

**BOARD OF INQUIRY
TE MIHI GEOTHERMAL POWER STATION PROPOSAL**

In the Matter of the Resource Management Act 1991

And

In the matter of resource consent applications by Contact Energy Limited
in respect of the Te Mihi Geothermal Power Station Proposal

BRIEF OF EVIDENCE IN CHIEF OF MARK BULPITT CHRISP

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Introduction

1. My name is Mark Bulpitt Chrisp. I am a Director and a Principal Environmental Planner in the Hamilton Office of Environmental Management Services Ltd.
2. I have the following qualifications and experience relevant to the evidence I shall give:
 - I have a Master of Social Sciences degree in Resources and Environmental Planning from the University of Waikato. I am a member of the New Zealand Planning Institute and have more than 18 years experience as a resource management consultant; and
 - environmental issues associated with the development, expansion, and on-going operation of industrial activities, particularly within the energy sector, is one of my specialties. I have been a planning advisor for the following industrial / energy projects over the last 14 years:
 - Wairakei Binary Plant (1994 – 1998);
 - Te Rapa Dairy Factory Expansion and Co-generation Power Plant (1996 – 1997);
 - Ohaaki Geothermal Power Plant Re-consenting (1998 – 1999);
 - Tauhara Geothermal Power Development (1999 – 2000);
 - Tongariro Power Development Re-consenting – advising the Waikato Regional Council (Environment Waikato) (2000 – 2002);
 - Wairakei Geothermal Power Plant Re-consenting (1999 – 2007); and
 - Resource consents for exploratory drilling on the Wairakei - Tauhara Geothermal System (2007).
3. I was involved in the environmental investigations and the preparation of the documentation supporting the resource consent applications by Contact Energy Ltd (Contact) dated 31 July 2007 for the construction, operation and maintenance of the proposed Te Mihi Power Station including the following roles:

- author of the report entitled: “Te Mihi Geothermal Power Project Consents Assessment and Policy Context” forming part of the AEE;
 - co-author of the report entitled: “Te Mihi Power Station Land Management Practices Report” forming part of the AEE;
 - writing sections of the AEE lodged with Contact’s resource consent applications; and
 - contributing author of the Draft System Management Plan for the Wairakei – Tauhara Geothermal System (presented as Part C of the application documentation).
4. I am familiar with the area that is the subject of Contact’s 2001 resource consent applications having grown up in Taupo. I have worked for Contact and a number of other clients within the Taupo District over the last 18 years. Through this work I also have considerable experience with the Taupo District Plan and other statutory documentation relating to the management of natural and physical resources within the Taupo District.
 5. In relation to statutory planning matters, I have been an advisor to Contact in relation to the Waikato Regional Policy Statement, the Waikato Regional Plan, and the Taupo District Plan as they have evolved over the last 12 years. This has included, in particular, the formulation of planning provisions relating to the management of the geothermal resource in the Waikato Region and the Taupo District.
 6. I confirm that I have read the ‘Code of Conduct for Expert Witnesses’ contained in the Environment Court Consolidated Practice Note 2006. My evidence has been prepared in compliance with that Code. In particular, unless I state otherwise, this evidence is within my sphere of expertise and I have not omitted to consider material facts known to me that might alter or detract from the opinions I express.

Scope of Evidence

7. My evidence will provide the Board of Inquiry with details as to the regulatory and policy framework under the Resource Management Act 1991 (RMA) within which decisions regarding the resource consent applications by Contact for the proposed Te Mihi Power Station are to be made. This will include an analysis of the relevant objectives and policies that will need to be considered by the Board of Inquiry. Specifically, I will set out a

summary of the key conclusions that I have reached in relation to my analysis of the proposed Te Mihi Power Station in respect of the relevant statutory criteria. The evidence upon which those conclusions are based will then be presented under the following headings:

- the status of the proposed activities under the RMA;
- Part II of the RMA (Purpose and Principles);
- relevant National Policy Statements;
- Waikato Regional Policy Statement;
- Waikato Regional Plan; and
- Taupo District Plan.

Summary of Conclusions

8. The activities for which Contact has applied for resource consents from both Taupo District Council and Environment Waikato for the proposed Te Mihi Power Station are all Discretionary Activities under the RMA.
9. The proposed Te Mihi Power Station project is consistent with a relevant National Policy Statement relating to transmission lines.
10. There are a large number of objectives and policies that are relevant to the proposed Te Mihi Power Station project that are contained in the following documents prepared under the RMA:
 - Waikato Regional Policy Statement;
 - Waikato Regional Plan; and
 - Taupo District Plan.
11. I have undertaken an analysis of the proposed Te Mihi Power Station project in relation to those objectives and policies. My analysis concludes that the project is consistent with the relevant objectives and policies. This is largely for the following reasons:
 - the power station will be centrally located within a large site in an area already used for geothermal electricity generation purposes;
 - the site is relatively remote from neighbouring land uses;

- the project will result in an efficient use of geothermal resources (more so than the present situation);
 - a high standard of design will be undertaken to address potential environmental issues; and
 - any adverse effect on the environment can be appropriately managed and will be no more than minor.
12. Ultimately, an assessment of the applications under Part II of the RMA requires an overall consideration of all aspects of the project measured against the statutory purpose in section 5 of the RMA. In my opinion, such an overall assessment in this case leads to a conclusion that the purpose of the RMA is better served by granting the consents as sought than declining them.

The Status of the Proposed Activities under the RMA

Taupo District Council

13. The Taupo District Plan was made operative on 11 October 2007 (except for various aspects of the Taupo District Plan that were subject to variations, none of which are relevant to the current resource consent applications). At the time the resource consent applications for the Te Mihi Power Station were lodged with the Taupo District Council, the Taupo District Plan had not been made operative but had reached a stage whereby the parts of it which were relevant to the proposed Te Mihi Power Station were beyond challenge and are therefore treated as operative pursuant to section 19 of the RMA. This means that the proposal is not subject to the provisions of the former Taupo Transitional District Plan.
14. The aspects of the project (land uses) that fall within the jurisdiction of Taupo District Council are:
- the construction, operation and maintenance of the proposed Te Mihi Power Station; and
 - the construction, operation and maintenance of the proposed switchyard and transmission line.
15. The site of the proposed Te Mihi Power Station and the associated switchyard and transmission line is partially located within the Industrial Environment and partially within the Rural Environment in the Taupo District

Plan. In Schedule 1 of the resource consent applications is Plan 124922-RC06 Rev 4 which shows the Te Mihi Power Station Land Use Consent Application Area (including the proposed site of the actual power station) and the Industrial Environment boundary (shown in blue). This plan shows that approximately one third of the Land Use Consent Application Area is zoned Industrial Environment (i.e. the eastern end of the site) while the balance of the area is zoned Rural Environment. Attachment MBC1 of my evidence is Revision 7 of Plan 124922-RC06 (which is proposed to be attached to the land use consent conditions) which also shows proposed 100 metre buffer areas around the Ellery and Price properties.

16. Efforts were made to locate the proposed Te Mihi Power Station entirely within the Industrial Environment whereupon it would be a permitted activity (leaving aside the transmission line). However, a critical consideration was the avoidance of two fault lines shown on the Planning Maps and compliance with the required 20 metre setback from those fault lines. This resulted in the power station site being located between the two fault lines whereby it now straddles the boundary of the Industrial and Rural Environments. While it may have been possible to locate the power station entirely within the Industrial Environment and still avoid the fault lines (e.g. by locating it further to the east), it was decided by Contact that the optimal layout of the project should not be compromised for the sake of achieving a more favourable RMA land use status.
17. The report I prepared entitled: "Te Mihi Geothermal Power Project Consents Assessment and Policy Context" forming part of the AEE provides an analysis of the RMA land use status of the proposed Te Mihi Power Station in terms of the Taupo District Plan. The results of that analysis are summarised as follows.
18. For an activity to be a Permitted Activity in the Taupo District Plan it must comply with all the performance standards relating to the relevant zone (referred to as 'environments') and must also comply with all the district wide performance standards.
19. The proposal breaches several of the performance standards relating to the Industrial Environment resulting in Restricted Discretionary Activity status with Taupo District Council's discretion being restricted to the matters of non-compliance in accordance with Rule 4d.1.3 of the Taupo District Plan

(in this case relating to the height of structures, setbacks from the zone boundary, and the absence of landscaping within the setback requirement).

20. The proposal breaches several of the performance standards relating to the Rural Environment (namely height, coverage, and setbacks). On this basis the proposed Te Mihi Power Station is a Discretionary Activity in accordance with Rule 4b.1.7 of the Taupo District Plan.
21. The only aspect of the proposal that does not comply with the district wide performance standards is the proposed 220 kV transmission line (and the associated switchyard which forms part of the proposal) due to the voltage of the line exceeding 110 kV and the height of the associated support structures.
22. Rule 4e.14.5 of the Taupo District Plan is headed “Non-compliance with performance standards” and states:

“Network Utility structures listed as a permitted or controlled activity but which do not comply with any applicable performance standards, are a restricted discretionary activity.

The Council restricts the exercise of its discretion to the following matters:

- i. the size of the structure in relation to surrounding activities.*
- ii. the location of the structure.*
- iii. the design and external appearance of the structure.”*

23. As a result of ‘bundling’ in terms of differing land use classifications relating to different aspects of the same proposal (whereby the most restrictive land use classification is applied), I have assessed the proposed Te Mihi Power Station as a Discretionary Activity in terms of the resource consent applications lodged with Taupo District Council.

Environment Waikato

24. The RMA status of such activities within the Waikato Region is determined by reference to the Waikato Regional Plan. At the time the resource consent applications for the Te Mihi Power Station project were lodged with Environment Waikato, the Waikato Regional Plan had reached a stage whereby all aspects of it which were relevant to the project (apart from Variation 2 – discussed below) were beyond challenge and are therefore treated as operative pursuant to section 19 of the RMA. The Waikato Regional Plan has since been made operative on 28 September 2007 apart from several aspects which are the subject of variations, including Variation 2.

25. Variation 2 relates to the entire Geothermal Module of the Waikato Regional Plan including the rules relating to the discharge of geothermal fluid onto and into land (the latter by way of reinjection) which are relevant to the current resource consent applications. All aspects of Variation 2 have now either been determined by way of settled appeals or been agreed amongst the parties to the various appeals on Variation 2. The final document is yet to be the subject of a Consent Order of the Environment Court. Environment Waikato is currently securing the signatures on the Consent Memorandum with a view to its being submitted to the Environment Court for approval in the very near future.
26. The fact that Variation 2 has yet to be made operative means that the corresponding provisions (if any) of the Waikato Transitional Regional Plan are relevant. However, the proposed discharges of geothermal fluid, the subject of the current resource consent applications, are not provided for in the Waikato Transitional Regional Plan and nor are there any relevant objectives or policies (and on that basis will not be considered any further in my evidence). As they are not provided for, I understand that case law¹ indicates that these activities fall to be considered as Discretionary Activities, or under section 104 of the RMA as if they were Discretionary Activities (i.e. the same status as specified in Variation 2).
27. Contact has recently secured resource consents for the on-going operation of the Wairakei Geothermal Power Plant² until 30 June 2026. Some of these resource consents will be able to be used for the proposed Te Mihi Power Station. These generally relate to the broad geothermal take and discharge consents and the other broad consents associated with the operation of the steamfield.
28. An analysis of the scope of Contact's current resource consents and the need for additional resource consents for the proposed Te Mihi Power Station project has been undertaken in the report I prepared already referred to in paragraph 17 above. In summary, new resource consents are required for the following activities:
- the discharge of additional volumes of geothermal fluid by way of reinjection;

¹ Te Aroha Air Quality Protection Appeal Group v Waikato R.C. (No.2) (1993) 2 NZRMA 574; Tutton Sienko & Hill v Canterbury R.C. W100/95

² The term 'Wairakei Geothermal Power Plant' includes the Wairakei Power Station, Poihipi Power Station, and all associated steamfield activities.

- the discharge of cooling water blowdown and condensate onto land (and by seepage into underground water) by way of irrigation;
 - the discharge of sewage to ground; and
 - discharges to air.
29. All of the above activities for which resource consents are sought from Environment Waikato are Discretionary Activities.

Part II of the RMA (Purpose and Principles)

30. The overarching intention of the resource consent application process is to ensure that the proposed activities are consistent with the purpose of the RMA. This involves the comparison of often conflicting considerations and the scale or degree of them and their relative significance or proportion in the final outcome.
31. In terms of the purpose of the RMA, the proposed Te Mihi Power Station will enable people and communities to provide for their social, economic, and cultural well-being and for their health and safety by the provision of electricity. This is particularly the case in relation to electricity generated using geothermal resources, which is important for New Zealand's security of supply, as it is not constrained by climatic conditions (as is the case with hydro, wind and solar energy sources).
32. Electricity generated from geothermal sources is also consistent with the Government's policy³ of encouraging the use of renewable energy sources, particularly where this assists the Government in meeting its international commitments in relation to the Kyoto Protocol due to the low emissions of CO₂ associated with geothermal electricity generation. I note that the Government policy documents relating to these matters are not RMA policy documents, but they are, in my opinion, relevant considerations. This position has been further reinforced as a result of the Government progressing the Emissions Trading Scheme and Renewables Preference Bill 2007 (currently before Parliament) placing a 10 year moratorium on the construction of new fossil-fuelled power stations (i.e. gas and coal fired power stations). If that bill is enacted, it will mean that electricity generated from geothermal sources is the only realistic option available for increased base load generation capacity in the short to medium term.

33. The anticipated benefits of the proposed Te Mihi Power Station project are outlined in the evidence of Mr David Hunt including:
- a significant increase in electricity production (assessed as being equivalent to the energy requirements of approximately 70,000 households between 2011 and 2026, and approximately 200,000 households from 2026 onwards);
 - \$60 million less in electricity production costs over the first 25 years of the project compared with alternative supply options;
 - increased diversification of electricity generation sources thereby reducing supply risks;
 - a continuous source of generation (aside from maintenance periods);
 - displacing other sources of generation with higher greenhouse gas emissions;
 - reduced transmission losses (valued at approximately \$1 million per year);
 - a contribution to the regional economy during the construction phase including employment for up to 400 people and approximately \$50 million being injected into the local economy (rising to a regional economic benefit of approximately \$90 million when flow effects are considered);
 - on-going economic benefits due to employment of staff and contractors; and
 - continued operation of cascade users of geothermal fluid.
34. All of the above outcomes will enable people and communities to provide for their social, economic, and cultural well-being.
35. Sustainable management enables the use and development of resources while seeking to ensure that the circumstances in section 5(2)(a)-(c) are able to be satisfied. I have outlined in the next paragraphs my opinion on how this will be achieved.

³ As expressed through the current National Energy Efficiency and Conservation Strategy and the New Zealand Energy Strategy to 2050 – Powering Our Future dated October 2007.

36. In terms of the needs of future generations, the benefits of the proposed Te Mihi Power Station (discussed above) are relevant considerations. In terms of the use of geothermal resources, it is relevant to note that no additional resource consent is required for the take of geothermal fluid from the Wairakei – Tauhara Geothermal System. The proposed Te Mihi Power Station will generate a greater amount of electricity using the same amount of geothermal fluid taken, for which Contact already holds a resource consent. The evidence of Professor Michael O’Sullivan concludes that the proposed additional injection of geothermal fluid will be able to be undertaken in a manner which achieves the required 56 barA minimum pressure at Tauhara (as measured in wells TH1 and TH3) at the -400 mRL level in accordance with the resource consents already held by Contact. Some cooling of the geothermal fluid in the Waiora aquifer is predicted but is considered to be a minor effect. Also of relevance to future generations, the proposed Te Mihi Power Station project will facilitate an improvement to the water quality of the Waikato River (discussed in more detail below).
37. I do not consider that the proposed Te Mihi Power Station project gives rise to any issue in respect of the life supporting capacity of air, water, or soil. The evidence of Mr Christopher Bromley discusses the effects of the proposed additional injection of geothermal fluid on Significant Geothermal Features⁴ within the Wairakei – Tauhara Geothermal System which is relevant to section 5(2)(b) in relation to the life supporting capacity of ecosystems. Mr Bromley concludes that surface thermal features and heated groundwater aquifers are expected to continue to change through interaction with, and in response to, pressure and temperature changes in deeper geothermal aquifers. This will result in both adverse and beneficial effects on surface geothermal features which will be managed through the Discharge Strategy forming part of the System Management Plan (discussed later in my evidence) as outlined in Mr Bromley’s evidence.
38. A key issue for the Board of Inquiry is the extent to which any adverse effects of Contact’s proposed activities are appropriately avoided, remedied or mitigated. This is the subject matter of the evidence of various Contact witnesses that are referred to throughout my evidence.

⁴ Significant Geothermal Features within the Wairakei – Tauhara Geothermal System are listed in Table 7-5, and shown on the Planning Maps, in Variation 2 to the Waikato Regional Plan.

39. The proposed Te Mihi Power Station project does not, in my opinion, give rise to any issues in relation to section 6(a) - (d) and (f) - (g) of the RMA for the following reasons:
- No new development is proposed in proximity to the coastal environment, wetlands, lakes or rivers, however, the reduction in the discharges of geothermal fluid to the Waikato River which will be facilitated by the proposed Te Mihi Power Station project is a benefit in terms of restoring (to some extent) a more natural character to that waterbody (at least in terms of water quality);
 - There are no outstanding natural features or landscapes affected by the proposed activities;
 - Any areas of significant indigenous vegetation and/or significant habitats of indigenous fauna will be managed in accordance with the relevant geothermal policy regime (discussed later in my evidence);
 - Public access to and along the margins of the coastal marine area, lakes and rivers will not be affected by the proposal;
 - No areas of historic heritage that I am aware of will be adversely affected by any of the proposed development; and
 - There are no customary activities that I am aware of that will be adversely affected by the proposal.
40. In terms of section 6(e), i.e. the relationship of Maori and their culture and traditions with their ancestral lands, water, sites, waahi tapu, and other taonga, the submissions representing Maori interests have raised some concerns about the potential effects of the proposed discharges onto and into land (the latter by way of reinjection). These submissions do not appear to raise any fundamental objection to the nature of the proposed discharges, but rather they raise concerns about the potential for them to cause adverse effects on valued aspects of the environment, such as the Waikato River and Karapiti (Craters of the Moon).
41. The construction and operation of the proposed Te Mihi Power Station project, and the consequential decommissioning of most of the current activities at the Wairakei Power Station, will facilitate a significant reduction in the discharge of contaminants to the Waikato River. Contact holds resource consents which allow for the operation of the Wairakei Power

Station until 2026 including discharges to the Waikato River. The commissioning of the proposed Te Mihi Power Station will mean that Contact will significantly reduce the amount of contaminants that would otherwise have been lawfully discharged to the Waikato River.

42. The decommissioning of most of the Wairakei Power Station will result in the progressive removal of at least 93% of the geothermal steam condensate (including hydrogen sulphide, heat and mercury contaminants) that is currently discharged into the Waikato River via the Wairakei Power Station cooling water. It will also result in heat and mercury loads on the Waikato River being reduced to 28% of present loads by 2012 (possibly sooner), and to 6.4% of present loads by 2016 (possibly sooner). These reductions are consistent with the process envisaged in consent 104712 of investigation of options to reduce heat and mercury inputs to the river, and if appropriate, implementation of available options over time.
43. The existing conditions of consent 104712 require 'best endeavours' be utilised to reduce mercury loads to 22% of the present maximum load by the 10th anniversary of commencement of consent (from 46kg per annum to 10kg). This was phrased as a best endeavours obligation because at date of grant in August 2007, there was no practicable treatment mechanism available to achieve that reduction. The proposed decommissioning of parts of the Wairakei Power Station would result in this best endeavours obligation being met and the mercury reduction sought by that condition exceeded.
44. The present consent conditions do not require any specific reduction in heat load before 2026. The proposed decommissioning of parts of Wairakei Power Station results in a significant reduction in river temperatures in the reach of the river between the outfall and the Aratiatia Dam from 2016 onwards.
45. Reductions in mercury concentrations resulting from the decommissioning of the Wairakei Power Station can be expected to improve the condition of the biota (reduction in mercury bioaccumulation) and habitat (i.e. reduction in mercury deposition in the sediments) within the Waikato River in the longer term.
46. On the basis that the environmental effects of the proposed discharges are no more than minor (or positive in the case of the Waikato River compared with the currently consented situation), it is my view that section 6(e) of the

RMA has been appropriately recognised and provided for as a matter of national importance.

47. The following parts of section 7 of the RMA are, in my opinion, relevant to the proposed Te Mihi Power Station:

(a) *Kaitiakitanga:*

(aa) *The ethic of stewardship:*

(b) *The efficient use and development of natural and physical resources:*

(c) *The maintenance and enhancement of amenity values:*

(f) *Maintenance and enhancement of the quality of the environment:*

(g) *Any finite characteristics of natural and physical resources:*

(i) *The effects of climate change:*

(j) *The benefits to be derived from the use and development of renewable energy.*

48. Contact has actively provided for Kaitiakitanga in a number of ways, both specifically in relation to the Te Mihi Power Station project and in relation to wider management of the Wairakei – Tauhara Geothermal System. The evidence of Mr Stephenson has outlined the process of consultation that has been undertaken with representatives of tangata whenua in relation to the Te Mihi Power Station project and the range of measures and actions that have been undertaken or agreed to including:

- The preparation of a Cultural Impact Assessment;
- Participation by tangata whenua in a Technical Focus Group Meeting;
- Site visits and hui;
- The adoption of a Cultural / Archaeological Sites Protocol (including as part of any Construction Management Plan) which forms part of the proposed land use consent conditions;
- Investigating options for the protection of three rock art features;
- A study of the ecology of various surface water bodies; and
- A Heads of Agreement (incorporating the above matters).

49. The consents which have been applied for from Environment Waikato (and the proposed consent conditions proffered by Contact) are subject to the wider suite of resource consents already held by Contact relating to the Wairakei - Tauhara Geothermal System including the establishment of a Peer Review Panel which has a key role in relation to management of Contact's operations on the System, including in particular finalisation and approval of the Discharge Strategy. The Peer Review Panel for the Wairakei - Tauhara Geothermal System includes a representative of tangata whenua which provides an on-going opportunity for kaitiakitanga.
50. The ethic of stewardship, the efficient use of natural and physical resources, and the finite characteristics of the geothermal resource are matters which are closely linked in relation to the current proposal. The proposed Te Mihi Power Station will result in a more efficient use of the geothermal fluid extracted from the Wairakei – Tauhara Geothermal System. The overall management of the geothermal resource (and the effects of its use) will accord with the ethic of stewardship in accordance with the System Management Plan (a draft of which was submitted as Part C of the application documentation). The contents and direction of the System Management Plan are guided by the relevant objectives and policies in the Waikato Regional Policy Statement and the Waikato Regional Plan (discussed later in my evidence) which in turn seek to appropriately manage the finite characteristics of the Regional Geothermal Resource.
51. The maintenance and enhancement of amenity values and the quality of the environment are relevant considerations in terms of the extent to which any adverse effects on the environment will be adequately avoided, remedied, or mitigated. This is particularly relevant in relation to the issues raised in the submission from surrounding land owners (e.g. traffic generation, noise, and visual effects). On the basis that these types of effects will be appropriately avoided, remedied, or mitigated (as discussed in the evidence of the various witnesses for Contact) it is my opinion that these matters have been adequately addressed. To the extent that the current proposal will facilitate a reduction of the current discharges of contaminants to the Waikato River (as previously discussed), this will be an enhancement to the quality of the environment.
52. The effects of climate change and the benefits to be derived from the use and development of renewable energy are closely linked and are

particularly relevant matters in relation to the proposed Te Mihi Power Station. The term “renewable energy” is defined in section 2 of the RMA and includes energy produced from geothermal sources. Section 7(j) specifically recognises the benefits of renewable generation and therefore gives weight to the type of benefits that will be derived from the proposed Te Mihi Power Station (as previously discussed).

53. In terms of section 8 of the RMA, the Board of Inquiry is exercising functions and powers under the RMA in determining the current resource consent applications by Contact and will therefore need to take into account the principles of the Treaty of Waitangi. In relation to this matter, the matters I have discussed above in relation to Contact’s efforts to actively provide for kaitiakitanga and to avoid, remedy or mitigate adverse effects on aspects of the environment of particular value to tangata whenua are, in my opinion, relevant considerations under section 8 of the RMA.

Relevant National Policy Statements

54. There is one National Policy Statement (NPS) that is relevant to the proposed Te Mihi Power Station. The NPS on Electricity Transmission 2008⁵ is relevant to the proposed transmission lines and associated switchyard proposed to convey the electricity generated by the proposed Te Mihi Power Station to the National Grid.
55. The NPS identifies as a matter of national significance *“the need to operate, maintain, develop and upgrade the electricity transmission network”*.
56. The objective of the NPS is:
- “To recognise the national significance of the electricity transmission network by facilitating the operation, maintenance and upgrade of the existing transmission network and the establishment of new transmission resources to meet the needs of present and future generations, while:*
- *Managing the adverse environmental effects of the network;*
 - *and*
 - *Managing the adverse effects of other activities on the network.”*
57. The above objective is followed by 14 policies which amplify and expand upon the outcomes embodied in the objective of the NPS. Of particular

⁵ The National Policy Statement on Electricity Transmission 2008 was gazetted on 13 March 2008 and took effect 28 days later.

relevance to the proposed Te Mihi Power Station, the policies require decision-makers to:

- recognise and provide for the national, regional and local benefits of sustainable, secure and efficient electricity transmission;
- recognise and provide for the effective operation, maintenance, upgrading and development of the electricity transmission network;
- have regard to the extent to which adverse effects have been avoided, remedied, or mitigated by the route, site and method selection (and the constraints imposed on achieving measures to avoid, remedy or mitigate adverse environmental effects by the technical and operational requirements of the network);
- minimise adverse effects on urban amenity and avoid adverse effects on town centres and areas of high recreational value or amenity and existing sensitive areas; and
- avoid adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreational value and amenity and existing sensitive activities.

58. The proposed transmission equipment associated with the proposed Te Mihi Power Station is, in my view, consistent with the NPS on the basis of the assessment and conclusions reached in the various technical reports forming part of the AEE and the evidence of other Contact witnesses covering aspects of the proposed transmission equipment. In particular the proposed transmission equipment will:

- provide national, regional and local benefits associated with a sustainable, secure and efficient electricity transmission network and enhance its effective operation;
- not cause any adverse effects on town centres and areas of high recreational value or amenity and existing sensitive areas; and
- not cause any adverse effects on outstanding natural landscapes, areas of high natural character and areas of high recreational value and amenity and existing sensitive activities.

Waikato Regional Policy Statement

59. The operative Waikato Regional Policy Statement (referred to as the “RPS”) identifies significant resource management issues, objectives, policies and methods relating to the Waikato Region.
60. My evidence will focus on the Geothermal Chapter of the RPS. This is the most relevant part of the RPS to the assessment of Contact’s resource consent applications in terms of section 104 of the RMA. However, I will also consider the Energy Chapter and the Air Chapter of the RPS.

Geothermal Chapter of the RPS

61. The Geothermal Chapter of the RPS is now operative following the resolution of appeals in relation to Change 1 to the RPS.
62. The policy framework in the RPS sets up a comprehensive approach for the sustainable management of the Waikato Regional Geothermal Resource as a whole, rather than attempting to achieve the sustainable management of specific resource elements. The RPS allocates the Regional Geothermal Resource in a way that provides for multiple uses and the variety of the Region’s geothermal features. This is achieved by the identification of each geothermal system within the Waikato Region into one of the following five classifications:
- Development Geothermal Systems
 - Limited Development Geothermal Systems
 - Research Geothermal Systems
 - Protected Geothermal Systems
 - Small Geothermal Systems
63. The proposed Te Mihi Power Station is to be located on the Wairakei – Tauhara Geothermal System which is classified in the Waikato Regional Plan as a Development Geothermal System. The objective and policies for Development Geothermal Systems in Section 3.7.2.1 of the RPS that are relevant to the proposed Te Mihi Power Station are presented in Attachment MBC2 of my evidence.

64. The proposed Te Mihi Power Station project is, in my opinion, entirely consistent with the objective and policies for Development Geothermal Systems for the reasons that will be discussed as follows.
65. The Objective and Policy One explicitly recognise and provide for the large scale take, use and discharge of geothermal energy and water. The proposed Te Mihi Power Station project will facilitate a more efficient use of geothermal fluid that is taken pursuant to an existing resource consent (i.e. more electricity will be generated from the same amount of geothermal fluid taken). The proposal will provide for the energy needs of current and future generations as sought by the Objective. Effects on Significant Geothermal Features (referred to in the Objective) are discussed below in relation to Policy Five. Any adverse effect on other natural and physical resources will be avoided, remedied or mitigated as required by the Objective. In this respect, the current applications (and the proposed consent conditions) are proposed to be subject to the management regime embodied in the resource consents already held by Contact relating to the Wairakei – Tauhara Geothermal System. This includes, for example, conditions relating to pressure maintenance and the operation of the Peer Review Panel. As previously discussed, the commissioning of the proposed Te Mihi Power Station will also facilitate a significant reduction in the discharge of contaminants to the Waikato River.
66. As prescribed in Policy Two, a key focus of the policies relating to Development Geothermal Systems is the requirement for the integrated management of each Development Geothermal System through the preparation of a System Management Plan, a Peer Review Panel, resource consent conditions, and a system liaison group / forum where appropriate.
67. As previously noted, a draft System Management Plan was submitted as part of the documentation supporting the current resource consent applications in accordance with Policy Two. This document will be completed once the consent conditions are determined by the Board of Inquiry in relation to the current applications (subject to the current applications being granted). Even if the current applications were declined, the System Management Plan will still be completed in accordance with the requirements of Contact’s existing resource consents relating to the Wairakei – Tauhara Geothermal System. The draft System Management Plan covers the matters required to be addressed in Policy Two.

68. I do not consider that a liaison group / forum is necessary in relation to the current applications for the same reasons that I advanced in relation to the re-consenting of the Wairakei Geothermal Power Plant (where one was not required by the consent conditions). Those reasons are essentially that there are a number of existing groups (e.g. the Hapu Collective) and consultative relationships already in place that do not need to be duplicated by another group / forum.
69. Policy Three requires that geothermal fluid remaining after use be reinjected / injected in accordance with a Discharge Strategy forming part of the System Management Plan. The proposed Te Mihi Power Station project is in accordance with this policy. Additional reinjection is proposed as part of the project in a manner which is consistent with the list of considerations specified in Policy Three.
70. The Environment Court decision that gave rise to Policy Three⁶ stated a preference for geothermal fluid to be reinjected back into the geothermal system from which it was taken (after it had been used for some beneficial purpose) but acknowledged that this may not be the best option in all circumstances (hence rules and policies covering discharges to other receiving environments). As noted above, the commissioning of the Te Mihi Power Station will facilitate a greater proportion of the used geothermal fluid being reinjected and a corresponding reduction in the amount of geothermal water being discharged to the Waikato River.
71. The current applications include a proposal to discharge up to 6,500 tonnes per day of cooling water blowdown and condensate onto land which is to occur by way of irrigation (which is considered to be beneficial from a farming perspective). This consent will provide a greater degree of flexibility in terms of discharge options (a matter to have regard to in Policy Three). In this regard, it should be noted that Contact has applied for consents to be able to discharge a greater volume of geothermal water than the amount it is able to take. This is specifically intended to enhance operational flexibility within the parameters of the Discharge Strategy (forming part of the System Management Plan). The proposed discharge of cooling water blowdown and condensate onto land represents a relatively small proportion of the amount of geothermal fluid to be discharged and will only

⁶ See the discussion in paragraphs 254-264 of the Environment Court's Interim Decision in *Geotherm Group Ltd and Others v Waikato Regional Council A047/2006*. Note that this decision refers to Policy Six which is now Policy Three in Section 3.7.2.1 of the RPS.

be undertaken in accordance with the objectives of the Discharge Strategy. On the basis of the evidence of Mr Stevenson, any environmental effect resulting from this discharge will be no more than minor.

72. Policy Five allows for the efficient take, use and discharge of geothermal energy and water while remedying or mitigating within the Regional Geothermal Resource significant adverse effects on Significant Geothermal Features. As explained in the explanation to this policy in the RPS:

“Policy Five recognises that it is not possible to avoid all adverse effects to Significant Geothermal Features when large scale takes, uses and discharges of geothermal energy and water are allowed in Development Geothermal Systems. Accordingly, the policy requires that where extractive uses cause significant adverse effects to Significant Geothermal Features, these effects should be addressed by remediation or mitigation within the Regional Geothermal Resource. This may include remediation or mitigation of existing adverse effects and/or protection from potential adverse effects in similar types of surface features (as listed in Appendix 5) in the same or another Geothermal System to an extent commensurate with the adverse effect being caused (‘like for like’ mitigation).”

73. As previously discussed, the potential effects on Significant Geothermal Features have been discussed in the evidence of Mr Christopher Bromley. No significant adverse effects on Significant Geothermal Features are predicted, but if they do occur then measures to remedy or mitigate such effects will be undertaken as part of the System Management Plan.
74. As required by Policy Six, any adverse effects on non-geothermal natural and physical resources as a result of the proposal will be avoided, remedied, or mitigated (this being the subject of evidence presented by other witnesses for Contact).

Energy Chapter of the RPS

75. The following objective and policy are included in the Energy Chapter of the RPS:

Objective: *Efficient use of energy within the Waikato Region.*

Policy One: Energy Efficiency and Conservation
To promote efficiency and conservation in the production, transmission and consumption of energy.

76. The outcomes sought by the above objective and policy are consistent with Contact's own approach to the management of geothermal resources and the generation of electricity.

Air Chapter of the RPS

77. Section 3.6.3 of the RPS sets out the objective for regional and local air quality as follows:

“Objective: Significant characteristics of areas of:

- *high air quality protected*
- *degraded air quality enhanced*
- *other air quality maintained.”*

78. The above objective is followed by various policies which reflect and amplify the outcomes that the objective seeks to achieve. Given that the discharge of H₂S is the key issue associated with the application for an Air Discharge Permit, the most relevant policy is Policy Four which states:

“Policy Four:

Adverse Effects on Human Health

Discharges to air managed in a way that is designed to avoid adverse effects on human health.”

79. On the basis of the evidence of Dr Stevenson, it is my opinion that the discharges to air associated with the proposed Te Mihi Power Station will be in accordance with the objective and policy in the Air Chapter of the RPS discussed above.
80. The Air Chapter of the RPS also includes a brief section focusing on greenhouse gases and climate change. The objective and policy are very similar and seek to support Government policy in the management of greenhouse gases. As previously noted, the use of renewable resources (including geothermal) for the generation of electricity is consistent with Government policy as outlined in the National Energy Efficiency and Conservation Strategy and the New Zealand Energy Strategy to 2050 – *Powering Our Future* dated October 2007.

Waikato Regional Plan

Geothermal Module

81. The Geothermal Module of the Waikato Regional Plan is of greatest relevance to the proposed Te Mihi Power Station. The following analysis is based on the latest version of Variation 2 as agreed by the parties (i.e. appellants and s.274 parties) but which is still subject to the signing of a

Consent Order of the Environment Court, in the expectation that the position will be formalised before the forthcoming Board of Inquiry in late July of this year.

82. There are 6 (of a total of 8) objectives in the Geothermal Module that are relevant to Contact's applications for the proposed Te Mihi Power Station which are presented in Attachment MBC3 of my evidence. Those objectives are sought to be achieved through a number of policies. The relevant policies are also presented in Attachment MBC3 of my evidence.
83. The proposed Te Mihi Power Station project will, in my opinion, be consistent with the objectives and policies in the Geothermal Module of the Waikato Regional Plan for the following reasons (which in most instances will be discussed briefly as they largely cover the same matters in the Geothermal Chapter of the RPS discussed above).
84. Geothermal water will be used and managed efficiently (more so than the present situation) in accordance with Objective 1 and Policy 3.
85. Objective 2 and Policy 6 outline the same directions in relation to Significant Geothermal Features as the RPS and the same comments apply. The current applications include the discharge of non-geothermal water (i.e. sewage) which will be undertaken in a manner that is consistent with the requirement in Objective 4 (i.e. that such discharges do not cause significant adverse effects on Significant Geothermal Features).
86. In accordance with Objective 5 and Policy 11, there will be no more than minor adverse effects on non-geothermal resources including fresh water (in fact the proposal will facilitate an improvement in the water quality of the Waikato River as previously discussed). A key aspect of Objective 5 and Policy 11 is the potential effect on "overlying structures (the built environment)", which in relation to the Wairakei – Tauhara Geothermal System primarily relates to a concern about the potential effects of subsidence on the township of Taupo. In this regard, the proposed Te Mihi Power Station project will be subject to the management regime determined by the Environment Court in relation to the current resource consents held by Contact. A key element of this management regime is the required 56 barA minimum pressure at Tauhara (TH1 And TH3) at the -400 mRL level which is aimed at minimising the risk of subsidence occurring in Taupo. In addition, the proposed reinjection capacity within the wider area for which consent has been sought will provide Contact with greater options to pursue

targeted reinjection as a subsidence mitigation measure should that be necessary and desirable.

87. The various discharges of geothermal energy and water will be managed so as to avoid any significant adverse effect on fresh water in accordance with Objective 7 and Policy 12.
88. The on-going use and management of the Wairakei – Tauhara Geothermal System will result in increased knowledge and understanding about the Regional Geothermal Resource and the effects of its use in accordance with Objective 8.
89. Finally, the proposed Te Mihi Power Station project is in accordance with Policies 4 and 13 (focusing on the System Management Plan and Discharge Strategy) for the reasons previously discussed in relation to the corresponding policies in the RPS.

Air Module

90. The Air Module of the Waikato Regional Plan contains three objectives in relation to air quality (see Section 6.1.2). Objective 1 is largely a repeat of the objective in Chapter 3.6 of the RPS discussed above. Objectives 2 and 3 are also relevant to the current proposal as follows:

“Objective 2:

No significant adverse effects from individual site sources on the characteristics of air quality beyond the property boundary.”

“Objective 3:

Cumulative effects of discharges on ambient air quality do not:

- a. present more than a minor threat to the health of humans, flora and fauna*
- b. cause odour that is objectionable to the extent that it causes an adverse effect*
- c. result in levels of suspended or deposited particulate matter that are objectionable to the extent that they cause adverse effects*
- d. have a significant adverse effect on visibility*
- e. cause accelerated corrosion of structures*
- f. cause significant adverse effects on the relationship tangata whenua as Kaitiaki have with their identified taonga such as air, ancestral lands, water and waahi tapu.”*

91. The policies relating to the above objectives that are relevant to the current proposal are as follows:

“Policy 2: Managing Effects of Other Discharges

Manage other discharges of contaminants to air through controlled

and discretionary activity rules having particular regard to the effects of the discharge on:

- a. ambient air quality compared to the Regional Ambient Air Quality Guidelines (RAAQG) levels provided in Chapter 6.3,*
- b. ambient air quality compared to internationally accepted air quality guidelines or standards for managing and understanding the effects of contaminants on human health, the health of flora and fauna and amenity values,*
- c. ambient odour and particulate matter levels compared to the guidelines for assessment provided in Chapter 6.4 of the Plan for odour and particulate matter*
- d. adverse effects from contaminants that are hazardous in ambient air, particularly with respect to human health,*
- e. the significant characteristics of air quality within an area,*
- f. significant adverse effects of the discharge on the identified values of tangata whenua as Kaitiaki,*
- g. the sensitivity of the receiving environment,*
- h. existing ambient air quality and any cumulative effects as a result of the discharge on the receiving environment,*
- i. nationally accepted codes of practice for the relevant activity.*

Policy 5: Positive Benefits of Resource Use

Recognise the positive benefits to people and communities arising from activities that affect air quality by enabling a range of activities to use the air (including existing activities) whilst ensuring that:

- a. high quality air resources are protected,*
- b. degraded air quality is enhanced,*
- c. adverse effects on air quality are avoided, remedied or mitigated.”*

92. The above objectives and Policy 2 focus on managing the effects of air discharges (including cumulative effects). On the basis of the evidence of Dr Stevenson, it is my opinion that the discharges to air associated with the proposed Te Mihi Power Station will be in accordance with the objectives and Policy 2 in the Air Chapter of the RPS discussed above.
93. Policy 5 requires the recognition of the positive benefits to people and communities arising from activities that affect air quality subject to the achievement of the outcome specified in Objective 1 discussed above. As discussed in relation to section 5 of the RMA, the construction and operation of the proposed Te Mihi Power Station project will provide a range of positive benefits.

Taupo District Plan

94. The following objectives and policies of the Taupo District Plan are relevant to the proposed Te Mihi Power Station.

Rural Environment

95. The objectives and policies relating to the Rural Environment of relevance to the proposal are:

- **OBJECTIVE 1**
3b.2.1 The protection of the rural amenity and character of the Rural Environment.

POLICIES

- i. Maintain and enhance the amenity and character of the Rural Environment by providing land use performance standards and subdivision rules to manage the scale and density of development.*
- iv. Provide for a range of productive land use activities within the Rural Environment while ensuring any adverse effects are avoided, remedied or mitigated.*
- vi. Avoid, remedy or mitigate adverse effects of subdivision, use and development of land on areas or features of cultural, historical, landscape or ecological value.*

96. As noted in the explanation to the objective and policies in the Taupo District Plan, Policy iv. above seeks to maintain productive land use activities that make up a significant portion of the overall Rural Environment and acknowledges that there are many different forms of productive land use, including electricity generation facilities, that provide a diverse range of established land use in the rural area.

97. Policy iv. recognises that the Rural Environment contains a wide range of resources that require the location of activities close to the resource. The proposed Te Mihi Power Station is centrally located on a large property (that is owned by Contact) relatively remote from dwellings in the surrounding environment. The proposed development is consistent with the amenity and character of the existing environment, i.e. a productive steamfield which already incorporates a significant level of electricity generation infrastructure. The site of the proposed Te Mihi Power Station has not been identified as having any particular cultural, historical, landscape or ecological value.

- **OBJECTIVE 4**
3b.2.4 The efficient and effective functioning of the Rural Environment by enabling the use and development of natural and physical resources, while ensuring appropriate environmental outcomes are achieved.

POLICIES

- i. Control activities which may potentially restrict or compromise the operation of existing activities of the Rural Environment including the creation of new rural allotments that may lead to conflict between residential and rural activity.*
- iii. Avoid subdivision and development of rural land that will put pressure on rural infrastructure and may require an increase in the level of service now or in the future.*
- v. To recognise the important role of resource use and development in the Rural Environment, by providing for the continued operation and associated development of existing electricity generation facilities and network utilities by allowing their use, maintenance and minor upgrading where all significant adverse effects are avoided, remedied or mitigated.*

98. The above objective and policies recognise that existing facilities for the generation and transmission of electricity represent a significant investment that creates social and economic benefits both locally and nationally. The Plan provides for the operation of electricity generation facilities and network utilities. The objective recognises that so long as appropriate environmental outcomes are achieved, resource use and development of the Rural Environment should be provided for. The proposed Te Mihi Power Station will be consistent with the outcomes sought to be achieved by the above objective and policies.

- **OBJECTIVE 5**

- 3b.2.5 The protection of adjoining Environments from the adverse effects of activities within the Rural Environment.*

POLICIES

- i. Manage the potential for adverse effects of activities in the Rural Environment at the interface of this and other more sensitive Environments.*

99. The above objective and policy seek to ensure that development and the level of environmental effects within the Rural Environment do not have excessive off-site effects, and that the adjoining Environment as well as the amenity of the wider District is protected. As noted above, given the central location of the proposed Te Mihi Power Station on a large property there will be little in the way of any off-site effects. Off site effects associated with the construction of the proposal (e.g. traffic) will be carefully managed and controlled. Specific measures that are proposed to address off-site effects during the construction phase include a 100 metre buffer area around the Ellery and Price properties and the preparation of a Construction

Management Plan which will include measures to minimise effects on neighbouring properties.

Industrial Environment

- **OBJECTIVE 1**
3d.2.1 The maintenance of the environmental qualities and functioning of the Industrial Environment.

POLICIES

- Maintain the qualities of the Industrial Environment through controlling the bulk, location and nature of activities, to ensure an appropriate scale and intensity of buildings and activities that are consistent with an industrial scale of development; i.e. an appropriate density of activity and level of environmental effects, while allowing the functioning of the area to be maintained.*
- Encourage a wide range of activities within the Industrial Environment, including any activity with nuisance elements not appropriate for any other Environment, while ensuring any adverse effects are avoided, remedied or mitigated.*

- **OBJECTIVE 2**
3d.2.2 The protection of adjoining Environments from the adverse effects of activities within the Industrial Environment.

POLICY

- Control the effects of activities within the Industrial Environment so the scale of development and level of environmental effects does not adversely affect the amenity of the other Environments of the District.*

100. The above objectives and policies provide for the functioning of activities in the Industrial Environment and seek to ensure that excessive off-site effects do not arise, and that the adjoining Environment as well as the amenity of the wider District is protected. This will be achievable through the appropriate design and operation of the proposed Te Mihi Power Station.

Traffic and Transport

- **OBJECTIVE 1**
3f.2.1 The safe and efficient operation of the roading network, and movement of traffic, including cyclists and pedestrians within the District.

POLICIES

- Ensure activities avoid, remedy or mitigate any adverse effects on the operation and function of the roading network, including the movement of traffic cyclists and pedestrians, as [sic] accordance with the Roding Hierarchy.*

- ii. Encourage activities, including the design and location of new vehicle crossings, to provide for the safe and efficient movement of traffic, including cyclists and pedestrians.*

101. The above objective and policies seek to provide for the efficient and effective operation of the roading network with the adverse effects on other users of the road and other land use activities avoided, remedied or mitigated through the appropriate location of activities within the Environments and areas of the District, in accordance with the Roding Hierarchy. This will be achieved by the management of construction traffic and the improvements to the roading network being undertaken as discussed in the evidence of Mr Harries.

Geothermal Activity

- **OBJECTIVE 1**
3o.2.1 Enable and manage the effects of land use activities associated with geothermal resource use and development.

POLICIES

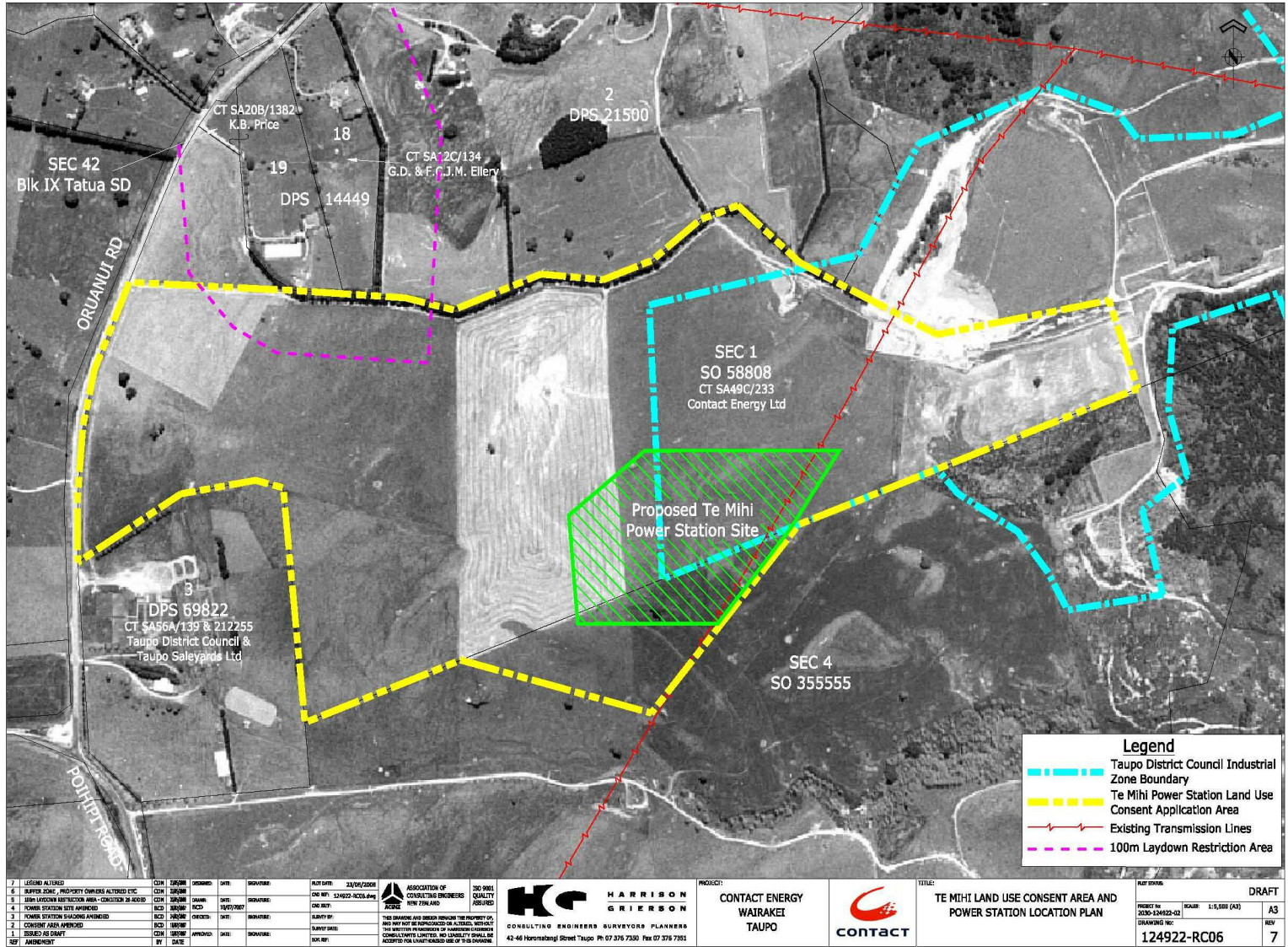
- ii. To enable land uses associated with the use of geothermal resources in a manner which avoids, remedies or mitigates adverse effects on the environment.*
- iii. To control the land use effects associated with the use of geothermal resources by way of environmental performance standards in rules and conditions on resource consents.*

102. The above objective and policies seek to enable the use of geothermal resources in a manner that avoids, remedies or mitigates adverse effects on the environment. In relation to the proposed Te Mihi Power Station, this will be achieved by the imposition of appropriate conditions on any resource consents granted.

M B CHRISP

Attachment MBC1

Plan 124922-RC06 Rev 7 Showing the Proposed Te Mihi Power Station in relation to the Land Use Zoning



7	LEGEND ALTERED	CHN	28/08	DESIGNED	DATE	BY	DATE	23/08/2008	ASSOCIATION OF CONSULTING ENGINEERS NEW ZEALAND	230 2800	QUALITY ASSURED		CONTACT ENERGY WAIRAKEI TAUPO		TE MIHI LAND USE CONSENT AREA AND POWER STATION LOCATION PLAN	PROJECT NO: 124922-RC06 SCALE: 1:5,000 (A3) DRAWING NO: 124922-RC06	REV 7
6	SLIPPER ZONE, PRIORITY OWNERS ALTERED ETC	CHN	28/08	DATE	BY	DATE	12/02/2008		THIS DRAWING AND DESIGN RELIANT ON THE PROPERTY CO. AND MAY NOT BE REPRODUCED OR ALTERED WITHOUT THE WRITTEN PERMISSION OF HARRISON GRIERSON CONSULTING ENGINEERS. NO LIABILITY SHALL BE ACCEPTED FOR UNAUTHORIZED USE OF THIS DRAWING.	CONTACT ENERGY WAIRAKEI TAUPO							
5	100M LAYDOWN RESTRICTION AREA - CONSTRUCTION BY ACCESS	CHN	28/08	DATE	BY	DATE	10/07/2007										
4	POWER STATION SITE APPROVED	CHN	28/08	DATE	BY	DATE											
3	POWER STATION SHADING AMENDMENT	CHN	28/08	DATE	BY	DATE											
2	CONSENT AREA APPROVED	CHN	28/08	DATE	BY	DATE											
1	ISSUED AS DRAFT	CHN	28/08	DATE	BY	DATE											
REF	AMENDMENT	BY	DATE	APPROVED	DATE	BY	DATE										

Attachment MBC2

Relevant Objectives and Policies for Development Geothermal Systems in Section 3.7.2.1 of the Waikato Regional Policy Statement

Objective: *Large scale take, use and discharge of geothermal energy and water enabled within Development Geothermal Systems in a manner that:*

- *is efficient and allows the controlled depletion of energy so as to provide for the energy needs of current and future generations;*
- *remedies or mitigates significant adverse effects on Significant Geothermal Features; and*
- *avoids, remedies, or mitigates adverse effects on other natural and physical resources including overlying structures (the built environment).*

Policy One: **Management of Use and Development in Development Geothermal Systems**

Provide for large scale use and development of geothermal energy and water, promote efficient use of the resource and recognise there will be controlled depletion.

Policy Two: **Integrated System Management Required for Development Geothermal Systems**

Each Development Geothermal System shall be managed in an integrated manner through:

- a. *A System Management Plan that defines, by reference to all relevant policies in Chapter 3.7 of this Policy Statement, the objectives for the management of the system and provides as appropriate for:
 - i. *operational flexibility and adaptive management including provision for subsequent uses;*
 - ii. *reservoir modelling and subsidence modelling;*
 - iii. *a discharge strategy, including provision for reinjection/injection;*
 - iv. *a mechanism(s) to ensure coordination and promote cooperation between all consent holders for large takes;*
 - v. *research, monitoring and reporting;*
 - vi. *non-statutory review of the System Management Plan if in the opinion of the consent holders and the Waikato Regional Council, such amendments are minor.**
- b. *a peer review panel for the purpose of assisting the consent authority to manage the system so as to achieve the objectives of the System Management Plan;*
- c. *resource consent conditions; and*
- d. *a system liaison group/forum where appropriate.*

Policy Three: Reinjection / Injection

For large takes of geothermal energy and water from Development Geothermal Systems, the geothermal water remaining after use is to be reinjected / injected in accordance with a Discharge Strategy forming part of a System Management Plan which shall consider the following matters, as relevant to:

- i. Dispose of waste water;*
- ii. Return geothermal water to that system;*
- iii. Facilitate further extraction of energy from the system;*
- iv. Avoid or mitigate potential differential subsidence, and remedy or mitigate the adverse effects of subsidence, particularly in the built environment*
- v. Reduce the risk of hydrothermal eruptions particularly in the built environment;*
- vi. Remedy or mitigate significant adverse effects on Significant Geothermal Features; and*
- vii. Avoid, remedy or mitigate contamination of surface and ground waters.*

Such Discharge Strategy shall also have regard to:

- i. Any likely benefits to or adverse effects on the system or its productive capacity;*
- ii. The need for adaptive management and flexibility over time.*
- iii. The benefits, costs and adverse effects of the Discharge Strategy;*
- iv. The need to avoid or mitigate potential differential subsidence, and remedy or mitigate the adverse effects of subsidence, particularly in the built environment; and*
- v. The need to reduce the risk of hydrothermal eruptions particularly in the built environment.*

Policy Five: Management of Significant Geothermal Features in Development Geothermal Systems

Allow for the efficient take, use, and discharge of geothermal energy and water in Development Geothermal Systems while remedying or mitigating within the Regional Geothermal Resource, significant adverse effects on Significant Geothermal Features.

Policy Six: Adverse Effects of Take, Use, and Discharge in Development Geothermal Systems

When taking, using, or discharging geothermal energy and water in Development Geothermal Systems, avoid, remedy, or mitigate the adverse effects on non-geothermal natural and physical resources, including overlying structures (the built environment).

Attachment MBC3

Relevant Objectives and Policies in Sections 7.3 and 7.4 of Variation 2 (Geothermal Module) to the Waikato Regional Plan

Section 7.3 Objectives

Objective 1

Where geothermal energy and water is taken, it shall be used and managed efficiently.

Objective 2

In Development Geothermal Systems, significant adverse effects on Significant Geothermal Features arising from the take of geothermal energy and water to be remedied or mitigated within the Regional Geothermal Resource.

Objective 4

Significant adverse effects on Significant Geothermal Features arising from land use and the take, use and discharge of non-geothermal water to be avoided.

Objective 5

In Development Geothermal Systems, adverse effects on other natural and physical resources including overlying structures (the built environment), such as those resulting from subsidence and land instability, arising from the take, use, and discharge of geothermal energy or water to be avoided, remedied or mitigated.

Objective 7

Significant adverse effects on fresh water and land arising from the discharge of geothermal energy and water avoided.

Objective 8

Increased knowledge about the Regional Geothermal Resource, and better understanding of the effects of using the resource and effects of other activities on the resource.

Section 7.4 Policies

Policy 3: Management of Use and Development in Development Geothermal Systems

Control the depletion of energy in Development Geothermal Systems through stepped production based on reservoir modelling that:

- *considers the capacity of the system as a whole; and*
- *considers the reasonably foreseeable needs of present and future generations; and*
- *promotes efficient management and use of the system.*

Policy 4: Integrated System Management of Development Geothermal Systems

Each Development Geothermal System shall have an up to date approved System Management Plan that defines the objectives to be achieved in relation to the system having regard to the relevant policies in the RPS.

Policy 6: Significant Geothermal Features in Development Geothermal Systems

Where significant adverse effects on Significant Geothermal Features in Development Geothermal Systems are to be remedied or mitigated, the remediation and mitigation may include:

- *the take and return of geothermal water being managed to remedy or mitigate significant adverse effects on those Significant Geothermal Features affected, or*
- *adverse effects on features of the same or similar type (defined in the glossary) being remedied or mitigated to an extent commensurate with the adverse effect being caused ('like for like' mitigation).*

Policy 11: Effects of Geothermal Resource Use on Other Natural and Physical Resources, including Overlying Structures (the Built Environment)

When taking, using, or discharging geothermal energy and water in Development Geothermal Systems, avoid, remedy or mitigate the adverse effects on non-geothermal natural and physical resources, including overlying structures (the built environment).

Where there is scientific uncertainty and a threat of serious or irreversible adverse effects on natural and physical resources including overlying structures (the built environment) adopt a precautionary approach.

Policy 12: Discharges of Geothermal Energy and Water onto Land and into Fresh Water

Ensure that discharges of geothermal energy and water onto land and into fresh water after efficient and appropriate use are limited such that the adverse effects are no more than minor.

Policy 13: Discharge Strategy for Large Discharges of Geothermal Energy and Water in Development Geothermal Systems

For large discharges of geothermal energy and water, reinjection / injection is to be undertaken in accordance with a Discharge Strategy prepared for each Development Geothermal System.