JERA Engineering Consultants

ENGINEERING 8700 DESIGN PROJECT PLAN

RONALD MCDONALD HOUSE

SUBMITTED TO: DR. STEVE BRUNEAU

FEBRUARY 2ND, 2010

Greg Barton Brad Ackerman



Group 5:

Emily Kavanagh Jessica Mandville Rebecca Manuel Amanda Coles

> JERA Engineering Consultants



JERA Engineering Consultants Faculty of Engineering and Applied Science Memorial University St. John's. NL. A1B 3X5 jera.engineering@gmail.com

February 2nd, 2011

Greg Barton Acuren Group Inc. 2 Hunt's Lane St. John's, NL, A1B 2L3

Subject: Ronald McDonald House Newfoundland & Labrador

Dear Mr. Barton,

Please accept the following proposal from JERA Engineering Consultants for the engineering design of the Ronald McDonald House Newfoundland & Labrador. The plan is a tool to be utilized throughout the project by Acuren Group Inc. and JERA Engineering Consultants, as well as a requirement of ENGI 8700.

The project plan outlines our execution strategy, which has been designed to ensure completion of the project within the specified deadlines. Information pertaining to all aspects of the project has been incorporated including overall methodology, scheduling, reporting and associated costs.

If you have any questions or concerns regarding the project plan, we would be pleased to discuss them with you.

Sincerely,

Emily Kavahagh

Amanda Coles

JERA Engineering Consultants

Rebecca Manuel

Jessica Mandville

cc: Dr. S. Bruneau

Attachment: Ronald McDonald House Newfoundland and Labrador Project Plan

Acuren Group Inc.

Ronald McDonald House - Structural Design



ENGINEERING 8700

Project Plan

February 2nd, 2011

Presented To:

Dr. S. Bruneau

Presented By:

GROUP 5

Amanda Coles

Rebecca Manuel

Jessica Mandville

Emily Kavanagh

JERA Engineering Consultants

Project Group 5, Engineering 8700 Faculty of Engineering & Applied Science, Memorial University, St. John's, NL, A1B 3X5 Email: jera.engineering@gmail.com



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1.0 **PROJECT DESCRIPTION**

Ronald McDonald House is a proposed two-storey, fourteen suite building to be located near the Janeway Children's Health and Rehabilitation Centre, Clinch Crescent, St. John's, Newfoundland and Labrador. Its function is to provide affordable housing for families with children requiring treatment at the province's only dedicated paediatric hospital. A recent study has indicated that approximately one fifth of the patients requiring services at the Janeway travel over eighty kilometres from their homes. Many patients are required to stay in the St. John's area for an extended period of time, resulting in large expenses to be incurred by the families. Therefore, there is a real need for a Ronald McDonald House in Newfoundland and Labrador.

Figure 1.1 below is an architectural representation of the completed structure. The structural design of Ronald McDonald House is a project to be completed by JERA Engineering Consultants (JERA) during the first quarter of 2011.



Figure 1.1: Architectural Representation of Proposed Ronald McDonald House

JERA will work closely with Acuren Group Inc. (Acuren), the project's prime consultant, as well as the sub-consultants to ensure the optimal design approach is taken for this project.



2.0 STATEMENT OF PROJECT REQUIREMENTS

JERA has been retained by Acuren to provide design services for the structure of Ronald McDonald House Project. This will require detailed structural design calculations, including roof loading, load bearing walls, partition walls, columns, floor systems, slab on grade, foundations as well as a retaining wall on the project site. The structure will also be modelled using computer software for structural analysis. In addition to design requirements, JERA will also produce a schedule for completion of the project and a cost estimate. A design methodology review will be included to detail which structural systems were considered and why they were selected.



3.0 METHODOLOGY

3.1 Approach

JERA plans to develop this project in a strategic manner. The first stage of design is the completion of roof loading calculations. Due to the nature of the roof proposed by the architect, this will be a major task and is vital for determining the loading for the rest of the structure. Once this is established, the team will evaluate different structural systems, such as steel, concrete, wood, or any combination the three. Once a structural system has been selected, the loading bearing wall calculations will be completed, followed by the floor systems, slab on grade and foundations. There is the requirement to also design a retaining wall on the project site which can be completed concurrently with the above calculations. The project schedule will dictate when each task is designated to start and ensures sufficient resources are available to do so.

When each aspect is designed, the designer will produce quantity take-offs, which will be used to provide a cost estimate. The final cost estimate will be complied once all aspects have been designed. At this stage, sketches of the design will be created as required.

3.2 Group Organization and Inter-Company Interaction

3.2.1 Organizational Structure

While it is expected the major components of this project will be completed jointly by the team, specific roles have been defined to establish a member to manage each component. Each team member will have a major task assigned, as well as multiple sub-task responsibilities. The overview structure of the JERA team is shown below in Figure 3.1. This structure was developed by the team according to each members' previous work experience, interests and strengths.



Figure 3.1: JERA Organizational Structure

Tasks will be allocated by the project manager or the lead of the various company sectors according to the JERA organizational chart. A detailed organizational structure can be found in Appendix A.

3.2.2 Internal Meetings

Throughout the course of this project, JERA will have formal weekly internal meetings to discuss project progress. It is expected there will be two to three informal working meetings every week where the JERA team will collectively progress various aspects of the project. Meeting minutes will be recorded and logged by each team member in turn.

3.3 Client Interaction and Role

Meetings with Acuren will take place on a weekly basis at their office, depending on Client availability. Weekly progress will be reported so the Client is regularly updated on JERA's progress. JERA will provide an agenda before each meeting, keep a record of the meeting minutes and distribute them to all invitees within twenty-four hours. For other matters, the primary mode of communication with the Client will be via email.

Acuren's role in this project will be to provide guidance throughout each stage of the project design where necessary and to make available any information needed to assist in the design of the Ronald McDonald House.



3.4 Design Principles

There are many resources available to consulting engineers that ensure acceptable standards are consistently met during the design of any structure. Design of the Ronald McDonald House will incorporate limit state design principles through the use of various design codes such as the National Building Code of Canada and relevant CSA Standards. This practise is the basis upon which JERA's design will be completed. Loads and calculations will conform to the following standards:

- National Building Code of Canada, 2005
- CAC Concrete Design Handbook, 3rd Edition
- CISC Handbook of Steel Construction, 9th Edition
- CSA-086 Engineering Design in Wood, 2005 Edition

Computer modelling and structural analysis software will be used to ensure that accurate results have been obtained through hand calculations.

3.5 Cost Estimating Strategy

JERA will deliver a cost estimate within an accuracy level of $\pm 15\%$. Quantities for the estimate will be calculated by individual group members as detailed design is completed. All quantities will be tallied in a spreadsheet, with cost estimation to be completed after design is finalized. After completion of detailed design, group effort will be divided between preparing a cost estimate and creating sketches for structural design.

Material and labour rates for the construction of Ronald McDonald House will be calculated using RS Means software. This program incorporates current market rates in the construction industry and will be tailored to suit economic conditions in the St. John's area.

3.6 Desired Outcomes

Upon completion of this project, JERA will deliver a complete set of structural calculations to Acuren, in conjunction with submitting all required deliverables to Memorial University for Engineering 8700. Prior to commencing design, the team will meet with all stakeholders to ensure expectations have been set. The JERA team will work closely with the Client and course instructor throughout the project life to ensure that upon project completion, expectations have been met for all stakeholders.



3.7 Troubleshooting

Any problems occurring during the design process will be handled in an organized manner. Each problem will be documented and solved internally if possible. The JERA team will evaluate the reason each problem has occurred and determine the optimum solution. If the problem cannot be solved within the design group, JERA will seek counsel from the Client or a member of the engineering faculty. Any problems arising will be discussed in weekly meetings with the Client. An action log will be created to list all problems encountered and include respective solutions.



4.0 TASKS

The allocation of tasks required for the execution of the project can be found in Table 4.1. The table is broken down into nine primary tasks with project controls and administrative work broken into sub-tasks. The personnel responsible for each task are listed as well as the resource requirements.

Research of technical requirements will be completed prior to commencing design in order for JERA to properly implement all applicable codes and standards. The roof design will be the first component analyzed. Determination of roof loadings will be necessary to complete the design of other elements in the structure. Each component of the structure, such as the walls and columns, floor design, foundations and retaining wall will be split up among the group as to equally divide the total workload amongst the team members.

Quantity take-offs will occur after the design of each component is finished. Once design and take-offs are completed, two members of the team will carry out a detailed cost estimate and the other two members will progress detailed sketches of structural drawings. Document control will be ongoing throughout the entire project both electronically and through a detailed project binder. The schedule will also be followed and updated regularly to ensure the team is completing each task efficiently and on time.

Task	Sub-Task	Allocation of Personnel	Resource Requirements
Research of Technical Requirements	N/A	All	Design codes, class notes, internet, Client and class instructor support
Roof Design	N/A	All	Relevant design codes, course notes, analysis software, Client support
Wall and Column Design	N/A	Emily Kavanagh, Jessica Mandville	Relevant design codes, analysis software, class notes
Floor Design	N/A	Rebecca Manuel, Emily Kavanagh	Relevant design codes, analysis software, class notes
Foundation Design	N/A	Amanda Coles, Jessica Mandville	Relevant design codes, class notes

Table 4.1: JERA Task Allocation



Retaining Wall Design	N/A	Rebecca Manuel, Amanda Coles	<i>Slope/W</i> , relevant design codes			
Drafting	N/A	Emily Kavanagh, Rebecca Manuel	<i>AutoCAD</i> , architectural drawings			
Project Controls	Schedule Tracking	Emily Kavanagh	MS Project			
	Quantity Take-Offs	All	Relevant design codes, MS Excel			
	Cost Estimation	Jessica Mandville, Amanda Coles	RS Means			
	Financial Management	Emily Kavanagh	MS Excel			
	Action Log	Jessica Mandville	MS Excel			
Administrative Tasks	Document Control	Rebecca Manuel, Jessica Mandville	E-mail, stationary supplies			
Final Design Reports	Final Report	All	MS Word, printing services			
	Final Presentation	All	<i>MS PowerPoint</i> , printing services			



5.0 SCHEDULE

A carefully planned activity schedule is the key to the successful completion of any major undertaking. To conform to standard practise used by consulting engineers, the Ronald McDonald House project schedule has been displayed as a Gantt chart, which can be found in Appendix B. The first activity defined in the schedule is the creation of the project plan, a task necessary to inform all parties involved of the steps required to ensure project completion. Completion of the project plan is followed by the design phase, initiated as the group collaborates on the details of the roof loading. The remaining design tasks include the retaining wall, foundations, floor plans, walls and columns. When each aspect of the design nears completion, a detailed quantity take-off will be completed, followed by a cost estimate and sketches of the structural design. The final requirements of the project will include a comprehensive report as well as a group presentation on project design.



6.0 COSTS

The costs expected with the execution of this project as part of the project course are minimal at this point. Due to the project site's convenient location (walking distance from Memorial University) there will be no costs associated with site visits. There will not be a physical model of the structure developed by JERA and there will be no material testing conducted. All software and resources necessary for the completion of this project, such as structural analysis programs, drafting programs, cost estimating software and design and building codes can be acquired through student trial versions or through Memorial University's library resources.

The only expected costs are administration expenses such as printing, copying and binding, and transportation to the Client's office. This cost is estimated to be approximately \$165.00. Total costs per month for the project are estimated as follows:

Month	January February		March	April		
Overhead	\$90.00	\$10.00	\$10.00	\$30.00		
Transportation	\$5.00	\$10.00	\$10.00	\$0.00		

Table 6.1: Total Costs Estimated for Project Execution (Winter 2011)

All expenses are agreed upon by the group and are paid up-front by one of the JERA team members. Receipts are then marked with the individual's name and are placed in the project binder. The team financial manager will tally all out of pocket expenses for each member at the end of each month. If an unbalance exists, it will be settled so each team member is contributing equally.



7.0 DELIVERABLES

There will be numerous deliverables submitted to both the Client and course instructor throughout completion of this project.

For the meetings with Acuren, JERA will send soft copies of the meeting agenda, previous meeting minutes and any other relevant documentation (such as design calculations) to Acuren prior to the meeting via e-mail correspondence. A weekly update will be presented to the class and course instructor by the JERA team. A hard copy of the update will also be submitted to the project instructor.

Upon completion of the project, a full design report will be submitted to the Client and course instructor. This report will include all work done over the duration of the project such as design calculations, project schedules, a cost estimate and project drawings. It is important to note that JERA and Acuren have jointly agreed that JERA will not produce a full set of AutoCAD drawings, but will provide design sketches instead. The abovementioned deliverables will be submitted via hard copy.





8.0 RISKS

Risks associated with execution of the structural design for Ronald McDonald House have been assessed and are determined to be minor. The following table summarizes the risks identified for JERA, as well as plans for mitigation.

Risk	Mitigation
Obtaining required project resources (i.e. codes, software, subject matter experts as required)	Required project resources have been identified and vetted with the Client. Methods to obtain each resource were discussed at the first Client meeting.
Scheduling regular meetings with the Client, based on Client availability.	During the first Client meeting, the preferred approach for regular Client interaction was discussed. A plan has been established, with persons from both JERA and the Client to be responsible for scheduling meetings.
Project team undertaking structural design which has not yet been covered in the relevant elective course.	Concern expressed to the instructor of the relevant course. Instructor indicated the material will be covered, beginning at the end of January. Course material has been proactively obtained by the team members, allowing JERA to work ahead of the course, if necessary. Project schedule will favour covering relevant material prior to starting design.

Table 8.1:	Risks	Associated	with	Pro	ject	Execution
				-		



9.0 **REFERENCES**

- [1] Ronald McDonald House Newfoundland & Labrador, (2011) http://www.rmhnl.ca/
- [2] Cement Association of Canada, (2005), Concrete Design Handbook, Third Edition
- [3] National Research Council of Canada; Institute for Research in Construction (2005)
- [4] Canadian Institute of Steel Construction, (2006), Handbook of Steel Construction, Ninth Edition
- [5] Bruneau, S. (2010), *Guide to Writing an Engineering Project Plan* http://www.engr.mun.ca/~sbruneau/teaching/8700project/classof2011/



Appendix A

Organizational Chart





Appendix B

Ronald McDonald House Project Schedule

ID	6	Task Name	Duration	Start	Finish	anuary	00/01 16/01	22/01	February	12/02 20/0	Ma	ch	12/02 0	0/02 07/0	April	10/04
1		Ronald McDonald House	77 days	Tue 18/01/11	Tue 05/04/11	02/01		23/01	30/01 06/02	13/02 20/0	JZ Z1/U	2 06/03	13/03 2	27/0	3 03/04	10/04
2							•								•	
3		Work Plan	10 days	Tue 18/01/11	Thu 27/01/11				_							
4																
5		Work Plan Due	0 days	Wed 02/02/11	Wed 02/02/11				02/02							
6									•							
7		Detailed Design	43 days	Fri 28/01/11	Fri 11/03/11											
8		Roof Loading	13 days	Fri 28/01/11	Wed 09/02/11			j v					•			
9		Design Calcs	11 days	Fri 28/01/11	Mon 07/02/11				i i i i i i i i i i i i i i i i i i i							
10		Quantity Takeoff	2 days	Tue 08/02/11	Wed 09/02/11				Г. П.							
11		Walls and Columns	10 days	Thu 10/02/11	Sat 19/02/11											
12		Design Calcs	9 days	Thu 10/02/11	Fri 18/02/11				Ĭ	i i i i i i i i i i i i i i i i i i i						
13		Quantity Takeoff	1 day	Sat 19/02/11	Sat 19/02/11					Ĭ.						
14		Floor Systems	10 days	Sun 20/02/11	Tue 01/03/11					Ţ.						
15		Design Calcs	9 days	Sun 20/02/11	Mon 28/02/11						li l					
16		Quantity Takeoff	1 day	Tue 01/03/11	Tue 01/03/11						ĥ					
17		Foundations	10 days	Wed 02/03/11	Fri 11/03/11											
18		Design Calcs	9 days	Wed 02/03/11	Thu 10/03/11								•			
19		Quantity Takeoff	1 day	Fri 11/03/11	Fri 11/03/11								-			
20		Retaining Wall	10 days	Thu 10/02/11	Sat 19/02/11											
21		Design Calcs	9 days	Thu 10/02/11	Fri 18/02/11				i i i	ТП П Г						
22		Quantity Takeoff	1 day	Sat 19/02/11	Sat 19/02/11					·····			1			
23																
24		Cost Estimate	12 days	Sat 12/03/11	Wed 23/03/11									V		
25		Roof Loading	4 days	Sat 12/03/11	Tue 15/03/11									•		
26		Walls and Columns	2 days	Wed 16/03/11	Thu 17/03/11								The second secon			
27		Floor Systems	2 days	Fri 18/03/11	Sat 19/03/11											
28		Foundations	2 days	Sun 20/03/11	Mon 21/03/11									1		
29		Retaining Wall	2 days	Tue 22/03/11	Wed 23/03/11											
30																
31		Drafting	16 days	Sat 12/03/11	Sun 27/03/11											
32		Roof Loading	4 days	Sat 12/03/11	Tue 15/03/11									•		
33		Walls and Columns	3 days	Wed 16/03/11	Fri 18/03/11								h			
34	1	Floor Systems	3 days	Sat 19/03/11	Mon 21/03/11									1		
35		Foundations	3 days	Tue 22/03/11	Thu 24/03/11									1		
36		Retaining Wall	3 days	Fri 25/03/11	Sun 27/03/11								ç			
37																
38		Final Report	11 days	Fri 25/03/11	Mon 04/04/11											
39		Report	10 days	Fri 25/03/11	Sun 03/04/11										iiiih	
40		Presentation	5 days	Thu 31/03/11	Mon 04/04/11										i Th	
41																
42		Final Report Due	0 days	Mon 04/04/11	Mon 04/04/11										04/04	1
43															Ť	
44		Final Presentations	0 days	Tue 05/04/11	Tue 05/04/11										05/0	04
Project	: Schedule	Task			Progress		Summa	iry		External Tasks			Deadline	$\hat{\nabla}$		
Date: N	lon 24/01/	11 Split			Milestone	•	Project	Summary	·	External Milestone	e 🔶					
							P	age 1	*							



Appendix C

Statement of Qualifications

JERA ENGINEERING CONSULTANTS



MISSION STATEMENT

JERA Engineering Consultants provide the highest quality of civil engineering solutions tailored to the client's needs. Our economic approach offers innovation while complimenting our commitment to health, safety and the environment



Engineering 8700 Project Group 5 Faculty of Engineering & Applied Science Memorial University St. John's, NL A1B 3X5

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ABOUT US

JERA Engineering Consultants (JERA) was formed in January 2011 and is a team of four hard working, senior civil engineering students at Memorial University. The company's well rounded employees draw upon experience from across Canada, the Gulf of Mexico and overseas. Working in various industries such as oil and gas (onshore and offshore), heavy civil, mining, utilities and transportation enables JERA to apply collective knowledge and experience to virtually any challenge.

Selected Industry Experience

Hibernia structural support Harbour design and optimization **Construction of North Bay Regional Health Centre** Conceptual design and drafting, various mining developments **IOC Structural Remediation Program** Federal Timber Pile Wharf Inspection Program Terra Nova FPSO structural support Construction of Niagara Health Care Complex and Walker Family Cancer Centre White Rose subsea system operation and maintenance Subsea installation and construction research and development Conceptual design and drafting, structural developments Municipal road realignment design and execution Design reviews of offshore containers White Rose - North Amethyst Project Long Harbour Processing Plant Project **Aurora Tailings Management Project** Sugarloaf Bridge Rehabilitation Geotechnical Study - Fort Hills Waste Dump Expansion Transmission line thermal upgrade study Lower Churchill Project



THE JERA TEAM

AMANDA COLES (709) 427-3696



Amanda is a senior civil engineering student with a wide variety of engineering experience. She has worked for clients in the transportation, mining (oil and gas) and utilities industries, highlighted by undertaking a project management role for an oil and gas company in Alberta. Her strengths include well-developed communication skills and leadership abilities, as well as a strong work ethic.

EMILY KAVANAGH (709) 690-3390



Emily is a currently completing her final term at Memorial University of Newfoundland. Through co-operative education, she has gained experience in the offshore oil and gas industry, construction industry, utilities industry and private consulting across Canada, locally and overseas. The majority of her experience and interest is in structural analysis and design but also has valuable experience in field and project management. Her hardworking attitude and excellent time management skills contribute to the strength of JERA.

> JERA Engineering Consultants

THE JERA TEAM

JESSICA MANDVILLE (709) 765-8762



Jessica is a senior civil engineering student at Memorial University. Her co-op work terms, both in Canada and overseas, have allowed her to gain experience in a number of fields within the industry such as oil and gas, mining, transportation and heavy civil construction. Her most recent work experience has been in heavy civil contracting which enabled her to gain valuable field experience. Jessica's strengths include strong organization skills, work ethic and the ability to work cohesively as part of a team.

REBECCA MANUEL (709) 764-5857



Rebecca is a senior engineering student currently completing academic Term VIII at Memorial University. Through her diverse work placements she has been involved in a variety of engineering environments such as mining, construction and marine infrastructure. More specifically her experience includes structural remediation projects, the development and implementation of appropriate design solutions as well as experience working in project management. To maximize her commitment to the JERA team she draws upon her initiative and motivation skills.

> JERA Engineering Consultants

CONTACT INFORMATION

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