National Certificate of Educational Achievement
TAUMATA MĀTAURANGA Ā-MOTU KUA TAEA

Exemplar for Internal Achievement Standard

Geography Level 3

This exemplar supports assessment against:

Achievement Standard 91433

Apply spatial analysis, with consultation, to solve a geographic problem

An annotated exemplar is an extract of student evidence, with a commentary, to explain key aspects of the standard. It assiststeachers to make assessment judgements at the grade boundaries.

New Zealand Qualifications Authority

To support internal assessment

	Grade Boundary: Low Excellence
1.	For Excellence, the student needs to comprehensively apply spatial analysis, with consultation, to solve a geographic problem. This involves: • evaluating the manipulations • fully justifying the solution to the geographical problem. The full justification is an in-depth response that uses clarity of argument and holistic understanding to demonstrate why one course of action is better than the alternatives. This student has addressed the problem of a parking shortage at a school. The student has evaluated the manipulations made to the spatial data by assessing the strengths (1) (4) and weaknesses (3). The evaluation includes how specific techniques enable the presentation to illustrate more complex data without compromising clarity (2). The student uses data from the layout to support their evaluation (5). A solution to the geographic problem is provided (6) which is fully justified through evidence from the spatial data (7). Several alternative solutions (8) (9) are examined in detail. For a more secure Excellence, the student could more clearly justify their solution to the problem by more closely comparing the alternatives to the proposed solution. A fully justified solution could also examine combinations of strategies.

Evaluating manipulations

… A strength of this manipulation is that tabular data is converted in geo-referenced spatial data which can then be compared with other spatial data (1). A second benefit of creating different layers is that I am able to turn them on and off so that my map is not too crowded and busy. I can display only the information that I required for a certain observation (2). For example, when I was looking to see how many students drive to school, I was able to turn off the layer showing the students who come to school on the bus. This data was not necessary for my manipulation and therefore it was useful to turn it off. A weakness is that if data is entered incorrectly it cannot be identified using the address locator and therefore will not be shown on the map and cannot be included in the analysis (3)…

The next thing I did was to create 2 buffer zones … A strength of this manipulation is that I could visually see the area that is included and create various buffers that could be turned on and off as needed for analysis (4). However, the buffer does not take into account the topography of the land or the road network. Impassable features such as the Waimapu and Waikareao Estuaries that fall within the buffer zones. Students would not be able to cross … therefore the distance that they would need to travel would be far greater than that indicated by the buffer zones… The buffers do not account for the road layout either as the K Road motorway is a national highway that cannot be crossed (5), which would mean that students would need to go around, adding much distance onto their commute. Therefore, a student may live within 2km of the school as the crow flies, but Manhattan distance, it may be more than that, and therefore make it unrealistic to expect students to walk or cycle to school from that location. This can cause inaccuracies in the findings…

Proposing a solution to a geographic problem

From my analysis, there is definitely a shortage of parking at our school. … A solution to this problem could be for students to apply for a parking permit with strict criteria and to charge these students to park at school (6). The criteria would be based on whether the student had alternative ways of getting to school. The criteria could be that students who live within 3km of school cannot get a permit. From Map 4 on my layout, you can see that there are 24 students who drive to school but they could walk as they live close enough to the school. There are also 10students who drive to school who could cycle to school. This would reduce the number of cars trying to park at school. By enforcing these permits, these students are not hindered from getting to school as they have another option of getting to school. From Map 3 and Table 2, you can see that 9% and 4% of students walk and cycle respectively and therefore there is no reason why students who drive from this zone could not also walk or cycle (7)…

Charging students for the permit would also reduce the number of students who wish to park at school so taking the bus … may be a cheaper option. As one can see from Table 2 and Map 3, 23% of students living in other suburbs of Tauranga use the bus … students who drive from these areas can also use the buses to get to school. This would further reduce the pressure on the parking at school. This solution would help to reduce the number of people wanting to use the car parks and prevent cars parking on the grass or parking illegally as in Graph 1 and Table 2 on the layout. Solutions to this problem need to consider how much car parking and who has priority rights to it. Investment in

further car parking at school is not really a priority consequently … An alternative could be to only allow year 13 students this privilege. An advantage of this solution is it would be clear who was permitted to park at school and this would also reduce the pressure on parking. This may result in a waste of parking space if there were insufficient students opting for permits which might occur if students were charged. It could be difficult to police as well (8)… A total ban on students bringing cars to school would immediately solve the problem and only exemption given for students who have no alternative method of getting to school. This currently accounts for 48 students. This would be the easiest from the point of view of administration and would not disadvantage students who currently have no other way of getting to school. As well as the limited space available it is crucial that students who clearly need the parking are considered in any alternative. This would be included on the permit proposed in the solution which has a wider focus than other alternatives and is fairer, making more effective used of this limited resource… … Walking buses could be encouraged, and the "push play" ethos fostered throughout the school to get more students who live closer to school walking to school. This would be an innovative solution (9)… Map 4 on my layout, shows that 24 students drive to school could walk to school as they live within the 3km buffer. ..

	Grade Boundary: High Merit
2.	For Merit, the student needs to effectively apply spatial analysis, with consultation, to solve a geographic problem. This involves: • collecting sufficient spatial data to address the geographic problem • completing manipulations of the spatial data to produce an accurate layout related to the problem • explaining the manipulations in detail • justifying the solution to the geographic problem. The justification demonstrates why the chosen course of action is better than the alternatives. This student has addressed the problem of a parking shortage at a school. The student has explained the manipulations in detail with reference to the data, software and techniques used (1). The detailed explanation shows clear understanding of several techniques for manipulating spatial data such as creating layers (2) and buffers (3). The student clearly explains the problem (5) before proposing and explaining the solution (6). The solution is justified with the use of supporting evidence from the layout (7). An alternative solution is examined in some detail (8). To reach Excellence, the student could develop the evaluative statements further. Evaluation of the actual manipulations is needed. This could be attained by extending the explanation when a strength and weakness of the results of the manipulation are identified (4). To fully justify a solution, the student could support their suggested alternatives with evidence from the spatial data and more explicitly compare them with the proposal.

Explaining the manipulations in detail… After collecting data the next thing that I did was to geocode the data in my survey using ArcMap and ArcCatalog and the files from the TCC. I created layers using the information that I collected … I did the geocoding by adding the excel table to my map in ArcMap and then using the right click menu instructing the software to geocode the information using the address locator. It then turned my data into points in my map which allowed me to easily see this data in map form (1). I did this process several times and geocoded the different modes of transport, one into each layer. I made each layer a different colour I then used the information to create layers to show visually how many students drove to school and from where. I also created layers to show (2) ….. This can be seen in Map 3 on my layout. I did this so that I could turn the different layers on and off and see how many people lived where. My results showed that 53% of students drive to school, 23% come on the bus, 8% walked, 4% cycled and 12% got to school in another way. A strength of this manipulation is that real data can be used. A weakness is that if data is entered incorrectly it won't be shown on the layout. The next thing I did was to create 2 buffer zones around the school to show which areas around the school were within walking distance of the school and thereby show which students in my survey who drove to school could have walked instead. I did this by creating a new shape file in ArcCatalog and ensuring that I was using the correct projection (3). Once I had created this file I was able to add it to my map of Tauranga in ArcMap. Once this was added I used the editor tool to create a 2km buffer around the school to show … I followed the same process to create a 3km buffer to show which students …

The last thing I did was to look at the layers that I created and count how many students who drive could in fact walk or cycle to school. I did this by looking at the legend on Map 4 to see which students who drove to school fell into the 2km buffer zone and could in fact walk to school. It showed me that 24 students fell into this category. I did the same thing by looking at my 3km buffer to see how many students could walk rather than drive. The results showed me that 10 students fell into this category. A strength of this method is that you can visually see who lives where. A weakness is that some houses are on the boundary of the zones so it can be confusing (4).

Proposing a solution to a geographic problem

From the results of my analysis, I see that there is definitely a shortage of parking at our school. 53% of students drive to school (graph 2) and require parking, but Table 1, one can see that of the 188 parking spaces, 186 and 170 spaces were occupied at 8:45am and 2:00pm respectively. There are both staff and students who use these parking spaces and from Image 1, you can see the location of the different car parks and also shows the limited space for the creation of new parking areas. Street car parks were occupied all day, and A Block was near full all day, and J Block was in fact overfull at 8:45am with students parking on the grass (5).

A solution to this problem could be for students to apply for a parking permit and receiving one would be determined by strict criteria. This would make it possible to monitor the use of car parks and reduce the number of cars trying to park at school (6)… The criteria could be that students who live within 3km of school cannot get a permit. From Map 4 on my layout, you can see that this criteria would have a big impact as there are 24 students who drive to school but they could walk as they live close enough to the school. There are also 10 students who drive to school who could cycle to school (7)… By enforcing these permits, these students are not hindered from getting to school as

they have another option of getting to school. Structuring the criteria so that the people with no alternative way to get to school and those living the furthest away have first option to a permit…

An alternative to this solution could be introducing a fee where student' would rent a car park. Charging students for the permit would also reduce the number of students who wish to park at school as many of the surveyed students lived on a bus route so could take this as it is cheaper than paying for parking (8). Again these students would still be able to get to school, and it would reduce the pressure on the parking at school… An added advantage of this option is that the money earned could be used to upgrade the facilities… A weakness of this solution is that students who don't have an alternative way of getting to school would be seriously disadvantaged…

	Grade Boundary: Low Merit
3.	For Merit, the student needs to effectively apply spatial analysis, with consultation, to solve a geographic problem. This involves: • collecting sufficient spatial data to address the geographic problem • completing manipulations of the spatial data to produce an accurate layout related to the problem • explaining the manipulations in detail • justifying the solution to the geographic problem. The justification demonstrates why the chosen course of action is better than the alternatives. This student has produced a layout which indicates that sufficient spatial data has been collected and manipulated to address the geographic problem of a parking shortage at a school. The layout is appropriately displayed, including a range of tables, graphs and maps which are annotated with supporting explanations (1). Some of the manipulations have been explained in detail. Evidence is provided both on the layout (1) and in the body of the student evidence (2). An appropriate solution has been proposed and justified (3). Alternatives are suggested and compared with the proposed solution (4). For a more secure Merit, the student could explain more of their manipulations and provide detail as to why that technique was used or what the intended outcome was. Further justification for the chosen solution could be achieved by discussing the solution in relation to the alternatives. Alternatively, further explanation of how weaknesses of the alternatives could be solved by implementing the chosen solution.

Location: Tauranga Girls' College is located in Tauranga on the North Island of New Zealand. **Latitude** is 37° 44' 42"S; **Longitude** is 176°08'38"E with an elevation of 20 metres.

1

Map 1: Tauranga, North Is. NZ

Note: Maps and co-ordinates clearly show spatial location

Map2: Tauranga and surrounds

Image 1 - location of the five parking areas on campus.... Table 1 shows, there are 188 parking spaces available...

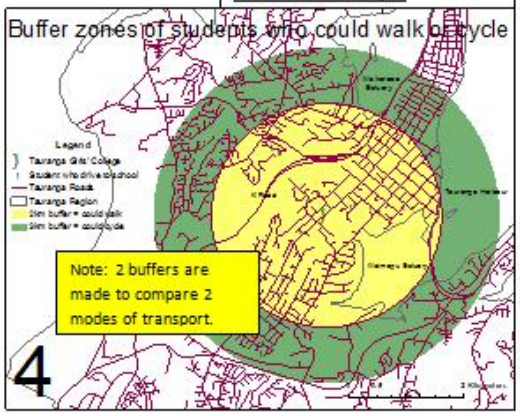
Note – Image is annotated and shaded to show study area.

Image 1: Google maps image showing existing parking areas at TGC

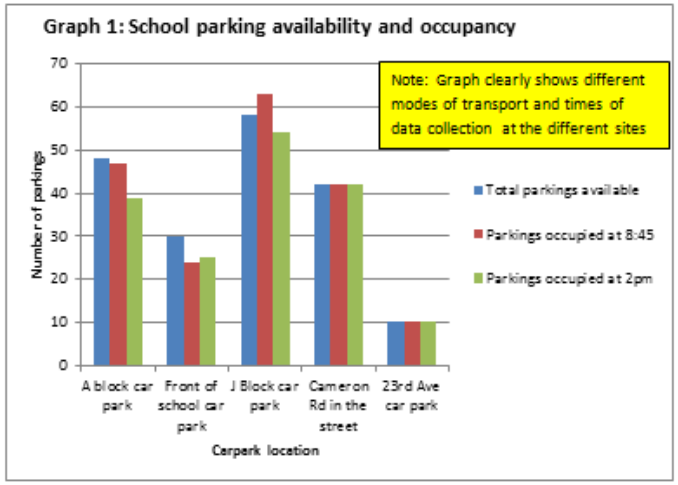
Table 1: Parking occupancy at TGC

	Number of parkings available	Occupied parkings at 8:45	Occupied parkings at 2pm
A block (1)	48	47	39
Front of school (2)	30	24	25
J block (3)	58	53 (+10 in grass)	50 (+4 on grass)
Cameron Rd in front of school (4)	42	42	42
23rd Ave outside K block (5)	10	10	10
Totals	188	186	170

Map 3 – Buffer Zones of students who could walk or cycle



Note: 2 buffers are made to compare 2 modes of transport.

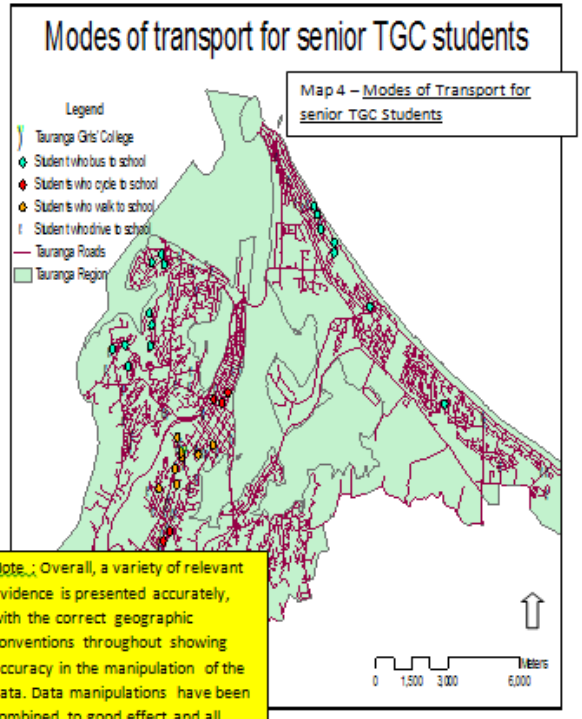


Note: Graph clearly shows different modes of transport and times of data collection at the different sites

Graph 1 shows occupancy of the 5 parking areas at TGC is high throughout the day. Both street parking areas were full at both counts. A block and front of school were near full, with only 1 bay free in A Block at 8:45am and 9 at 2:00pm. ..

J Block parking was over full with 10 students parked on the grass.

This graph highlights the shortage of parking and the need for a solution.



Map 4 – Modes of Transport for senior TGC Students

Note : Overall, a variety of relevant evidence is presented accurately, with the correct geographic conventions throughout showing accuracy in the manipulation of the data. Data manipulations have been combined to good effect and all relate to the problem. The findings of the manipulations are explained in detail.

Map 4

Is a spatial representation of the different modes of transport that senior students use to get to school. From the map one can see that while the school is located in the suburb of Gate Pa, students come to the school from different suburbs around the city as represented by the different coloured dots.

The majority of students drive to school (blue dots), while other ...

From this map one can see that there are many students who drive to school who live close to the school and could possibly walk...

This manipulation is key in suggesting a solution that encourages students who drive to find another mode or transport and reduce the pressure on existing parking areas.

Explaining manipulations

There were many manipulations that I did in order to analyse the problem of parking at school. I used ArcMap and ArcCatalog to geocode the data from TCC and from my surveys...

I created layers using the information that I collected about how senior students get to school, by putting their addresses into an Excel table. I did the geocoding by adding the Excel table to my map in ArcMap and then using the address locator it turned my data into points in my map, see map 4. This manipulation made it possible for me to see where students lived and compare distances (2). This process was repeated several times for the different modes of transport, one into each layer. I made each layer a different colour I then used the information to create layers to show visually how many students drove to school and from where. It was now possible to turn the layers on and off separately…

Proposing a solution to a geographic problem

From the results of my analysis, I see that there is definitely a shortage of parking at our school. 53% of students drive to school (graph 2) and require parking. A solution to this problem could be for students to apply for a parking permit with strict criteria. This would immediately reduce the number of cars trying to park at school, as only a set number of permits would be allocated… The criteria would relate to the distance students lived from the school (3). Students who live within 3km of school cannot get a permit. From Map 4 on my layout, you can see that there are 24 students who drive to school but they could walk as they live close enough to the school. There are also 10 students who drive to school who could cycle to school. The distance from school could vary with the number of applicants for parking permits; this would make it possible to regulate the distance by the number of parks available in any year…

An alternative is to ban students from parking at school with the exception of those students who have no alternative way of getting there. This is quite similar to the solution proposed as the criteria can be such that only selected students are eligible (4). The school could use and idea like carless days, where certain people can bring a car on stipulated days, this was more people would have the option to bring a car…

	Grade Boundary: High Achieved
4.	For Achieved, the student needs to apply spatial analysis, with consultation, to solve a geographic problem. This involves: • collecting and presenting spatial data relevant to the geographic problem • completing manipulations of the spatial data to produce a layout related to the problem • explaining the manipulations • proposing a solution to the geographic problem. This student has produced a layout indicating that spatial data relevant to the problem of a parking sshortage at a school has been collected (1). A variety of relevant evidence is presented following most geographic conventions and data transformations are appropriate. Several manipulations have been explained, clearly addressing why each method was used. For example, the creation of layers (2) and buffers (3). The student proposes a solution to the geographic problem with the use of supporting evidence from the layout (4). To reach Merit, the student could collect more spatial data and complete more manipulations, to support effective analysis. For example, data related to occupancy of the car park or modes of travel to school could be collected, and a second buffer added to the map. The layout could show a higher degree of accuracy, such as clearer coding on the maps and use of all geographic conventions. The justification for the solution needs to demonstrate why the proposal is better than the alternatives outlined (5), for example explaining that the cost of building additional car parks would be prohibitive.

1

Location: Tauranga Girls' College in located in Tauranga on the North Island.
Latitude is 37° 44' S; **Longitude** is 176°08'E

Map 1 - Tauranga

The spatial dimension is clearly evident.

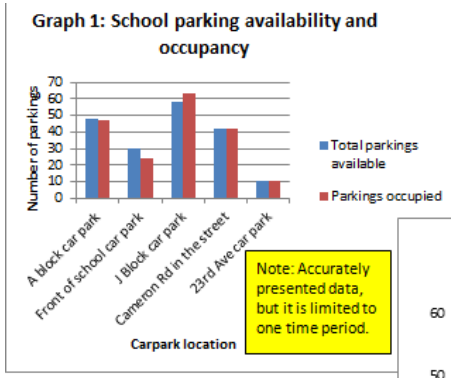
Map 2: Tauranga and surrounds

Note : Overall, a variety of relevant evidence is presented following most geographic conventions. Data manipulations have been combined and all data relates to the problem. The findings of the manipulations are explained.

Image 1 - shows the three parking areas, and the two areas of street parking at Tauranga Girls' College. Staff and students use these parking areas. Graph 1 show the need for extra parking spaces or a reduced number of cars.

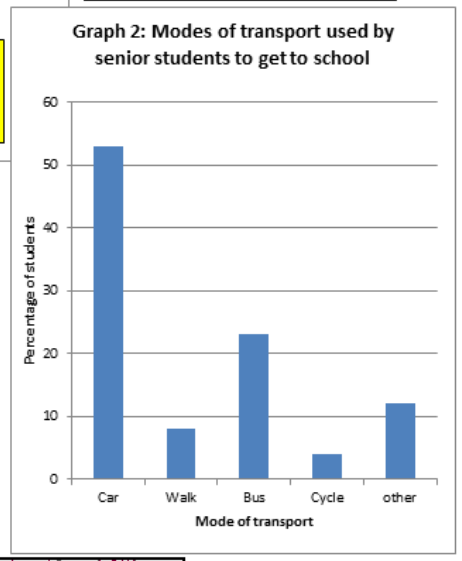
Image 1: Google Maps image

Note: Parking areas are difficult to see – labels with names would enhance this image.



Graph 1 - shows occupancy of the 5 parking areas is high. Both street parking areas were full. A block and front of school were near full, with only 1 bay free in A Block. J Block parking was in fact over full with 10 students parked on the grass. Data collected on a Monday at 1pm.

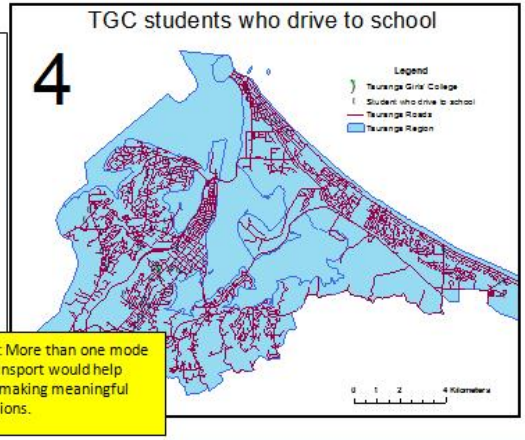
Note: Accurately presented data, but it is limited to one time period.



Graph 2 -shows over 50% of senior students drive to school, less than 10% walk, over 20% take the bus and 5% cycle. The remainder of students get to school by other methods, lift with a friend, lift with a parent and on a scooter.

Note: Accurate graphing. Supporting % values would have helped with interpretation of this graph.

4

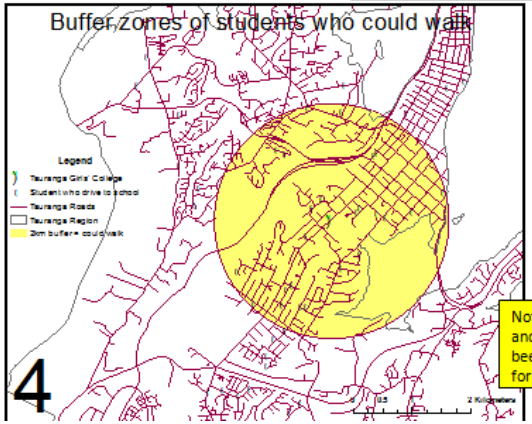


Map 3 shows that students come to the school from different suburbs around the city seen by the blue dots.

From this map you can see that there are many students who drive to school, many of whom live close to school.

It is important that my solution encourages students who drive to use another mode of transport.

Note: More than one mode of transport would help with making meaningful decisions.



Map 4 shows the buffer zone that I created. The buffer is a distance of 2km. I think this a distance that students could walk to school from. There are 24 students who drive to school who fall into this buffer zone. I suggest that they could walk to school.

Note: One buffer zone accurately drawn and explained. This technique could have been used to show more data and allow for more meaningful decisions

Explaining manipulations

The first thing that I did was to create layers. I did this by collecting information about how senior students get to school as well as their addresses through a survey so that I knew how many students used cars, bided or walked to school. I geocoded the results of the survey using files from the TCC…

I geocoded this data into layers to show visually how many students drove to school and where students lived. I did this so that I could turn the different layers on and off and see if there were patterns or relationships between home and driving to school and it also showed how many people lived where (2). I created a graph to show the different modes of transport used and my results showed that 53% of students drive to school, 23% on the bus, 8% walked 4% cycled and 12% got to school in another way…

The next thing I did was to create a buffer around the school to show which students who currently drove could walk instead. I did this by creating a new shape file in ArcCatalog that I added to Arc map and using the editor tool I created a circle 2km around the school. I made it transparent so that I could see other data as well (3)…

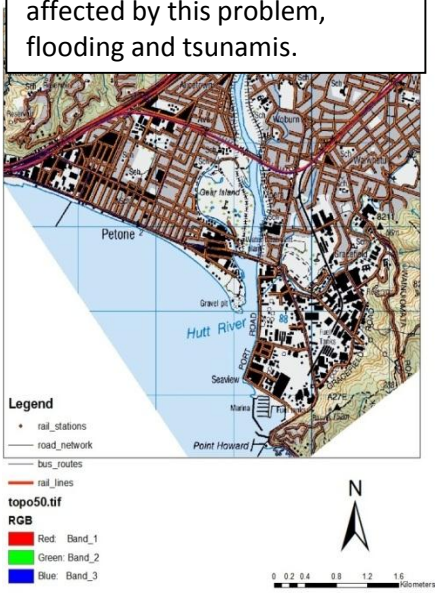
Proposing a solution to a geographic problem

From the results of my analysis, there is definitely a shortage of parking at TGC.

A solution is needed to encourage them to use other modes of transport. A solution to this problem could be to charge students to park at school. There are not enough car parks at the school for the number of students who want to use them and therefore those who want to park at school should have to pay. This might encourage students who live close to school to either walk or catch the bus. Of the 53% of students who drive to school 46% of them live close enough to walk or are able to catch a bus see maps 3 and 4 (4). This would help to make less people want to use the car parks and prevent people from parking on the grass or parking illegally as you can see on the layout. A weakness of this solution is that some students do not have an alternative way to get to school and students may continue to bring cars and further congest the surrounding streets… Many alternatives to this solution could be examined such as permits, which are used in many schools or the building of more parking spaces (5). Buses could be more efficient if they didn't have to stop so much and that might encourage students to use them more often…

	Grade Boundary: Low Achieved
5.	For Achieved, the student needs to apply spatial analysis, with consultation, to solve a geographic problem. This involves: • collecting and presenting spatial data relevant to the geographic problem • completing manipulations of the spatial data to produce a layout related to the problem • explaining the manipulations • proposing a solution to the geographic problem. This student has produced a layout (1) using a variety of relevant spatial and statistical data. Data manipulations have been combined and transformations relate to the problem of flood risk in the Hutt valley. The manipulation technique of selecting 'layers' is used to emphasise aspects of relief data on the maps (2). The explanation links this relief data to the potential river and tsunami flood risk areas, thereby showing the relevance of this data. A solution to the geographic problem is proposed with reference to the spatial data (4). The student's justification for their proposal demonstrates understanding of the spatial data (5) and some ability to apply spatial analysis to solve a geographic problem. For a more secure Achieved, the student could attain greater accuracy with the layout (1) by using geographic conventions and place names, and more logical presentation. The student needs to extend the descriptions of the manipulations to explanations. This explanation needs to include why a selected technique was used with the data and how it helped them to resolve the problem. For example, the student could explain how and/or why the manipulation through creating themes allows for an easy comparison (3).

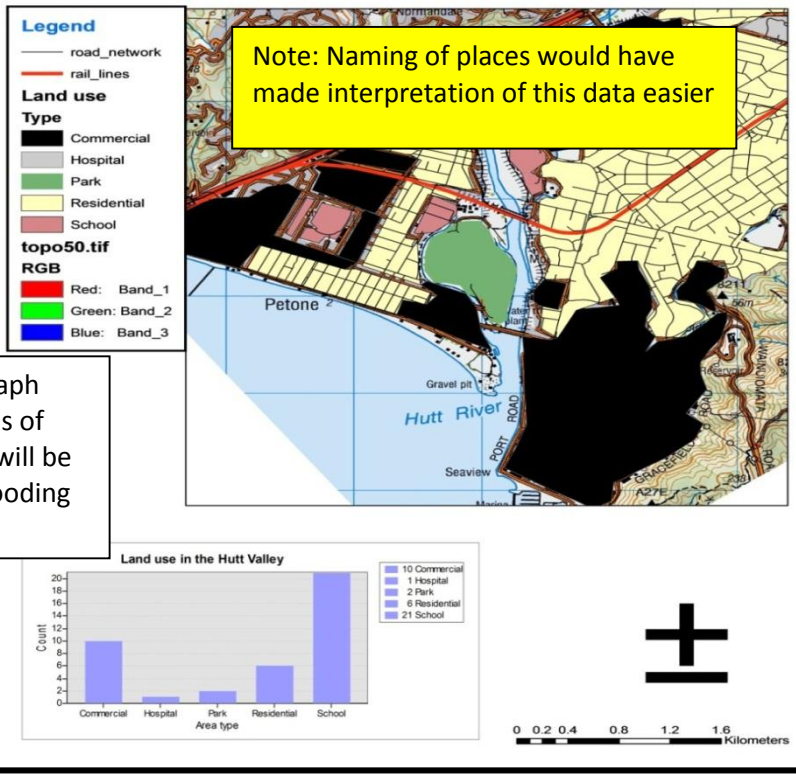
Map 1 – shows the total area of the Hutt Valley that will be affected by this problem, flooding and tsunamis.



Note: Labels to identify important areas affected are

1

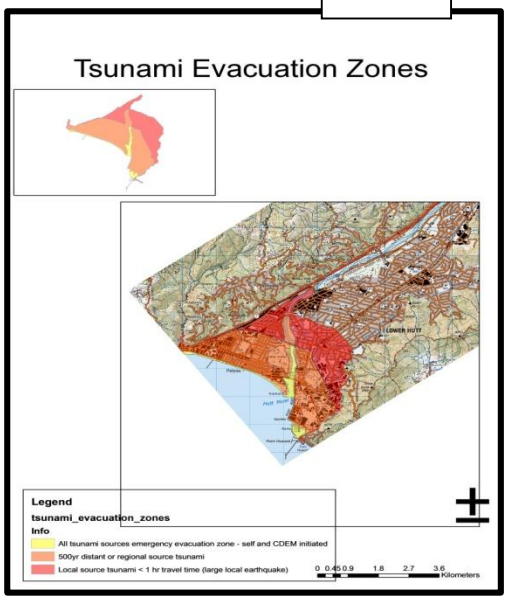
Land Use in the Hutt Valley



Note: Naming of places would have made interpretation of this data easier

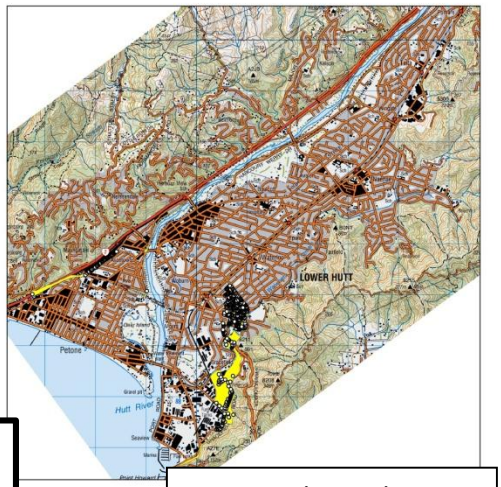
Map 2 and Graph show the types of land use that will be affected by flooding and tsunami

Map 4



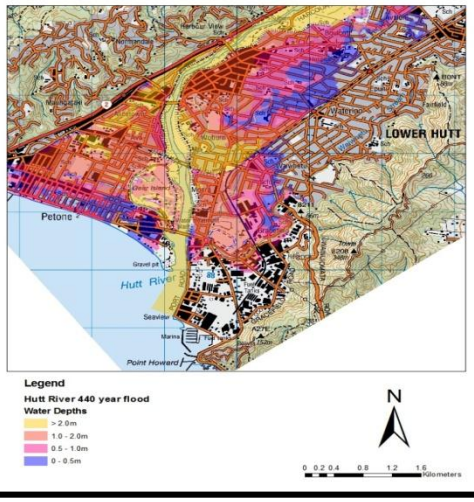
Note: Comparisons are made between two data sets. It would be better if layering was used to combine the data and turn off data sets to show the combined result.

Addresses in a yellow tsunami only



Map 3 – shows the layering of houses that are in the self-evacuation zone (yellow tsunami). 448 people will be affected, mainly in the South East.

Map 5



Maps 4 and 5 show the main area affected by flooding and Tsunami is in the lower parts of the Hutt Valley, near Petone .

Note: Geographic conventions, orientation, scale are needed on some maps

Explaining the manipulations

I began by manipulating the topo map to show key relief features, land heights and rivers/streams. This was achieved by selecting only the layers I wanted and saving this image. The primary use of this map was to be able to show areas that would be flooded at different river heights or how far tsunamis waves could travel up the valley (2)…

Then it was necessary to create several themes e.g. land use and key assets… I used the draw tool to trace the outline of schools, parks, and hospital areas with a polygon shape. The land use map shows, commercial, residential, parks and schooling areas that would also be affected, mainly in Petone. Based on the map there are many commercial areas e.g. Gracefield and residential areas e.g. Alicetown and Woburn that will be affected. This was evident when comparing the base map with the land use map…(3).

These themes could be layered using the GIS software…

Wellington Regional council has a GIS Data Portal Programme, which has enabled me to gain the addresses for selected areas and locate them on a map to show the number of residents at risk of floods or tsunamis. Although we have access to this data, the accuracy and validity of the data was limited…

The solution to the problem

The maps clearly show the areas that are at highest risk of floods and what this land is used for… My proposal is to rezone the areas with the highest risk. This would mean the Petone area including Alicetown and … (map 5) these coastal areas are major tsunami risk areas(4)… The current land is largely, commercial and residential…

Flooding caused by the river is already partly managed with carparks and recreation being the main land uses bordering the river and significant stop banks have been constructed… This already shows the benefits of zoning (5)…

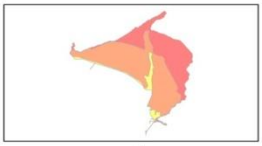
	Grade Boundary: High Not Achieved
6.	For Achieved, the student needs to apply spatial analysis, with consultation, to solve a geographic problem. This involves: • collecting and presenting spatial data relevant to the geographic problem • completing manipulations of the spatial data to produce a layout related to the problem • explaining the manipulations • proposing a solution to the geographic problem. This student has collected and presented spatial data relevant to the problem of flooding in the Hutt Valley, and produced a layout (1). Some manipulations have been explained (2) showing understanding of the spatial data. A solution to flooding is provided (4) which demonstrates the student's ability to apply the spatial evidence. To reach Achieved, the student could collect and present more spatial data. Effective use of geographic conventions is expected at this level, specifically scale, orientation and clear titles. The descriptive evidence (3) needs to be developed further to show understanding of why selected techniques were used. When proposing a solution to the geographic problem (4) the student needs to show that it is based on the spatial analysis. This means that explicit reference must be made to the spatial data presented on the layout to support the proposal.

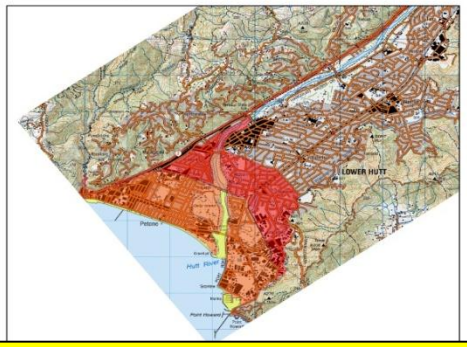
Houses to be affected by a Tsunami
23 BELL RD WAIWHETU
20 BELL RD WAIWHETU
63 MANDEL MEWS WAIWHETU
29 BELL RD WAIWHETU
45 MANDEL MEWS WAIWHETU
51 MANDEL MEWS WAIWHETU
61 MANDEL MEWS WAIWHETU
31 BELL RD WAIWHETU
23 WHITES LINE E WAIWHETU
119 WHITES LINE E WAIWHETU

1

Note: Table not linked to data manipulation or problem.

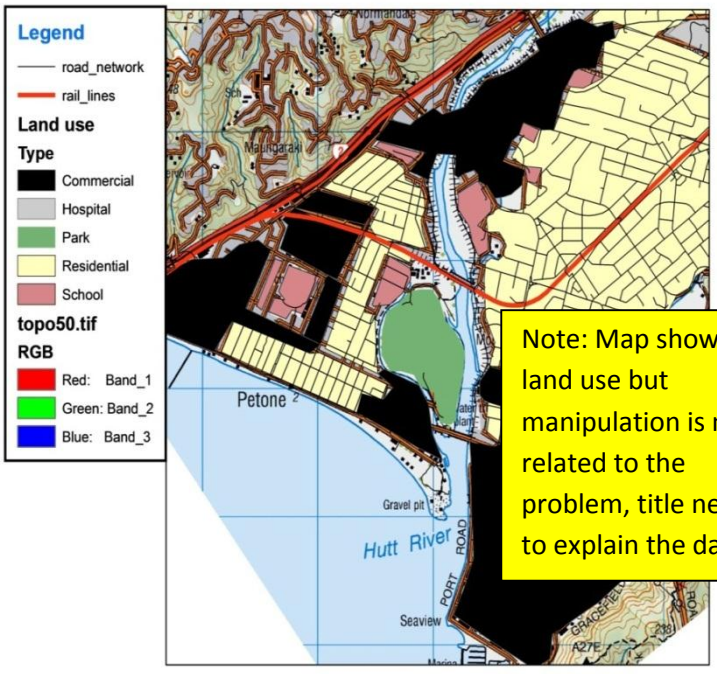
Tsunami Evacuation Zones



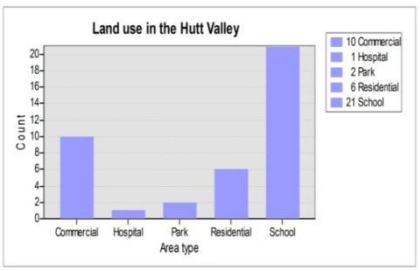


Note: Map is missing scale, orientation point and a key. The 3 different colours need identifying to indicate what the manipulation shows.

Lower Hutt



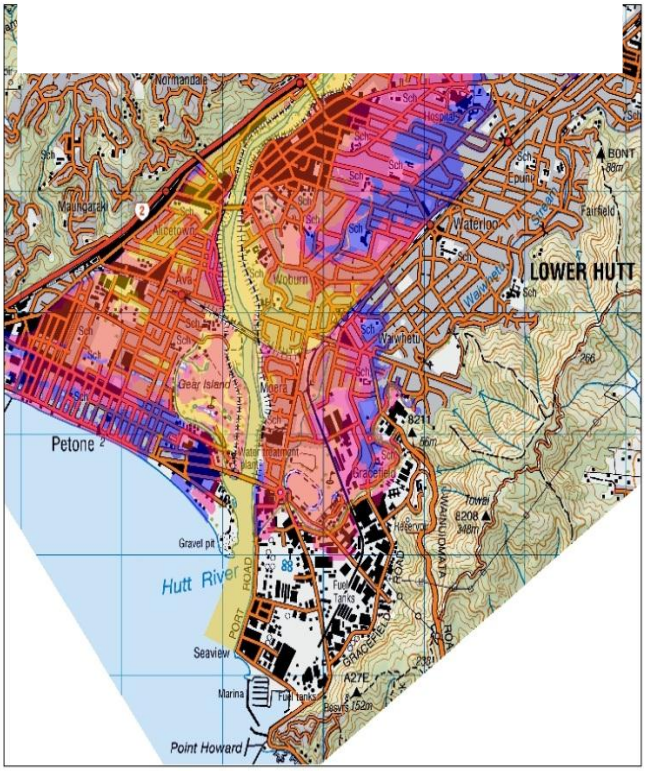
Note: Map shows land use but manipulation is not related to the problem, title needs to explain the data

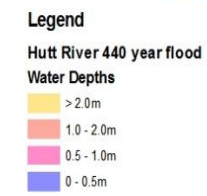


Note: The relationships between the data manipulations and the problem should be clear.

440 year flooding in the Hutt Valley

FLOODING IN THE HUTT VALLEY





Note: Map is missing appropriate title, scale, and orientation point.

Student 6 – Not Achieved

Explaining the manipulations

I created a land use map of the Hutt Valley to show what assets might be affected. In the land use theme, I used the draw tool to pick out the assets. Affected assets included the railway, roads (including SH2), houses and commercial areas, including factories and houses, especially around Petone. This technique helped me identify what type of land use was most at risk and what type of action needed to be taken (2).

Themes were layered in the GIS software to show the areas affected. Layering the themes is a process where all the shape and layer files were inserted into the map show where the risks were. I noticed that there was some overlap, as the layers showed up a different colour –some people would be affected by both a flood and a tsunami – especially if it was a local tsunami…

I joined the two themes and then selected areas and clipped actual addresses. This is done by adding the address file and then clipping for each of the scenarios.

1. To clip – click on toolbox, then extract, then clip and name it something you will remember

2. Edit input feature – addresses, and output feature is the layer you are getting them from

I clipped information so that I could get the exact address for each layer (3).

Solution to the problem:

I think the solution needs to protect people so the residential areas at risk need to have flood barriers constructed…Over time it could be possible to change the zoning of some areas to make the main risk areas all recreation zones (4)…