Revised Proposal
Containment Cell Dimensions
Industrial Development, Tonkin Park
Bassendean (Stages 1 and 2)

Ridgepoynt Pty Ltd

Report and recommendations
of the Environmental Protection Authority

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1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for the Environment on the environmental factors relevant to the revised proposal by Ridgepoynt Pty Ltd (Ridgepoynt) to change the dimensions of the containment cell involved in the remediation of the Tonkin Park Stage II site.

There is considerable history concerning previous proposals for this development, which is briefly outlined below.

In the 1980's, property developer Northcorp purchased the 42 hectare (ha) Tonkin Park property in Bassendean (Figure 1) with the intention to subdivide and develop the property. In 1988, Northcorp submitted a Public Environmental Review (PER) to the EPA to remediate the site. Following submissions, Northcorp amended the original proposal to a two stage development. In 1990, Northcorp developed Stage I of the Tonkin Park site in accordance with Ministerial conditions which allowed Northcorp to clear the Tonkin Park Stage I site for development by relocating Stage 1 waste material to Stage II. As part of this agreement, all wastes from Stage II were to be subsequently relocated off-site to a suitable landfill before Stage II could be subdivided and sold. Development on the 25 ha Stage I land, which includes lots 107 and 108, has been completed.

In 1995, Ridgepoynt, the current proponent, purchased the 17 ha Tonkin Park Stage II site from Northcorp with full knowledge of the Ministerial conditions requiring the removal of all wastes before development. The site is currently undeveloped. It is zoned industrial and is surrounded by other industrial properties. The nearest residential property is located approximately half a kilometre to the north-east. Wastes consisting of pyritic cinders and building rubble were located in a 7 ha low-lying area within the southern portion of the site. The extent of the contamination was estimated to be up to 250,000m^3. The remaining northern portion of the site was investigated by the Department of Environmental Protection (DEP) and was considered to be suitable for light industrial and/or commercial development, without encumbrances (DEP, 1996c).

In June 1998, Ridgepoynt submitted a Section 46 request for a change to Ministerial condition 4 on the Tonkin Park Stage II site to allow the proponent to manage the wastes by the use of one or a combination of remediation options, including on-site containment and disposal to landfill. An environmental review document outlining the potential impacts associated with this change and how they would be managed was released for four weeks public review. The EPA's assessment was based mainly on the impact of the waste material on public health and the environment, through contamination of soil and groundwater.

In 2000, the Minister for the Environment approved Ridgepoynt's Section 46 request subject to revised Ministerial conditions (Statement 539) included a condition (condition 8) which stated that "if the proponent does not substantially commence remediation of the Stage 2 site within three years following the date of publication of the statement, or within such further period as the EPA may by notice in writing to the proponent specify, then the approval as granted in Statement No.82 published on 25 October 1989 shall lapse and no further implementation of the proposal shall be authorised".

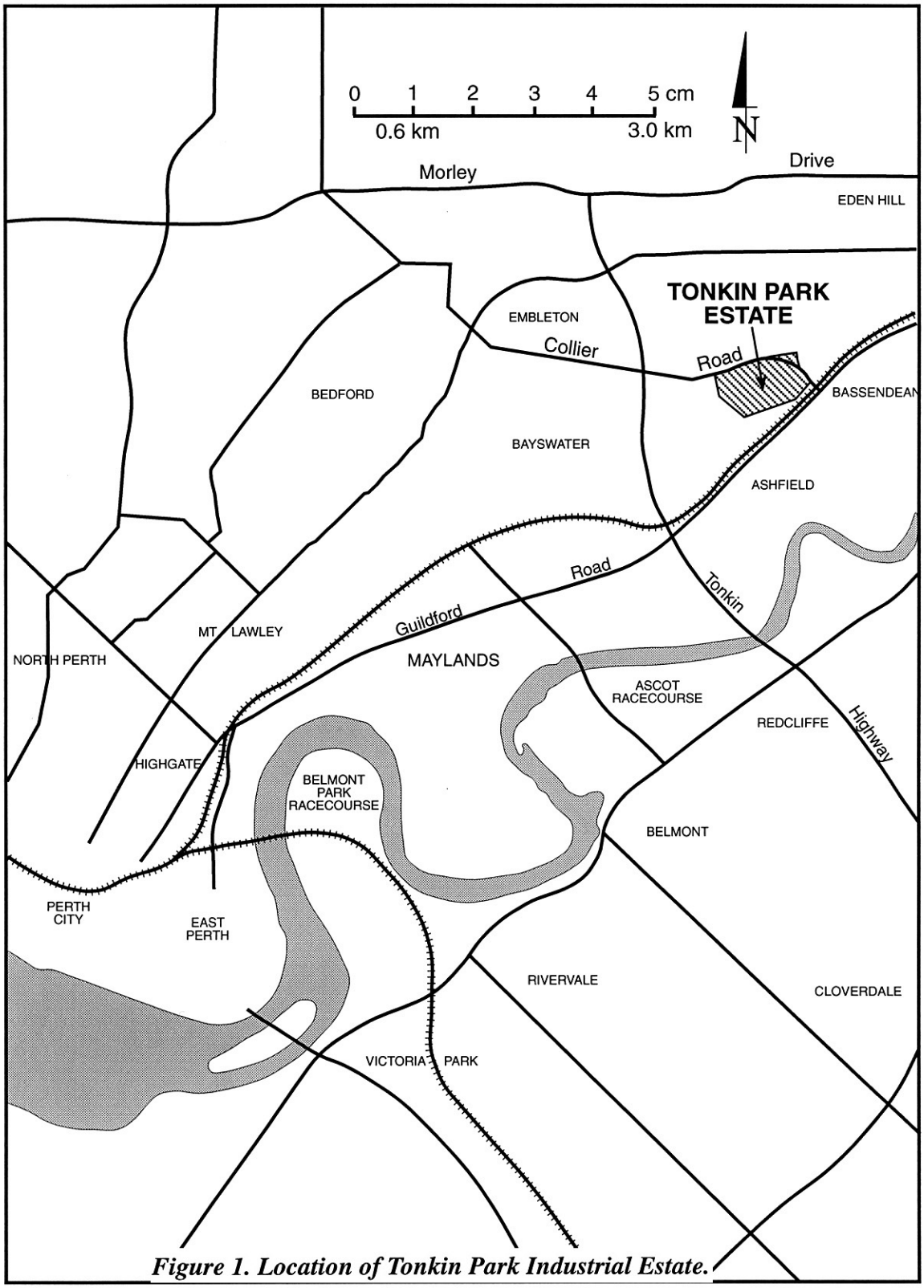

Figure 1. Location of Tonkin Park Industrial Estate.

In 2003, the proponent requested a further extension of time which allowed the proponent until the 19 March 2004 to complete remediation of the site. On 25 February 2004 Ridgepoynt advised the EPA of contractual arrangements put in place for the supply of material and engineering services to complete the remediation works. Ridgepoynt advised that due to unforeseen circumstances it was not able to obtain development approvals for the construction of the on-site containment cell within the timeframe it anticipated and that sourcing suitable clays for use in the cell construction was also causing some delay. On 4 March 2004, Ridgepoynt advised that it would not meet the deadline of substantially commencing remediation by 19 March 2004 and indicated, by providing details of construction timelines, that the remediation would be completed by 31 October 2004. Accordingly, Ridgepoynt submitted a Section 46 request that an extension of time be considered so that remediation works could be completed. On the 28 May 2004 the Minister for the Environment approved the Section 46 request subject to further Ministerial conditions (Statement 651, Condition 8), which stated that "The proponent shall complete the remediation works by 31 October 2004" .

On 19 November 2004, Ridgepoynt submitted a revised proposal, specifically relating to the dimensions of the containment cell and the date of completion for the remediation works. Citing difficulties in sourcing required quantities of suitable clay material for the cell, Ridgepoynt requested that the footprint of the containment cell be reduced from 7 ha to 3.8 ha and the height increased from 25m AHD to 35.5m AHD (approximately 15.5m above adjacent land).

The proponent has submitted a referral document (Ridgepoynt Pty Ltd, May 2005) setting out the details of the revised proposal, potential environmental impacts and appropriate commitments to manage those impacts. Based on the information provided in the referral document the EPA considered that, while the proposal has the potential to affect the environment, it could be managed to meet the EPA's environmental objectives. The proposal as described can be managed in an acceptable manner, subject to the EPA's recommended conditions being made legally binding.

The EPA has therefore determined under Section 40(1) of the Environmental Protection Act 1986 that the level of assessment for the proposal is Assessment on Referral Information (ARI), and this report provides the EPA advice and recommendations in accordance with Section 44(1).

In its letter of 19 November 2004, Rigdepoynt also requested a change to the existing conditions of Ministerial Statements 539 and 651 relating to the time for completion of proposal. Pursuant to Section 46(1) of the *Environmental Protection Act, 1986,* the Minister for the Environment has requested the EPA to inquire into whether the existing conditions relating to the time for completion, and also related to the ongoing management of the cell once construction has been completed, should be changed. The EPA's report to the Minister on the Section 46 request is provided in Bulletin 1193, which is being released concurrently with this ARI report.

2. The revised proposal

The Tonkin Park (Stage 2) site is a 17 ha area located within the Tonkin Industrial Park, Bassendean, about 9 kilometres north east of Perth (Figure 1). The site originally contained waste consisting of pyritic cinders and building rubble spread over an area of 7 ha. This waste was going to be placed in a containment cell with a 7 ha footprint and a height of 25m AHD.

The revised proposal is to change the dimensions of the containment cell by reducing the footprint, from 7 ha to 3.8 ha, and increasing the height, from 25m AHD to 35.5m AHD (approximately 15.5m above surrounding land). The main characteristics of the revised proposal are summarised in the table below.

It is noted that this assessment relates specifically to the revised proposal, and it is not open to the EPA to reassess the original proposal.

Table 1: Summary of key revised proposal characteristics

Element	Description
Area of Cell Base	3.8 hectares
Height of Cell	35.5m AHD
Cover Material	Minimum 500mm topsoil to sides and top of cell
Future Use	None planned
Landscaping	Batter slopes and top covered with unirrigated rough mown grass. Shallow rooted groundcover and shrubs on areas of the cell facing future road reserve

The potential impacts of the revised proposal are discussed by the proponent in the referral document (Ridgepoynt, 2005).

3. Consultation

The proponent has advised that consultation with the public mainly occurred through the distribution of leaflets and letters to the surrounding community. Media releases in the local newspaper were also used. In order to support its application to the Town of Bassendean to amend the Development Approval (DA), the proponent circulated a flyer (between the 4 and 8 February 2005) to local business and land owners in the immediate area. The flyer provided details on the proposed changes to the design of the containment cell and encouraged the community to comment on these changes. There were two points of contact provided to discuss any aspect of the DA submission in detail, Benchmark Projects and the Town of Bassendean. Benchmark received one call from a neighbouring landowner in support of the project and there were no submissions to the Town of Bassendean. There was a general invitation for the public

to inspect the site and discuss the project, however only one person took advantage of this.

No public forums or workshops were organised as it was felt that previous levels of interest did not warrant it. The EPA understands this was discussed and agreed with the Planning Manager at the Town of Bassendean.

The proponent provided a full copy of the DA submission to the Town of Bassendean for public viewing in advance of the Council meeting. The Bassendean Town Council discussed this submission in detail at its planning committee meeting on 15 February 2005 and again at the full meeting of Council on 22 February 2005. The Council was satisfied that the surrounding community were provided with sufficient information and opportunity to comment on the submission. The Council supported the revised change and approved the increase in height to a maximum of 35.5m AHD, that is, approximately 15.5m above adjacent land.

4. Relevant environmental factors

Section 44 of the *Environmental Protection Act 1986* requires the EPA to report to the Minister for the Environment on the environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

It is the EPA's opinion that the following environmental factors relevant to the proposal require evaluation in this report:

(a) Groundwater Contamination; and

(b) Visual Amenity.

Details on the relevant environmental factors and their assessment are contained in Sections 4.1 - 4.2. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

4.1 Groundwater Contamination

Description

Groundwater under and down gradient of the site is contaminated by heavy metals. Contaminated groundwater has moved towards the Swan River, has contaminated bore water in the Ashfield Flats area and therefore poses a risk to the Swan River. Groundwater discharge to the Swan River is via the Chapman Street Main drain.

In 1988, groundwater studies at Tonkin Industrial Park site in Bassendean showed that groundwater within the shallow aquifer has low pH values and is contaminated with heavy metals at concentrations above those typically found in Bassendean sands (Maunsell and Partners, 1988).

Further studies (ERS, 1998) of groundwater collected from three monitoring bores located within the shallow aquifer at Tonkin Park also showed that groundwater quality was affected. The main cause of groundwater contamination is due to leaching of the pyritic material. Leaching is greater in winter when the pyrites become immersed in the groundwater due to a high water table. Leaching also occurs when rainwater infiltrates through the waste stockpile. Groundwater contamination can be reduced at Tonkin Park, by taking steps to reduce the rate of oxidation of the pyrites, and/or to reduce the rate of water movement through them. Studies also show that groundwater leaving the site has higher levels of heavy metals than that entering and upgradient of the site.

The primary concern with the Chapman Street drainage system is that it is subject to recharge by the local groundwater and contaminated groundwater can discharge directly to the Swan River. Regional groundwater flow is in a south-east direction towards the Swan River. Groundwater discharge to the Chapman Street Main drain is greater in winter.

Local groundwater use is mainly for irrigation purposes. Groundwater is drawn either from the Bassendean sands or from sand beds within the Guildford Formation. The Bassendean sands are the near surface sediments and consist of leached quartz sands which overlie clays, sands and gravels of the Guildford Formation. The sands are porous and have low attenuation capacity to retain heavy metals.

Given the above characteristics of the soil type and waste stockpile at the site, it is evident that leaching is the main factor leading to groundwater contamination. This contamination will be greatly reduced by isolating the waste stockpile in the containment cell and for this to be done effectively it is important that there is no leachate from the cell into the soil.

Initially, the contaminated contents of the cell will contain water as they have been sitting partly beneath the water table. Once this has drained out of the cell, the contents must be kept dry and ingression of water into the cell prevented. It is also important that the integrity of the base of the cell be maintained to prevent water leaching into the soil though cracks in the base.

Ingression of Rainwater through Cap

The cell will contain approximately 250,000 m^3 of contaminated material consisting of pyritic cinders, raw pyritic material and other building wastes. In order to properly contain this material, it is important that the integrity of the cell be maintained; this requires the cell to contain as little water as possible. The main way that water can enter the cell is ingression through the cap. This can occur either when water forms a pool on the cap and slowly permeates through it, or when there is a crack in the cap, allowing a path for the water to run through.

The cell cap will consist of a 500mm impervious clay layer which will be constructed to have a permeability of 1×10^{-9} m/s or better. The original cell design specified a minimum of 300mm topsoil on the cap and then 300mm of compacted bitumen and limestone seal on the top. The top of the cell was originally planned to be used as a trucking depot, however with the change in height this is no longer plausible. The cap

will now be covered by a minimum of 500mm of topsoil and unirrigated rough mown grass. Shallow rooted groundcover and shrubs will also be planted on areas of the cell facing the future road reserve. The topsoil will be reasonably porous to increase absorption of rainfall and therefore reduce surface erosion.

The cell will rise to a nominal maximum height of 15.5m above the surrounding land, incorporating nominal maximum slopes of 1 in 4. There will be a subsoil drainage system in place to reduce and collect storm flow from the upper surface into the topsoil matrix of the sides of the cell. Due to the increased length of the sides of the cell, there will be subsoil drains at the base, half height and the edges of the upper surface.

Leakage through Base

To avoid contamination of groundwater, there must be negligible leachate from the cell into the soil. The base of the cell consists of a 500mm impervious clay layer which is constructed to have a permeability of 1×10^{-9} m/s or better. The foundation of the cell will be 2m above the water level.

There are two ways in which leachate from the base can occur, the pooling of water on the base and differential settlement of the soil below it. Differential settlement is an uneven distribution of soil under the cell and can cause cracking at the base.

In order to avoid pooling of water on the base of the cell, the construction specifications require the base to have a one way slope of approximately 1 in 200 towards the SE corner. Leach drains constructed on the upper surface of the base (within the contaminated soil) collect any leachate emerging from the contaminated soil. The leach drain discharges to a storage pit outside the cell where it will be monitored before being transferred to a tank. This will then be pumped to a tanker and transported to an approved disposal site.

Assessment

In order to consider the potential contaminant impacts from changing the dimensions of the cell, Coffey Geosciences Pty Ltd provided a geotechnical review of the cell to the proponent; the review involved a geotechnical stability and settlement assessment for the proposed containment cell (Coffey, 2005). Coffey has advised that a minimum of 300mm thick topsoil will be sufficient to reduce the potential for cracking and drying out of the underlying clay cap. The EPA considers the proponent's commitment of a minimum of 500mm topsoil to be adequate. Coffey have also advised that in order to avoid erosion gullies forming in the topsoil, a full coverage of grass be maintained on the slope and all drains be regularly cleaned to prevent blockages. The proponent has indicated that the batter slopes and top of the cell will be covered by unirrigated rough mown grass.

The EPA therefore does not consider that the change in cell dimensions will alter the potential for ingress of rainwater through the cap.

The EPA understands, on advice from Coffey Geosciences, that "although the total predicted amount of settlement beneath the centre of the cell is considered to be relatively large, the settlement is evenly distributed over the whole of the cell and differential settlement of the basement clay liner is not considered likely to cause

tension cracking" (Coffey, 2005). This assumes that the basement clay liner has been placed and compacted in accordance with accepted earthworks guidelines. Coffey has also noted that "the presence of any peaty clay below the cell could lead to large differential settlement and hence the potential for possible cracking of the basement clay layer" (Coffey, 2005). Coffey has advised that the contaminated material is likely to experience ongoing settlement or creep, however, this is not considered likely to affect the basement clay liner. This needs to be allowed for in the design of the drainage system to ensure sufficient gradients are maintained.

The EPA therefore does not consider that the change in dimensions of the cell will significantly alter the potential for leachate through the base of the cell.

The EPA sought an independent peer review of the Coffey work from GHD Pty Ltd. GHD concluded that "the increased height of the containment cell will not substantially alter the risk of failure in the integrity of the containment cell structure and consequently does not represent an increased risk to potential contaminant impacts".

The independent peer review prepared by GHD identified the treatment of surface runoff as a key issue for the revised cell design, specifically the construction of surface drains and drainage inlets and a surface cut-off drain on a berm at approximately 25m to 30m intervals. It is suggested that this will minimise the risk of significant overland flow occurring, causing the slope to erode. This issue is dealt with in Section 5.

GHD also raised several issues regarding the ongoing management of the cell. The Minister for the Environment has requested the EPA to undertake a Section 46 review of the management and post closure conditions on the Tonkin Park Stage II remediation including addressing enforceability, monitoring provisions and public reporting. The EPA considers that these matters are best addressed within the Section 46 review. The EPA's report to the Minister on the Section 46 review is provided in Bulletin 1193, which is being released concurrently with this ARI report.

Summary

Having particular regard to the:

- Geotechnical advice of Coffey Geosciences Pty Ltd and GHD Pty Ltd on the potential affects on the integrity of the cell, due to the proposed changes in dimensions,

it is the EPA's opinion that the revised proposal can be managed to meet the EPA's environmental objective for this factor.

4.2 Visual Amenity

Description

The revised cell design specifies an increase in height from 7m to 15.5m above the surrounding ground level. This has the potential to increase the visual impact of the cell on its surroundings.

Assessment

The EPA considers, on the advice of the Town of Bassendean, that the revised design of the cell will not cause significant visual impact. This is due to surrounding buildings being of similar height and shape to that of the containment cell as well as the commitment by the proponent to landscape the cell appropriately. The Town of Bassendean has approved the development approval sought by the proponent to change the dimensions of the cell.

Summary

Having particular regard to the:

- Proponent's commitment to landscape the cell; and
- Cell being similar in height to the surrounding buildings,

it is the EPA's opinion that the revised proposal can be managed to meet the EPA's environmental objective for this factor.

5. Revised Conditions

Section 45B of the *Environmental Protection Act, 1986*, provides:

> "If a proposal is revised after implementation conditions have been agreed or decided, each of those implementation conditions continues to apply in relation to the revised proposal subject to –
>
> (a) . . . ; or
>
> (b) revised conditions or procedures being agreed or decided under section 45 in relation to the revised proposal after the revised proposal has been referred to the Authority and assessed."

In accordance with 45B(b) the EPA recommends the following revised conditions be applied to the revised proposal:

1. The height of the cell is not to exceed 35.5m AHD.

2. The cell design and construction provide for adequate surface drainage to dispose of any surface runoff.

Conditions relating to these are set out in Appendix 2.

6. Conclusions

The EPA has considered the proposal by Ridgepoynt to change the configuration of the containment cell by reducing the footprint, from 7 ha to 3.8 ha, and increasing the height, from 25m AHD to 35.5m AHD.

The EPA has considered the geotechnical advice provided by Coffey Geosciences Pty Ltd and GHD Pty Ltd on the potential affects on the integrity of the cell, due to the proposed changes in dimensions.

The EPA has concluded that the proposal is capable of being managed in an environmentally acceptable manner such that it is most unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation of the recommended conditions.

The Minister for the Environment has requested the EPA to undertake a Section 46 review of conditions on the Tonkin Park Stage II remediation relating to ongoing management of the site. The EPA considers that the matters raised by GHD concerning ongoing management of the cell should also be addressed within this Section 46 review.

7. Recommendations

The EPA submits the following recommendations to the Minister for the Environment:

1. That the Minister notes that the revised proposal being assessed is for a change to the configuration of the containment cell by reducing the footprint, from 7 ha to 3.8 ha, and increasing the height, from 25m AHD to 35.5m AHD;
2. That the Minister considers the report on the relevant environmental factors as set out in Section 4;
3. That the Minister notes that the EPA has concluded that it is unlikely that the EPA's objectives would be compromised, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 2.
4. That the Minister imposes the revised conditions and procedures recommended in Appendix 2 of this report.
5. That the Minister notes that a Section 46 review of cell management and post closure conditions are addressed in Bulletin 1193.

Appendix 1

References

Coffey, 2005. *Tonkin Park Storage Cell Geotechnical Stability and Settlement Assessment.* Prepared by Coffey Geosciences Pty Ltd for Ridgepoynt Pty Ltd. Perth, Western Australia. January 2005.

DEP, 1996c. *Assessment of Soil Quality for Proposed Land development:* Letter from DEP to Environmental Risk Solutions.

EPA, 1999. *Tonkin Park Stage II, Bassendean.* Environmental Protection Authority Bulletin 960, November 1999.

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GHD, 2005. *Tonkin Park Stage II Bassendean, Review of Modified Containment Cell*. Prepared by GHD Pty Ltd for the Environmental Protection Authority, May 2005.

Maunsell and Partners Pty Ltd, 1988. *Northcorp Ltd, Tonkin Industrial Park Bassendean*. Public Environmental Review, December 1988.

Ridgepoynt, 2005. *Revised Proposal to modify the Design of the Containment Cell at Tonkin Park (Stage 2).* Prepared by Benchmark Consulting for Ridgepoynt Pty Ltd. Perth, Western Australia. May 2005.

Appendix 2

Recommended Environmental Conditions and Proponent's Consolidated Commitments

Statement No.

RECOMMENDED REVISED ENVIRONMENTAL CONDITIONS

STATEMENT OF REVISED CONDITIONS APPLYING TO A PROPOSAL (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

TONKIN IDUSTRIAL PARK (CONTAINMENT CELL DIMENSIONS), BASSENDEAN

Proposal: Change to the dimensions of the containment cell on the Tonkin Park Stage II site, to decrease the footprint from 7 hectares to 3.8 hectares and to increase the height from 25m AHD to 35.5m AHD as documented in schedule 1 of this statement.

Proponent: Ridgepoynt Pty Ltd.

Proponent Address: 245-253 Collier Road
Bayswater, WA 6053

Assessment Number: 1588

Report of the Environmental Protection Authority: Bulletin 1193

Implementation of the proposal; Industrial Development, Tonkin Industrial Park, Bassendean (Stages 1 & 2), is subject to the following statements:

Statement No. 539 (published on 24 February 2000)
Statement No. 651 (published on 28 May 2004).

The revised proposal referred to above may be implemented by the proponent subject to the following revised conditions:

1 Implementation

1-1 The proponent shall implement the revised proposal as documented in schedule 1 of this statement subject to the conditions of this statement.

2 Containment Cell Dimensions

2-1 The top of the cap of the containment cell shall not rise above 35.5m AHD.

3 Drainage

3-1 The proponent shall install drainage over the cell to ensure that rainfall infiltration and runoff is managed to prevent erosion.

Notes

1 The Minister for the Environment will determine any dispute between the proponent and the Environmental Protection Authority or the Department of Environment over the fulfilment of the requirements of the conditions.

Schedule 1

Proposal (Assessment no. 1588)

The Tonkin Park (Stage 2) site is a 17 hectare area located within the Tonkin Industrial Park, Bassendean. The site originally contained waste consisting of pyritic cinders and building rubble spread over an area of 7 hectares. It was originally intended to place the waste in a containment cell with a 7 hectare footprint and a height of 25m AHD.

This proposal is to change the configuration of the containment cell by reducing the footprint from 7 hectares to 3.8 hectares and increasing the height from 25m AHD to 35.5m AHD.

The main characteristics of the proposal are summarised in Table 1 below.

Table 1: Key proposal characteristics

Element	**Description**
Area of Cell Base	3.8 hectares approx.
Height of Cell	35.5m AHD approx.
Cover Material	Minimum 500mm topsoil to sides and top of cell.
Landscaping	Batter slopes and top covered with unirrigated rough mown grass. Shallow rooted groundcover and shrubs on areas of the cell facing future road reserve.