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IRONGATE INDUSTRIAL AREA – REPORT ON SERVICES FOR DISTRICT PLAN VARIATION

The report below sets out the proposed solutions for services for the Irongate Industrial Area following the review and adoption of an on-site solution for stormwater disposal. This report is intended to be used as supporting information for the proposed Variation to the Plan.

BACKGROUND

Plan Change 50 (the predecessor to the proposed Variation) incorporated specific solutions for water supply, wastewater collection and stormwater disposal and the development of the Irongate Industrial Area was structured to be carried out in a two stage process. Aspects of these solutions have been the subject of appeal for some time. Discussions between Council and the various appellants have led to a review of the technical solutions, with specific focus on the suitability of on-site services.

OVER VIEW

The Irongate Industrial Area has no Council infrastructure in place to provide water supply and domestic wastewater and trade waste services to the existing industrial properties within the zone. The existing properties within the Zone have on-site solutions for these services. There is a limited stormwater system that deals with road stormwater, however the existing industrial properties are also primarily reliant on on-site systems for stormwater management.

Plan Change 50, and the supporting Structure Plan, envisaged fully reticulated solutions to be installed to the Stage 1 area of the Irongate Industrial Area to be constructed and commissioned prior to the deferment of the Stage 1 Area being lifted.

The previous preferred solution for water supply for Plan Change 50 was, in summary, a new water supply system to be supplied via a new reticulation main from Stock Road to the Zone. The water was to be supplied from the Wilson Road water pump station, which would require upgrading in order to supply the additional demand for the Irongate area. Some water mains within the system between the pump station and Irongate Road would also require upgrading. The review of an alternative on-site solution and the proposed refinements of the technical elements of the water supply system are described in the Water Supply Section of this Report.

The solution for wastewater was based on a reticulated wastewater system collecting domestic wastewater only (no trade waste envisaged for this Zone) and discharging to the existing Council

sewer network at St Leonards Park, Hastings. It is proposed that individual properties will install a private pump system which will discharge to a Council collector main, which will discharge to the existing reticulation. The review considered an alternative on-site solution but concluded that a reticulated system achieved better overall outcomes. The background to the preferred solution is discussed in the Wastewater Section of this Report.

The Structure Plan supporting Plan Change 50 includes a large public stormwater conveyance swale servicing two sub catchments, one discharging to the Sissons Drain via a large attenuation/infiltration area and an area discharging to a swale in Irongate Rd, and conveyance via a swale to the Irongate Stream via a public stormwater network. As a result of the Review, it is now recommended that stormwater from each individual development be discharged to ground on an on-site basis, with appropriate pre-treatment, storage and discharge devices.

The review has also led to the conclusion that, on engineering technical grounds, the proposed Industrial Area, covered by the Variation, can be expanded and the need for any staging of the development of the Zone can also be avoided.

The new solutions for water supply, wastewater collection and stormwater disposal are described below to provide the detail required for an appropriate assessment of the proposed Variation.

WATER SUPPLY

Potable water supply for domestic and firefighting purposes is proposed to be supplied to the Zone from the Wilson Road pump station. During the Review, consideration was again given to on-site supply for potable water. Several landowners felt that they could obtain sufficient water supply from their own bore. They felt this should be cheaper than a Council solution requiring piping water from the Wilson Road pump station. They were concerned that some of the elements included in the cost apportionment to the Irongate Industrial Area resulted in an overly expensive solution, which could be avoided with on-site solutions.

The key elements of any on-site solution would involve:

- An appropriate technical solution on each site to provide a reasonable level of firefighting capacity. This is difficult and expensive due to the need to either have very large bore pumps with emergency standby power for firefighting or a smaller capacity bore in combination with water storage of up to 540m³ on each site if a standard of FW4 is to be achieved;
- A multitude of individual resource consents for water take, which would make allocation potentially difficult due to the *“first come, first served”* process;
- Subsequent subdivision and/or intensification of development would trigger further expansion of the on-site infrastructure;
- Emergency back-up power supply would be problematic/expensive/impractical on an individual property basis.

Whilst it is possible to construct a bore and large water storage on each site, the collective cost of doing so makes the option more expensive than a Council reticulation solution. In addition, a Council reticulation system would provide greater operating pressure within the network and thus assist the Fire Service to fight a fire.

A public reticulation system provided by Council also avoids the need a multitude of additional resource consents for water take, and potential operational issues arising from individual on-site water supply system. If the HB Regional Council (as consent authority) determined that the cumulative effects of abstraction were likely to result in adverse conditions to the environment or other users, then they could refuse to grant any further consents and development would not be able to self-service.

The Review also considered some refinements to the proposed Council system. These included a closer assessment of cost apportionment, the ability to avoid some upgrading of the network that was previously thought to be necessary and a refinement of the level of service that the system would be designed to achieve.

The proposed water reticulation system will provide for domestic consumption and fire-fighting but not for any significant process water with demand expected to be approximately 1,000 litres/ha/day. The domestic demand is not critical in sizing water mains as the instantaneous firefighting flows dictate minimum water main sizing. The reticulation system will be refined within the Flaxmere area as part of a general network improvement program. The existing 300mm main in Stock Road is sufficient to provide a reasonable firefighting supply flow to the Irongate Zone and modelling has confirmed that a minimum of 50 litres per second is achievable. A new 300mm main will be installed from Stock Road, along Irongate Road, to service the Irongate Industrial Zone. Additional link mains will branch off this bulk water main to service the land on either side of Irongate Road.

As the actual subdivision layout and timing of development of individual parcels of land is not known at this time, it is not possible to confirm the degree of water main looping within the Zone that is likely to be achieved over the next decade or so. The final peak firefighting flow and operating pressure at a discrete building within the Zone will depend on the location of that building and whether or not there is some supply to that building from branch mains that augment the 300mm “spine” main. It is expected that the network will evolve over time and as it grows, greater resilience and flows will be achieved. The system will not deliver a design flow of 100l/s, which is the required flow rate for an FW4 fire-fighting water supply flow and pressure (under SNZ PAS 4509 2008). This is due to a limitation on the capacity of the supply bore. However, the flow rate that will be available at the Irongate Zone will be close to this level and will be sufficient for an appropriate level of firefighting protection for the land use envisaged for the zone. Additional main and hydrant extensions may be required within the development area to service land that is not adjacent to Irongate Road and these are expected to be provided by developers as required. It is also expected that fire sprinkler systems can be supported from the supply but this will be subject to the instantaneous demand required and/or supplementary storage provisions by the developer.

As indicated above, the water will be supplied from Flaxmere via the Wilson Road bore site. The required firefighting capacity is not currently available from the existing system and necessitates an upgrade of the bore supply at Wilson Road. The bore upgrade will also provide improved network performance in Flaxmere however only the proportion of the upgrade costs is directly attributable to Irongate, based on the stand alone infrastructure assessment.

The network will provide full potable water for use within the zone. However, the use is not aimed at any wet industries and so water demand is not expected to be high.

The water reticulation will be owned and operated by Council. Connection to the network is expected to be triggered by subdivision activity or the development of any notable building work on a particular site.

WASTEWATER RETICULATION

The new Zone will be serviced with a full pressure sewer reticulation system which will discharge to the existing network at St Leonards Park.

The alternative of relying on individual on-site wastewater treatment and disposal systems was considered during the review and discussed with some land owners. This solution would be complex to implement due to the expected subdivision process that is likely to be carried out throughout the Zone. Each lot subdivided would require an individual wastewater treatment system and a land

disposal area. This would result in up to 70 individual systems. These systems do not have a good track record of performance because they require a steady flow, good operation, good maintenance and they rely on sound technical support. These items are seldom achieved with any degree of reliability and the consequential cumulative adverse effects are likely to impact on poor water quality in the ground water system and in the nearby streams.

In addition, the individual systems require land area for the disposal system, create a risk of odour from the treatment units and require time and effort to manage them properly. They typically cost in the order of \$17,000 for a system capable of dealing with 1Ha. The total cost of an on-site wastewater solution would exceed \$1M plus additional costs for consenting, operation, maintenance and lost opportunity for land area.

Given the risks associated with cumulative adverse effects on the environment and the difficulties of achieving good performance across the Zone, it was concluded that an on-site wastewater treatment and disposal solution for this Zone was not the best solution. A Council owned and operated solution could achieve better results, reduce the risks of adverse effects on the environment, achieve better public health protection and would not cost significantly more than an on-site solution. The fully reticulated solution has therefore been adopted.

The proposed reticulated pressure system will collect domestic wastewater from individual sites and convey the wastewater to the Council's wastewater system, which discharges to the wastewater treatment plant.

The proposed pressure reticulation system will consist of a mixture of private and Council owned components. The property owner will be responsible for the supply, installation and operation of on-site pumps, a storage chamber and the connection pipework out to the road boundary, which will have an isolation valve and a non-return valve to prevent back flow from the main. The private system will discharge into Council's pressure mains in the road, which will convey the wastewater to the Council's reticulation system near St Leonards Park.

The proposed pressure sewer network design is based on the following rational:

- individual sites will have a grinder pump pod;
- allowance for domestic wastewater only for day staff and possible live-in care taker/security staff at each site;
- design flow based on an average population of 20 people per Ha; (equivalent to 0.5 l/s per hectare)

It is anticipated that wastewater flows will be of domestic origin only and no allowance for process waste, wash down or other trade waste discharges has been made. The proposed pump systems will be required to conform to guidance and standards specified by HDC for effective operation of the pressure sewer network.

It is expected that proprietary grinder pump pods will be used with a typical pump rate of around 0.6 l/s or less depending on operating pressure and the number of pumps operating. The proprietary systems will be required to have a storage capacity of 1,000l per Ha serviced so that there is no risk of overflow. The pumps are typically designed to operate in a volume storage range of approximately one third of the storage volume (0.3m³/Ha) so that additional storage is available in the event of a pump or power failure. Typically, the pump would operate about 3 times per day and run for approximately 10 minutes per run time (per Ha), which equates to approximately 1,000 litres per day. There may be some activities on some sites which have a much lower staff/head count and these will size their systems to suit the actual staff numbers so that the pump systems are not over-sized.

The above assumed wastewater flow equates to approximately two household unit equivalents (HUE) per Ha. Greater volumes at an individual site would require additional storage and different pumping arrangements, and agreement from Council that any additional volumes could be catered for in the network. If sufficient capacity is not available, onsite methods (increased storage and treatment) would need to be implemented.

The proposed design for the Council owned reticulation is based on a total daily flow of 80m³ for the full Irongate Industrial area. The downstream network is capable of receiving this flow.

The concept design for the Council owned pressure mains in the road is for two 75mm diameter collection mains located on either side of Irongate Road. A transfer main along Maraekakaho Road is expected to consist of twin pipes 75mm diameter and 90mm diameter, or 110mm diameter for greater flexibility in flows. Providing two individual pipelines will enable more efficient staging of development and flow management issues in relation to residence times and odour. The proposed pressure sewer will be located within Maraekakaho Road from Irongate Road to Francis Hicks Avenue, Hastings, discharging into the existing gravity network near the top end of the western interceptor.

STORMWATER DISPOSAL

The earlier concept for stormwater disposal involved a communal stormwater swale for conveyance of stormwater runoff from yards and roads to a centralised detention and disposal system. Stormwater from roofs was to be to on-site detention and soakage systems.

Over the last year or so further consideration has been given to the alternative on-site solution. This has been triggered by the potential to achieve a lower cost solution and, if it is feasible, then there would be no engineering/infrastructure element requiring staging.

The soils in the Irongate Industrial Zone have been found to have rapid to very rapid soakage rates. These soils assist in achieving a satisfactory solution for individual on-site stormwater for each land owner. An on-site solution enables progressive construction of on-site disposal as each land owner progresses with development without the need to construct large swales to service small development areas in the early years. It also avoids the need for Council to purchase land for the swales.

As a result of the potential to achieve the above advantages, further assessment of a potential on-site solution was carried out and discussed with land owners and HBRC. This has resulted in a preferred solution based on individual on-site disposal.

The previous stormwater solution was based on particular consideration of the following matters:

- The principle of low impact design;
- The specific characteristics of the potential stormwater receiving environment;
- Climate change;
- The HBRC Stormwater Guidelines;
- The Council's LTP, Engineering Code of Practice and Best Practice Design Guide for Subdivision and Development, and the;
- On-site Stormwater Management Guideline (NZWERF/MfE 2004).

These principles led to design objectives aimed at minimizing the extent of any off-site discharge, discharge at source as much as is reasonably feasible, effective management of contamination risks and use of infiltration disposal basins to reduce concentration effects. These objectives were to be met through the adoption of a design event of no overflow to surrounding areas in events up to the 50 year ARI, discharge of roof water for up to 10 year ARI to be on individual sites, management of potential

contaminants through the use of pre-treatment devices and discharge to ground through a conveyance swale and large areas for detention and infiltration.

The new proposed solution can be engineered to achieve these general principles, but will not have specific design criteria aimed at avoiding off-site overland flow in a 50-year event. The key differences being the use of detention and disposal systems on each individual site to provide both storage and discharge to ground via infiltration without the need to convey stormwater to a separate location in a communal swale and the potential for some secondary flow in a 50-year event, depending on the scale of the development.

The individual system servicing the yard and hardstand areas within a site will need to be sized to meet the requirements of the Building Code and to also give consideration to additional storage to minimize overland flow to neighboring sites during very large rainfall events. Areas greater than 2 Ha will be controlled by resource consent from HBRC.

The system may comprise a swale or a detention pond or a combination of both. The expected volume of storage and area of soakage for the proposed zone, based on the high to very high soakage rates within the zone, are not excessive and should allow efficient and cost effective solutions to be constructed.

Each system, on each site, will be the owner's responsibility. It is also relevant to note that any land which currently falls towards the Irongate Stream may be permitted to direct overland flows from that land in a manner that is consistent with the current situation or as required via resource consent.

The need to install treatment will be dependent on the land use activities being proposed and assessments of the type and nature of contaminants that might result from this. The HBRC would be the Consent Authority administering stormwater applications and issuing consents under their Regional Resource Management Plan rules for sites within the Zone that exceed 2Ha.

Stormwater runoff from large parking and/or hard stand areas may contain grit and silt particles that could clog up the treatment element within the on-site stormwater disposal system. This risk is influenced by the scale of the parking/hardstand area. HBRC may require the land owner/developer to install on-site settlement devices to settle out grit etc prior to discharge to the disposal system servicing the specific site greater than 2Ha.

If HBRC considered that there was a risk of contaminants reaching groundwater from a specific land-use activity that had a potential contamination risk, then HBRC could require the developer/landowner to install some form of filtration system in the base of the swale/detention system. This would be controlled by the resource consent associated with the activity on the particular site, if a resource consent was required.

Roof water is deemed to be clean and this will be discharged directly to ground via soakage pits. These soakage pits will be required to comply with the Building Code, which requires the pit to cope with a 10 year ARI for a 1-hour duration event. The soakage pits do not require any pre-treatment because the runoff from the roof area is considered to be free from contaminants. Some sites that border the Irongate Stream may be permitted to discharge roof stormwater directly to the stream subject to appropriate resource consent from HBRC.

Swales and detention devices require monitoring of performance and regular maintenance of the vegetation to both identify operational problems and avoid clogging of the surface above the filtration/treatment zone in the base of the swale/detention pond. In some instances, it has been found to be necessary to re-construct the filtration/treatment zone after several years of operation due to clogging from excess sediment discharge. These issues can be managed through a combination of

the use of pre-treatment devices on the discharge from large car park/sealed areas prior to discharge and the obligation on the property owner to maintain the swales/detention devices once they have been formed and accepted by Council as part of the building permit/Code of Compliance process.

The maintenance is expected to include maintenance of the vegetation in the swales/detention devices, monitoring of performance of individual systems, identification of any sediments discharged to the systems and/or clogging from inappropriate on-site discharges. The land owner will be responsible for the appropriate maintenance of the stormwater disposal system.

Stormwater runoff from the roads will be managed as part of the road system and discharged to the Irongate Stream at Maraekakaho Rd. Roading upgrades will include appropriate stormwater solutions to avoid flooding. The on-site stormwater solution is expected to result in the stormwater solution associated with the road upgrading being limited to Irongate Road and the immediate land frontage onto the road. The performance standard would also be a 1 in 50-year rainfall event which can be accommodated via a roadside swale located within the road reserve. The swale is expected to be 0.5m deep, 1m base width and grassed with outlets from kerb and channel or sumps. Culverts at driveways are expected to be 450mm to 600mm diameter or twin pipes. Some soakage within the swale is expected, limiting runoff to the Irongate stream during frequent rain events.

SUMMARY

The above describes the proposed solutions for the three water infrastructure services associated with the Irongate Industrial Zone. The solutions have been developed to provide an appropriate level of service for the Zone to achieve sound engineering and environmental outcomes. The expected cost of these solutions is within an acceptable range for the efficient and cost effective development of the Zone and meet landowner expectations.

It is therefore concluded that the proposed solutions will provide appropriate services to the zone and are consistent with the intent of the Plan Change.



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