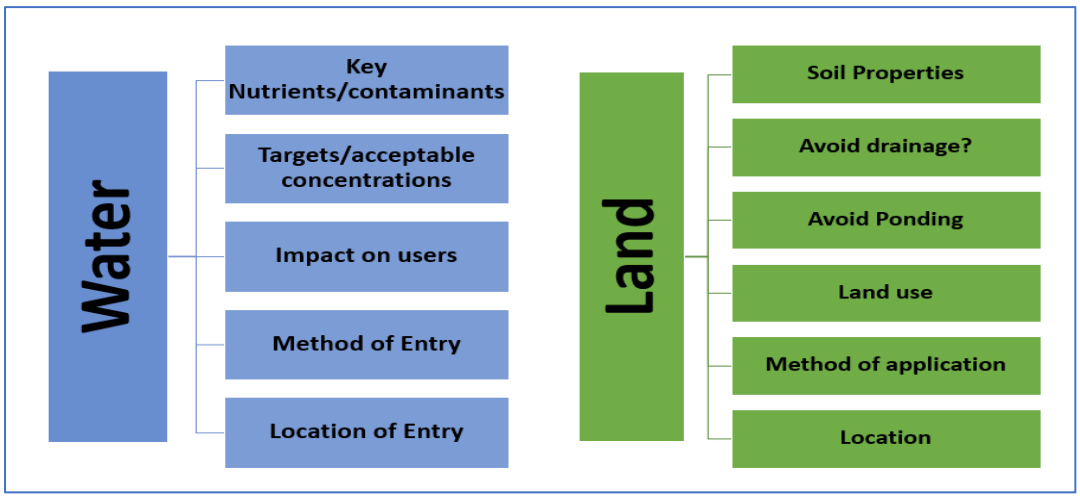
RECEIVING ENVIRONMENTS

Once wastewater has been treated, it needs to be discharged somewhere – it doesn't just disappear or evaporate.

The choices are: discharge to land, freshwater bodies (lakes, rivers, streams), estuaries, and the ocean. The soils, terrain and adjacent water bodies determine the most feasible choices. In Wairoa's case, it has some land options and is close to the ocean and a river estuary.



It may also be important to consider the use of two or more receiving environments so that one can be used as the alternative when the other environment is unable to receive treated wastewater.

WHAT TO CONSIDER WHEN DEVELOPING OPTIONS

Rivers and Estuaries

- Nutrients & contaminants - What are the key nutrients and contaminants currently of concern and require limiting during discharge – is the waterway able to accept any further contaminants?
- Concentration level - What are the target values and acceptable concentrations to be achieved downstream after reasonable mixing?
- Cultural - What is the impact on cultural values?
- Public use - What are the impacts on users - (who are the users, what are their uses and relevant values, when do they use the waterway, and what changes from the existing state would the discharge cause)?
- Public awareness - Is Public Health protection needed (eg spread of disease from contact with contaminated water or consumption of contaminated fish), and what is the relevance of recreational values?
- Outfall pipe - What is the method of entry for the discharge (e.g. via an open drain or a submerged pipe within the river bed)?
- Location - What is the location of entry for the discharge and its sensitivity for causing concerns or risk of damage from erosion?
- River flow - What is the flow rate of the waterway compared with the discharge – what dilution rate is likely? Are there tidal cycles, flood events, and seasonal low flows and high flows which affect how much dilution is possible and what times of day and year are best suited to accept the discharge.
- Seasonal effects - Is the flow rate and quality of treated wastewater being discharged affected by storm events and seasons?
- Discharge timing - What is the timing of discharges – will discharge events be restricted to times of day such as falling tides, above median flows, and/or hours of darkness?
- Storage - Is storage for deferred discharges possible – How much storage volume will be needed? Does the existing WWTP have enough freeboard or what size pond will be needed for additional storage? Where will an additional pond be located?

Ocean (Hawke's Bay)

- Nutrients & contaminants - What are the key nutrients and contaminants of concern and requiring limits on discharges – is the ocean location sensitive to additional contaminants?
- Concentration level - What are the target values and acceptable concentrations to be achieved after reasonable mixing?
- Cultural - What is the impact on cultural values?
- Public use - What are the impacts on users - (who are the users, what are their uses and relevant values, when do they use the ocean area, and what changes from the existing state would the discharge cause)?
- Public awareness - Is Public Health protection required (e.g. spread of disease from contact with contaminated water or consumption of contaminated fish), and are recreational values of concern?
- Outfall pipe - What is the method of entry for the discharge (e.g. what design is appropriate for the diffuser on the pipe's outlet)?
- Location - Where should the location of entry for the discharge be and what is its sensitivity for causing concerns, proximity to the beach, or risk of damage from erosion, river mouth bar movements, or boating activities?

Land

- Location – How close is the land to the WWTP and how many sensitive neighbours are nearby?
- Terrain and elevation – gentle slopes or flat land at similar height to WWTP are ideal.
- Soil properties – water holding capacity, drainage rate, and particle size or soil type will determine loadings rates.
- Land use – will wastewater irrigation integrate with the current land use (eg reserve, farm, or forestry) or will the land use need to change to accommodate the wastewater irrigation? How will harvesting or stock grazing regimes integrate with irrigation regimes?
- Land area – how much land is available after subtracting buffers and unsuitable land?
- Climate – what are the normal and extreme ranges of rainfall, soil moisture deficit, and wind for each month and year? How will these variations limit irrigation design and operation?
- Method of discharge – examples are subsurface dripper lines, fixed irrigators, travelling irrigators, border dyke or infiltration basin, and (artificial) wetland basin.
- Application rate and purpose – choices are deficit for zero drainage while maximising plant growth, non-deficit for some drainage and loss of nutrients to groundwater, rapid discharge for disposal to groundwater or wetland, and land passage prior to entering waterways.
- Timing of discharges – what seasons and weather or soil moisture conditions will restrict or prevent discharges (eg wet soils, heavy rain, or strong winds)?
- Storage for deferred discharges – How much storage volume will be needed? Where will an additional pond be located?
- Emergency or large storm contingencies – what will happen to excess wastewater volumes and what limits would be appropriate?

CLAWD

- Criteria for selecting land and water discharges – what criteria will be used to determine when the best times will be to discharge to these environments and how much is to be discharged each day? How will they be prioritised and balanced?
- Storage for deferred discharges – How much storage volume will be needed for times when neither environment (land and water) can receive the discharges? Where will an additional pond be located?
- Emergency or large storm contingencies – what will happen to excess wastewater volumes and what limits would be appropriate?

PROCESS TO SELECT BEST PRACTICABLE OPTION

In order to establish a Best Practical Option:

- The potential receiving environments and their limitations for accepting treated wastewater discharges need to be understood.
- Community views need to be sought at the initial stages, during discharge site selection, and when refining the project design.
- Planning rules and requirements for resource consenting need to be understood and factored in.
- Landowner aspirations and agreements need to be integrated with the Council's need to manage and discharge the wastewater.
- Legal aspects such as leases, land purchases, easements, or revoking reserve status for land.
- Balancing of key values (environmental, cultural, social, financial, and engineering complexity) and ranking of which values take priority over others.
- Feasibility and costs of storage and pipelines with appropriately sized pumps.