Regina Public Library

Building Assessment

June 5, 2012
P3Architecture Partnership
P3A File # 2012-42

Table of Contents

1.0 Introduction

This report was originally prepared in 2009 and has been updated to reflect the master Program prepared by Resource Planning Group. The report consists of a facility analysis by P3A as Architects, JC Kenyon Engineering- Structural, MacPherson Engineering- Mechanical, Ritenburg and Associates- Electrical, Resource Planning Group- Library Programming and Functionality. The report reflects the requirements of the Regina Public Library from a technical and functional perspective and reviews issues related to building re-use.

2.0 Executive Summary

Built environments are a combination of both art and technology. This report deals firstly with the technology component of the Central Branch of the Regina Public Library. Commentary on the building use as a library indicates significant issues for the RPL from an operational perspective. Any investment into a renovation must be measured against the functional and operational value of the retained property. The ability of the existing building to function as a modern library and meet the ever evolving needs of the community are also of concern.

While the library has been well maintained over the years, in general, the technology of the Regina Public Library is outdated and time expired. Constructed in 1962 the building has not had a major general renovation since its original construction. The building was originally constructed of long term durable materials and in general they are in good condition throughout.

In particular, building technology has evolved considerably and the methods from the time of design and construction of the Main Branch are incongruous with our current definition of sustainability. Insulation levels for the entire exterior building envelope are very low by today's standards. Mechanical and electrical systems are much more efficient today than the current building equipment and systems.

Structural systems according to recent reports are all in good condition if the building stays as is or if modest additions are contemplated. If suitable for potential redevelopment the structural systems could be reused depending on the scale of the project contemplated. A structural assessment of the building was conducted to review opportunities for vertical additions. This appears to be not economically feasible.

3.0 Background

Originally constructed and opened in 1962, the Regina Public Library replaced the original Carnegie building. Izumi, Arnott & Sugiyama were selected as the consulting architects. Remnants from the original library were retained and installed in the fabric of the new building. The building is a typical example of late century modern and is notable for its lantern like presence on the corner of Victoria Park, aluminum louvres, and cobblestone granite finish at the main entry.

The Regina Public Library building comprises approximately 70,000 square feet on 3 levels (basement, main and second). The building area for building code application (main floor foot print) is 26,319 square feet (2445 square metres). The library planning consultant determined via an interactive design charrette process and the master programming process that an ideal floor plate for RPL was approximately 35,000 s.f. with an overall Library Total Building Area of 150,000 s.f. excluding parking and expansion space.

4.0 Architectural Building Assessment

The building has been generally well maintained over the years and at the time of its construction utilized high quality durable materials. In the last 47 years since its original construction the technology that we apply to building construction has changed dramatically. Exterior envelopes in particular are much improved over the current Central Branch. Wall systems incorporating high insulation values, high quality air barriers and rain screen principles are all standard for high quality buildings today. All of these design components are lacking in the existing building.

4.1 Significant Issues

4.1.1 Building Envelope

.1 Wall System Insulation

All areas of the exterior building envelope have poor thermal insulation values. The existing drawings show the walls having 2 inches of Rockwool insulation supported in a 2"x2" wood strapping system. With an R value of 5 at most, the building wall system has an insulation value of less than 25% of what it should be. Current LEED designed buildings generally have R25 to R30 values of insulation in the walls. There are also significant areas where no insulation occurs on the wall such as at the floor slab edges and roof structure overhangs. (Refer to sketches in section 3.1) The location of the insulation within the wall is also poor as it occurs at the inside of the system. Insulation located nearer the outside of the wall provides more thermal mass inside the insulation line and results in improved wall performance. Refer to the section drawings for additional information on the wall system insulation.

.2 Roofing System

Roofing is the original built up asphalt roof system that has been patched as required over the years to maintain water tightness. Forty-seven years is long past the expected life of a conventional built up asphalt roof. The original drawings show 2" of insulation. This potentially R6 or R7 insulation value is likely reduced due to moisture infiltration over the years. Typically roofs of LEED quality buildings have approximately R40 insulation values in our climate.

. 3 Windows and Curtain Wall

Exterior curtain walls – poor frames and poor glass. All seals at their current age will be brittle and not performing as intended. The glass units themselves are conventional double glazed sealed units of clear glass. (current glazing offers a minimum of 167% better thermal resistance and 250% better resistance to solar heat load (shading coefficient)). In addition, the existing frames were installed backwards for aesthetic reasons. What should be the interior of the frame is in fact installed to the exterior. This had water infiltration and drainage implications for the frames.

. 4 Granite Cladding

In at least 2 locations the granite cladding has fallen off of the building. The Retro-Specs report discusses these events in detail but does not speculate on whether the cause of the failure is a generalized condition throughout the building. In other buildings built during this period the steel elements that support the stone were not typically provided with corrosion protection. Currently steel supports for stone on exterior walls require a minimum of galvanized anchors and many are constructed with stainless steel anchors to prevent support failures. With the supports identified as steel without protection and

showing corrosion it is only a matter of time until general remediation is required to the exterior stonework. This would involve removing all the stone and replacing the anchors with stainless steel anchors. Specific site investigation including removal of some of the stone panels will be required to completely assess this situation.

. 5 Air Barrier

The existing exterior wall has no air barrier as currently required by the National Building Code of Canada 2008.

.6 Support for Special Interior Environments

In total, the current exterior building envelope system as described above will function to support more conventional office and general environmental requirements but does not effectively support special environments that should be provided for spaces like the Dunlop Art Gallery and any rooms storing significant rare collections. These special spaces need, in particular, very controlled humidity levels that are only economically achievable in spaces with tightly constructed moisture, thermal and air barriers.

4.1.2 Building Code Requirements

This section identifies discrepancies with respect to current building code requirements. The majority of these code deficiencies result from changes in the building codes that have occurred between the original construction in 1962 and the current building codes. The Authorities having Jurisdiction generally only require upgrades to current codes be made during major renovations to a building. Minor renovation work will not generally invoke the requirement to update to current code requirements. It is assumed that the scale of renovation contemplated in the current study will require upgrades to the current building code requirements. Major building code issues are advised in the following list

.1 Fire Protection Sprinklers

The Central Branch is classified under the National Building Code of Canada as a Group A2 occupancy. The NBCC 2005 requires that this building type be provided with a complete fire protection sprinklering system per code section 3.2.2.24.

.2 Environmental Envelope

The existing Central Branch building envelope does not meet NBCC part 5 environmental envelope requirements. Minimum energy use performance is also required by the National Model Energy Code and we can say with confidence that the library does not meet these energy use requirements and in fact our current building designs typically use between 30% and 50% less energy than allowed by the model energy code. As an example every LEED certified building must be a minimum of 25% more efficient than required by the Model Energy Code.

.3 Handicapped Accessibility

Handicapped accessibility requirements have changed dramatically over the last 50 years. While most of the high priority handicapped accessibility issues have been addressed over the years in the Central Branch, the building is not universally accessible and the “split level” layout is inherently difficult to retrofit. A review and complete updating of vertical circulation is necessary to bring the building closer to contemporary standards.

.4 Fall Arrest Systems

The current building contains no engineered fall arrest system on the roof. In accordance with Saskatchewan OH&S regulations all buildings require fall arrest systems for workers accessing roof areas.

.5 Exiting

The main building Boiler room is located under main entrance which is an exit for the building. This is not allowed by NBCC 3.6.2.2 if the boilers operate at pressures exceeding 100 kPa.

4.1.3 Exterior Finishes

The exterior finishes of the Central Branch are typically long term high quality finishes. The two main exterior building finishes are granite and aluminum/glass window systems. These materials as finishes are extremely durable and appear to be in good condition throughout the building. Refer to section 2.1.1 for information on problems with these materials related to the exterior envelope.

4.1.4 Interior Constructions

The interior construction of any building is typically not the driver to assess the need to conduct a major renovation. Depending on the building type and the initial quality of finishes some facilities will replace soft flooring finishes, soft ceilings and other finishes on a 10-20 year schedule. Some of this work has occurred over the years at the Central Library over its 47 year life span. More long term interior finishes such as masonry and hard flooring surfaces can last indefinitely. The walls, doors, stairs, millwork and similar constructions are often inappropriately located for new programming requirements. As well new mechanical and electrical systems also can have a significant impact on the ability to maintain the existing interior architectural construction of a building.

Removal of the remaining asbestos material located within the building will also have an impact on the ability to maintain any existing interior construction. A final analysis of the interior of the building would be conducted once the program requirements have been defined and whether the new program would be compatible with the existing building layouts.

4.1.5 Other Issues

.1 Hazardous Materials

Asbestos – from the previous reports some asbestos remains in the building. The May 2006 report by Ground Engineering recommended some action with regards to friable asbestos containing materials. It is recommended that all asbestos containing materials be removed from the building during future renovations in order to remove the danger and ongoing maintenance associated with this problem.

Lead Paint – Buildings of this age will contain lead based paints. This will have to be addressed in any renovation plans for the building.

4.2 Issues associated with correction of identified problems

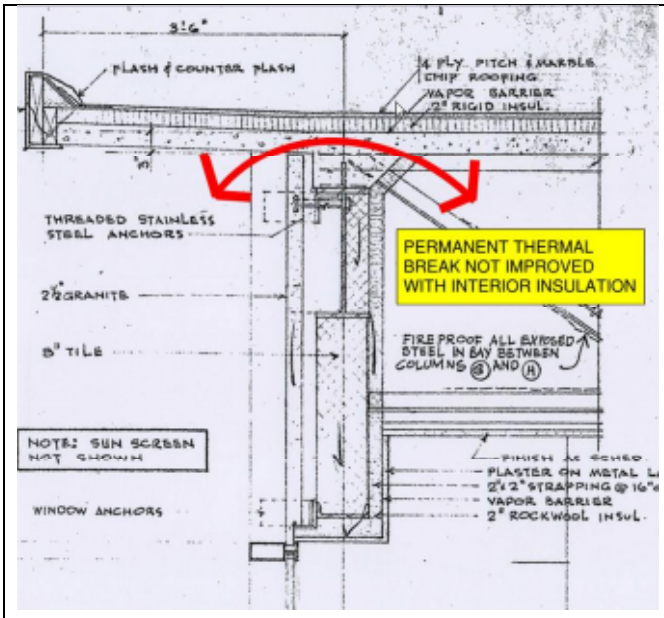
The major architectural issues identified in this report are all potentially correctable under various renovation scenarios. Some of the issues maybe only partially correctable depending on the renovation scenario. This section identifies those issues.

4.2.1 Building Envelope

The roof replacement and roof insulation upgrade can be conducted effectively under any renovation scenario. The existing roof and insulation would be removed and replaced with a new roof system incorporating appropriate insulation values.

The exterior walls create a bigger challenge to upgrade if all or portions of the exterior walls are to remain in place and be retained in the renovation. The windows and curtain wall areas are fairly straightforward and can be replaced with improved glazing and framings systems independent of other work. The solid portions of the exterior wall, if the exterior finishes are to remain during the renovation, can only be improved by adding insulation on the inside of the wall. This results in the existing thermal breaks that occur at the floors and roof line remaining with no option to improve the condition. See sketches below for additional explanation.

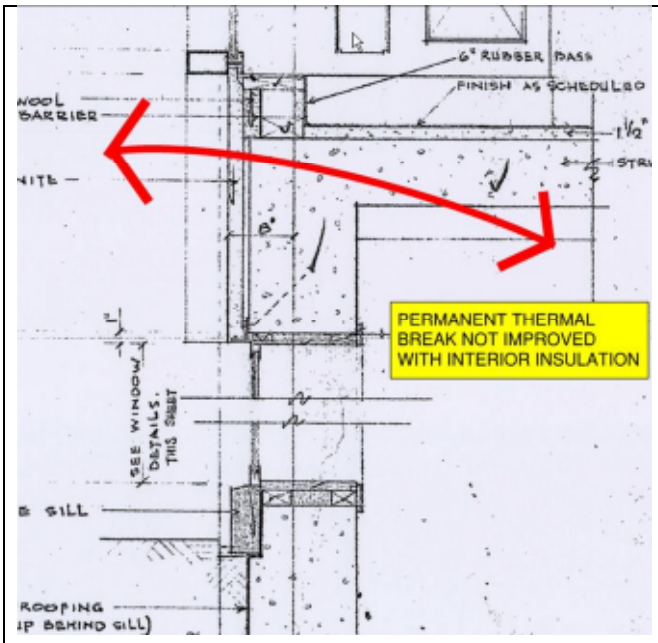
The sketch at right shows the thermal break that will remain if the exterior wall remains in place and additional insulation is provided at the inside of the wall only. The increased insulation on the inside of the wall will increase the potential for frost and condensation to form at the thermal break. i.e. on the inside surfaces of the thermal break.



WALL SECTION @ TOP OF EXTERIOR WALL

Similar to the sketch above a thermal break at the floor line also occurs and would continue if the exterior walls are left in place.

Another problem with the interior insulation renovation is the lack of a high quality air barrier. Interior insulation can only add a vapour barrier on the inside of the new insulation. A cavity wall system as described below is technically a far superior wall construction that incorporates a vapour barrier and an air barrier into one element that allows proper venting of the insulation space.



WALL SECTION @ BASE OF EXTERIOR WALL

The above noted insulation conditions can only be improved with the implementation of a cavity type wall on the exterior walls. Cavity walls are comprised of an exterior finish, a vented air space, insulation, air barrier and interior wall structure. The existing wall construction cannot be retrofitted to a cavity wall without a complete dismantling of the wall and reconstructing a new wall.

5.0 Structural Assessment

5.1 Description

The structural systems for the existing Regina Central Library Building consist of both concrete and steel framing. The building is supported on end bearing concrete belled piles with their base at approximately 50 feet below grade. The foundation walls are reinforced concrete and the lower floor system is a 5" thick concrete slab cast on compacted fill. The theatre area consists of a stepped cast-in-place concrete slab supported on concrete beams. The piles support concrete columns that run to the main floor level. The columns support steel columns above that support the second floor and roof systems.

The main floor construction is a cast-in-place concrete slab and beam system over part of the floor and a two-way, flat slab over the remaining area. The second floor is steel framed using steel beams, joists and metal deck. The deck supports a thin concrete slab. The original construction drawings indicate that the second floor design loading is 150 psf.

The roof is framed with steel similar to the second floor. The framing consists of steel beams, joists and metal deck and the deck supports a thin concrete slab. The design load for the roof is 35 psf.

The building structure was not designed to take an addition and the roof capacity is insufficient for use as floor space. The design bearing capacities for the structure were less than for a modern building at the time of design and construction of the Regina Public Library. Vertical expansion is not possible without the design and insertion of a secondary, reinforced structure. The Structural Engineers review of vertical expansion possibilities and constraints is included as in the Appendix.

5.2 Inspection

J.C. Kenyon Engineering performed an inspection of the building on July 14, 2009. The inspection was visual in nature only and no testing or analysis was undertaken regarding the building structure. The basic structural systems were for the most part covered with building finishes and could not therefore be directly inspected.

In general the structural systems for the building appeared to be performing satisfactorily. We did not observe any significant structural distress in the form of major cracks or deflections in any structural members. We did observe some minor cracks in some of the concrete beams below the main floor and in some of the perimeter concrete walls. These cracks appeared to be the result of normal loading conditions.

The one significant issue in the building is the movement of the lower level floor slab. As mentioned previously, this slab is supported on a compacted fill which is subsequently supported on the clay soil below. The slab has settled at the northwest corner of the building and appears to have heaved in other areas. The slab movement is not a structural issue as such but is the result of changes to the supporting soil below it. Slab heaving is common in Regina and results from swelling of the clay soil when subjected to an increase in moisture content. Slab settlement is less common and would normally be caused by subsidence of the backfill.

The slab movement at the Library has resulted in unlevel floors and some cracks in interior wall finishes. We note that soil subsidence has occurred to some extent around the perimeter of the building at grade level.

The exterior of the building includes a stone veneer cladding. The system used for anchoring and supporting the stone cladding is unknown however it likely consists of steel support along the base and pins connected back to structure behind the stone. An inspection of the stone around the building did not reveal any unusual shifting or tilting of the panels. There is one location along the south side of the building at the base of the wall where a panel has fallen off. The panels along this wall appear to be braced back to the wall by a clip angle attached to the vertical mullion of the metal screen wall. It appears that at this location the clips may have been omitted.

6.0 Mechanical Assessment

6.1 General

Following is a brief assessment of the existing mechanical systems at the Regina Public Library Main Branch. In summary, with the exception of the chiller, cooling tower and related pumps that were replaced in 2007, all mechanical systems have surpassed their predicted service life and are not suitable for reuse.

6.2 Systems Description

Fire Protection: Building is not equipped with sprinklers. The building is equipped with a combination standpipe / firehose system.

The Computer Room is protected with a Halon fire suppression system. Halon systems are no longer acceptable by code.

Ventilation: The building is equipped with multizone constant volume air handling systems. Economizing sections allow the use of outside air free-cooling.

The Gallery area is not equipped with an independent ventilation system and is not able to maintain typical gallery temperature & humidity conditions.

The outside air intakes have been retrofitted so that ventilation air is drawn from roof intakes rather than street facing louvers with the addition of surface-mounted ductwork.

Heating: The building is equipped with two natural gas fired forced draft low pressure steam boilers that are original to the building. Steam to hot water convertors provide heating water for perimeter radiation.

Cooling: The original chiller, cooling tower, chilled water pump and condenser pump were replaced in 2007 with a new 255 ton centrifugal 134A chiller and draw-thru cooling tower.

Humidification: The building is equipped with steam to steam humidifiers
which use boiler plant steam as the heat source to provide humidification steam which is injected into the ventilation systems.

Plumbing: The plumbing systems and fixtures are generally original to the building and not suitable for reuse.

Controls: The building mechanical systems are generally pneumatically controlled.

Site Services: The building is serviced as follows: Storm service: 10” service to storm main in lane.

- Sanitary service: 6” service to sanitary main on Lorne St.
- Water service: 4” service from water main on Lorne St.
- Natural gas service: serviced from gas main on Lorne St.

7.0 Electrical Assessment

7.1 Electrical Overview

The majority of the electrical equipment is original to building construction in 1962. The building has a 4160volt electrical service entry from SaskPower which terminates in the main electrical switchgear which is located in the basement electrical room.

Breaker panels are distributed throughout the facility. A 50kVA natural gas generator is located in the boiler room.

The motor control centres, interior lighting, and fire alarm system are at the end of their operable life. The exit signs have been upgraded in the last year and are in good condition.

The building electrical systems are maintained but no major electrical upgrades have occurred since the original building construction.

7.2 Main Electrical Distribution

The main high voltage switchgear consists of 200amp rated main load break switch, SaskPower high voltage metering section, and a 600kVA dry type transformer to step down the voltage from 4160volts to 120/208volts.

The library electrical meter operates at 4160volt which provides a different electrical rate structure through SaskPower. It was normal SaskPower practice at the time of building construction to have the customer provide their own step-down transformation.

The 120/208volt distribution consists of molded case breakers and is at full capacity. There is no space for expansion.

The clearance in front of the electrical switchgear and distribution is not sufficient and contravenes the 2009 Canadian Electrical Code (C.E.C.) which requires a minimum of 1.5m for the current electrical room layout.

There is also concern regarding the location of the basement electrical room. The centrally located electrical room requires the 4160volt SaskPower conductors to be installed underground from the south into a small void under the basement. These conductors are non-accessible and would not meet current SaskPower requirements.

7.3 Breaker Panels

The breaker panels are original to building construction and are at the end of their serviceable life. All breaker panels should be replaced.

7.4 Distribution Wiring

The distribution wiring is concealed within walls, above ceilings, and within conduit raceways. There have been no major renovations to the building so it is likely that the majority of the wiring is also original. Considering the age of the building, it is recommended that all distribution wiring be replaced as renovations occur.

7.5 Branch Wiring

The branch wiring is also concealed and could not be visibly reviewed. Replacement of all branch wiring should occur during renovations.

7.6 Wiring Devices

The wiring devices including the light switch and receptacles are aged and should be replaced as renovations occur.

7.7 Emergency Power

The building has a 40kW (50kVA) 120/208volt 3 phase natural gas emergency generator which is located in the basement boiler room. The unit is in fair condition but is unlikely to meet future needs. An upgrade is recommended.

7.8 Interior Lighting

The interior lighting consists of surface mounted and recessed T-12 and T-8 fluorescent fixtures. The split between lamp types is approximately 50/50. Lighting levels are good but the T-12 fixtures are aged and not energy efficient compared with modern fixtures. We recommend a complete lighting upgrade.

Due to the age of the building, all T-12 fixtures should be reviewed to determine if the ballasts contain PCB.

The low voltage lighting control system was manufactured by GE is also at the end of its serviceable life. Some lights are controlled by circuit breakers which is not the intended use of circuit breakers.

7.9 Exterior Lighting

The exterior lighting consists of metal halide and high pressure sodium type fixtures. There are canopy down lights, wall mounted fixtures above the exit doors, and pole mounted fixtures along the west side of the building. There have been upgrades to the exterior lighting and lighting levels are generally good.

7.10 Fire Alarm System

The Edwards 6500 zoned fire alarm control panel is located in the boiler room with a remote annunciator panel at the main entrance. There is a fire alarm control panel outside the server room which controls the server room fire suppression system.

The fire alarm system is obsolete and should be upgraded as soon as possible. Replacement parts are difficult to source and any repairs will be costly.

7.11 Emergency Lighting

Strategic light fixtures are connected to emergency power to illuminate the means of egress. Some areas had battery power emergency light fixtures to supplement the emergency lighting.

We were unable to review the emergency lighting coverage without simulating a power outage but this should be closely reviewed with any renovations.

7.12 Exit Signs

The exit signs have been upgraded and are in good condition. No concerns were noted.

7.13 Telephone and Data System

The telephone system enters the building from the 12th Avenue. A fibre optic service cable has also been brought to the building by SaskTel.

The data system has a mixture of Category 5 and Category 5e type cabling. The main server room is located in the basement.

There were no concerns noted with the telephone or data system as they appear to be well maintained.

8.0 Acknowledgements

The following listed previous reports prepared for the Regina Public Library have been reviewed and utilized in the preparation of the technical portion of this report;

1. Central Library Feasibility Study - 2007 – Stantec
2. Building Envelope Investigation Phase 1 –September 2007 - Retro-Specs Consultants Ltd.
3. Phase 1 Environmental Site Assessment – April 2007 - Stantec
4. Inspection of Asbestos containing Materials – May 2006 - Ground Engineering.
5. Central Library Building Assessment – 1997 – Stone Hutchinson Architects
6. Review of the Regina Public Library Expansion Proposals March 1997 – Regina Chamber of Commerce.
7. Building Assessment Study Central Library 1995 – Arnott Kelley O'Connor & Associates.

9.0 Functional Assessment

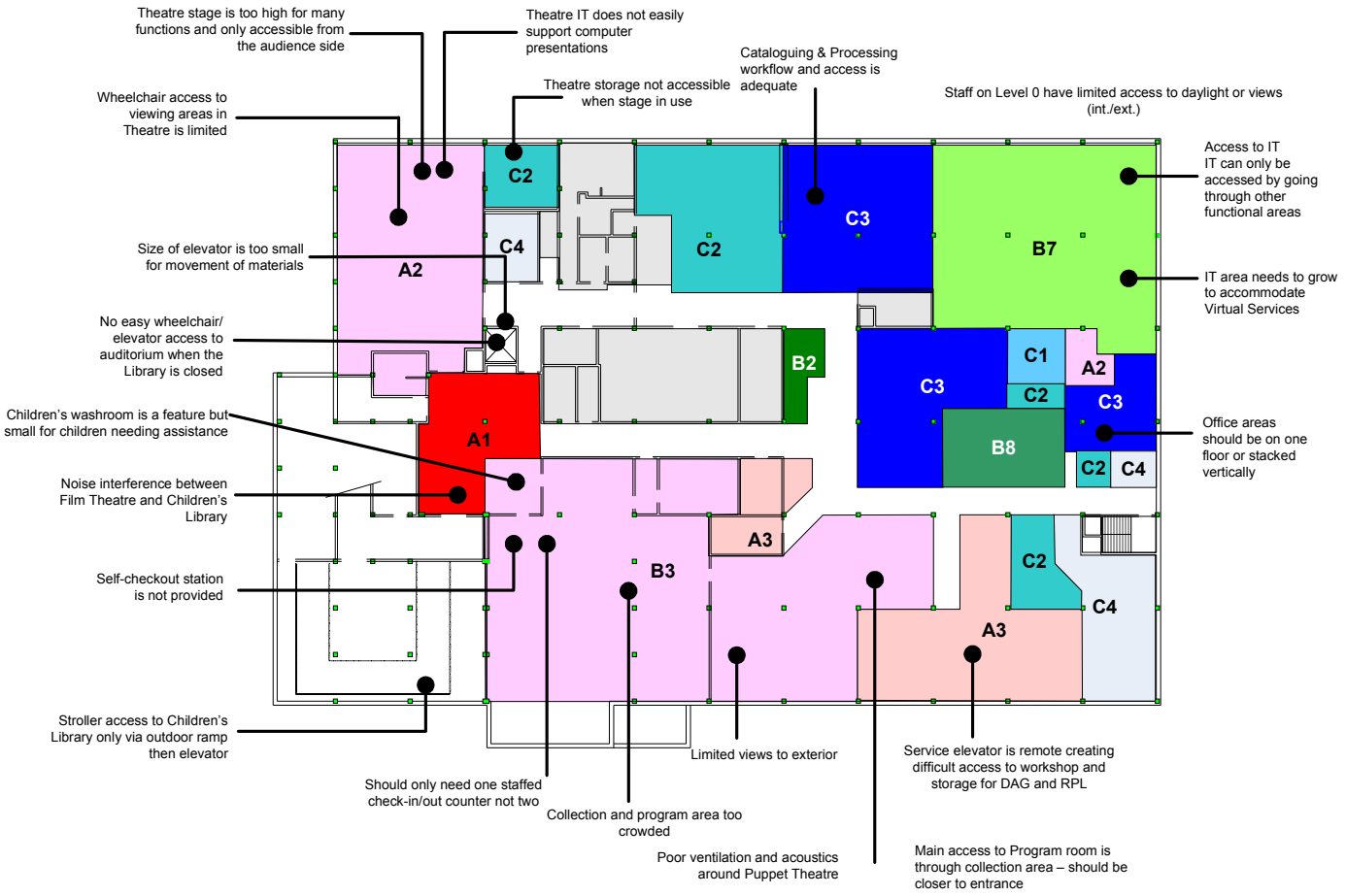
9.1 Functional Assessment Overview

The Regina Public Library functional assessment is an overview of the current facility conducted by RPG as Library Planning Consultants. The information provided was included in the Master Program Document. RPG prepared the following diagrams in order to provide a functional analysis of the existing Regina Public Library facility. This functional analysis provides comments related to a functions location and adjacency to other Library functions, material and patron flow information, as well as general observations regarding the library's existing functional strengths, weaknesses and potential areas for improvement.

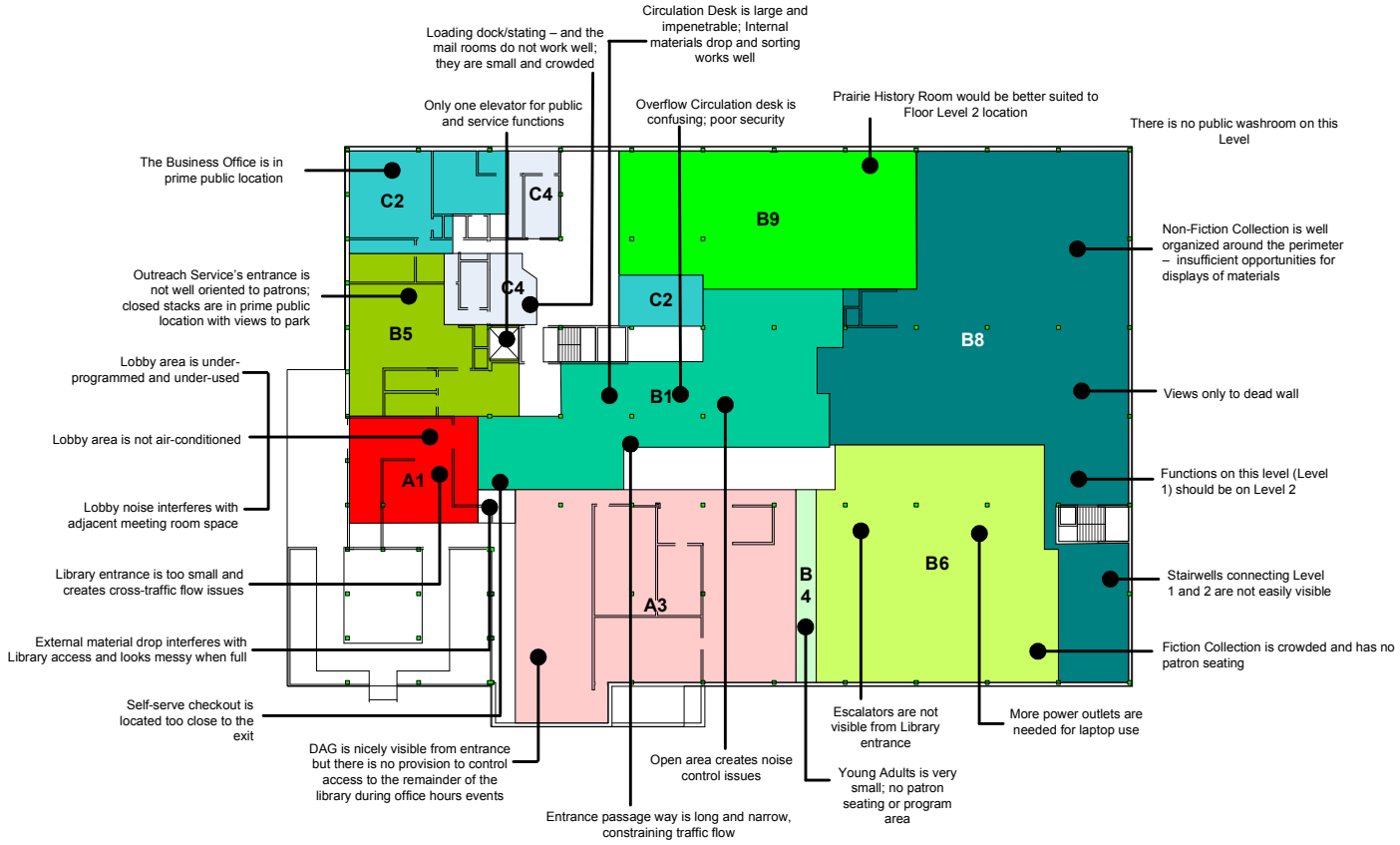
The site usage and organization of the existing RPL is very weak and was poorly considered in the original design. The diagram below outlines some readily apparent shortcomings.

The functional analysis indicates the Library Building suffers functionally, primarily due to overall building layout and the vertical circulation systems. For instance, a single elevator is used for the public and staff and as a service elevator. It is also used as a through-corridor, linking the loading dock with the main public floor. The elevator is located within the Library's security zone, yet must serve functions that operate outside of the Library's hours of operation. Many other functional issues exist necessitating a complete revision of the building plan to perform as a modern library. The analysis does not presume any addition vertically or horizontally.

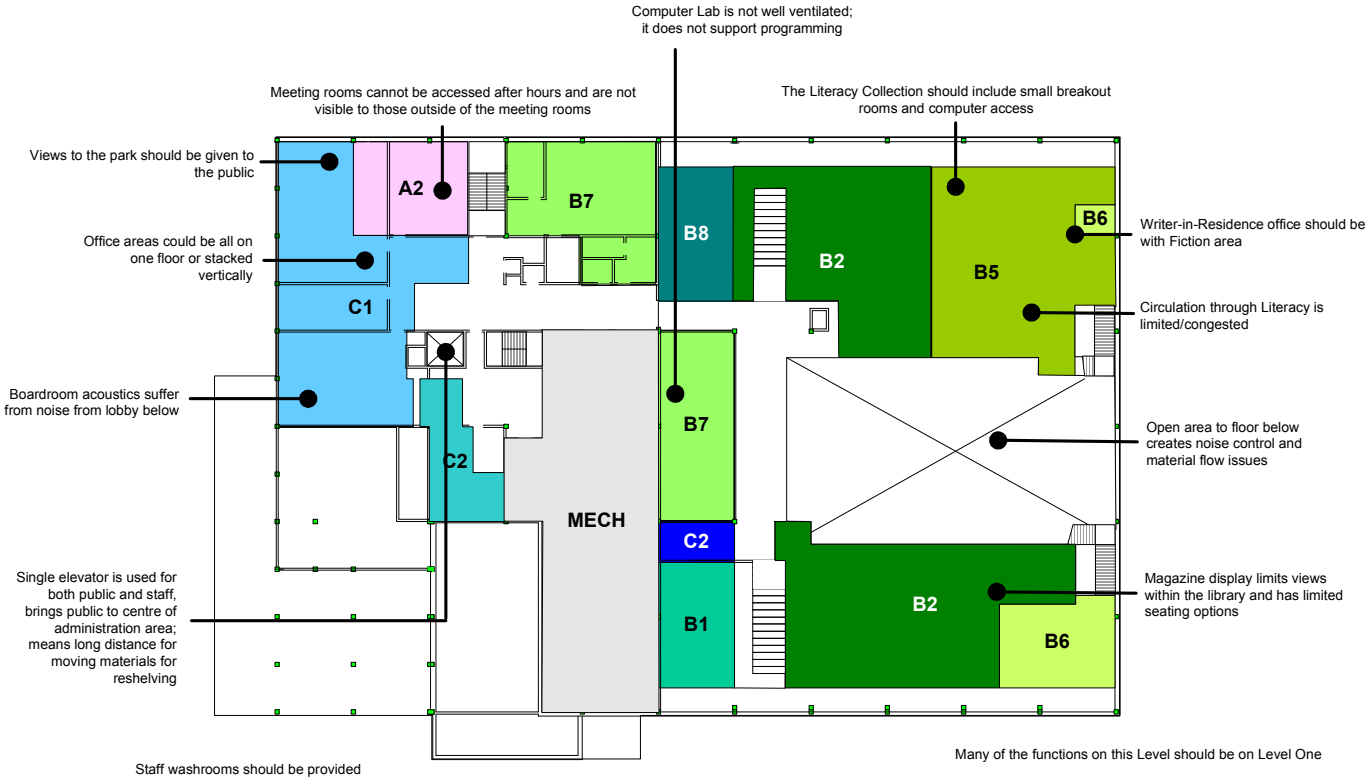
Floor Level 0



Floor Level 1



Floor Level 2



10.0 Opinion of Probable Cost

10.1 Overview

By definition, a Class "D" *Opinion of Probable Cost (OPC)* is based on a statement of requirements and potential solutions. The cost derived from this level of detail is strictly an indication of the order of magnitude of final construction values. The variance for a Class "D" OPC can be in the order of plus or minus 25%.

The costing provided below provides a tool to assess the viability of the existing Regina Public Library for renovations and modifications versus a new build. All costs are approximate and are intended to demonstrate a direct comparison between the options. The premise is based on:

- 163,050 sf (15,148 sm) final library area
- 23,000 sf (2,138 sm) leasable or expansion area
- 69,500 sf (6,457 sm) parkade

The renovation cost per s.f. ,is determined as 70% of new construction. This is calculated as follows:

- New construction cost = 22% structural + 46% architectural + 20% mechanical + 12% electrical =100%
- Renovated construction cost = retained structural (20%) + retained architectural (12%) + retained mechanical (0%) + retained electrical (0) = 32%

The cost of construction is as follows:

- New construction = **$485/s.f.**
- Renovated construction = $485 x 68% = **$330/s.f.**

Demolition costs reflect selective demolition in an occupied building and are therefore a marginally higher demolition cost per square foot than that for a complete demolition.

The Opinion of Probable Cost does not include fees, soft costs, taxes, or FF&E. The fee consulting fees for a renovation will be approximately 3-4% higher than for a new build scenario. Soft costs, and FF&E will essentially the same for either scenario and are excluded for clarity.

Opinion of Probable Cost

Component of Work	Component Area (s.f.)	Cost per s.f.	Component Cost
			Option 1 – Renovate and Addition
Demolition to suit renovations	70,000	$10.00	$700,000
Renovated Area	70,000	$330.00	$23,100,000
New Construction/ Addition	93,050	$485.00	$48,129,000
Sub-Total Renovation and New	**163,050**		**$71,929,000**
Leasable Space	23,000	$330.00	$7,590,000
Parkade	n/a		
Sub-Total			**$7,590,000**
Structural Allowance			To Be Determined
Total- Renovation and Addition			**$79,519,000**
			Option 2 – New Build
Demolition of Existing	70,000	$8.50	$595,000
New Construction	163,050	$485.00	$79,079,250
Sub-Total New Build			**$79,674,250**
Leasable Space	23,000	$330.00	$7,590,000
Parkade	*Allowance*		*$10,000,000*
Total New Build including Parkade			**$97,264,250**

11.0 Summary

When assessing the viability of a renovation/addition versus a new build one must determine not only the retained value from a construction perspective, but also the value as a functional Public Library, and then the value as a heritage building. The Opinion of Probable Cost indicates that the retained value of the existing RPL building is quite low given degree of work required to retain the building. From a commercial analysis perspective the retained value is relatively low. The choice to invest heavily into a building that does not function well from a program perspective at the end of the project will need to be measured against the heritage value of the building.

The structural review indicates a limited a vertical expansion is possible, however, due to the structural limitations of the building foundations this would be limited to one or possibly two floors. This limitation necessitates a horizontal addition to the floors. The cost of reinforcing the existing vertical structure and converting the existing roof to a structurally sound floor would be significant and extremely complex. A horizontal expansion would result in an approximate 70,000 square foot floor plate. This would result in both operational and physical challenges. The primary challenge is based on the area that staff can control from a single service location. As staff become less tied to their desks, this also represents a dilution of staff concentration. Simply put, the area each staff member is responsible for overseeing exceeds the member's capability to do so.

Other challenges go to the legibility of the space. Larger floor plates are inherently more difficult to cognitively map. If the space is open, there is a definite challenge around animating the space and providing enough differentiation from area to area to ensure patrons understand the function of each space. If the space is broken up, it becomes difficult to know what is in the other areas. The Winnipeg Library is a good example of this. The Library had an irregular access to the 3rd floor, which put it out of sight. A large number of patrons did not even realize that the top floor existed despite a familiarity with the Library. In addition, the larger the space, the greater the distance you are asking patrons to walk to access services which may be in the far reaches.

Calgary Public Library's existing central library as a notable example of adding a new facility horizontally onto an existing building, it is difficult to harmonize an existing building and addition to read as a unified space. Fixed elements will likely disrupt the flow and organization of the spaces, creating barriers that both impede the ability of staff to serve the entire floor and the ability of patrons to see and understand the organization of services and functions on the floor. Any addition to the RPL would experience comparable challenges. The building is one half level above grade, and any attempt to improve the accessibility would result in a complex series of half grade changes.

The heritage value of the property becomes far less quantifiable than the previous two points. The building is representative of an era of design and construction sparsely represented in Regina, however, its functional design as a library is relatively poor. Notable buildings constructed in this late modern era in Regina includes; SaskPower; the Court of Queen's Bench/ Court of Appeal Building; and Cooper Place on the corner of College Avenue and Albert Street. Any assessment of the building becomes subjective, and it may be in the interest of the RPL to review critical design elements that make the building important and retail those elements in much the same way the medallion from the original Carnegie library was retained and reused. Design elements in any new building on the site should recognize the design elements that make the RPL a unique building, while correcting the glaring functional and performance issues.

APPENDIX

JC Kenyon Engineering Structural Report

JCK
J C KENYON ENGINEERING INC.
STRUCTURAL ENGINEERING CONSULTANTS

May 18, 2012

File: 060-12

Mr. James Youck
P3 Architecture Partnership
2292 Dewdney Ave.
Regina, SK
S4R 1H3

Re: Central Library, Regina Public Library
12th Avenue
Regina, Saskatchewan

Dear James:

As you requested, we have reviewed the potential for adding new floor levels to the Central Library in downtown Regina. It is our understanding that there would potentially be three additional levels plus a mechanical level above these. The use would be a combination of library stack areas, office areas and mechanical/electrical spaces.

Our analysis has been based on the information contained on the original construction drawings prepared by Izumi, Arnott and Sugiyama dated May 15, 1961. These drawings have been made available to us for previous work and studies that we have done at the Central Library however we cannot guarantee that the information contained on them corresponds directly with the as-built construction of the building.

The determination as to the capability of the existing building to support additional floors basically depends on the capacity of the foundation. The existing building is supported on end bearing belled piles based in the till approximately 55 to 60 feet below grade. The drawings indicate that these piles were hand belled and hand cleaned. The drawings indicate that the design safe allowable soil bearing pressure was 12,000psf. This soil bearing pressure would be low at today's standards and assuming the piles are bearing on the brown till, the allowable bearing pressure would be approximately 17,500psf which is a 50% increase from the original design. This would allow the foundations to potentially carry significantly more load.

To confirm the actual capacity of the foundations would require a significant of investigation and testing including both geotechnical and structural engineering. Our analysis at this time is based on the assumption that the foundations are as shown on the drawings and that the allowable bearing capacity is 17,500psf.

On the basis of the above, our analysis indicates that the building foundations are sufficient to carry the loading of additional floors but not to the extent described above. One or two additional levels plus a penthouse would be the maximum that could be accommodated. We expect that with this there would be a requirement for significant reinforcement of the columns to achieve the new loads and transfer them down to the piles.

It should be noted that this analysis is very schematic and we foresee several difficulties with any type of floor additions to the building. Firstly, the existing roof structure is not sufficient to act as a floor system and as such it would be removed as part of the building modifications. Alternatively it would

be left in place and the new 3rd floor level would be built just above it. This in itself creates issues with floor to floor heights, stair and elevator access, etc.

In addition, the framing of the building is such that many of the columns drop off at the main floor level so that at the 2nd floor and roof levels the floor spans are as high as 45 feet. This floor grid would be difficult and expensive to achieve at the new floors. There are also large two storey spaces that would presumably be framed over for the new floor levels. Once again the spans are long and the column reinforcement that would be required would be significant.

We trust this information is sufficient for your present needs. Please contact our office if you have any questions or concerns.

Yours truly,

J C KENYON ENGINEERING INC.

Jim Kenyon, P.Eng.

PROFESSIONAL ENGINEER
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REGINA
May 18/12
SASKATCHEWAN

Association of Professional Engineers & Geoscientists of Saskatchewan
CERTIFICATE OF AUTHORIZATION
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