, it is recommended a proper security system is installed.

Figure 5-12 Disconnected Camera Recorder

5.4.2 Public Address System

Existing ceiling mounted speakers are located throughout the Main Building only; however, the PA system is not functional. Radios are used for communication throughout the facility. As this is not a Code required, it is up to the client if it should be replaced. However, as this is a public facility, it is recommended a PA system is installed.

5.4.3 Fire Alarm System

The building is not sprinklered, therefore, fire alarm devices are installed throughout the building and connected to the main fire alarm panel located in the Mechanical Room. An annunciator is located at the main entrance as required by code. Smoke detectors, heat detectors, control relays appear to be installed as per Code throughout. The Main Fire Alarm Panel had the batteries replaced in 2016 and the building has had an annual inspection completed in December 2018. However, there are areas with deficiencies, which will be listed below:

5.4.3.1 West Wing (Richard Larson Building)

- Pull station not in place for west exit expansion section.
- Smoke detector not located in expansion section.
- No horn/strobes located in West Wing.
- No smoke detector located in two storage rooms.

5.4.3.2 Main Museum (Main Building)

- Add one additional smoke detector above “storage room” in Gallery.
- Add one additional smoke detector higher ceiling area of employee lunchroom.
- No smoke detector in vestibule leading to East Wing corridor.
- No magnetic hold open devices are installed on doors in corridor leading to east wing. Currently, they are mechanically held open. If they are intended to be fire-rated doors and want to be kept open, they will require magnetic hold open devices and a smoke detector on either side of the doorway. The hold open devices and smoke detectors would need to be connected to the fire alarm system. However, If the doors are kept closed and aren’t held open mechanically, this meets the intent of the code, but users will have to manually open the doors.

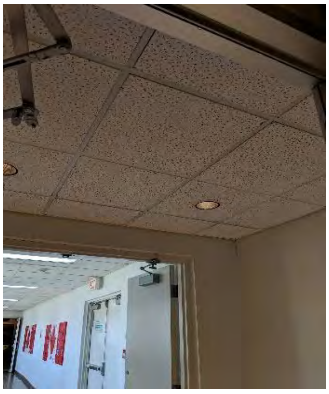


Figure 5-13 Vestibule Missing Smoke Detector

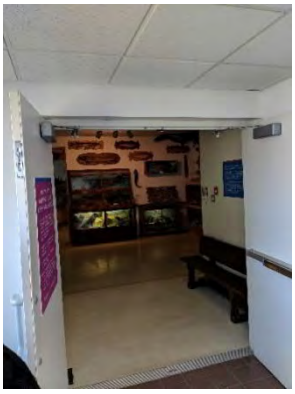


Figure 5-14 Corridor Doors Mechanically Held Open

Figure 5-15 Missing Smoke Detector Higher Ceiling Area

5.4.3.3 East Wing

- No magnetic hold open devices are installed on door between Fuchs and OTS Building. Currently, it is mechanically held open. If it is intended to be a fire-rated door and to be kept open, it will require a magnetic hold open device and a smoke detector on either side of the doorway. The hold open device and smoke detectors would need to be connected to the fire alarm system. However, If the door is kept closed and isn't held open mechanically, this meets the intent of the code, but users will have to manually open the door.
- Exit door from Mechanical Room does not have a pull station in place.

Figure 5-16 Mechanical Room Exit Door Missing Pull Station

5.5 Lighting

5.5.1 Parking Lot Lighting

Parking lot lighting was recently replaced with LED fixtures and may be photocell controlled, however, this was unable to be confirmed. They are in good working order and do not require replacement.

Figure 5-17 Parking Lot Lighting

Figure 5-18 Parking Lot Lighting

5.5.2 Exterior Lighting

As the site was visited during the day, all exterior lights were off and unable to be confirmed if in working order. Lights appear original and are old, aged, broken and in need of replacement. In discussion with maintenance staff, multiple areas are lowly lit, such as the entrance and rear, additional lighting should be installed. Lights fixture above exit doorways should be replaced with new LED fixtures to provide adequate lighting. Currently, the exterior lights are controlled by a time clock and photocell. Upgrading the exterior lighting to LED will also provide cost savings and reduce long term maintenance costs.

Figure 5-19 Exterior Lighting

Figure 5-20 Exterior Lighting

5.5.3 Interior Lighting

Overall, the interior lights appear to be a combination of fluorescent and incandescent sources. The age of the interior lights is unknown; however, they appear to be original. They appear to be in working order, however, some areas are underlit and some areas have flickering lights. The ballasts should be replaced every five to eight years. It is currently unknown when the fluorescent fixtures were last serviced. Some existing fluorescent lights are missing a protective cage or lens to adequately protect the fluorescent tubes from damage. A lens or protective cage should be installed on the fluorescent fixtures. The existing lights will begin to fail more frequently because of lamp and ballast failure.

The existing lighting controls appear to still be in place, it is recommended these are replaced along with the lights to allow for more diverse lighting control.

The costs for LED lighting has reduced greatly over the years. The cost difference between installing a T5 fixture compared to an LED fixture is minimal. The energy savings between a T12 and T5 can be up to 30%, and for LEDs it can be greater. Maintenance costs are also substantially less for LEDs compared to T5s. Over a 20-year period, re-lamping, ballast replacement, and cleaning costs for T5s are approximately four times as much as LED fixtures. It is recommended that the fixtures be replaced with LED fixtures to reduce energy and maintenance costs over a 20-year period.

5.5.4 Emergency Lighting and Exit Signs

Emergency lighting is installed throughout the building, but not all areas meet ABC Section 3.2.7.3 “Emergency Lighting”. There are multiple areas where additional emergency lighting is required.

Not every exit has an exit sign installed as per ABC section 3.4.5 “Exit Signs”. Some of the existing exit signs are not lit or are barely lit, which does not meet Code requirements. The existing exit signs can remain as is, but if the building is renovated the updated green “running man” (pictogram) style signs will be required as per ABC Section 3.4.5. Testing should be completed to ensure exit signs illuminate in the event of a power outage.

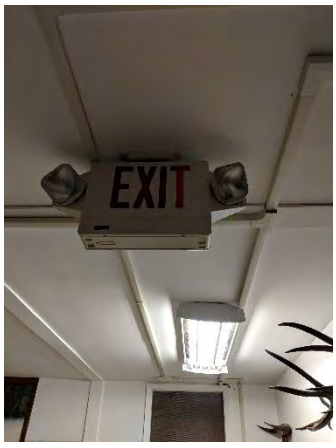


Figure 5-21 Exit Sign Barely Lit

The majority of emergency lights and exit lights are provided emergency power from a DC inverter located in the Storage Room by the Main Office. Currently, the DC inverter was last serviced in 2002. In discussion with the electrician, this is an item that requires a special tech for service and parts are not readily available. It is recommended to remove the DC inverter and replace existing exit lights with built in emergency lighting and battery pack.

Figure 5-22 DC Inverter

Figure 5-23 DC Inverter

Most of the emergency lighting deficiencies can be resolved with replacing the nearby exit sign with a new pictogram sign that has built in emergency lighting.

The areas with deficiencies are listed below:

5.5.4.1 West Wing (Richard Larson Building)

- Require an exit sign near west exit.
- Require one additional emergency light in area.

5.5.4.2 Main Museum (Main Building)

No emergency light was found in the following areas:

- Kitchen area;
- Classroom/Cafeteria;
- Northwest Gallery;
- Employee Lunch Room area;
- Northeast Interpretive Centre;
- South Gallery; and
- Corridor to East Wing.

5.5.4.3 East Wing

- Mechanical Room does not have Exit sign by door.
- Mechanical Room does not have emergency lighting in place.
- West Exit door does not have an Exit sign or emergency lighting.

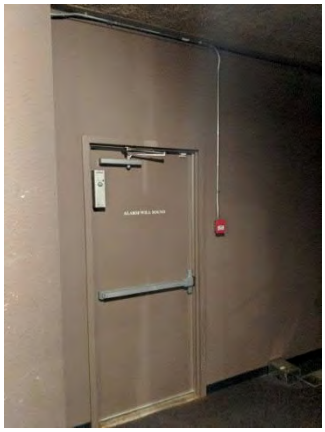


Figure 5-24 Missing Exit Sign

Figure 5-25 Missing Exit Sign

5.6 Recommendations

Recommendations accompanied by ranking priority and an estimated probable cost related to electrical work are presented below in Table 5-1. The costs are inclusive of 15% engineering consulting fee and 30% contingency. "Immediate" are considered risks to the public's safety, "high" is within 1 to 5 years, "medium" is within the next 6 to 10 years, and "low" is within the next 11 to 20 years. Values are probable costs in 2019 dollars and are assumed to be combined with other scope items.

Table 5-1
Estimated Costs for Electrical Upgrades

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Richard Larson Building	Remove Utility feed, Replace West Wing Distribution Panels, Disconnect, and Splitter and re-feed to Main Switchboard	Immediate	$25,000
Elec.	Barr Colony Centre	Replace Main MCC and Switchboard in Barr Colony Centre	Immediate	$70,000
Elec.	Barr Colony Centre	Replace 120/208V Distribution Panels	Immediate	$30,000
Elec.	Barr Colony Centre	Replace receptacles located near sinks with GFI type in Barr Colony Centre	Immediate	$2,000
Elec.	OTS Building	Remove display located in front of main disconnect for access	Immediate	$1,000
Elec.	Richard Larson Building	Install Fire alarm devices as required per Code	Immediate	$5,000

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Barr Colony Centre	Install Fire alarm devices as required per Code	Immediate	$7,000
Elec.	OTS Building	Install Fire alarm devices as required per Code	Immediate	$5,000
Elec.	Richard Larson Building	Installation of additional exit sign and emergency lighting	Immediate	$4,000
Elec.	Barr Colony Centre	Installation of additional emergency lighting	Immediate	$10,000
Elec.	OTS Building	Installation of exit signs and additional emergency lighting	Immediate	$4,000
Elec.	OTS Building	Replace Exterior Receptacles with Weatherproof GFI type for OTS	High	$1,000
Elec.	Fuchs Wildlife Building	Replace Exterior Receptacles with Weatherproof GFI type for Fuchs	High	$1,000
Elec.	Barr Colony Centre	Replace Exterior Receptacles with Weatherproof GFI type for Barr Colony Centre	High	$3,000
Elec.	OTS Building	Removal of Electrical Power to rooftop condensing units no longer in use	High	$4,000
Elec.	Barr Colony Centre	Replace Exterior Lighting and Controls for Barr Colony Centre	High	$5,000
Elec.	Barr Colony Centre	Replace Interior Lighting Controls and Fixtures	High	$250,000
Elec.	OTS Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Elec.	Fuchs Wildlife Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Elec.	Richard Larson Building	Replace Interior Lighting Controls and Fixtures	High	$80,000
Elec.	OTS Building	Replace Exterior Lighting and Controls for OTS	High	$2,500

Disc.	Asset	Work Description	Priority	Estimated Cost
Elec.	Fuchs Wildlife Building	Replace Exterior Lighting and Controls for Fuchs	High	$2,500
Elec.	Barr Colony Centre	Removal of DC Inverter	High	$4,000
Elec.	Barr Colony Centre	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Main Museum	Medium	$10,000
Elec.	OTS Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in OTS	Medium	$3,500
Elec.	Richard Larson Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Richard Larson	Medium	$3,500
Elec.	Fuchs Wildlife Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Fuchs	Medium	$3,500
Elec.	Fuchs Wildlife Building	Install Functional Security Camera System to Fuchs	Low	$10,000
Elec.	OTS Building	Install Functional Security Camera System to OTS	Low	$10,000
Elec.	Richard Larson Building	Install Functional Security Camera System to Richard Larson	Low	$10,000
Elec.	Barr Colony Centre	Install Functional Security Camera System to Main Museum	Low	$30,000
Elec.	Barr Colony Centre	Install PA System to Main Museum	Low	$25,000
Elec.	Richard Larson Building	Install PA System to Richard Larson	Low	$8,500
Elec.	OTS Building	Install PA System to OTS	Low	$8,500
		TOTAL ELECTRICAL CONDITION ASSESSMENT ITEMS		**$798,500**

6 SUMMARY OF RECOMMENDATIONS

A summary of the prioritized recommendations and probable costs is presented below by building. “Immediate” are considered risks to the public’s safety, “high” is within 1 to 5 years, “medium” is within the next 6 to 10 years, and “low” is within the next 11 to 20 years. Values are probable costs in 2019 dollars and are assumed to be combined with other scope items.

Table 6-1
Summary of Estimated Costs

Disc.	Asset	Work Description	Priority	Estimated Cost	Type
Civil	Barr Colony Centre	Install downspouts and splash pads throughout building's exterior	Immediate	$3,000	Condition
Civil	Parking Lot	Perform geotechnical study to confirm the structural condition of the pavement structure.	Immediate	$15,000	Condition
Civil	Site	Swale regrading, sodding and erosion control	Immediate	$16,000	Condition
Mech.	Barr Colony Centre	Air Handling Unit (AHU-1) system replacement, including ductwork and reheat coils	Immediate	$200,000	Condition
Mech.	Barr Colony Centre	Air Handling Unit (AHU-2) system replacement, including ductwork and reheat coils	Immediate	$500,000	Condition
Mech.	Barr Colony Centre	Whole Boiler system replacement, including system piping in Barr Colony Centre	Immediate	$400,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-1) system in Barr Colony Centre	Immediate	$40,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Chiller (CH-2) system in Barr Colony Centre	Immediate	$80,000	Condition
Elec.	Richard Larson Building	Remove Utility feed, Replace West Wing Distribution Panels, Disconnect, and Splitter and re-feed to Main Switchboard	Immediate	$25,000	Condition
Elec.	Barr Colony Centre	Replace Main MCC and Switchboard in Barr Colony Centre	Immediate	$70,000	Code
Elec.	Barr Colony Centre	Replace 120/208V Distribution Panels	Immediate	$30,000	Condition
Elec.	Barr Colony Centre	Replace receptacles located near sinks with GFI type in Barr Colony Centre	Immediate	$2,000	Code
Elec.	OTS Building	Remove display located in front of main disconnect for access	Immediate	$1,000	Code

Disc.	Asset	Work Description	Priority	Estimated Cost	Type
Elec.	Richard Larson Building	Install Fire alarm devices as required per Code	Immediate	$5,000	Code
Elec.	Barr Colony Centre	Install Fire alarm devices as required per Code	Immediate	$7,000	Code
Elec.	OTS Building	Install Fire alarm devices as required per Code	Immediate	$5,000	Code
Elec.	Richard Larson Building	Installation of additional exit sign and emergency lighting	Immediate	$4,000	Code
Elec.	Barr Colony Centre	Installation of additional emergency lighting	Immediate	$10,000	Code
Elec.	OTS Building	Installation of exit signs and additional emergency lighting	Immediate	$4,000	Code
Civil	Parking Lot	Asphalt surface Patching and Deep patching as temporary repairs to parking structure (pothole repair)	High	$20,000	Condition
Civil	Site	Sidewalk replacements around the LCSC	High	$70,000	Condition
Civil	Parking Lot	Replace parking stall markings	High	$25,000	Condition
Civil	Site	Re-grading of site around the LCSC Building	High	$55,000	Condition
Struc.	Barr Colony Centre	Repair vertical crack in SE corner of Imhoff Gallery with an expansion joint intended for gypsum board finishes	High	$2,000	Condition
Struc.	Barr Colony Centre	Mold remediation of Barr Colony Centre (unknown quantity)	High	$60,000	Condition
Struc.	Richard Larson Building	Plan to demolish the remaining East Wing of the Richard Larson Building	High	$25,000	Condition
Struc.	Barr Colony Centre	Repaint exterior steel framing at Main Entrance	High	$5,000	Condition
Mech.	Barr Colony Centre	Humidification system replacement, including piping	High	$250,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-1)	High	$8,000	Condition
Mech.	Barr Colony Centre	Electric and hot water heaters throughout building	High	$20,000	Condition
Mech.	Barr Colony Centre	Full electronic control upgrade and pneumatic removal throughout entire facility	High	$200,000	Condition

Disc.	Asset	Work Description	Priority	Estimated Cost	Type
Mech.	OTS Building	Full electronic control upgrade and pneumatic removal for OTS	High	$50,000	Condition
Mech.	Fuchs Wildlife Building	Full electronic control upgrade and pneumatic removal for Fuchs	High	$50,000	Condition
Elec.	OTS Building	Replace Exterior Receptacles with Weatherproof GFI type for OTS	High	$1,000	Condition
Elec.	Fuchs Wildlife Building	Replace Exterior Receptacles with Weatherproof GFI type for Fuchs	High	$1,000	Condition
Elec.	Barr Colony Centre	Replace Exterior Receptacles with Weatherproof GFI type for Barr Colony Centre	High	$3,000	Condition
Elec.	OTS Building	Removal of Electrical Power to rooftop condensing units no longer in use	High	$4,000	Condition
Elec.	Barr Colony Centre	Replace Exterior Lighting and Controls for Barr Colony Centre	High	$5,000	Condition
Elec.	Barr Colony Centre	Replace Interior Lighting Controls and Fixtures	High	$250,000	Condition
Elec.	OTS Building	Replace Interior Lighting Controls and Fixtures	High	$80,000	Condition
Elec.	Fuchs Wildlife Building	Replace Interior Lighting Controls and Fixtures	High	$80,000	Condition
Elec.	Richard Larson Building	Replace Interior Lighting Controls and Fixtures	High	$80,000	Condition
Elec.	OTS Building	Replace Exterior Lighting and Controls for OTS	High	$2,500	Condition
Elec.	Fuchs Wildlife Building	Replace Exterior Lighting and Controls for Fuchs	High	$2,500	Condition
Elec.	Barr Colony Centre	Removal of DC Inverter	High	$4,000	Condition
Civil	Parking Lot	Reconstruct sections of the parking lot based on results of the proposed geotechnical study.	Medium	$470,000	Condition
Struc.	Fuchs Wildlife Building	Plan to demolish the Fuchs Wildlife Building	Medium	$33,000	Condition
Struc.	OTS Building	Plan to demolish the OTS Heavy Oil Building	Medium	$39,000	Condition

Disc.	Asset	Work Description	Priority	Estimated Cost	Type
Mech.	Barr Colony Centre	Plan for replacement of stainless steel sink and faucet replacement of Kiln Room, Staff Room, and Kitchen/Classroom	Medium	$8,500	Condition
Mech.	Barr Colony Centre	Plan for replacement of Drinking Fountain	Medium	$3,500	Condition
Mech.	Barr Colony Centre	Plan for replacement of Electric Domestic Hot Water Heater	Medium	$2,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Gas Fired Domestic Hot Water Heater	Medium	$16,500	Condition
Mech.	OTS Building	Plan for replacement of all 4 furnaces in OTS Oil Building	Medium	$22,000	Condition
Mech.	Richard Larson Building	Plan for replacement of both furnaces in Richard Larson (Subject to Building decommissioning)	Medium	$12,000	Condition
Mech.	OTS Building	Plan for replacement of 4 AC units connected to 4 furnaces in OTS.	Medium	$24,000	Condition
Elec.	Barr Colony Centre	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Main Museum	Medium	$10,000	Code
Elec.	OTS Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in OTS	Medium	$3,500	Code
Elec.	Richard Larson Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Richard Larson	Medium	$3,500	Code
Elec.	Fuchs Wildlife Building	Replace existing Exit signs with new Pictogram Style Signs c/w emergency lights in Fuchs	Medium	$3,500	Code
Mech.	Barr Colony Centre	Plan for replacement of Lavatory and Faucet	Low	$6,000	Condition
Mech.	Fuchs Wildlife Building	Wet Fire Suppression Sprinkler System in Fuchs (For Administration type building)	Low	$7,500	Condition
Mech.	OTS Building	Wet Fire Suppression Sprinkler System in OTS (For Administration type building)	Low	$7,500	Condition
Mech.	Barr Colony Centre	Wet Fire Suppression Sprinkler System in Barr Colony Centre (For Administration type building)	Low	$50,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Water Closets	Low	$7,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Urinal replacement	Low	$2,500	Condition

Disc.	Asset	Work Description	Priority	Estimated Cost	Type
Mech.	Barr Colony Centre	Plan for replacement of Make-Up Air unit (MUA-1)	Low	$20,000	Condition
Mech.	Barr Colony Centre	Plan for replacement of Exhaust Fan (EF-2)	Low	$8,000	Condition
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000	Condition
Mech.	OTS Building	Remove existing original AC units that are not in use in OTS	Low	$10,000	Condition
Elec.	Fuchs Wildlife Building	Install Functional Security Camera System to Fuchs	Low	$10,000	Condition
Elec.	OTS Building	Install Functional Security Camera System to OTS	Low	$10,000	Condition
Elec.	Richard Larson Building	Install Functional Security Camera System to Richard Larson	Low	$10,000	Condition
Elec.	Barr Colony Centre	Install Functional Security Camera System to Main Museum	Low	$30,000	Condition
Elec.	Barr Colony Centre	Install PA System to Main Museum	Low	$25,000	Condition
Elec.	Richard Larson Building	Install PA System to Richard Larson	Low	$8,500	Condition
Elec.	OTS Building	Install PA System to OTS	Low	$8,500	Condition

TOTAL IMMEDIATE PRIORITY	$1,417,000
TOTAL HIGH PRIORITY	$1,353,000
TOTAL MEDIUM PRIORITY	$651,000
TOTAL LOW PRIORITY	$230,500
TOTAL	$3,651,500

7 REMAINING LIFE

In general, a building of similar construction of the museum facility typically have an expected life of about 50 years. It is AE's understanding that the building was constructed through 1963 to 1995 (24-56 years). It is possible for buildings to exceed their expected life depending on quality of construction and maintenance history. The following describes the remaining life by building title

7.1 1963 – Original Fuchs Wildlife Museum (including OTS Heavy Oil and Corridor Link)

With the structures current age of 56 years it has served 112% of its expected life.

With the information gathered, it is estimated that the remaining life of the building be about **10-15 years**. Although with damage from expected mold and the conventional construction of the structure it is recommended that the structures be demolished for feasibility purposes.

The expected costs for recommended items within this report total **$397,500** where as demolition of this area is estimated at **$72,000**.

7.2 1980 – Richard Larson Building East Wing

With the structures current age of 39 years it has served 78% of its expected life.

With the information gathered, it is estimated that the remaining life of the building be about **5-10 years**, although with its current condition, and low quality of convectional construction it is recommended that the structures be demolished.

The expected costs for recommended items within this report total **$148,000** where as demolition of this area is estimated at **$25,000**.

7.3 1988 – Barr Colony Heritage/Cultural Centre (including 1995 addition)

The Barr Colony Centre and its addition have current ages of 30 years and 24 years, respectfully. This accounts for only 48% and 60% of their expected lives. With the recommendations performed and regular maintenance continued it is expected that these areas have potential of achieving a service life of another **30-40 years**.

The expected costs for recommended items related to this area total of just under **$2.34 million**.

Based on 2019 costing data, to construct a new private museum of the existing size (1,220 m^2) of modern construction would have an estimated construction cost of about **$6.1 million**.

7.4 Replacement Cost

Based on 2019 costing data, to construct a new building of the existing size (2,261 m^2) with modern construction would have an estimated construction cost of about **$11.5 million**, including engineering fees and demolition.

CLOSURE

This report was prepared for the Cornerstone Planning Group to provide recommendations for repairs and modernization. All work was collaborated with Melanie Roskell, Partner of Cornerstone Planning Group.

The services provided by Associated Engineering Alberta Ltd. in the preparation of this report were conducted in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No other warranty expressed or implied is made.

Respectfully submitted,
Associated Engineering Alberta Ltd.

Kevin Danyluk, P.Eng.
Structural Engineer

Job Choa, P.Eng.
Mechanical Engineer

James Sharpe, P.Eng.
Electrical Engineer

Owen Mierke, P.Eng.
Civil Engineer

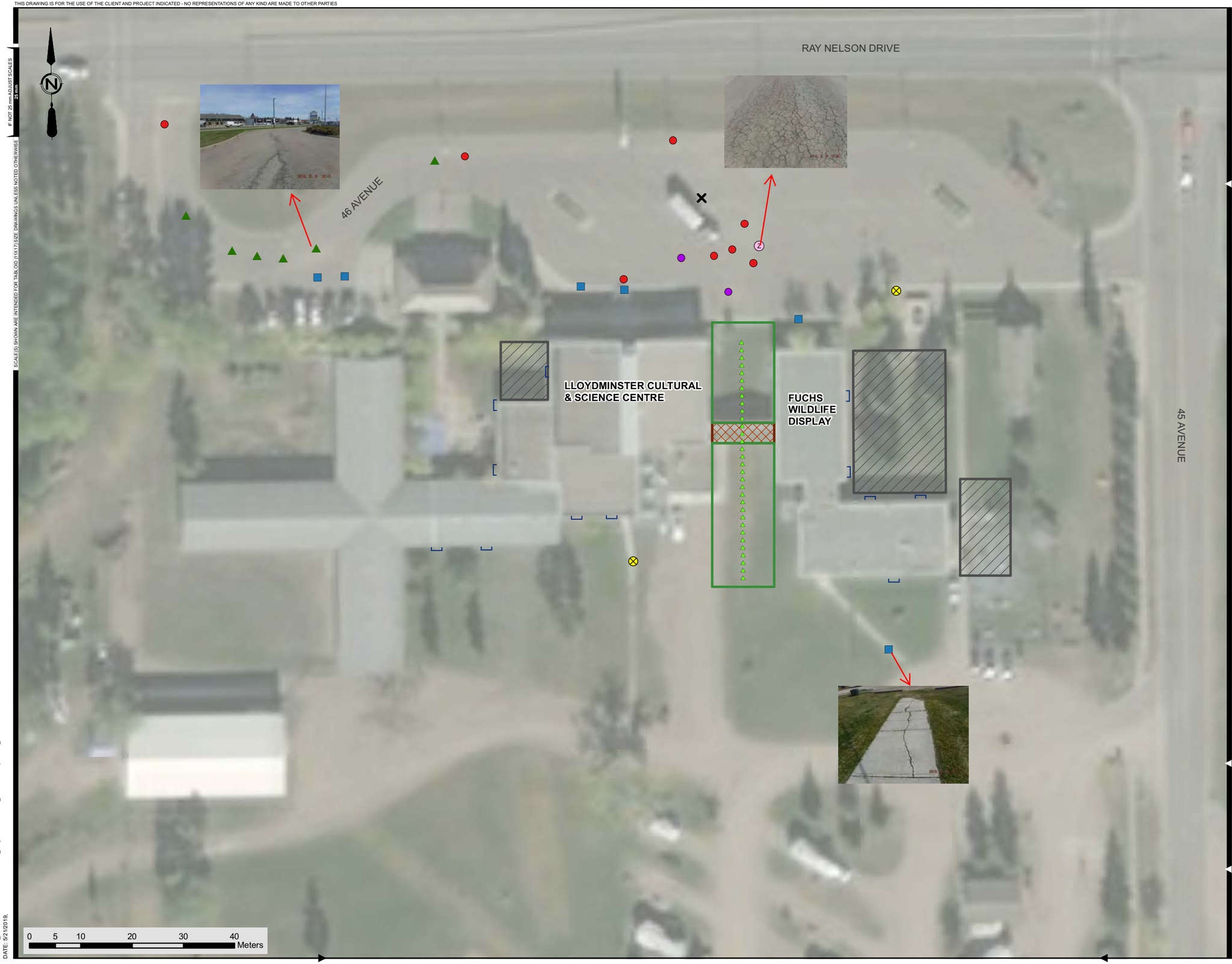
ASSOCIATED ENGINEERING
QUALITY MANAGEMENT SIGN-OFF

Signature: Carma Holmes

Date: June 28, 2019

APEGA Permit to Practice P 3979

APPENDIX A – CIVIL DEFICIENCY PLAN



Associated Engineering

Legend:

Road Defect

- Crocodile Cracks
- Longitudinal Cracks
- Pot Holes
- Ravelling

Sidewalk Defect

- Longitudinal Cracks
- Trip Hazard

Drainage

- Areas with Moisture
- Swale
- Downspout
- Area with Insufficient Grade
- Eroded Area
- Existing Swale with Backgrading & Erosion

CORNERSTONE planning group

FIGURE No. 2.1

LCSC CONDITION ASSESSMENT

FIELD ASESSMENT DATA

AE PROJECT No.	2019-3460
SCALE	1:700
COORD. SYSTEM	NAD 1983 3TM 111
DATE	2019 JUNE
REV	
DESCRIPTION	FINAL DRAFT

Appendix E: Human Studio Architectural Assessment Report & Design Study

HUMAN

Human Studio Architecture + Urban Design

Report

DRAFT

Lloydminster Cultural and Science Centre Condition Assessment (Architecture)

June 2019

TABLE OF CONTENTS:

PART ONE: PROJECT DESCRIPTION

The City of Lloydminster requested a review and update of the Facility Assessment Report of the Barr Colony Heritage Centre, now Lloydminster Cultural and Science Centre (LCSC) to assist the Owners in developing future plans for the facility.

The previous report, by Friggstad Downing Henry Architect of Saskatoon, is comprehensive and contains useful information that the scope of this short update study could not cover. Accordingly, we have used frequent excerpts from the previous study in our report.

Edited extracts from the FDHA 2010 F.A.R. are shown in blue italics.

The current study is to provide an updated visible assessment of the existing physical condition of the buildings and building systems. A key focus is to determine the ability of the existing buildings to provide the environment to meet Art Gallery standards, and to make high level recommendations as to building retention and / or new construction. The assessment will provide a high level cost estimate for repair and replacement of deficiencies as well as a projection of costs for repair/replacement of major components of systems.

This report includes reference to the site and landscape conditions as well as the existing program and functional use of the building since they impact the decisions for future development.

This report is part of a broader consulting study lead by Cornerstone Planning Group of Vancouver, BC focused on the future of the LCSC. The team for that studio includes:

- APA, Vancouver, BC (Exhibit Design)
- Human Studio Architecture and Urban Design, Vancouver, BC (Architecture)
- AES Engineering, Edmonton, AB (Structural / Electrical / Mechanical)

SCOPE OF WORK FOR THE CONDITION ASSESSMENT

- A visual review of all areas of the LCSC was conducted to assess both the functional condition and physical condition of the facility.
- Assessment to determine ability of buildings to provide environment to standards of Art Gallery.
- Notation of changes in the building relative to the 2010 report
- Discipline specific notes.

Human Studio and AES are responsible for the Condition Assessment Report. This component of the Report is the architectural assessment. The engineering assessment carried out by AES is a separate document.

PART TWO: EXISTING BUILDING CONSTRUCTION SUMMARY FROM 2010 F.A.R AND 2019 UPDATE

Based upon a review of existing plans supplied by Owners and visual observation the following construction is documented.

1980 Richard Larson Building (East Wing)

1. *Exterior walls are insulated wood frame construction with metal cladding.*
2. *4 inch slab-on-grade foundation.*
3. *Roof structures are of combustible frame construction.*
4. *Interior finishes are prefinished panels.*
5. *Gypsum wall board ceiling with stipple finish.*

2019 Added Information:

With the demolition of the other parts of the Richard Larsen Building a new wood frame west wall for the East Wing was constructed with green corrugated metal cladding, insulation of unknown type and interior painted particle board finish. See Figure 1.

FIGURE 1- New Richard Larson West Wall

1988 Barr Colony Centre Core Building

1. *Typical exterior wall construction consists either 8 or 6 inch insulated stud wall.*
2. *Exterior stucco finishes are complete with horizontal and vertical control joints.*
3. *Interior finish is painted gypsum wall board.*
4. *Interior floor finishes are carpet and tile.*
5. *Main entrance to lobby has a clear storey spanning aluminum curtain wall.*
6. *Original plans show roof construction consisting of built-up roof membrane over rigid insulation, vapour barrier over metal deck.*
7. *Original plans show roof construction over the front entrance consisting of*

built-up roofing over rigid insulation, vapour barrier over plywood sheathing and 8 in wood joists. Reason to change to wood construction at this location is not known.

8. *Built-up roofing is original to date on drawings. Patches have been done. Built-up roofing is at end of life cycle.*
9. *Original plans show a flat roof with structure sloping to the east and west. From center of vaulted roof.*
10. *Along the main corridor from the entrance a vaulted ceiling is present. The slope at the roof is as per original plans show 1:2. Roof construction at this location consists of prefinished metal cladding, asphalt shingles over insulated 10 inch wood joists. Assembly is vented.*
11. *Typical structure is metal deck over open web steel joists, supported by steel beam and columns.*
12. *Scuppers and down spouts are used.*

2019 Added Notes: None to note

1995 Barr Colony Centre Imhoff Gallery Addition Building

1. *Exterior wall construction consists of 8 inch insulated stud wall.*
2. *Exterior stucco finish complete with horizontal and vertical control joints.*
3. *Interior finish is painted gypsum wall board.*
4. *2 hour fire assembly between the Richard Larson building and the Cultural Center addition. Fire assembly consists of 8 inch concrete masonry units and 6 inch insulated stud wall.*
5. *Interior wall construction between the original 1988 Cultural Center and the addition consists of the existing 1988 wall construction of 8 inch insulated stud wall. Exterior stucco siding is believed to remain as no drawings indicate otherwise. New construction consists of 8 inch insulated stud wall.*
6. *Original plans show roof construction consisting of built-up roof membrane over rigid insulation, vapour barrier over metal deck.*
7. *Original plans show a flat roof with structure sloping to the south.*
8. *Typical structure is metal deck over open web steel joists, supported by steel beam and columns.*
9. *Scuppers and downspouts used.*

2019 Added Notes: None to note

Site Development

1. *North side of the site presents a large amount of available parking. A general review of the amount of stalls should be conducted to ensure capacities are met as well as general regulations.*
2. *Owner comments that on occasions the asphalt paving would become saturated. The cause is not known, but possible underwater seepage from improper drainage*

3. *Cracks in exterior concrete walks are visible in certain locations.*
4. *Exterior concrete pad located in front entrance is showing signs of sagging. This location presents an ideal spot for water penetration to the sub-grade below. This location contributes to the asphalt saturation that is occurring.*
5. *Landscape grading slopes from Weaver Park located to at the south of the building to the north with the museum in the middle. Efforts have been made to divert water to the east. Owner has indicated that water has leaked within the Richard Larson facility in the past.*
6. *Located to the east of the Barr Colony Museum and between the Fuchs building, the grade has been designed to flow from the south to north. The link that connects these two building was designed with a large weep hole beneath to allow the water to move freely from the south of the site to the north.*

2019 Added Information:

- The flooding since 2010 has indicated multiple site and building vulnerabilities to water ingress in the case of floods. With the demolition of the other parts of the Richard Larson Building a new drain and sump pump has been added immediately west of the new wall at the west end of the remaining East Wing of the Richard Larson Building. Despite this, floodwaters have come close to the threshold of the west door of the East Wing. In addition, it was noted during the 2019 site visit that there was only a single drain location at the north edge of the central parking lot. This single drain serves virtually the whole NE corner of the site and is inadequate. See Figure 2.

Accordingly, flooding must be considered a substantial risk to all of the existing LCSC buildings.

FIGURE 2 - Single Drain in Parking Lot for entire NE Site Area

Building Code Analysis

The building was designed in accordance with the requirements of the National Building Code of Canada in force at the time of construction. The NBC has been changed several times since. The existing building includes a mixture of combustible and non-combustible construction with one firewall separations and no sprinkler system. Based on the 2005 NBC the following classification would have applied:

3.2.2.25.Group A, Division 2, up to 2 Storeys

1. A building classified as Group A, Division 2 is permitted to conform to Sentence (2) provided
   a) it is not more than 2 storeys in building height, and
   b) it has a building area not more than the value in Table 3.2.2.25. Table 3.2.2.25. Maximum Building Area, Group A, Division 2, one storey facing 1 street - 1,600 sm, facing 2 streets - 2,000 sm, facing 3 streets - 2,400 sm.
2. The building referred to in Sentence (1) is permitted to be of combustible construction or noncombustible construction used singly or in combination, and
   a) floor assemblies shall be fire separations and, if of combustible construction, shall have a fire-resistance rating not less than 45 min,
   b) mezzanines shall have, if of combustible construction, a fire-resistance rating not less than 45 min,
   c) roof assemblies shall have, if of combustible construction, a fire-resistance rating not less than 45 min, except that in a building not more than 1 storey in building height, the fire-resistance rating is permitted to be waived provided the roof assembly is constructed as a fire-retardant treated wood roof system conforming to Article 3.1.14.1., and the building area is not more than
      i) 800 m2 if facing one street,
      ii) 1 000 m2 if facing 2 streets, or
      iii) 1 200 m2 if facing 3 streets, and
   d) loadbearing walls, columns and arches supporting an assembly required to have a fire-resistance rating shall have a fire-resistance rating not less than 45 min, or be of noncombustible construction.

The existing design began as individual building structure. The first building was the Fuchs building which has a gross floor area of approximately 742 sm. This building was built in 1963. Within the Fuchs building lies the Parks and Recreation Residency with an approximate gross floor area of 117 sm. The wall separating these two dwellings is required to be a fire separation, but cannot be confirmed.

In 1967 the first Richard Larson building was built as an individual stand alone structure with an approximate gross floor area of 288 sm. In subsequent years, additions were built on to the Richard Larson building with final overall approximate gross floor area of 1440 sm.

In 1989 the Barr Colony Heritage center was built having an approximate gross floor area of 1200 sm. The Heritage Center was joined and separated by a firewall to the Richard Larson buildings. In the year 1995 an addition was built onto the Heritage Center and a link was added joining the Heritage Center to the Fuchs building. No fire separation was used in this link as the link would combine both structures into one unit.

2019 Added Notes:

- Since 2010 all but the East Wing of the Richard Larsen Building has been demolished as noted above.
- The Building Code analysis noted above is still correct in principle. However, subsequent NBC updates since 2010 would apply to major renovations to the existing building, elevating the cost. Notable changes would impact features associated with accessibility, including:
    - Upgrades to device controls such as lights and fire alarms
    - Door threshold, hardware, and glazing improvements
    - Possible relocation of power door activators
    - Increased minimum requirements to ramps, drinking fountains and accessible washrooms

Zoning Requirements

The site is already being used for its intended purpose. Site development has been designed with reasonable setbacks and parking provisions based on the Owners anticipated demand.

2019 Added Notes:

- The current site is large enough to accommodate anticipated uses, including required parking. However, a parking review should be included in any new and / or renovation and / or addition building scope of work.

PART THREE: BUILDING AUDIT: ARCHITECTURAL

Richard Larson East Building

1. *Interior finishes appear to be well maintained, but aesthetic appearances is outdated. Interior finishes include pegboard, prefinished panels, painted panels and painted gypsum wall board.*
2. *Interior side of concrete grade beam looks to be in good condition. With visual inspection only a few surface cracks have been seen. However, where the concrete slab meets the concrete grade beam, this area has separated due to normal concrete shrinkage. The cracks appear to run around the entire base of the concrete grade beam in all additions. The Owner reported problems with ants coming through this gap. Owner has since filled with spray foam.*
3. *Concrete slab show signs of minor surface cracking. Existing concrete slab is without control joints.*
4. *Ceiling within the east wing shows a couple visible moisture locations. At this location we see some signs of paint chipping. Around the perimeter in the most eastern part of the east wing shows signs of cracking as well the most notable signs of some moisture spots.*
5. *Exterior emergency doors appear to be good condition. Exterior doors are hollow metal doors in pressed steel frames.*
6. *Bulkhead over east wing opening is pieced together and not aesthetically pleasing.*
7. *Flooring in this location appears in good condition, but is aesthetically outdated.*
8. *The roof is a gabled truss system. Shingles are used and are starting to show some sign of age. It would be recommended that these be replaced or upgraded to a different product.*

2019 Added Notes:

- Since 2010 the East Wing, the only remaining component of the Richard Larson Building, has exhibited further deterioration, with the exception of the new east wall. Further investment in this building is not recommended, except as minimally necessary to protect items stored there.

FIGURE 3 - New Sump Cover East of Richard Larson Remnant

1989 Barr Colony Heritage Center and 1995 Imhoff Gallery Addition

1. *Corridor leading from Richard Larson Wing looks to be well maintained. Suspended ceiling shows signs of moisture damage. Location indicates that moisture could be coming from condensation on the mechanical ducts.*
2. *Deleted*
3. *Deleted*
4. *Existing cafeteria is now being used as a classroom. Interior renovations have been conducted. Interior walls have been newly painted.*
5. *Interior walls have been added to allow for office space.*
6. *Entrance to existing cafeteria shows a large amount of surface moisture on the exterior door and sidelight. Cause for moisture is likely high humidity within this area and limited air circulation. Exterior door and window units appear to be in good condition except for surface moisture and maintenance due to water damage.*
7. *The entrance interior walls are showing sign of wear and tear. Vinyl composite tiles show signs of moisture damage and general use. Some tiles are missing and clear coat finish is rubbed off. Suspended ceiling shows signs of moisture. Cause could be improper AVB surrounding above structure.*
8. *Floor to ceiling windows located within this area are showing large amounts of surface moisture. Cause and condition are similar to entrance.*

9. *Arts Gallery interior walls appear to be well maintained. Located in the 1995 Gallery addition above the west door the wall shows signs of minor surface moisture.*
10. *All interior art room galleries are a painted gypsum wall board. Accent colors are used within the Community Art Gallery. Accent color picked to coincide with carpet. Altering carpet may require accent color to be updated.*
11. *Suspended ceiling throughout all galleries is in good condition, but in some locations signs of minor water spotting in ceiling tiles is visible. This is potentially caused but condensation off mechanical ducts cannot be confirmed.*
12. *Green speckled carpet and brown tile are located throughout the 1988 building. The carpet and tile while in good condition is aesthetically outdated.*
13. *Aluminum curtain wall has had a large amount of visible water on the glass as well the aluminum frame. The cause is mainly associated with the higher humidity levels and in-proper air circulation. Owner currently uses fans to circulate the air and has removed a large amount of the surface condensation, however there is still lingering moisture.*
14. *Multiple moisture damage is located in the lobby on the roof and walls surrounding the aluminum curtain wall.*
15. *Entrance lobby brown tile floor finish, while well maintained is aesthetically outdated.*
16. *The current washrooms located off the entrance lobby are not wheelchair accessible~~. The only wheelchair accessible washroom located on site is at the Richard Larson entrance.~~ Due to the small area designated to the washroom expansion it would be difficult to allow for accessible washrooms at this location. Overall floor finishes and wall finishes appear to be well maintained, but are aesthetically outdated.*
17. *Exterior door at the service entrance appears to be well used and visual inspection indicates that the weatherstripping is in rough shape.*
18. *Windows and doors within the link between the Barr Colony and Fuchs building appear to be in good condition. The sill on one window has some minor water damage.*
19. *Some of the aluminum cap has warped at a second story elevation on the exterior of the front curtain wall. Cause could be associated with building movement or expansion/contraction due to changed in temperature.*
20. *Frost is present high on the exterior of the curtain wall. This could suggest a system failure at this location. Warm air leaking out and freezing on the exterior surface.*
21. *Deleted*
22. ~~*A full inspection was not completed due to weather conditions.*~~ *The original roof system is near end of its useful life and increased maintenance repairs are required.*

2019 Added Notes:

- Since 2010 the 1988 original connecting building of the Barr Colony Heritage Centre has exhibited further deterioration.
- It was noted that moisture and condensation has frequently been seen inside the building. It was noted that this creates an opportunity for mould growth.
- Roof leakage in the vault area was identified and patched. See Figure 4.
- Three current major roof leaks are strongly indicative of the potential water ingress in many building walls and roofs. Any renovation would require wide ranging testing for envelope continuity, invisible water damage and mould.
- The roof of the complex has been selectively repaired. See Figure 5: Roof Repairs.
- Additional roof repairs will be required shortly to avoid further leakage.
- 90% of the doors and windows (including hardware) are original and due for replacement. It was noted that hardware replacements were challenging to find.
- In 2017 and 2018 infrared scanning was completed for approximately 80% of the exterior of this building. Large areas of “cold zones” were indicated in many areas of the exterior wall, indicating insulation failure.
- The number of different building ages and envelope types creates a substantial and ongoing challenge of maintaining Class A museum standard temperature and humidity ratings. This is an ongoing risk to artifacts.

FIGURE 4 - Damage to Ceiling tile in Vault Area in BCHC due to Roof Leak

FIGURE 5 - Roof Repairs

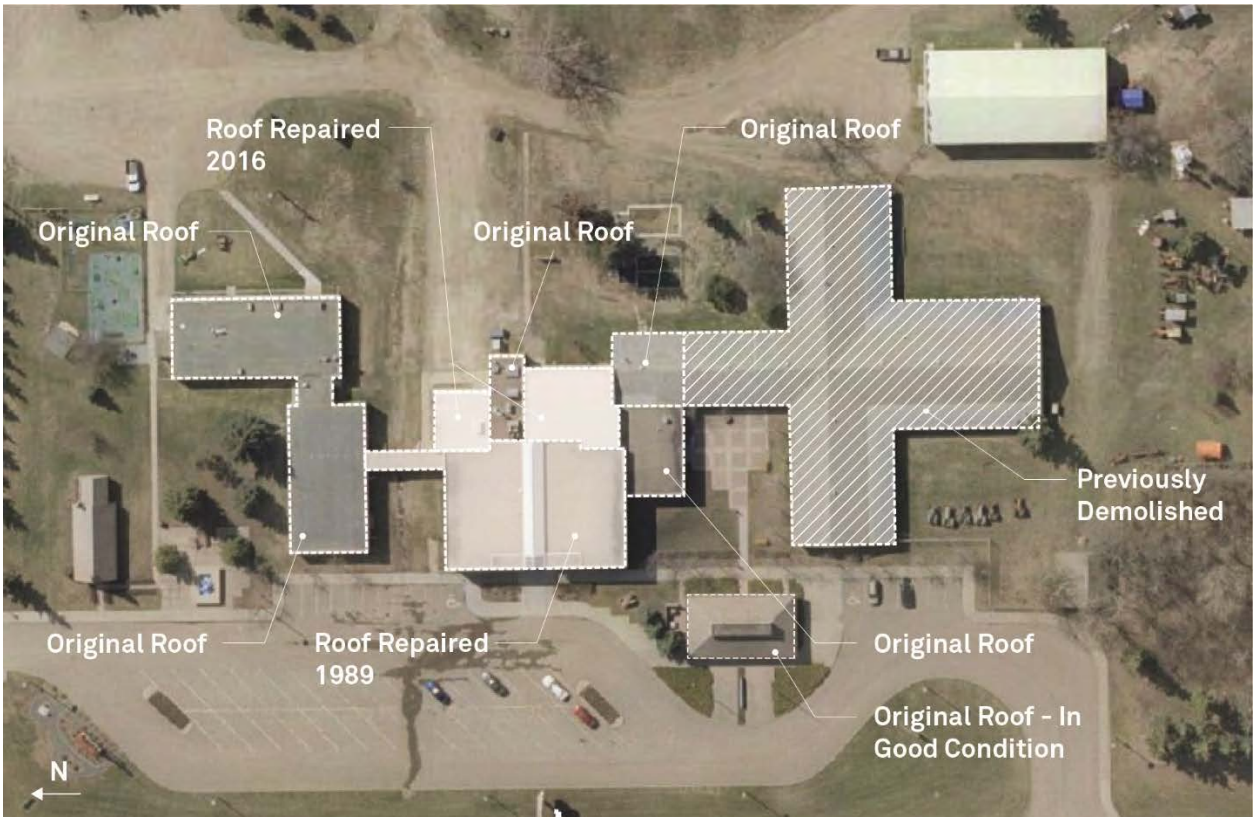
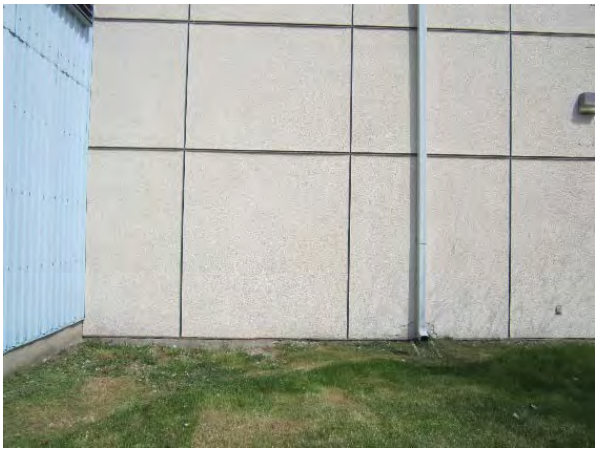


FIGURE 6 - Exterior Envelope Deterioration at Scupper

FIGURE 7 - Exterior Envelope Deterioration at Base



1963 Original Fuchs Wildlife Museum and Heavy Oil (OTS) Exhibit

1. *Overall interior finishes appear to be well maintained and good condition, but aesthetic appearance is outdated.*
2. *Deleted*
3. *The 1999 Heavy Oil display was incorporated within the Fuchs building. Minor renovations were done. Some renovations included combining individual washrooms into one accessible unisex washroom. Structural walls have been removed and replaced with structural beams and columns.*
4. *Deleted*
5. *Located within the Heavy Oil section, one display is located in front of an emergency exit which obstructs the path of exit. It is recommended that this display be moved to a different location.*
6. *The Park residence was not accessible at the time of inspections.*
7. *During the 1999 renovations portions of the exterior finish were upgraded. The addition of stucco to the North West side to match the Barr Colony Museum. At this location we can see that there is some damage to the stucco finish at the base of the wall.*
8. *The rest of the exterior was upgraded from the existing cedar siding with a residential grade vinyl siding. Located at the base of the vinyl siding damage can been seen in multiple locations. ~~It is recommended that siding be upgrade to a commercial material suited for high traffic. At this time further investigation into the carpenter ants incident should be conducted to ensure the structure is acceptable.~~ It would also be recommended that a more durable product be considered for the base of the exterior wall. During the 1999 renovation the roof has been upgraded to a rubber membrane system. The roof does appear to be moderately flat and is believed to rely on the existing insulation and insulation slopes. Water ponding is presumed to still be present as slopes to exterior scuppers appear minimal. ~~Further investigation of roofing and insulation assembly is required.~~*

2019 Added Notes:

- Since 2010 the 1963 Fuchs Wildlife Exhibit building has exhibited further deterioration. The building is now very aesthetically outdated. See Figure 8.
- The Fuchs gallery ceiling was tested for asbestos in 2017 and asbestos was identified.
- Selective air quality testing indicated localized and non-hazardous mould.
- The corridor to the Fuchs building is a location of one of the major post 2010 roof leaks.
- Further investment in these buildings is not recommended, except as minimally necessary to protect exhibits.

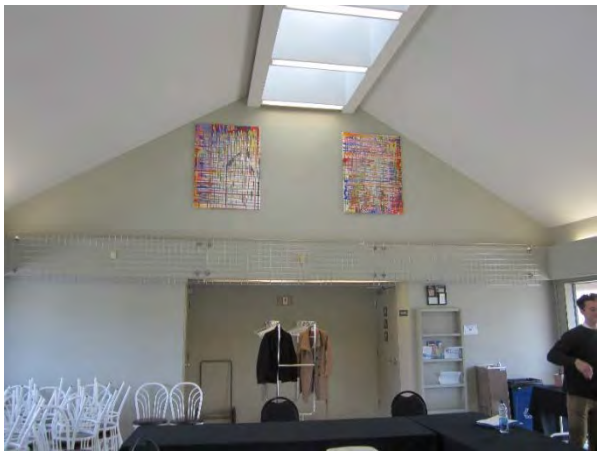
FIGURE 8 – Fuchs Gallery Exterior West Side

Former Tourist Information Building (now Studio 2)

1. Overall interior and exterior finishes appear to be well maintained and good condition. See Figures 9 and 10.
2. Currently requires minimal maintenance.
3. Building has a 4' crawl space with no visible moisture problems.

FIGURE 9 - Studio 2 Building Exterior

FIGURE 10 - Studio 2 Building Interior



Site

1. *Overall general landscaping design is flawed and would require to be addressed to eliminate water ponding at the south side of the of the Richard Larson and Barr Colony portion of the building. Landscape redesign at this location would help eliminate future ponding and could help eliminate future water infiltration into the building.*
2. *General parking allowances would need to be reviewed to ensure adequate parking is available.*
3. *The condition of existing parking paving area is questionable. An inspection would be required to ensure proper asphalt drainage is achieved and general asphalt condition. At this time a proper recommendation could be submitted.*
4. *Any deteriorated and cracked sidewalks would need to be addressed and corrected for safety.*
5. *The concrete pad located at the front entrance is required to be addressed. The void that is present could be a potential factor in the asphalt seepage that Owner has indicated. It provides a location for water to penetrate the sub-grade. Removal and installation of new concrete pad should be considered.*
6. *A land surveyor needs to be engaged to survey elevations of entire site so as to assess drainage conditions, etc.*

2019 Added Note:

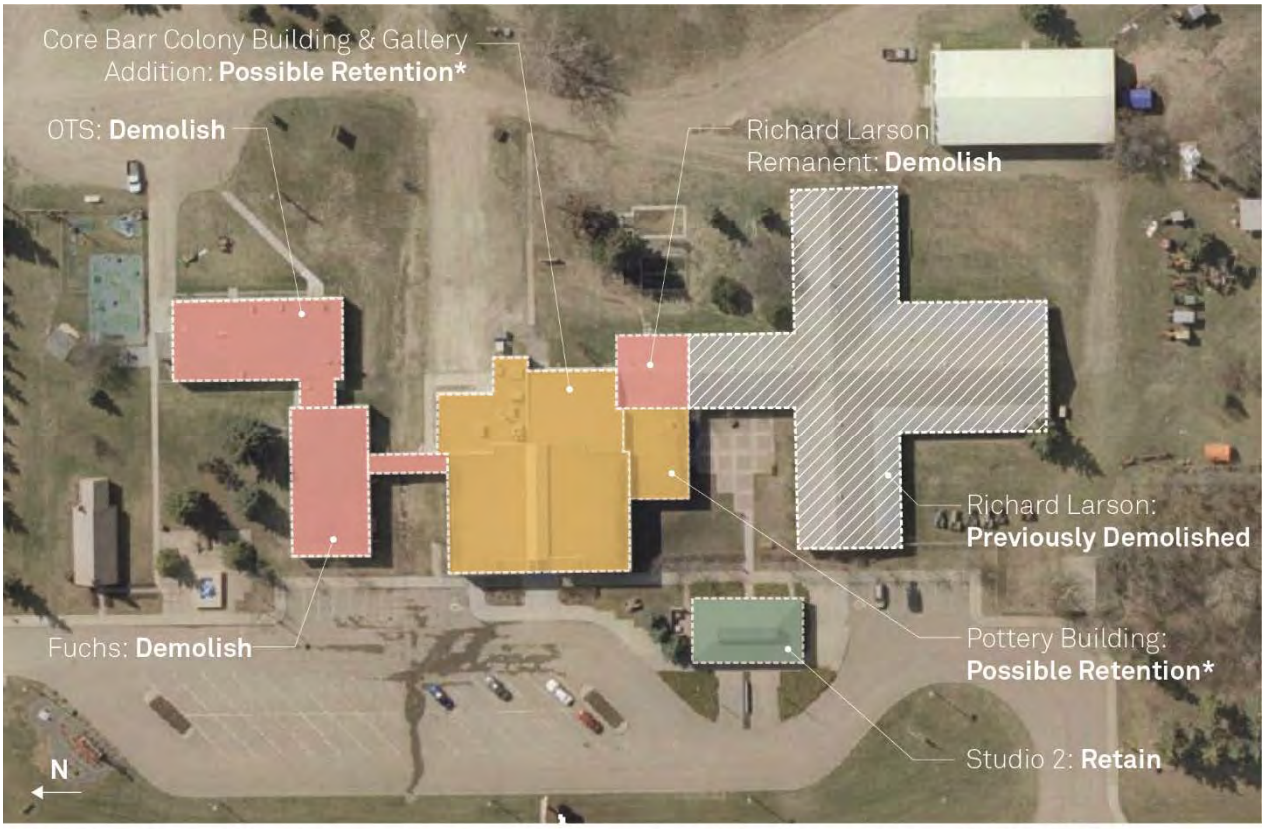
- The landscape is adequately maintained, but not in very good condition.
- As noted above, the flooding since 2010 has indicated multiple site and buildings vulnerabilities to water ingress in the case of floods. Accordingly, flooding must be considered a substantial risk to all of the existing LCSC buildings.
- The overall site and landscape relationship between the main building and the existing (mostly relocated) heritage buildings is not satisfactory in terms of creating an overall sense of place.

PART FOUR: ARCHITECTURAL SUMMARY AND RECOMENDATIONS

1. The remainder of the Richard Larson East Wing, the Fuchs and the OTS exhibit buildings are aged technically and aesthetically. There is no point in spending any further money on these buildings, except to protect the objects within until an overall strategy is in place that allows demolition of these buildings
2. The 1989 Barr Colony Heritage Center and 1995 Imhoff Gallery Addition have substantial envelope deterioration (roof and walls). The scope of this study was not detailed enough to evaluate strategies for upgrading the envelope, but these would inevitably be costly, and would almost certainly not add experiential benefit for visitors. Flooding is a substantial risk as well, and this would be very challenging to mitigate. The best option if funds are available would be demolition and replacement.
3. The requirements for a “Category A” museum facility include a “Class A” HVAC system for precise temperature and humidity control. Despite highly laudable efforts by LCSC staff, the 1989 Barr Colony Heritage Center and 1995 Imhoff Gallery Addition are nearing the end of their ability to serve as a Category A facility, and it would not be effective use of funds to try to upgrade those buildings to Class A HVAC performance. Even if a full building replacement is not possible, these buildings should, as quickly as possible, be re-programmed to not include storage and / or display museum quality artifacts.

See figure 11 for recommended demolitions and figure 12 for estimated costs.

FIGURE 11 – Recommended Demolitions

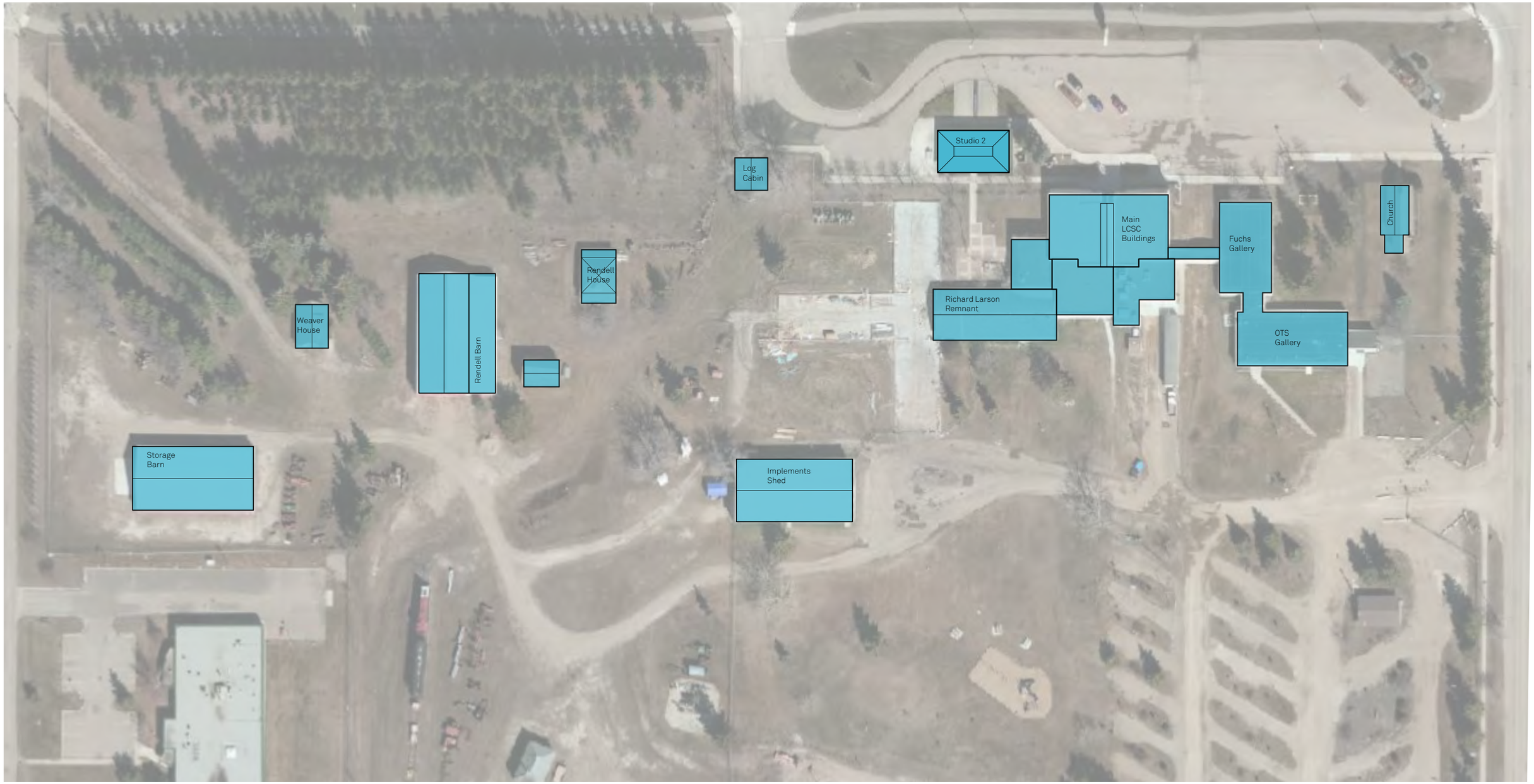


*Could be retained if replacement is not an option or demolished dependant on future plans.

FIGURE 12 – Summary of Estimated Costs

Work Description	Priority	Estimated Cost ($)
Barr Colony Building (Including Imhoff Gallery)		
Roof Replacement	High	500,000 - 540,000
Exterior Building Envelope (including new stucco panel cladding, insulation and membrane)	Immediate	720,000 - 770,000
New Door Hardware	Medium	50,000 - 60,000
Floor Replacement (including installation)	Medium	145,000 - 170,000
	Total:	**1,415,000 - 1,540,000**
Connect Walkway and Fuch's Building		
Roof Replacement	High	170,000 - 185,000
Exterior Building Envelope (including new stucco panel cladding, insulation and membrane)	High	250,000 - 275,000
New Door Hardware	Medium	5000 - 6000
Floor Replacement (including installation)	Medium	35,000 - 50,000
	Total:	**460,000 - 516,000**
OTS Building		
Roof Replacement	High	145,000 - 155,000
Exterior Building Envelope (including new stucco panel cladding, insulation and membrane)	High	170,000 - 180,000
New Door Hardware	Medium	5,000 - 6,000
Floor Replacement (including installation)	Medium	35,000 - 50,000
	Total:	**355,000 - 391,000**
	Grand Total:	**2,230,000 - 2,447,000**

Note: The above Class D estimates do not allow for any hazardous material remediation. If required this would substantially increase costs.



LCSC DESIGN STUDY
Human Studio, July 2019
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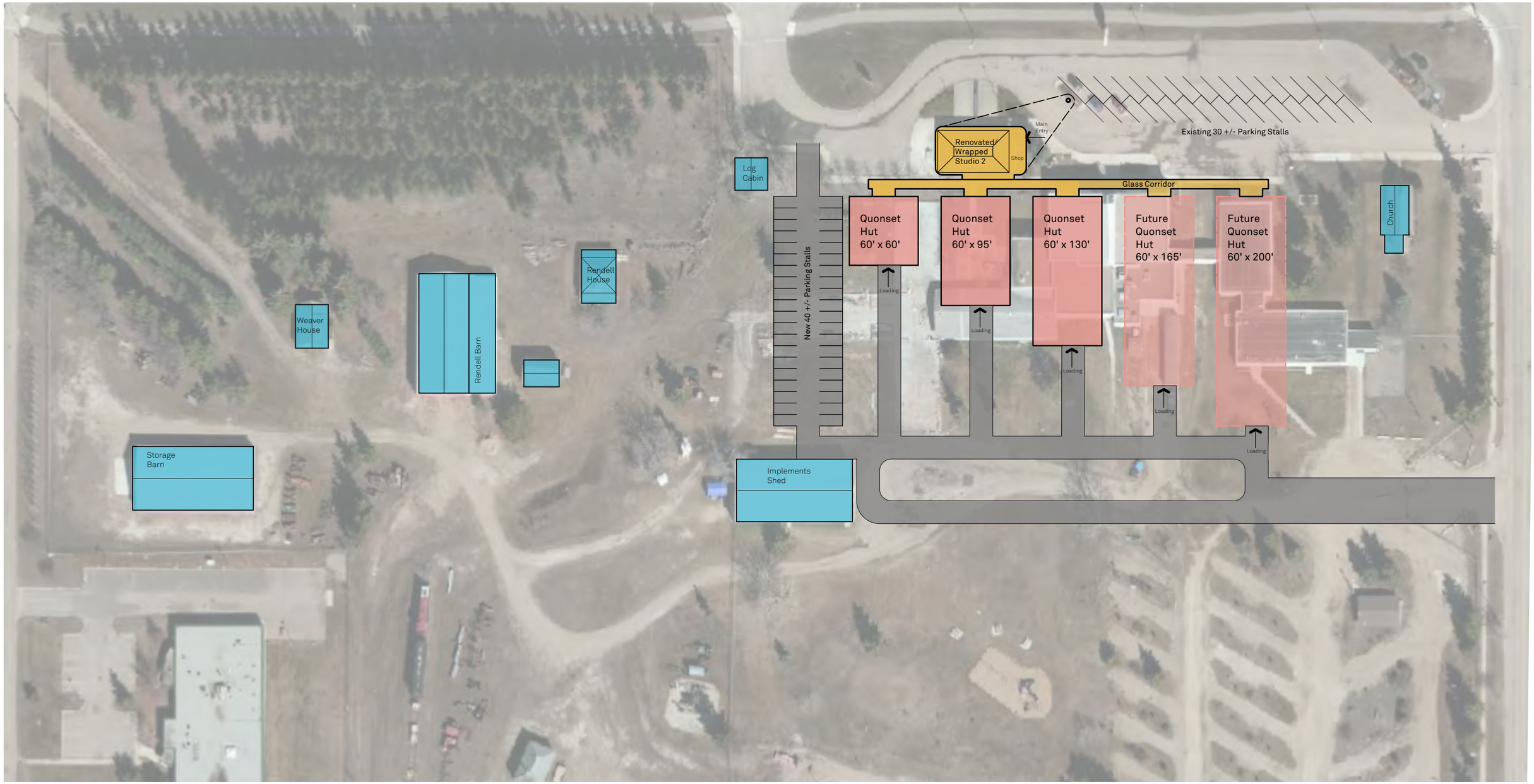
N

Existing Site



LCSC DESIGN STUDY
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N

- Existing Buildings
- Display / Admin
- Entry / Circulation

Opt. 1-New Building (Quonset Huts) Site Plan

Main Entry
Entrance / Office
Shop
Circulation
Log Cabin
Programming Area
Archives
Collections
Exhibit Gallery 1
Exhibit Travelling Gallery
Future Collections (Vehicles)
Future Collections (Buildings)
Church
Loading
Loading
Loading
Loading
Loading
Implements Shed

LCSC DESIGN STUDY
Human Studio, July 2019

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Existing Buildings
Display / Admin
Entry / Circulation

Opt. 1-New Building (Quonset Huts)
Building Plan

Main Entry

Entrance / Office

Shop

Log Cabin

Connection to Existing LCSC

Programming Area

Archives

Collections

Loading

Loading

DEMOLISH

Main LCSC Buildings

Fuchs Gallery

Church

OTS Gallery

Implements Shed

LCSC DESIGN STUDY

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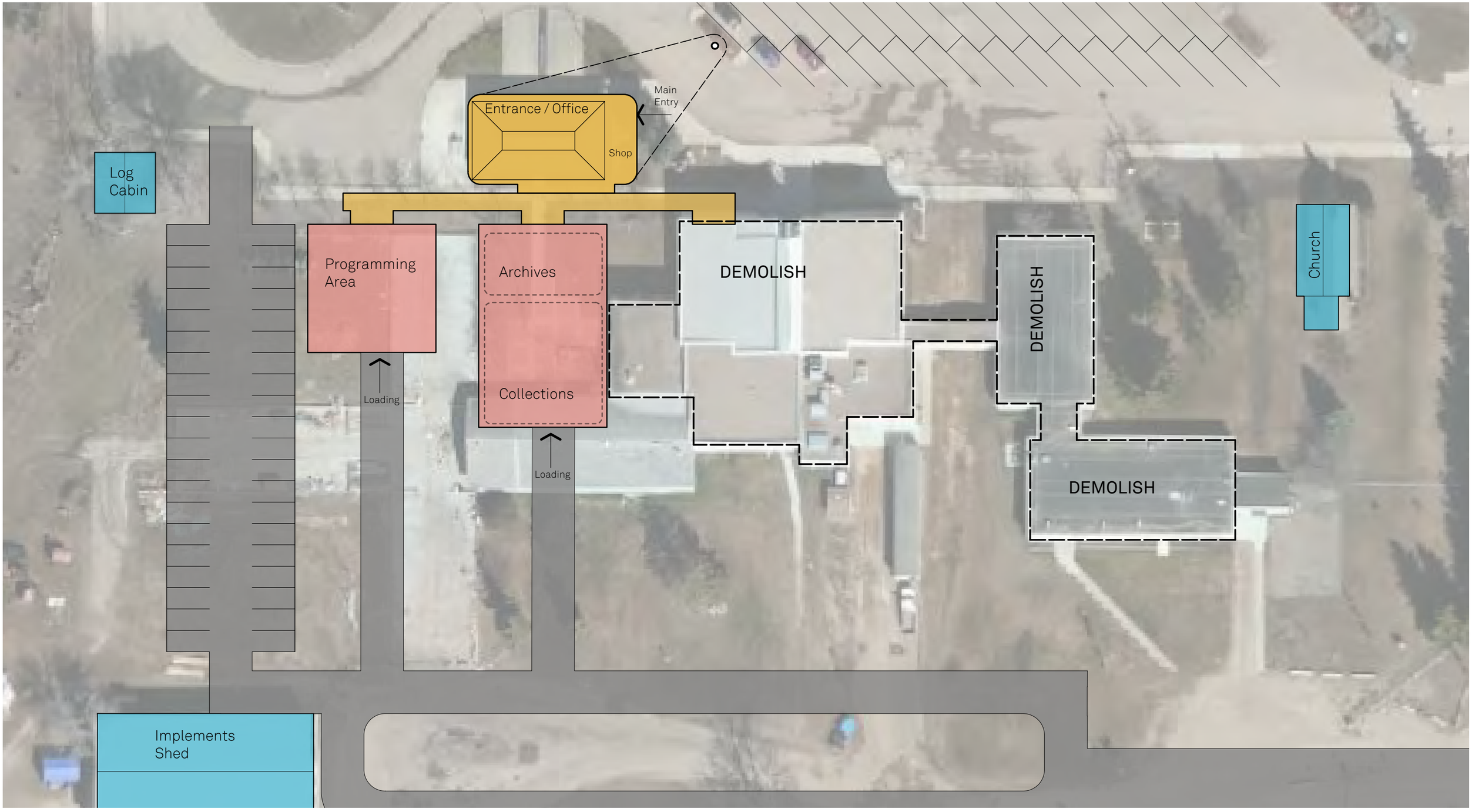
Existing Buildings

Display / Admin

Entry / Circulation

Opt. 1-New Building (Quonset Huts) Phase 1



LCSC DESIGN STUDY

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Existing Buildings

Display / Admin

Entry / Circulation

Opt. 1-New Building (Quonset Huts)
Phase 2

Main Entry
Entrance / Office
Shop
Circulation
Log Cabin
Programming Area
Archives
Collections
Exhibit Gallery 1
Exhibit Travelling Gallery
Future Collections (Vehicles)
Future Collections (Buildings)
Church
Loading
Loading
Loading
Loading
Loading
Implements Shed

LCSC DESIGN STUDY

Human Studio, July 2019

1:500

Existing Buildings
Display / Admin
Entry / Circulation

Opt. 1-New Building (Quonset Huts) Phase 3

CORE PROGRAM AREA

Main Entry

Entrance / Office

Shop

Circulation

Log Cabin

Programming Area

Archives

Collections

Exhibit Gallery 1

Exhibit Travelling Gallery

Future Collections (Vehicles)

Future Collections (Buildings)

Church

Loading

Loading

Loading

Loading

Implements Shed

LCSC DESIGN STUDY

Human Studio, July 2019

1:500

Existing Buildings

Display / Admin

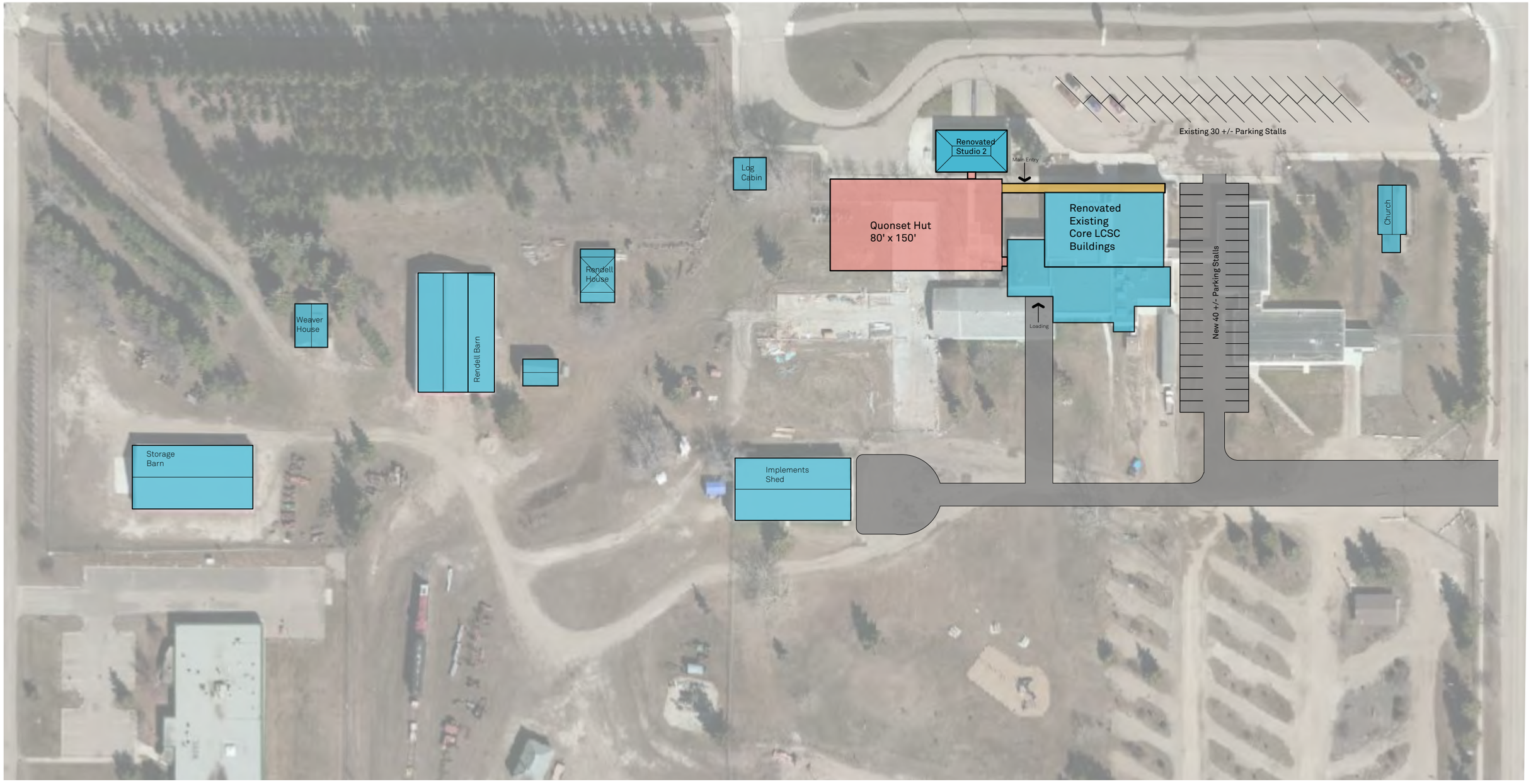
Entry / Circulation

Opt. 1-New Building (Quonset Huts)
Core Program Area

LCSC DESIGN STUDY
Human Studio, July 2019

Existing Buildings
Display / Admin
Entry / Circulation

Opt. 1-New Building (Quonset Huts)
3d View



LCSC DESIGN STUDY
Human Studio, July 2019
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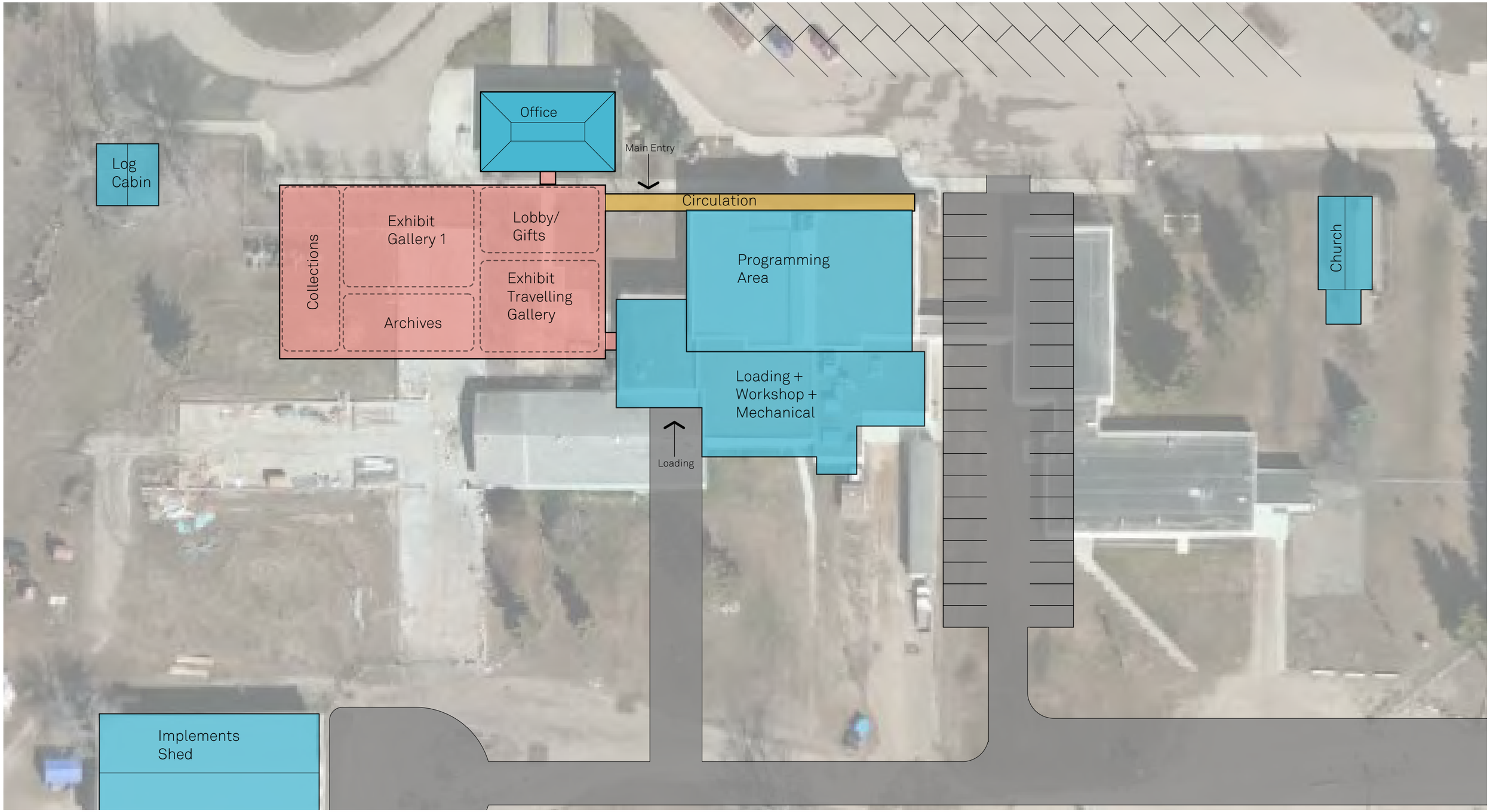
N

Existing Buildings
Display / Admin
Entry / Circulation

Opt. 2-Reno and Add Building and Screen
Site Plan



LCSC DESIGN STUDY

Human Studio, July 2019

1:500

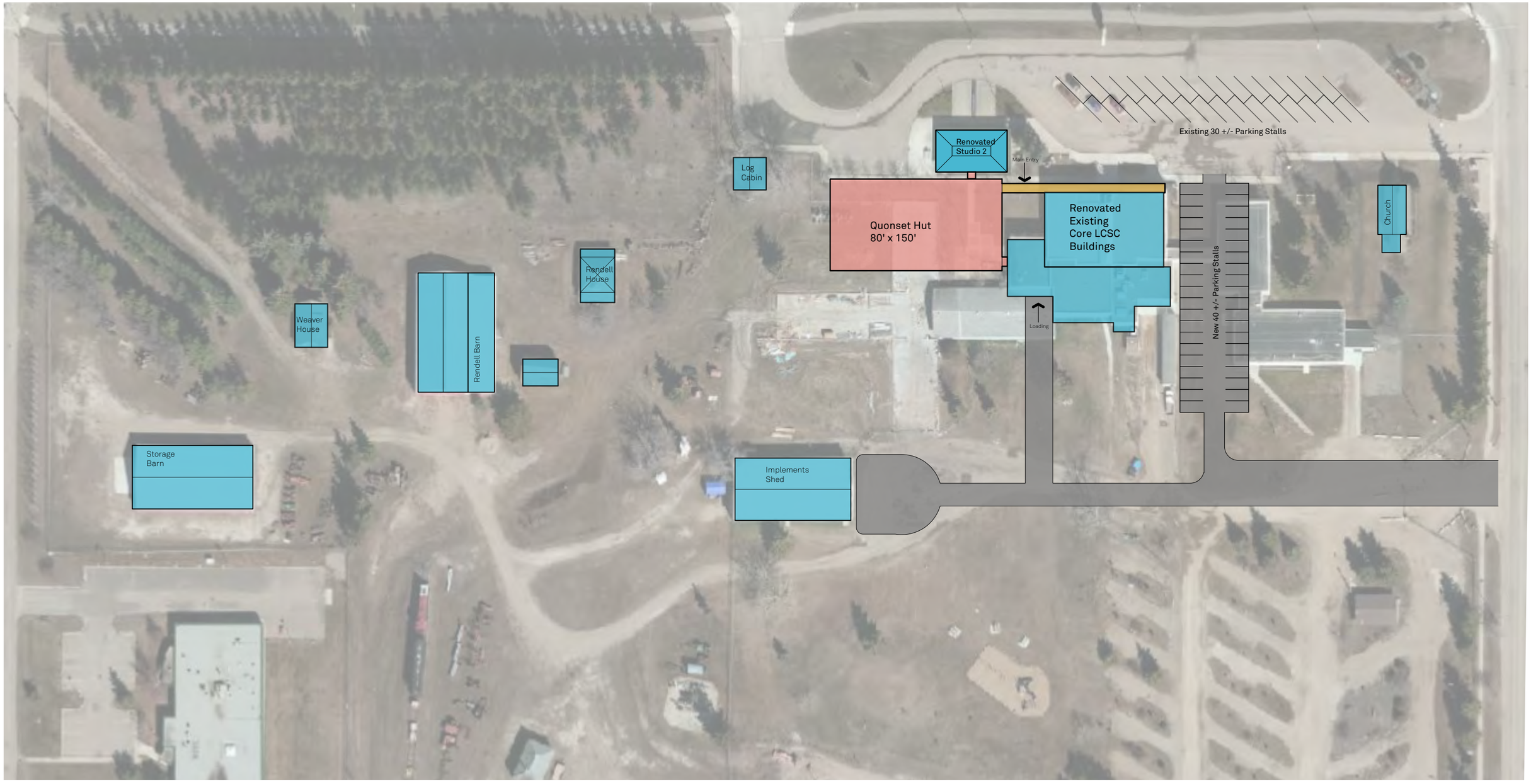
Existing Buildings

Display / Admin

Entry / Circulation

Opt. 2-Reno and Add Building and Screen

Building Plan



LCSC DESIGN STUDY
Human Studio, July 2019
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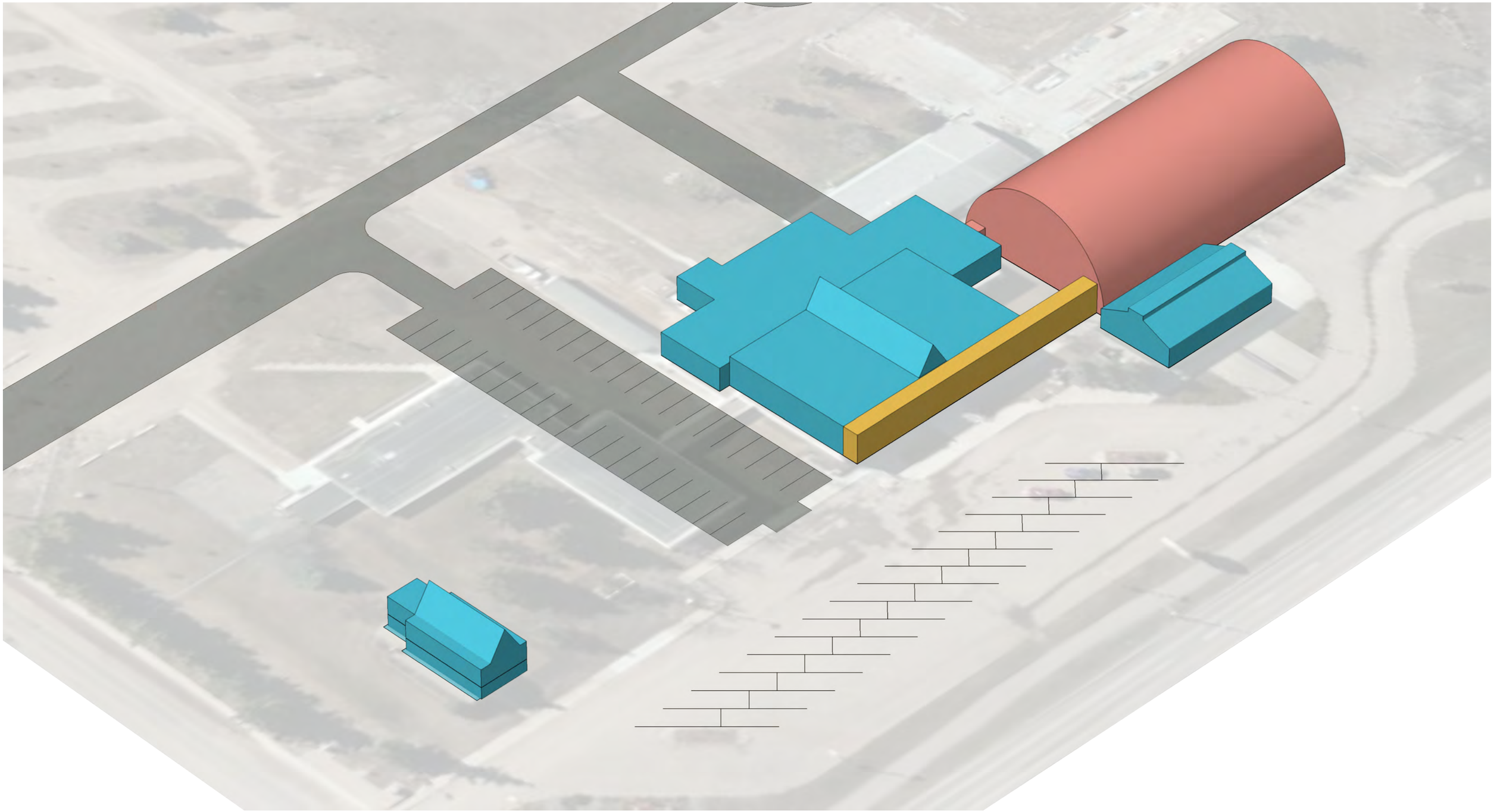
N

Existing Buildings
Display / Admin
Entry / Circulation

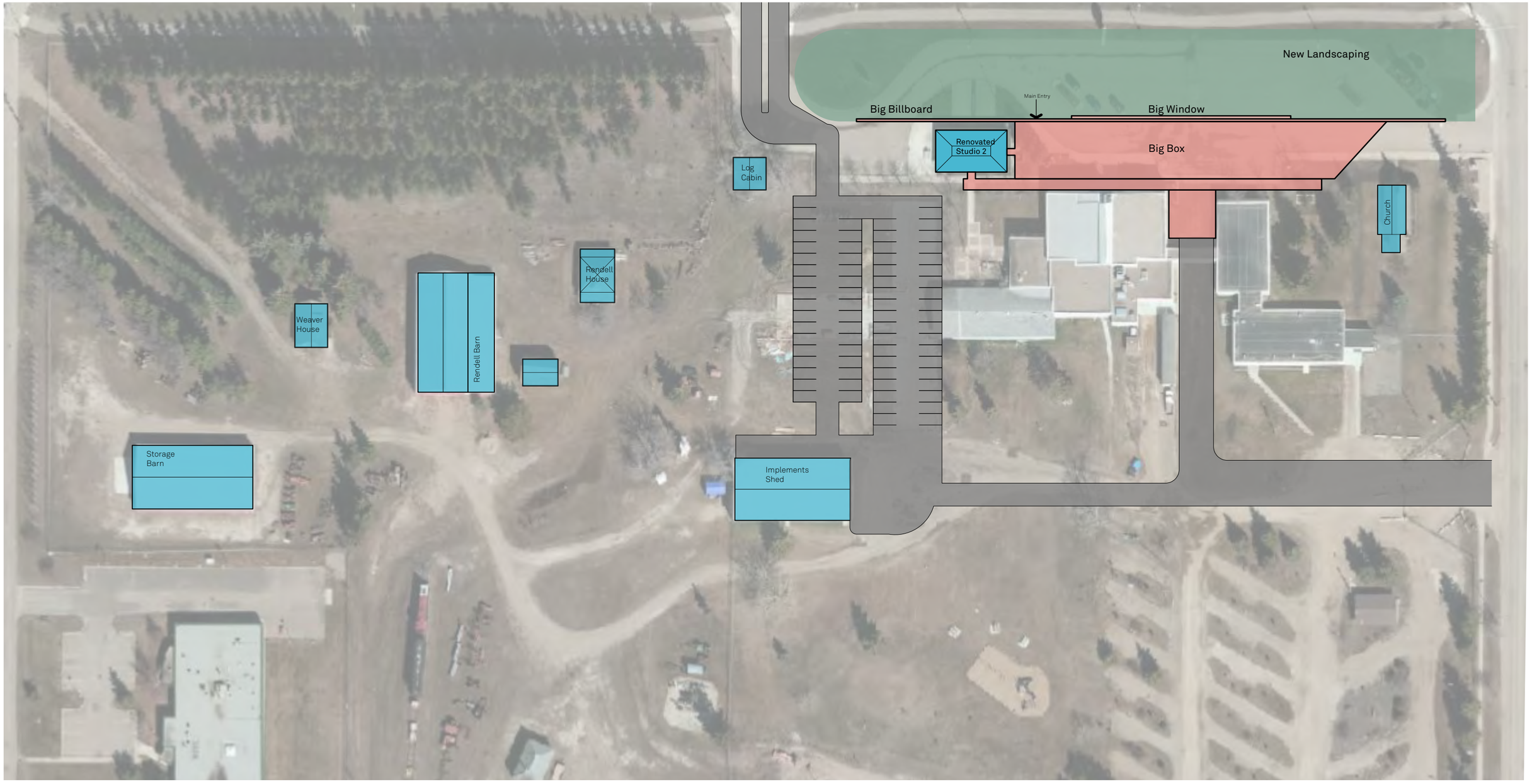
Opt. 2-Reno and Add Building and Screen
Site Plan



LCSC DESIGN STUDY
Human Studio, July 2019

- Existing Buildings
- Display / Admin
- Entry / Circulation

Opt. 2-Reno and Add Building and Screen
3D View



LCSC DESIGN STUDY
Human Studio, July 2019
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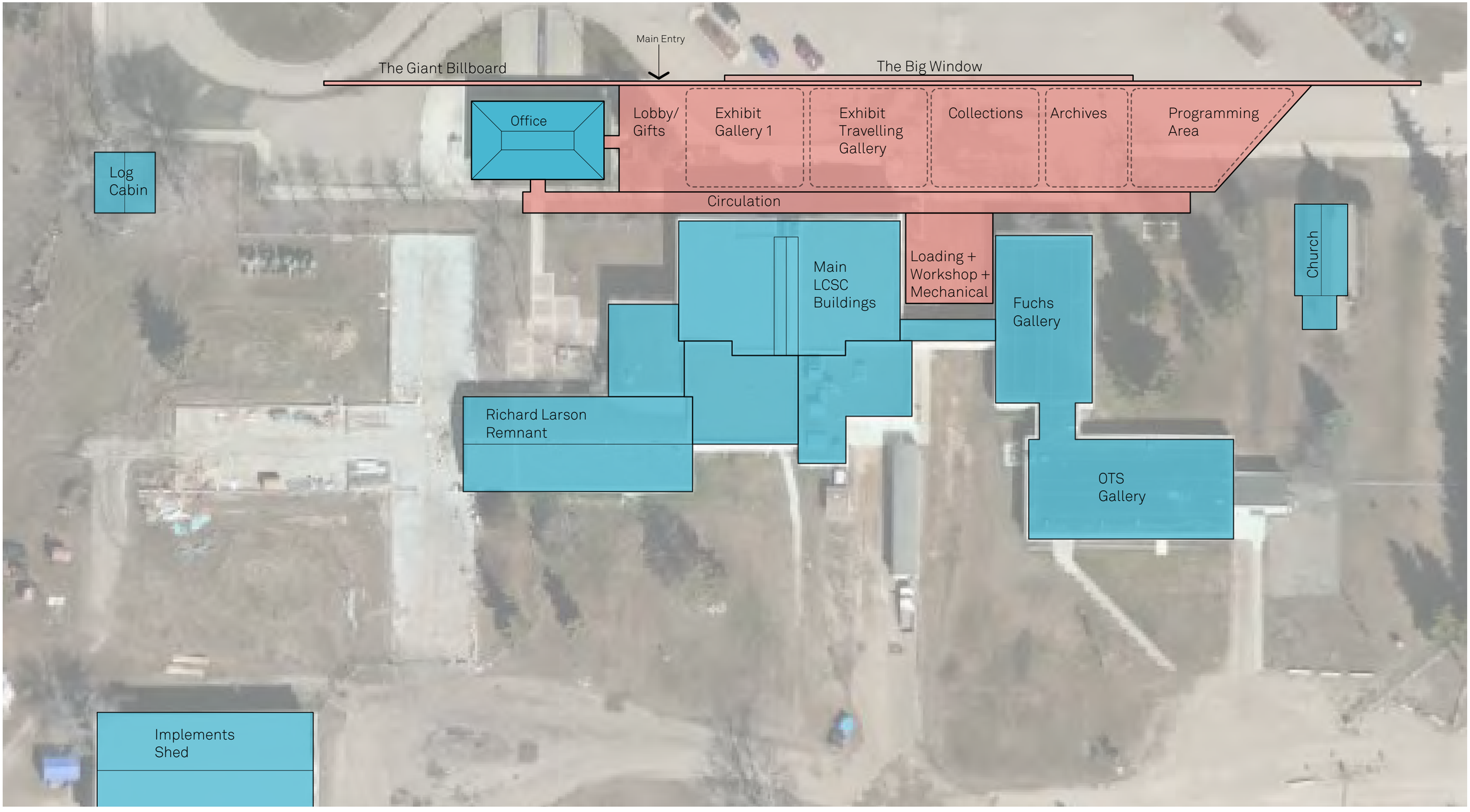
N

Existing Buildings
Display / Admin
Entry / Circulation

Opt. 3-Big Box + Big Billboard + Big Window
Phase 1 Building Plan



LCSC DESIGN STUDY

Human Studio, July 2019

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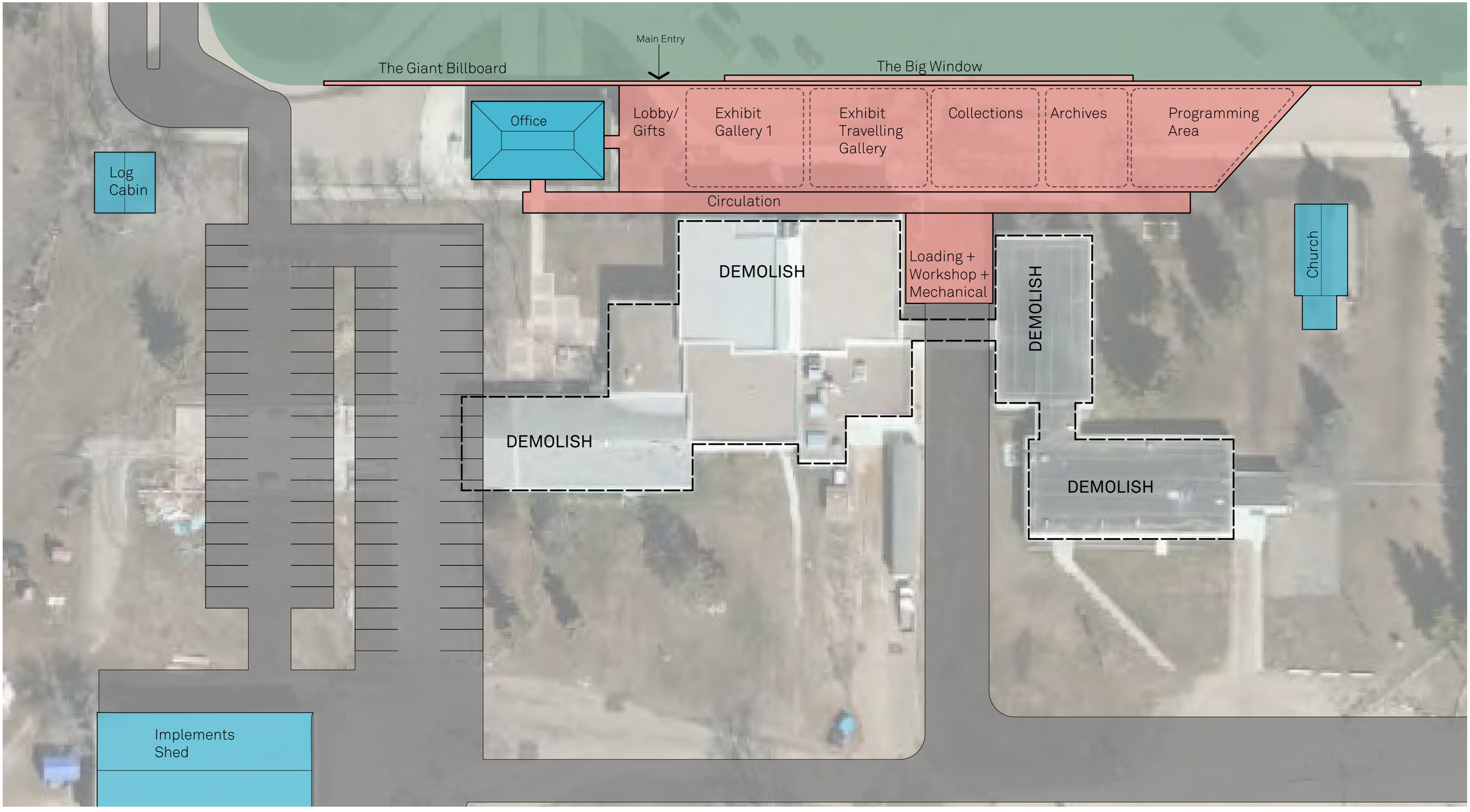
Existing Buildings

Display / Admin

Entry / Circulation

Opt. 3-Big Box + Big Billboard + Big Window
Phase 1 Building Plan



LCSC DESIGN STUDY

Human Studio, July 2019

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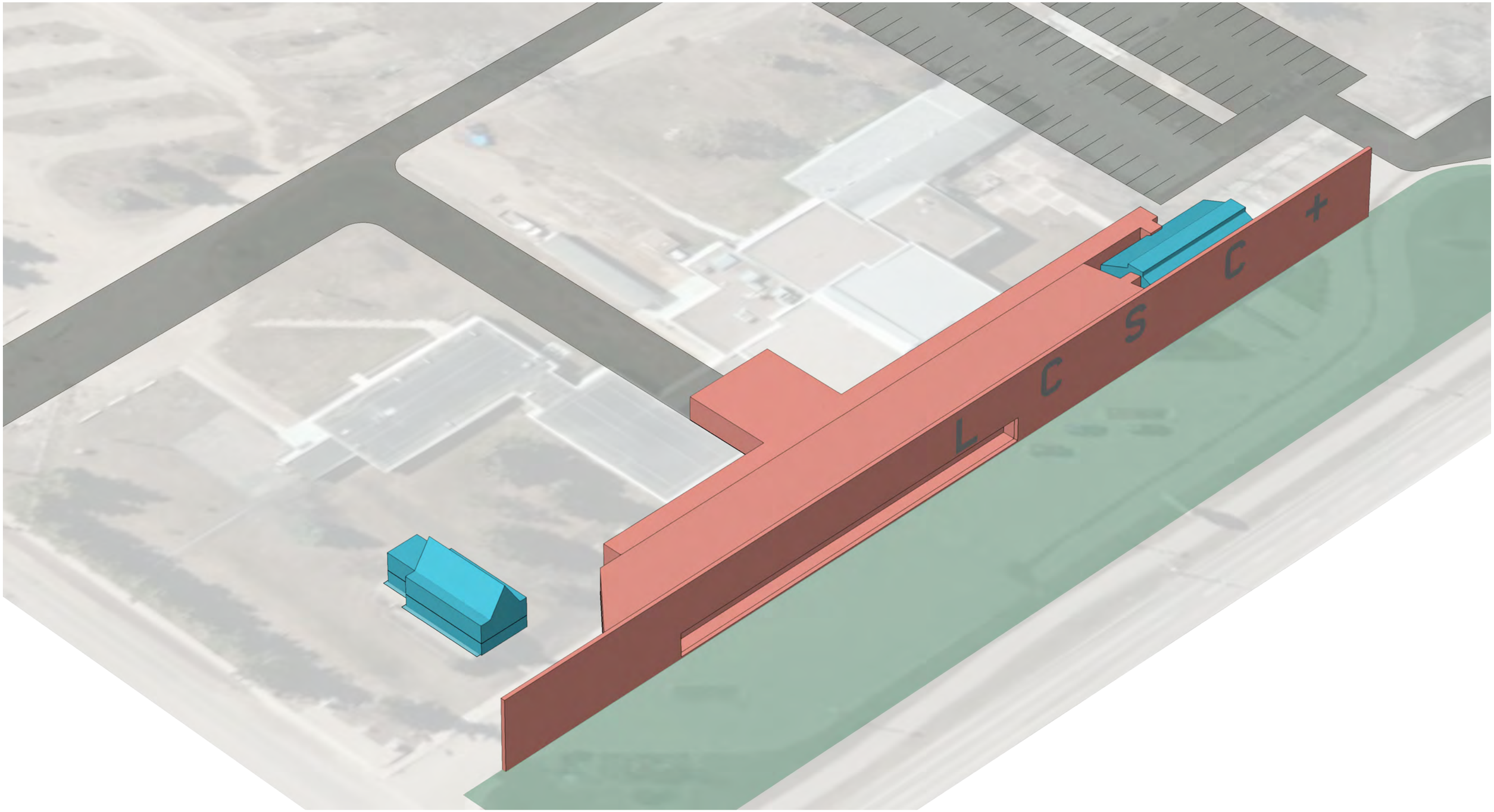
Existing Buildings

Display / Admin

Entry / Circulation

Opt. 3-Big Box + Big Billboard + Big Window
Phase 2 Building Plan



LCSC DESIGN STUDY
Human Studio, July 2019

Existing Buildings
Display / Admin
Entry / Circulation

Opt. 3-Big Box + Big Billboard + Big Window
3D View

Appendix F: SSA QS Class D Costing Report

LLOYDMINSTER CULTURAL AND SCIENCE CENTRE

CLASS 'D' PROGRAM ESTIMATE REPORT (Revision 4) (OPINION OF PROBABLE COST)

July 23, 2019

SSA QUANTITY SURVEYORS LTD
COST PLANNING | VALUE MANAGEMENT | PROJECT CONTROLS

203 – 3320 Richter Street, Kelowna, BC V1W 4V5 TEL 250 763 6677 FAX 250 762 6684 WEB ssaqs.com

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CONTENTS **PAGE NO.**

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1. INTRODUCTION

The City of Lloydminster is developing a Program for redevelopment of its Cultural and Science Centre on its existing site.

The Cornerstone Planning Group has prepared some initial Program Information and associated Planning for the project, and SSA Quantity Surveyors Ltd. (SSAQS) has prepared this this Class 'D' Program Estimate (Opinion of Probable Cost) for the various Options described for the project.

For the detail on the initial program and planning please refer to the separate information prepared by the Cornerstone Planning Group.

Based upon the information provided, we have developed this Program Estimate at a Class D level for the project.

This Class D Estimate Report presents estimates for 3 Options:

1.1. Option 1 – New Building – Quonset Hut Option.
1.2. Option 2 – Renovation of the Existing and Addition.
1.3. Option 3 – New Building – Big Box Option.

Please note the Exclusions in Section 4 below.

Notes:

- The Program Spaces have been provided by the Cornerstone Planning Group.
- Some Initial Budget Information regarding the upgrades to the existing facility has been received and reviewed and, where appropriate used for this report.
- Early Block Schematic diagrams have been provided by the Cornerstone Planning Group.
- We have excluded all allowances for the cost of any additional land.
- We have used unit rates for each functional space and each discipline based upon current information from similar projects and our benchmarked assumptions and allowances for a project of this size and type.
- We have had very limited discussions with design consultants regarding the building architecture. We have had no discussions with design consultants regarding structure, systems, civil and site.
- We have not included any allowances for providing the ability for systems in the facility to expand in the future.
- We have excluded allowances for Municipal Building Permit costs, Development Cost Charges and any other Municipal costs.
- We have excluded allowances for Legal Fees and City administrative costs associated with the project.
- We have excluded forward escalation.
- We have excluded allowances for Furniture, Furnishings and Equipment.
- Assumptions and allowances are identified in this report.

This Class 'D' Estimate (Opinion of Probable Cost) is based on the Program Areas described above. Our knowledge of the project is limited to the program information provided to us.

Pricing is based upon current early **3rd Quarter 2019** unit rates that we consider reasonable, but competitive, for the size, type and complexity of project, and its location in Lloydminster, SK.

The estimated construction costs reflect our opinion of the current construction industry market conditions for this size and type of project in Lloydminster. It has been assumed that the work will be tendered on a Design Bid Build (DBB) basis, competitively tendered to a minimum of 3 competent general contractors, where each trade contract is bid on a competitive stipulated price basis. The pricing in this estimate is predicated upon a minimum of three qualified trade contractors for each significant trade, bidding for the work on a competitive basis and there will be no sole source non-competitive trade contracts. It is also predicated upon the assumption that the project will be bid with normal and reasonable market conditions and that any unforeseen, aberrant or abnormal market conditions are not contemplated in the estimate.

The Goods and Services Tax (GST) has been excluded.

This estimate is our opinion of fair market value for the construction of this project, and is not a prediction of low bid.

2. LEVEL OF RISK

It is our opinion that the risk associated with this Opinion of Probable Costs at a Class D level is ±25%, 18 times out of 20.

3. BASIS OF THE ESTIMATE

3.1. Cost Base

Pricing shown reflects our opinion of probable construction costs obtainable in the 3rd Quarter of 2019 on the effective date of this report.

This estimate is our opinion of fair market value for the construction of this project, and is not a prediction of low bid.

3.2. Contingencies

3.2.1. **Design Contingency** – An allowance of 15% has been included for new construction and 20% for renovation works. This allowance, when included, is a reserve of funds included in the estimate and which is allocated to cover pricing adjustments resulting from incomplete design information and design detailing that is not currently available.

3.2.2. **Escalation Contingency** – Forward escalation has not been included. This allowance, when included, is a reserve of funds to cover possible price increases from the time that the estimate is prepared to the time that the project is tendered.

3.2.3. **Phasing Allowance –** No allowance has been included. This allowance, when included, is for any work required to maintain the operation of the facility while construction proceeds.

3.2.4. **Construction Contingency** – An allowance of 5% has been included. The construction contingency is a reserve of funds which is allocated to cover change orders that are required during the course of construction, and is not intended to be a scope change contingency.

4. EXCLUSIONS

The following items are specifically excluded from this estimate:

4.1. Land Purchase costs.
4.2. Building Permit.
4.3. Municipal Cost Charges.
4.4. Legal Fees.
4.5. City Administrative Costs.
4.6. Furniture, Furnishings and Equipment.
4.7. Escalation.
4.8. GST.
4.9. Hazardous Materials identification and removal.
4.10. Adverse environmental conditions.
4.11. Unknown adverse archeological conditions.
4.12. Adverse soil and/or subsoil conditions.
4.13. Project Procurement costs.
4.14. Project Financing Costs.
4.15. Significant Utility Upgrades.

5. STATEMENT OF PROBABLE COSTS

Estimates of construction costs prepared by SSA Quantity Surveyors Ltd. represent our best judgement as Professional Cost Consultants/Quantity Surveyors familiar with the construction industry. It is recognised, however, that we do not have control over the cost of labour, materials or equipment, over architect/engineering design, over a contractor's method of determining prices, or over market or negotiating conditions. Accordingly, we cannot and do not warrant or represent that bids or negotiated prices will not vary from this nor any subsequent estimate of design/construction cost or evaluation prepared by or agreed to by us.

6. CLASS 'D' ESTIMATE SUMMARY FOR OPTION 1 – NEW BUILDING – QUONSET HUT OPTION

SUGGESTED PROJECT BUDGET SHEET - DESIGN BID BUILD (DBB)							
		BUILDING		ON SITE		TOTALS	
		ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	GST EXCLUDED	TOTALS
1	Land	EXCLUDED		EXCLUDED		EXCLUDED	EXCLUDED
2	Construction	$6,764,000		$2,563,000		EXCLUDED	$9,327,000
3	Contingency for Construction (5%)	$338,000		$128,000		EXCLUDED	$466,000
4	Design Fees (14%)	$947,000	$47,000	$359,000	$18,000	EXCLUDED	$1,371,000
5	Quantity Surveyor	$41,000	$2,000	$15,000	$1,000	EXCLUDED	$59,000
6	Facility Programmer	$45,000	$2,000	$0	$0	EXCLUDED	$47,000
7	Landscape Consultant	$0	$0	$35,000	$2,000	EXCLUDED	$37,000
8	Environmental Consultant	$30,000	$2,000	$10,000	$1,000	EXCLUDED	$43,000
9	Other Consultants	$100,000	$5,000	$20,000	$1,000	EXCLUDED	$126,000
10	Surveys	$10,000	$1,000	$5,000	$0	EXCLUDED	$16,000
11	Commissioning	$50,000	$3,000	$10,000	$1,000	EXCLUDED	$64,000
12	Testing & Inspections	$15,000	$1,000	$5,000	$0	EXCLUDED	$21,000
13	Legal	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
14	Fire Safety Plans	$15,000	$1,000	$0	$0	EXCLUDED	$16,000
15	Administrative Costs	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
16	Insurance	$54,000		$21,000		EXCLUDED	$75,000
17	City Cost Charges	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
18	Building Permit	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
19	Off-Site Services	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
20	Furniture, Furnishings and Equipment	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
21	Escalation Contingency	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
22	General Project Contingency (2%)	$169,000		$80,000		EXCLUDED	$249,000
23							
24	**Sub-Total**	**$8,578,000**	**$64,000**	**$3,251,000**	**$24,000**	**$0**	**$11,917,000**
25							
26	**SUGGESTED PROJECT BUDGET**		**$8,642,000**		**$3,275,000**		**$11,917,000**

Note:

This sheet is subject to limiting conditions contained in the accompanying report.

7. CLASS 'D' ESTIMATE SUMMARY FOR OPTION 2 – RENOVATION AND ADDITION

SUGGESTED PROJECT BUDGET SHEET - DESIGN BID BUILD (DBB)							
		BUILDING		ON SITE		TOTALS	
		ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	GST EXCLUDED	TOTALS
1	Land	EXCLUDED		EXCLUDED		EXCLUDED	EXCLUDED
2	Construction	$10,915,000		$2,309,000		EXCLUDED	$13,224,000
3	Contingency for Construction (5%)	$546,000		$115,000		EXCLUDED	$661,000
4	Design Fees (18%) - RENO	$1,965,000	$98,000	$416,000	$21,000	EXCLUDED	$2,500,000
5	Quantity Surveyor	$65,000	$3,000	$14,000	$1,000	EXCLUDED	$83,000
6	Facility Programmer	$45,000	$2,000	$0	$0	EXCLUDED	$47,000
7	Landscape Consultant	$0	$0	$35,000	$2,000	EXCLUDED	$37,000
8	Environmental Consultant	$30,000	$2,000	$20,000	$1,000	EXCLUDED	$53,000
9	Other Consultants	$130,000	$7,000	$10,000	$1,000	EXCLUDED	$148,000
10	Surveys	$5,000	$0	$10,000	$1,000	EXCLUDED	$16,000
11	Commissioning	$65,000	$3,000	$0	$0	EXCLUDED	$68,000
12	Testing & Inspections	$10,000	$1,000	$5,000	$0	EXCLUDED	$16,000
13	Legal	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
14	Fire Safety Plans	$15,000	$1,000	$0	$0	EXCLUDED	$16,000
15	Administrative Costs	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
16	Insurance	$87,000		$18,000		EXCLUDED	$105,000
17	City Cost Charges	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
18	Building Permit	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
19	Off-Site Services	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
20	Furniture, Furnishings and Equipment	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
21	Escalation Contingency	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
22	General Project Contingency (2.5%)	$350,000		$74,000		EXCLUDED	$424,000
23							
24	**Sub-Total**	**$14,228,000**	**$117,000**	**$3,026,000**	**$27,000**	**$0**	**$17,398,000**
25							
26	**SUGGESTED PROJECT BUDGET**		**$14,345,000**		**$3,053,000**		**$17,398,000**

Note:

This sheet is subject to limiting conditions contained in the accompanying report.

8. CLASS 'D' ESTIMATE SUMMARY FOR OPTION 3 – NEW BUILDING – BIG BOX OPTION

SUGGESTED PROJECT BUDGET SHEET - DESIGN BID BUILD (DBB)							
		BUILDING		ON SITE		TOTALS	
		ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	ESTIMATED VALUE (Rounded to thousand $)	REIMBURSABLE EXPENSES	GST EXCLUDED	TOTALS
1	Land	EXCLUDED		EXCLUDED		EXCLUDED	EXCLUDED
2	Construction	$8,167,000		$2,563,000		EXCLUDED	$10,730,000
3	Contingency for Construction (5%)	$408,000		$128,000		EXCLUDED	$536,000
4	Design Fees (14%)	$1,143,000	$57,000	$359,000	$18,000	EXCLUDED	$1,577,000
5	Quantity Surveyor	$49,000	$2,000	$15,000	$1,000	EXCLUDED	$67,000
6	Facility Programmer	$45,000	$2,000	$0	$0	EXCLUDED	$47,000
7	Landscape Consultant	$0	$0	$35,000	$2,000	EXCLUDED	$37,000
8	Environmental Consultant	$30,000	$2,000	$10,000	$1,000	EXCLUDED	$43,000
9	Other Consultants	$100,000	$5,000	$20,000	$1,000	EXCLUDED	$126,000
10	Surveys	$10,000	$1,000	$5,000	$0	EXCLUDED	$16,000
11	Commissioning	$50,000	$3,000	$10,000	$1,000	EXCLUDED	$64,000
12	Testing & Inspections	$15,000	$1,000	$5,000	$0	EXCLUDED	$21,000
13	Legal	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
14	Fire Safety Plans	$15,000	$1,000	$0	$0	EXCLUDED	$16,000
15	Administrative Costs	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
16	Insurance	$65,000		$21,000		EXCLUDED	$86,000
17	City Cost Charges	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
18	Building Permit	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
19	Off-Site Services	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
20	Furniture, Furnishings and Equipment	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
21	Escalation Contingency	**EXCLUDED**		**EXCLUDED**	**EXCLUDED**	EXCLUDED	**EXCLUDED**
22	General Project Contingency (2.5%)	$254,000		$80,000		EXCLUDED	$334,000
23							
24	**Sub-Total**	**$10,351,000**	**$74,000**	**$3,251,000**	**$24,000**	**$0**	**$13,700,000**
25							
26	**SUGGESTED PROJECT BUDGET**		**$10,425,000**		**$3,275,000**		**$13,700,000**

Note:

This sheet is subject to limiting conditions contained in the accompanying report.

9. CLASS 'D' ESTIMATE DETAILS

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
							UNIT RATES							
1	**OPTION 1 - NEW BUILDING**													
2														
3	Base Building - Quonset Type	NEW			2,038.9		150.00	0.00	300.00	0.00	100.00	250.00	800.00	$1,631,000
4	Glazed Link	NEW			247.8		500.00	0.00	200.00	0.00	100.00	400.00	1,200.00	$297,000
5														
6	Lobby	NEW			48.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$39,000
7	Gift Shop	NEW			65.0		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$52,000
8	LCSC Manager's Office	NEW			18.1		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$14,000
9	Open Office Area	NEW			73.1		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$59,000
10	Staff Lounge / Kitchen	NEW			16.3		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$13,000
11	Office Storage	NEW			17.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$15,000
12	Copy / Storage	NEW			10.6		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$9,000
13	Programming Storage	NEW			24.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$21,000
14	Event Storage	NEW			24.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$21,000
15	Programming Space 1	NEW			113.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$91,000
16	Vehicle Storage	NEW			113.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$91,000
17	Pottery Studio / Multi-Purpose Space	NEW			97.5		400.00	0.00	0.00	0.00	700.00	1,250.00	2,350.00	$229,000
18	Pottery Support (Glaze Room, Damp Room)	NEW			40.6		400.00	0.00	0.00	0.00	350.00	550.00	1,300.00	$53,000
19	Coat Room / Cubby Area	NEW			24.4		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$20,000
20	Gallery 1 (excludes Exhibit Design)	NEW			325.0		600.00	0.00	0.00	0.00	350.00	550.00	1,500.00	$488,000
21	Gallery 2 (travelling)	NEW			325.0		600.00	0.00	0.00	0.00	700.00	1,500.00	2,800.00	$910,000
22	Workshop	NEW			121.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$104,000
23	Workshop Storage	NEW			32.5		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$28,000
24	Archives - Office Area	NEW			29.3		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$23,000
25	Archives - Office Storage	NEW			6.5		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$5,000
26	Archives - Collection Area	NEW			151.9		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$122,000
27	Archives (LCSC)	NEW			2.0		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$2,000
28	Art Storage - Imhoff & Other	NEW			32.6		800.00	0.00	600.00	0.00	500.00	700.00	2,600.00	$85,000
29	Vehicle & Equipment Storage	NEW			0.0		50.00	0.00	0.00	0.00	100.00	150.00	300.00	$0
30	Textiles Storage	NEW			34.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$30,000
31	Houseware Items	NEW			88.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$75,000
32	Books	NEW			1.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$2,000
33	Photographs	NEW			1.6		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
34	Archaeological Artifacts	NEW			1.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
35	Ethnographic Artifacts	NEW			3.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$3,000
36	Taxidermy / Natural History	NEW			37.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$32,000
37	Collections Workroom	NEW			40.6		650.00	0.00	0.00	0.00	500.00	1,200.00	2,350.00	$95,000
38	Crate Storage	NEW			48.8		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$41,000
39	Loading Dock	NEW			65.0		150.00	0.00	0.00	0.00	150.00	0.00	300.00	$20,000
40	Renovate Studio 2	RENO			65.0		750.00	0.00	200.00	0.00	400.00	1,200.00	2,550.00	$166,000
41														
42	**TOTAL BUILDINGS**				**2,038.9**									**$4,888,000**
43														
44	**Building Lump Sum Allowances**													
45	Exterior Overhangs		1	l/s		15,000.00								$15,000
46	Exterior Shading Devices		1	l/s		15,000.00								$15,000
46														
47	**Building Lump Sum Allowances Sub-Total**													**$30,000**
48														
49	**TOTAL BUILDING BEFORE MARKUPS**				**2,039**									**$4,918,000**
50	Location Factor												4.0%	$197,000
51	Overhead & Profit												15.0%	$767,000

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
52	Phasing Allowance												0.0%	$0
53	Building Design Contingency												15.0%	$882,000
54	Building Forward Escalation Allowance												0.0%	See Summary
55	Building Construction Contingency												0.0%	See Summary
56														
57	**ESTIMATED TOTAL - BUILDING**													**$6,764,000**
58	**On Site**													
59	Demolish Fuchs & OTS		785	m2		75.00								$59,000
60	Demolish LCSC		1,110	m2		75.00								$83,000
61	Demolish Richard Larsen		252	m2		75.00								$19,000
62	Pre-Demolition Hazmat Abatement (Fuchs, OTS & Richard Larsen)		2,147	m2		140.00								$301,000
63	Remediate site where building demolished		2,147	m2		75.00								$161,000
64	Upgrade Incoming Electrical Service		1	ls		25,000.00								$25,000
65	Upgrade Incoming Water Service		1	ls		10,000.00								$10,000
66	Upgrade Incoming Gas Service		1	ls		10,000.00								$10,000
67	Upgrade Incoming telephone and communications services		1	ls		10,000.00								$10,000
68	Automobile Parking (no plug-ins)		70	No		5,500.00								$385,000
69	Bus Parking		2	No		12,500.00								$25,000
70	Hard Landscaping		1	ls		150,000.00								$150,000
71	Soft Landscaping		1	ls		75,000.00								$75,000
72	Storm water management on site		1	ls		200,000.00								$200,000
73	Flood plain water management on site		1	ls		350,000.00								$350,000
74														
75	**Site Sub-Total**													**$1,863,000**
76	Location Factor												4.0%	$75,000
77	Overhead & Profit												15.0%	$291,000
78	Phasing Allowance												0.0%	$0
79	Site Design Contingency												15.0%	$334,000
80	Site Forward Escalation Allowance												0.0%	$0
81	Site Construction Contingency												0.0%	See Summary
82														
83	**ESTIMATED TOTAL - SITE**													**$2,563,000**
84														
85	**ESTIMATED TOTAL CONSTRUCTION COST - BUILDING AND SITE - OPTION 1 - NEW BUILDING**													**$9,327,000**

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
1	**OPTION 2 - RENOVATION AND ADDITION**													
2														
3	Base Building - Quonset Type	NEW			1,131.1		150.00	0.00	300.00	0.00	100.00	250.00	800.00	$905,000
4	Glazed Link	NEW			137.4		500.00	0.00	200.00	0.00	100.00	400.00	1,200.00	$165,000
5														
6	Gallery 1	NEW			325.0		600.00	0.00	0.00	0.00	350.00	550.00	1,500.00	$488,000
7	Gallery 2 (travelling)	NEW			325.0		600.00	0.00	0.00	0.00	700.00	1,500.00	2,800.00	$910,000
8	Workshop	NEW			0.0		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$0
9	Workshop Storage	NEW			0.0		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$0
10	Archives - Office Area	NEW			29.3		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$23,000
11	Archives - Office Storage	NEW			6.5		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$5,000
12	Archives - Collection Area	NEW			151.9		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$122,000
13	Archives (LCSC)	NEW			2.0		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$2,000
14	Art Storage - Imhoff & Other	NEW			32.6		800.00	0.00	600.00	0.00	500.00	700.00	2,600.00	$85,000
15	Vehicle & Equipment Storage	NEW			0.0		50.00	0.00	0.00	0.00	100.00	150.00	300.00	$0
16	Textiles Storage	NEW			34.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$30,000
17	Houseware Items	NEW			88.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$75,000
18	Books	NEW			1.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$2,000
19	Photographs	NEW			1.6		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
20	Archaeological Artifacts	NEW			1.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
21	Ethnographic Artifacts	NEW			3.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$3,000
22	Taxidermy / Natural History	NEW			37.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$32,000
23	Collections Workroom	NEW			40.6		650.00	0.00	0.00	0.00	500.00	1,200.00	2,350.00	$95,000
24	Crate Storage	NEW			48.8		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$41,000
25	Loading Dock	NEW			0.0		150.00	0.00	0.00	0.00	150.00	0.00	300.00	$0
26	Renovate Studio 2	RENO			65.0		750.00	0.00	200.00	0.00	400.00	1,200.00	2,550.00	$166,000
27	Renovate LCSC	RENO			1,110.0		800.00	0.00	200.00	0.00	700.00	2,000.00	3,700.00	$4,107,000
28														
29	**TOTAL BUILDINGS**				**2,306.1**									**$7,258,000**
30														
31	**Building Lump Sum Allowances**													
32	Exterior Overhangs		1	l/s		15,000.00								$15,000
33	Exterior Shading Devices		1	l/s		15,000.00								$15,000
34														
35	**Building Lump Sum Allowances Sub-Total**													**$30,000**
36														
37	**TOTAL BUILDING BEFORE MARKUPS**				**2,306**									**$7,288,000**
38	Location Factor												4.0%	$292,000
39	Overhead & Profit												20.0%	$1,516,000
40	Phasing Allowance												0.0%	$0
41	Building Design Contingency												20.0%	$1,819,000
42	Building Forward Escalation Allowance												0.0%	See Summary
43	Building Construction Contingency												0.0%	See Summary
44														
45	**ESTIMATED TOTAL - BUILDING**													**$10,915,000**
46	**On Site**													
47	Demolish Fuchs & OTS		785	m2		75.00								$59,000
48	Demolish Richard Larsen		252	m2		75.00								$19,000
49	Pre-Demolition Hazmat Abatement (Fuchs, OTS & Richard Larsen)		1,037	m2		140.00								$145,000
50	Remediate site where building demolished		1,037	m2		75.00								$78,000
51	Upgrade Incoming Electrical Service		1	ls		25,000.00								$25,000
52	Upgrade Incoming Water Service		1	ls		10,000.00								$10,000

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
53	Upgrade Incoming Gas Service		1	ls		10,000.00								$10,000
54	Upgrade Incoming telephone and communications services		1	ls		10,000.00								$10,000
55	Automobile Parking (no plug-ins)		70	No		5,500.00								$385,000
56	Bus Parking		2	No		12,500.00								$25,000
57	Hard Landscaping		1	ls		150,000.00								$150,000
58	Soft Landscaping		1	ls		75,000.00								$75,000
59	Storm water management on site		1	ls		200,000.00								$200,000
60	Flood plain water management on site		1	ls		350,000.00								$350,000
61														
62	**Site Sub-Total**													**$1,541,000**
63	Location Factor												4.0%	$62,000
64	Overhead & Profit												20.0%	$321,000
65	Phasing Allowance												0.0%	$0
66	Site Design Contingency												20.0%	$385,000
67	Site Forward Escalation Allowance												0.0%	$0
68	Site Construction Contingency												0.0%	See Summary
69														
70	**ESTIMATED TOTAL - SITE**													**$2,309,000**
71														
72	**ESTIMATED TOTAL CONSTRUCTION COST - BUILDING AND SITE - OPTION 2 - RENOVATION AND ADDITION**													**$13,224,000**

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
1	**OPTION 3 - RENOVATION AND ADDITION BIG BOX**													
2														
3	Base Building - Big Box	NEW			2,038.9		400.00	0.00	400.00	0.00	150.00	350.00	1,300.00	$2,651,000
4	Corridor	NEW			247.8		500.00	0.00	200.00	0.00	100.00	400.00	1,200.00	$297,000
5														
6	Lobby	NEW			48.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$39,000
7	Gift Shop	NEW			65.0		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$52,000
8	LCSC Manager's Office	NEW			18.1		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$14,000
9	Open Office Area	NEW			73.1		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$59,000
10	Staff Lounge / Kitchen	NEW			16.3		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$13,000
11	Office Storage	NEW			17.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$15,000
12	Copy / Storage	NEW			10.6		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$9,000
13	Programming Storage	NEW			24.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$21,000
14	Event Storage	NEW			24.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$21,000
15	Programming Space 1	NEW			113.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$91,000
16	Vehicle Storage	NEW			113.8		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$91,000
17	Pottery Studio / Multi-Purpose Space	NEW			97.5		400.00	0.00	0.00	0.00	700.00	1,250.00	2,350.00	$229,000
18	Pottery Support (Glaze Room, Damp Room)	NEW			40.6		400.00	0.00	0.00	0.00	350.00	550.00	1,300.00	$53,000
19	Coat Room / Cubby Area	NEW			24.4		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$20,000
20	Gallery 1 (excludes Exhibit Design)	NEW			325.0		600.00	0.00	0.00	0.00	350.00	550.00	1,500.00	$488,000
21	Gallery 2 (travelling)	NEW			325.0		600.00	0.00	0.00	0.00	700.00	1,500.00	2,800.00	$910,000
22	Workshop	NEW			121.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$104,000
23	Workshop Storage	NEW			32.5		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$28,000
24	Archives - Office Area	NEW			29.3		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$23,000
25	Archives - Office Storage	NEW			6.5		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$5,000
26	Archives - Collection Area	NEW			151.9		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$122,000
27	Archives (LCSC)	NEW			2.0		250.00	0.00	0.00	0.00	225.00	325.00	800.00	$2,000
28	Art Storage - Imhoff & Other	NEW			32.6		800.00	0.00	600.00	0.00	500.00	700.00	2,600.00	$85,000
29	Vehicle & Equipment Storage	NEW			0.0		50.00	0.00	0.00	0.00	100.00	150.00	300.00	$0
30	Textiles Storage	NEW			34.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$30,000
31	Houseware Items	NEW			88.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$75,000
32	Books	NEW			1.9		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$2,000
33	Photographs	NEW			1.6		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
34	Archaeological Artifacts	NEW			1.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$1,000
35	Ethnographic Artifacts	NEW			3.4		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$3,000
36	Taxidermy / Natural History	NEW			37.7		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$32,000
37	Collections Workroom	NEW			40.6		650.00	0.00	0.00	0.00	500.00	1,200.00	2,350.00	$95,000
38	Crate Storage	NEW			48.8		350.00	0.00	0.00	0.00	200.00	300.00	850.00	$41,000
39	Loading Dock	NEW			65.0		150.00	0.00	0.00	0.00	150.00	0.00	300.00	$20,000
40	Renovate Studio 2	RENO			65.0		750.00	0.00	200.00	0.00	400.00	1,200.00	2,550.00	$166,000
41														
42	**TOTAL BUILDINGS**				**2,038.9**									**$5,908,000**
43														
44	**Building Lump Sum Allowances**													
45	Exterior Overhangs		1	l/s		15,000.00								$15,000
46	Exterior Shading Devices		1	l/s		15,000.00								$15,000
47														
48	**Building Lump Sum Allowances Sub-Total**													**$30,000**
49														
50	**TOTAL BUILDING BEFORE MARKUPS**				**2,039**									**$5,938,000**
51	Location Factor												4.0%	$238,000
52	Overhead & Profit												15.0%	$926,000
53	Phasing Allowance												0.0%	$0

Line Number	Description		Quantity	Unit	BGSM/ CGSM	Lump Sum Allowance	Architectural	Demolition	Structural	ESCS	Electrical	Mechanical	TOTAL EXCLUDING MARKUPS (rounded)	ESTIMATED VALUE EXCLUDING MARKUPS (rounded)
54	Building Design Contingency												15.0%	$1,065,000
55	Building Forward Escalation Allowance												0.0%	See Summary
56	Building Construction Contingency												0.0%	See Summary
57														
58	**ESTIMATED TOTAL - BUILDING**													**$8,167,000**
59	**On Site**													
60	Demolish Fuchs & OTS		785	m2		75.00								$59,000
61	Demolish Richard Larsen		252	m2		75.00								$19,000
62	Demolish LCSC		1,110	m2		75.00								$83,000
63	Pre-Demolition Hazmat Abatement (Fuchs, OTS & Richard Larsen)		2,147	m2		140.00								$301,000
64	Remediate site where building demolished		2,147	m2		75.00								$161,000
65	Upgrade Incoming Electrical Service		1	ls		25,000.00								$25,000
66	Upgrade Incoming Water Service		1	ls		10,000.00								$10,000
67	Upgrade Incoming Gas Service		1	ls		10,000.00								$10,000
68	Upgrade Incoming telephone and communications services		1	ls		10,000.00								$10,000
69	Automobile Parking (no plug-ins)		70	No		5,500.00								$385,000
70	Bus Parking		2	No		12,500.00								$25,000
71	Hard Landscaping		1	ls		150,000.00								$150,000
72	Soft Landscaping		1	ls		75,000.00								$75,000
73	Storm water management on site		1	ls		200,000.00								$200,000
74	Flood plain water management on site		1	ls		350,000.00								$350,000
75														
76	**Site Sub-Total**													**$1,863,000**
77	Location Factor												4.0%	$75,000
78	Overhead & Profit												15.0%	$291,000
79	Phasing Allowance												0.0%	$0
80	Site Design Contingency												15.0%	$334,000
81	Site Forward Escalation Allowance												0.0%	$0
82	Site Construction Contingency												0.0%	See Summary
83														
84	**ESTIMATED TOTAL - SITE**													**$2,563,000**
85														
86	**ESTIMATED TOTAL CONSTRUCTION COST - BUILDING AND SITE - OPTION 3 - RENOVATION AND ADDITION - BIG BOX**													**$10,730,000**