**Project Journal  
Smart Decisions for Dwr Cymru/Welsh Water**

*Dwr Cymru Welsh Water provides safe drinking water for 1.4 million customers in Wales. From raw water acquisition, throughout water treatment and waste water management all processes are continually monitored by multiple inline sensors. All data is stored and records stretch back several years, covering a range of different events and incidents and the responses to them.*

*Dr Kate Martin is a Process Scientist in Ceredigion and is part of the team responsible for managing drinking water treatment in West Wales, ensuring the provision of safe drinking water. She needs to react immediately to events as they occur, day and night to protect the public. For example, a stakeholder intervention such as the deposition of slurry on fields can increase raw water turbidity and microbial composition to a level that is outside of acceptable parameters within hours. In this case urgent action must be taken to temporarily shut off the raw water inlet until levels meet raw water parameters. The length of time that this supply remains unavailable is time critical, since there is a limited volume held to buffer for these incidents. She also needs to make long term decisions to minimise risk whilst minimising the costs of unnecessary intervention, for example the replacement of filter media.*

*This project will provide intelligent software to analyse current and historic data from Kate and Dwr Cymru and will allow the company to make smart real-time decisions. The software will make use of data mining, statistics, machine learning and/or data visualisation solutions. We'll consult with Kate about the data that she has and the areas in which she'd like to see some intelligent support introduced.*

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| **Week 1**  **29/1 - 4/2**  **Hours –**  **II** | Monday  Had the first MMP project meeting this morning with Amanda and three other students. Before this point, I had not done much thinking about the project as I was waiting for a meeting with Kate (Welsh Water) to discuss what kinds of project would be useful.  The meeting gave me plenty of points to think about including what software will be used, what software development methodology will be used, the work week schedule planned for the project, backup systems and version control etc. [1]  I also need to look into what other people have done in the area of my project – are there any other Welsh water projects available online, how are similar projects data presented, and how is water quality tested and monitored around Aberystwyth.  Tuesday Today I spent time thinking about the points mentioned above. I split the time for this project into ten weeks and assigned each of the waterfall phases (i.e. requirements, implementation) into the ten weeks to ensure that I don’t spend too much time planning and not enough time doing.  I spent some time learning how to use git and github (MORE NEEDED).  Wednesday **9am Meeting with Kate and Amanda *\*\*\*\*\*\****  Thursday  **11:20 Meeting with Amanda**  Friday  Saturday  Sunday | To-Do This Week  REQUIREMENTS PHASE  - Prepare questions for 9am meeting (Wednesday)  - Think about points for the document required next week explaining your project  - Practice Python  - Project schedule?  - Have a look at useful Python libraries that might be needed |
| **Week 2**  **5/2 – 11/2** | Monday  Tuesday Today I spent some time making the first draft of the outline specification document, I need to email Hannah a draft by tomorrow or Thursday morning. I need to email Kate to confirm what my project is about and ask for some sample data to be sent to me so that I can begin some technical work.  Wednesday  <https://wiki.python.org/moin/NumericAndScientific>  **NOTE – MAKE SURE TO MENTION DIFFERENCE BETWEEN HIGHLAND AND LOWLAND RESERVOIRS**  Today I completed the first draft of the OPS and emailed to Hannah ready to get feedback tomorrow. I’m still a little unsure of how to approach a project of this size however the research today has been very interesting – I have studied the chemistry behind how an aluminium coagulant works and I think this will help with my understanding of the data once it finally arrives  Thursday  **Meeting with Hannah @ 11:20** The meeting with Hannah went well, I am feeling a bit better about the project now. It will soon be time to begin coding, my task for this week is to figure out how to import and read csv files into python, there are some helpful YouTube videos available that I have been looking at. Hopefully Kate will send everything soon.  Friday  Saturday  Sunday | To-Do This Week  REQUIREMENTS PHASE  - Set up github and upload documents (design spec and journal)  - ~~send blog link to Amanda and Hannah~~  - import and read csv files |
| **Week 3**  **12/2 – 18/2** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  DESIGN PHASE |
| **Week 4**  **19/2 – 25/2** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week IMPLEMENTATION PHASE |
| **Week 5**  **26/2 – 4/3** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  IMPLEMENTATION PHASE |
| **Week 6**  **5/3 – 11/3** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  IMPLEMENTATION PHASE |
| **Week 7**  **12/3 – 18/3** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  IMPLEMENTATION PHASE |
| **Week 8**  **19/3 – 25/3** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  IMPLEMENTATION PHASE |
| **Week 9**  **26/3 – 1/4** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week  VERIFICATION PHASE  - PyDebug library? (pudb) |
| **Week 10**  **2/4 – 8/4** | Monday  Tuesday  Wednesday  Thursday  Friday  Saturday  Sunday | To-Do This Week MAINTENANCE PHASE |

1. Meeting 1 – Initial Ideas  
[what software will be used, what software development methodology will be used, the work week schedule planned for the project, backup systems and version control etc]

I have decided to use the Spyder IDE for this project as it is an IDE I have used previously and I am confident it can provide what I need. I am using Python as it is an evident choice for working in Scientific and Numeric applications – there are multiple specialized modules like NumPy, SciPy, matplotlib and IPython which could prove useful in this project. I will also look into GUI modules if I have enough time. I must think of how the data will be shown on screen – are there any good libraries for that?

I will be using a Waterfall methodology due to not being able to have a constant on-site customer, it will suit the project to work in structured sections –

* Requirements (requirement doc, use cases)
* Design (software architecture)
* Implementation (construct the software, data storage and retrieval)
* Verification (test and debug)
* Maintenance (check errors, optimize capabilities)

The work schedule planned for this project is TBD (15 hours a week?)