Summary of Comments on Practical Work Report

Student Name .....Markers Initials _____

	Ranking			
Structure of the Report (compliance issue) All instruction about format have been followed, and all the prescribed sections are present	5	(4)	3	2 OR 1
Quality of the Report Grammar and spelling are good. The language is fluent, and flows well, no proof reading errors.	(5)	4	3 OR 2	1
Presentation of the Report The report is well focussed, balanced, interesting and contains an appropriate amount of detail. Illustrations are useful.	5	(4 OR 3)	2	1
Scope of Report Well-chosen and relevant to a Practical Work Report	(3)	2	1	0
TOTAL VALUE OF MARKS				16

OVERALL Grade for this Report

Total Marks greater than 14	(A)
Total Marks greater than 10	B
Total marks greater than 6	C
You are required to resubmit this report.	D

It is recommended that you contact the Student Learning Unit for advice on the writing of this report

THE UNIVERSITY OF AUCKLAND
FACULTY OF ENGINEERING

CERTIFICATE OF PRACTICAL WORK

Student Family Name		First Name	
Student ID Number		Specialisation	CIVIL AND ENVIRONMENTAL
Part Completed	✓	✓	✓
Full Company Name	WATERCARE SERVICES		
Company Physical Address	73 REMUERA RD, REMUERA, AUCKLAND, 1050		
Company Postal Address	PRIVATE BAG 92521, WELLESLEY STREET, AUCKLAND, 1141		
Company Website Address	Watercare.co.nz		
Company Phone Number	(09) 442 2222	Company Fax Number	(09) 970 1461
Supervisor Name and Designation	Senior Project Engineer	Supervisor e mail address	
Period Worked	From November 23rd 2015	To	August 2nd 2016

Nature of Work (To be classified showing the hours for each classification)	Hours	
	General	Sub Prof
Stakeholder engagement activities	120	
Improving Engineering Knowledge activities		560
Site visits	40	
Meetings	40	
Organising/seting up events	40	
Total Hours Worked	240	560

Report of Engineer in Charge

Signature		Date	2/08/2016
Student Progress	Good.	Student Diligence	Good.
Student Attendance	Generally.	Remarks	Diligent and detailed work.

FOR OFFICE USE

Name of Marker				
Reports Approved	General Hours		Sub Professional Hours	
Hours Credited	General Hours		Sub Professional Hours	
Grade	Signature		Date	

Work Report 2016

Watercare Services
73 Remuera Road, New Market

Civil and Environmental Engineering

Student ID:

Dates Employed:
23/11/2015 to 27/07/2016

REPORT DATE?

Watercare
An Auckland Council Organisation

Summary

From November the 23rd 2015 I have worked as an intern for the Central Interceptor Team at Watercare Services. Watercare is funded by Auckland Council and are a client-based company that provides water and wastewater services to the Auckland region. The team I was in focused on the Central Interceptor Project, a proposed wastewater pipe that will run from Western Springs to Mangere Treatment Plant. I was provided with a knowledgeable and supportive environment on a fantastic team that included designers and geologists from Jacobs and AECOM as well as my small Watercare team.

I was responsible for many tasks throughout my time as an intern including large assignments that made me think like an engineer and apply what I have learnt at university. I got the opportunity to learn about the upcoming Central Interceptor Project and the huge positive impact it will have on Auckland. I got to interact with people in the community to gain confidence in communicating with stakeholders and contractors. I got to observe and learn about the vast amount of work that is needed to design the best pipe possible. Furthermore I got to help by completing assignments and tasks that benefited the overall project to get the project to construction by the set construction date.

These tasks greatly improved a range of skills including organizational, time management; communication and confidence, just to name a few. I thoroughly enjoyed my time while working at Watercare and it has made me excited for the future of I have ahead of me as an Engineer.

NICE SUMMARY

Acknowledgements

I would like to acknowledge the Central Interceptor Project Team of Watercare. I would like to thank

all who made my time at Watercare enjoyable and taught me a lot thorugh my time working. I would like to thank them for making me feel apart of the team and for involving me in everything possible in the short time I have been working there. I also appreciate the great role models the four CI team members have been to me and acknowledge the experience they have shared with me.

Table of Contents

List of Figures

Introduction

From November the 23rd I have been lucky enough to work at Watercare Services. Watercare Services is an Auckland Council funded company that provides water and wastewater services to all of Auckland to a high standard. During this period I was selected to be the intern on the Central Interceptor Project. I was responsible for doing a lot of tasks during my time at Watercare to help get the project to it's final stages of design. The tasks I completed improved many vital skills that are a necesity to have to become a successful engineer in the future. These tasks also expanded my knowledge greatly and I was able to put what I've learnt from univeristy into real world applications. I throughly enjoyed my time working at Watercare and the following report will discuss my responsibilities and include a refelction on what I learnt during my time.

Company information

Watercare Services Company Structure

Watercare is located at 73 Remuera Road, New Market, Auckland. This new office building offers 3 levels for Watercare employees (refer to Figure 2). The company consists of a Board of Directors that make all the final company decisions and are reported to by Watercares Executives. The executive team consists of Watercares CEO, CFO, Company Secretary and General Managers for all the sectors of Watercare including: Strategy and Planning, Business Transformation, Risk and Assurance, Corporate Relations and Communications, Corporate Services, Retail, Infrastructure and Delivery and Service Delivery. Under all the General Managers are various managers and employees of Watercare. 18 summer interns were hired to work over the summer and were spread out through the company. I was extremely lucky to be selected to be apart of the Central Interceptor Project Team.

Central Interceptor Project

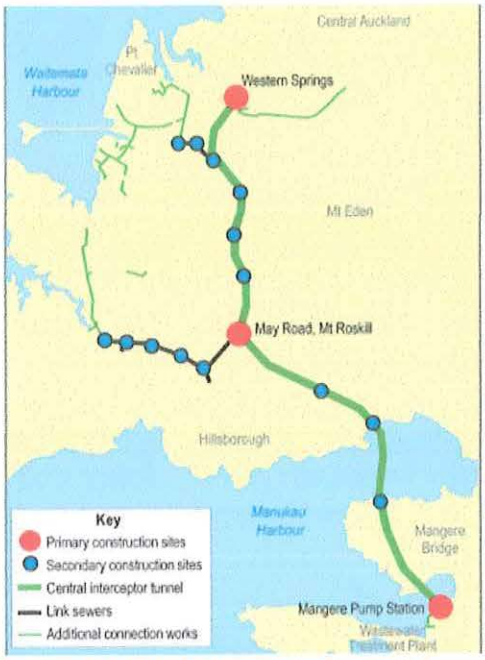

Figure 1: Central Interceptor Proposed Route and Construction Sites

The Central Interceptor is the project that I was put on for my time at Watercare. When beginning at Watercare the project was finishing off the Preliminary Design. Currently the project is in the final stages of the Detailed Design where it will then enter the tender process for contracting construction companies. The project is a proposed wastewater pipe that will begin at Western Springs and travel 13km approximately 22km to 122km under the surface to the Mangere Treatment Plant (refer to Figure 1). The main objectives and need for this pipe is to duplicate the aging section of the Western Interceptor Wastewater Pipe, provide capacity for population growth and finally to reduce overflow volume by 80%.

Central Interceptor Project Team

The Project Team consisted of four Watercare staff. My manager David Ward was the head of the Design and Management team and worked directly under the General Manager of Infrastructure and Delivery. He is also the Project Manager for Watercare for the Central Interceptor Project. The team then had two Senior Engineers, : who had a wealth of experience and held various responsibilities. looking after the stakeholder and environmental analysis side of the project and focused on the geotechnical engineering side of the project. The team lastly consisted of a Graduate Engineer . I was then the final addition to the team as the summer intern. Towards the end of my internship, went onto maternity leave so another Senior Engineer has relieved her position until she is back.

The Central Interceptor Project team also consisted of Contractors: Jacobs Consulting and AECOM Consulting. As the project had already completed the planning stage, extra expertise was needed to carry the project on through to construction. Jacobs are responsible for the design of the project and have a number of experienced designers and a Project Manager , whilst AECOM hold responsibility for the geotechnical investigations of the project and have a range of tunnel and geology experts. Watercare, Jacobs and AECOM all work together to design the best wastewater pipe for all stakeholders and the community as possible. To ensure this happens, Watercare tested for the first time, clearing an office space so all staff from the three companies can work under the same roof to improve communication and delivery of the project. To my knowledge this has been extremely beneficial to the project.

Workplace Amenities

The office that is located on Level 2 is large and spacious with excellent amenities including a kitchen and a common lunch table at the front. A large boardroom for meetings and events was also at the front as well as desks at the back and front for more informal smaller meetings. The office has rows of desks or work stations set up for each worker. Jacobs employees were set up on the left of the office whilst AECOM employees were on the right.

Figure 2: Watercare main offices, 73 Remuera Road, New Market

The small Watercare team (including my workstation) was at the back of the office along with the Jacobs Project Manager and Secretary. The office can be considered reasonably empty and this has made Watercare think about how to utilize the space better whether it was to make it available to more teams. However the success of how the project has been progressing only being available to the Central Interceptor Project have outweighed moving more people into the office. With less people the work atmosphere was quiet but hardworking which I thoroughly enjoyed, there was less chances of distractions. Furthermore I was able to gain a reasonably close working relationship with my small Watercare Team and I was able to interact and ask questions more openly than if the work place was too busy.

Work Experience

At watercare I had a range of activities and assignments that I was responsible for and completed for the duration of the time. I have decided to discuss each major assignment or task in their own separate paragraph to gage the different types of work I was involved with.

Stakeholder Engagement:

A few tasks I completed involved stakeholder engagement with Iwi members, community members, contractors and so on.

Contacted all Iwi groups for Geotechnical Investigations Round 2

I was responsible for drafting a letter and email that was sent to all iwi in the Auckland region regarding an upcoming borehole drilling near the Western Springs Park Lake. First of all I had to find the contact details of all iwi affiliations, I then drafted a letter that would be emailed out to Iwi. After a few very minor changes were made to the drafted letter I sent the email out to approximately 15 Iwi contacts. I was then responsible for tracking and replying to iwi contacts. Two Iwi required phone call conversations to organise a time that was suitable to visit the borehole location with my manager. Where the rest of the Iwi contacts just required answering a few simple questions, or wanted updates once the borehole was completed.

Letter Drops

I was responsible for drafting a letter up that was to be delivered to all nearby residents of the upcoming Geotechnical Investigations Round 2. All residents needed to be informed of potential boreholes that would be drilled nearby their residences or workplaces at least two weeks prior. The geotechnical investigations took approximately five weeks and the location of the drilling changed continuously as two drills were operating at one time, therefore I had to keep a close eye on the construction schedule and stay organised to ensure residents were given sufficient notice. Some letter drops involved me driving onto site and delivering to their mailboxes while majority of the other letter drops involved me going to the residents or workplace and talking to them to inform them of the upcoming works.

Filled in for the Graduate Engineer for one week

For one week the Graduate Engineer went away and I was lucky enough to get to fill in for him. This week was the most exciting as I got to engage and communicate with a lot of different people and it was the first week of the Geotechnical Investigations Round 2. Firstly I had to attend the Central Interceptor Induction. This induction was held at Mangere Treatment Plant and involved going over the CI project, what is involved in the Geotechnical

Investigations, health and safety, expectations etc. I also had to attend two more meetings, one with the Managers of the Mcmillian Drilling Company to finalise the drilling schedule and another with the geologists from AECOM.

My first task that week was to attend the first toolbox meeting. This involved going over expectations, schedule, health and safety etc. I also introduced myself to all the contractors that will be working over the next few weeks. Throughout the week I got to go out on site and watch some of the geotechnical work get completed. I followed the progress of the geotechnical works ensuring I contacted the drilling company manager every day to see the progress that was being made and tracking it. Finally once the site was completed I had to assess the site to make sure the works completed was sufficient. This was completed by following a checklist and taking photos. One instance the site had oil left on the road, therefore i had to contact the manager to see if someone could fix this. I also got contacted by a resident regarding the drilling machinery placement where he believed the machinery was placed in a dangerous position for pedestrians. I had to contact the drilling company manager to make sure the appropriate action was taken immediately and also ensure the resident was happy with the action, which they were.

Figure 3: Geotechnical Samples from Geotechnical Investigations Round 2

Improving Engineering Knowledge Activities

Throughout my time at Watercare I was responsible for finishing off a few major assignments that were used by the the Central Interceptor Team for their knowledge, to benefit the project and to be passed on to other teams at Watercare, for example the property strategy and GIS teams. These assignments took two or four weeks to complete and were usually completed in conjunction with smaller tasks during the week.

Contractor Briefing

Figure 4: Contractors looking at some of the posters I helped prepare at the contractor's briefing

I was responsible for assisting with the preparation, setting up and attending the CI project's first contractors briefing (refer to Figure 3). This was an important event for the CI project as it was the first time Watercare were approaching and informing outside contractors about project details for the near future construction. Contractors from New Zealand as well as around the world attended. I was responsible for making a lot of the content/posters that were displayed on the walls as well as a slideshow presentation that played throughout. I was also responsible for making a 10 page brochure that was handed to all contractors as a take away document. After the contractors briefing I was required to email all contractors that attended for feedback. The Project Manager created a set of questions and feedback was needed for these questions so Watercare could gage interest and also receive potential ideas. Once feedback was received I was responsible for reading through the feedback and presenting it in an easy to read summary so management could present the information at the next board meeting.

Lessons Learnt

During my time I had to complete a Lesson's Learnt Register. This involved searching through documents (hard and soft copies) from the Rosedale and Hobson Projects that Watercare recently completed and finding "problems" that these project encountered and compiling theses "problems" into one document. I then had to rate them of relevance to the CI project and categorise them as necessary. Once the register was completed I organised meetings with the CI team to go through all 300 lessons to come up with an appropriate action for each one. Actions included loading them on a system called Daptiv for future reference or adding them onto the risk register. From this document I also set up a meeting and collaborated a set of questions with a tunneling engineer specialist that worked on both Rosedale and Hobson Projects to go over the lessons he learnt. This assignment was beneficial as it allowed Watercare to ensure the same problems would not be encountered by the CI project.

Property strategy

The next major task I received was to complete the property strategy along the CI pipe alignment to find vulnerable buildings that may require extra compensation and to gage the different types of buildings the pipe passes under. After receiving all the properties that the pipe goes under from the GIS team I was tasked to go through all 1500 property and take notes on the type of property (residential, commercial, school, church etc.), how tall the building is (1 or 2 storey etc.), owner of the house, material the building was made of (wood, brick etc.) and vulnerability (in my opinion how vulnerable did the building look if we were to build under it). This document also led to a few other tasks that were needed. These tasks were sent to professional property companies so they could get a more visual idea of the project. This first sub task was creating screenshots on Adobe Photoshop of the 13km alignment of the property, noting all important buildings and features. A second sub task was taking screenshots of the

properties and marking the differing depths of all property and created a visual representation of the depths. This was important to find all the low points (22km to 30km underground) where extra care would need to be taken. The final document I made from this task was from my point of view where a slight realignment could be made so less houses would be affected. For example slightly shifting the alignment to the left may go under a field rather than under 10 to 15 houses. After completing these documents and the main property strategy document I presented my findings to three senior engineers from Jacobs, the CI Watercare Team and two property strategy team members from Watercare.

Spoil Disposal

Another task I got given was to find and calculate the best guess estimate on the spoil volume that will come out during the construction of the wastewater pipe. Originally I got given a very vague task to use the drawings and the construction schedule to find a rate of production of spoil that will be made from the shaft construction and the TBM movement. I received an estimated figure to work with to try and get my answer as close as possible to the figure. Using the preliminary drawings and measuring off these I was able to find the volumes for the shafts and the TBM tunnel. Using the construction schedule I was able to find an approximate start and end date and length of construction to find a rate of construction. During the assessment I found that the final figure was quite lower than the estimated figure I was comparing to of 400,000m3. Therefore I decided to add the volumes of the constructed manholes, plant rooms etc, that will be also constructed by the shafts. This boosted my final spoil volume figure up and I successfully was able to find an estimate spoil volume. I also had to contact the geologists at Jacobs for an estimated bulking factor to use to find the final volume. Furthermore I took the task further and used geology drawings to find the depths of the different materials that the shaft will be excavated to get an even more accurate figure.

Identify throttles along the networking

I was also responsible for identifying the throttles in the CI catchment. This task was needed as it has been assumed all throttles will be removed, this however can be a potentially expensive task that may be overlooked. Therefore if we could get an approximate cost we can prioritise the throttles. Approximately 100 throttle were identified in the catchment. This task involved me relying heavily on GIS following all major wastewater trunk sewers (e.g Orakei Main Trunk Sewer, Mt Roskill) in the catchment and finding all wastewater pipe diameter changes (throttles). I had to take note of the length, depth and location with a photo so I could begin pricing and prioritising the throttles. Pricing involved meeting with Steve and using his expertise to price a few throttles then I was responsible to go through using the examples he went over to create a price.

Figure 5: Throttle location under ground at Keith Hay Park

Other

Other activities I was involved in include:

Design team meetings

Every week I attended a design team management meeting. This team consisted of all managers of major design projects, majority of the team were highly experienced senior engineers. At these meetings strategies were discussed on how health and safety will be implemented through the major projects, 90 day plans on what work each team member will be involved in, meetings that had been attended, board updates and decisions etc. Another very interesting thing that was covered over the last two months was each team member had to present a major works project that they are currently working on. I thoroughly enjoyed this as I got an understanding of other projects going on at Watercare. I also attended weekly meetings with the CI Watercare team as well as other sub meetings during my time at Watercare.

Pronamics event

I organised a pronamics learning event for the design management team at Watercare. I had to organise food, location and date with the design team. I also was in contact with the Pronamics team located in Australia to ensure they were kept up to date on the event. I also got to attend the teaching session of the new pronamics software. This software is a more user friendly cost estimation software for companies.

Site visits

Mangere Treatment Plant

All the interns got a great opportunity to be shown around the treatment plant by one of the senior managers. We got shown all the processes and all the building/machines that do the work, they were also thoroughly explained by our host.

Rosedale Treatment Plant

Same as above

JUST COMBINE D ABOVE

Pump Station 64

Same as above but attended with the design management team, this was very beneficial for the CI team as a replica of this pump station will be built at Mangere Treatment Plant for the CI project.

All shaft locations along the CI Pipe

This was an opportunity to learn more about the CI project and the general locations of where the pipe will go through. I learnt more about how the geotechnical investigations will be undertaken, got to shadow a Graduate Engineer and Geologists as they discussed the upcoming work. I also got to read drawings to locate the potential borehole locations.

Waterview Connection

I observed the TBM machine removal for the Waterview Connection Project. I learnt about the TBM machine, equipment and parts of the TBM machine and how to remove them and the processes involved. This benefited the CI project as a TBM machine will be used (at a smaller scale) but it was interesting to learn about the differences and similarities.

Figure 6: Observing Waterview Connection TBM Removal

ALL FIGURES MUST BE CITED IN TEXT.

Reflective appraisal

Stakeholder Engagement Activities

These tasks greatly improved my communication skills with not just stakeholders but with all people. With communication my confidence also built, confidence to talk about the project and what we are doing as a team. My organisational skills were also improved as I had to keep track of the iwi responses and balance these tasks with other assignments. Furthermore my time management was improving as i juggled smaller tasks with longer assignments. Filling in for Bojan for a week was a great opportunity and I learnt an enormous amount over that one week. I got too see what goes on before a geotechnical investigation takes place, I got to meet a lot of new people and attend a range of compulsory meetings that I didn't know went on before works take place. I got to learn more about what is being investigated and how they do it for example the drilling machinery that was used and what the geologists are looking for in each sample and the equipment and techniques they use for testing. It was interesting to learn about other aspects of a project rather than just the engineering side of things.

Improving Engineering Knowledge Activities

From the lessons learnt document I learnt about what could go wrong on a project due to small decisions or actions. I improved my research skills and how to sift through important or unimportant material (this greatly benefited my fourth year project research). Talking to senior engineers at meetings to discuss the lessons learnt taught me about experiences that they have been through.

GREAT!

The contractors briefing improved my time management skills, the 10 page brochure I created had to be made in two days and the 20 posters displayed were created in only a week. I had to use adobe photoshop and word document in a way I haven't used it before. The final brochure created was of a very high standard, and the CI team was impressed with it including contractors who commented on the brochure hand out. At this event I also learnt more about the CI project and the event showed me the importance of client and contractor relationship.

The property strategy activity further improved my knowledge of the CI project. I became very familiar with the watercare GIS viewer and google maps to assess all the properties. If the house was unable to be seen via these two sites then I

had to go out on site to assess the property. Therefore I could get my bearings of where the project was being completed. I thoroughly enjoyed this task as I was able to use my opinion more to assess buildings and start thinking from an Engineer's perspective. For example assessing houses age, appearance and depth, in my opinion does that appear vulnerable? Furthermore I improved my communication skills as I had to present my findings to numerous senior professionals.

Identifying the throttles was a very tedious and time consuming task. I further improved my GIS skills and this task allowed me to use abit of engineering knowledge with help from Steve to try and price each throttle. Thinking through the processes or methods that would have to occur if this pipe was to be removed, the people involved, the community temporarily effected, the material the throttle lies under, all had to thought about when estimating the final price.

I enjoyed doing the spoil disposal task as it was out of my comfort zone. The task I got given was very vague and since my manager that set this task was away for the month it was hard to ask what was really wanted from me. Therefore I had to use my own initiative and go with what i felt was right. I learnt how to read measurements off drawings. I also gained an appreciation for the amount of work that has already been completed on the CI project as I had to go into detail of all the elements that wold be constucted. My manager was extremely grateful and happy with the final product I created, it was easy to follow and accurate which meant they could take it straight to Auckland Transport and NZTA and start planning the strategy on what to do with the high amount of spoil.

Other

The pronamics event ran smoothly and positive feedback was received from all. I also got to learn how to use the pronamics software and am now certified and able to use the software. This event also improved my organisational skills as I organised the day long event as well as ran the day long event at the same time as participating.

The design team management meetings were very informative and I got a gage of the different work that everyone is involved with at watercare. This is beneficial for me as I can learn more about Watercare and what is going on in the company as I am concentrated on the CI project. Weekly lunches and quarterly events were also organised for this team to meet up in a more social way so I got to learn more about personal experiences as an engineer that many of the team have experienced and where their engineering careers have taken them and it was good as I could go to them for advice on my engineering future.

All the site visits I went on were great opportunities for further learning and expanding my knowledge. It was really beneficial to apply what I've learnt at university and relating this knowledge to real world applications.

NICE APPRAISAL!

Conclusions

To conclude I received a vast range of tasks to work on through out my working experience that really improved a wide range of skills. The main skills I feel I have improved on include communication, confidence, time management and organizational. Furthermore through the assignments I got given I was able to think like an engineer and begin using what I have learnt at university and applying them to real world applications. Lastly I believe I also gained a lot of knowledge that can only be gained through work experience and interacting with more engineers in the workforce.

I am very grateful for the experience Watercare has given me in my early engineering career and they have made me very excited for the future I have ahead of me.

- TRY TO CONCLUDE ENTIRE REPORT IN THIS SECTION

- VERY GOOD. GOOD TECHNICAL WRITING.
- SOUNDS LIKE GOOD EXPERIENCE.