

CITY OF JOONDALUP

Notice is hereby given that a Special Meeting of Council will be held in the Council Chamber, Joondalup Civic Centre, Boas Avenue, Joondalup on **FRIDAY 24 JUNE 2005** commencing at **9.00 am**.

GARRY HUNT
Chief Executive Officer
22 June 2005

Joondalup
Western Australia

AGENDA

PUBLIC QUESTION TIME

(Please Note: Section 7(4)(b) of the Local Government (Administration) Regulations 1996 states that a Council at a special meeting is not required to answer a question that does not relate to the purpose of the meeting. It is requested that only questions that relate to items on the agenda be asked).

APOLOGIES AND LEAVE OF ABSENCE

Leave of Absence previously approved

Cmr Smith

7 and 28 June 2005

DECLARATIONS OF FINANCIAL INTEREST/INTEREST THAT MAY AFFECT IMPARTIALITY

ITEM OF BUSINESS

JSC1-06/05

CRAIGIE LEISURE CENTRE GEOTHERMAL BORE
CONTRACTUAL ISSUES – [09050, 36561]

CLOSURE

JSC1-06/05 CRAIGIE LEISURE CENTRE GEOTHERMAL BORE CONTRACTUAL ISSUES – [09050, 36561]

WARD: Pinnaroo

**RESPONSIBLE
DIRECTOR:** Garry Hunt
Chief Executive Officer

PURPOSE

To consider the options and seek approval to progress the Craigie Leisure Centre geothermal project.

EXECUTIVE SUMMARY

Geothermal heating was chosen as the method to heat the pools and building at Craigie Leisure Centre. Geothermal heating involves extracting hot water from Yarragadee Aquifer at a depth of 830m and pumping the water through heat exchangers that capture the heat. The water is then returned to the Aquifer at a depth of 450m.

Drilling works commenced at Craigie in April 2005. Problems have been encountered due to unusual conditions below ground. The first hole that was drilled was abandoned at a depth of 50m due to unstable ground and other below ground conditions. The second has been drilled to the required 830m however from 480m to 520m swelling clays have continually caused problems to the extent that casing cannot be installed past 480m.

A number of options to progress the works have been presented to the City along with cost estimates to complete the work. The drilling contract, which is based on a mix of lump sum items and schedule of rate items, was \$608,899.25 excluding GST. The contract included a contingency sum of \$80,000. The cost estimate to complete the project based on the preferred and lowest risk option will require a further allocation of up to \$300,000 taking the total cost of the project to \$990,000 excluding GST.

BACKGROUND

June 2003 (CJ130 – 06/03)	Council Report - consideration of various redevelopment options for Craigie – budget \$7.5m
August 2003 (JSC66 – 08/03)	Council Report - Project Budget of \$7.5m approved and additional \$600,000 to enable consideration of geothermal heating
August 2003 (CJ194 – 08/03)	Council Report – consideration of redevelopment project
September 2003 (CJ222 09/03)	Council Report – further consideration of redevelopment options and approval of project with \$8.1m budget including geothermal heating
August 2004 (CJ204 – 08/04)	Council Report – awarding of contract to Perkins Builders taking project budget to \$10.1m. Building contract includes Provisional Sum of \$690,000 for geothermal bores

In July 2003 Lincolne Scott, Mechanical Consultants, provided advice on various options available for pool heating at Craigie. In August 2003 the Council approved the project budget of \$7.5m with an additional \$600,000 to enable consideration for using geothermal heating for the pools. In September 2003 Lincolne Scott prepared a report reviewing all pool heating options which identified geothermal heating as the preferred option for heating in relation to cost and the environment. In September 2003 the Council approved the project with an \$8.1m budget including geothermal heating. Lincolne Scott prepared a detailed report on geothermal heating systems for pools in December 2003.

In August 2004 the Council awarded the contract to redevelop Craigie Leisure Centre to Perkins Builders at a cost of \$8.547m including a provisional sum of \$690,000 for the geothermal works. Total allocated budget for the project was now \$10.1m.

Worley Parsons, the City's appointed Hydrogeologist consultant, undertook extensive research on other deep bores drilled within the Craigie area and throughout Perth. Available drilling logs and design issues were examined and costings evaluated. None of the deep bores that were examined encountered similar latent conditions. One of the deep bores examined had experienced problems after it was constructed.

The research also identified the bore depth required to achieve the desired water temperature, water quality and depth and ground conditions. Prior to tendering an application was submitted to the Department of Environment for a groundwater exploration licence. Department of Environment maintains a database of deep bores and the history of these bores was also examined. Worley Parsons then developed the geothermal bore designs required for the project based on their research. Shortly after the Department of Environment issued the groundwater exploration licence.

Tenders were called and Perkins Builders were instructed to enter into a contract with Bunbury Drilling Company to construct the required bores. The original contract sum based on a mix of lump sum and schedule of rates items was \$608,899.25 excluding GST. This left a contingency sum of approximately \$81,000 within the building contract.

Drilling works commenced at Craigie in April 2005. Problems have been encountered due to unusual conditions below ground. The first hole that was drilled was abandoned at a depth of 50m due to unstable ground and other below ground conditions. The second has been drilled to the required 830m however from 480m to 520m swelling clays have continually caused problems to the extent that casing cannot be installed past 480m.

Drilling works on site have now ceased until the City determines its preferred way forward.

DETAILS

Issues and options considered:

Worley Parsons research has failed to identify a project in Western Australia that has encountered similar problems. Additional research however identified a bore with a similar problem in Queensland. Worley Parsons have identified three options to complete the project.

The first is to use a solution that was successfully used in addressing the similar problem in Queensland. It involves attempting to use the existing hole as the production hole using alternative drilling methods. Worley Parsons rate the chances of success around 65%. Additional costs for this option are estimated at \$81,825. Additional time required is 4-5 weeks. To date sourcing of a suitable expandable reaming tool required for this option has not been successful.

The second option is to convert the existing hole to the injection bore hole and drill a new production hole based on the existing design. Worley Parsons rates the chances of success around 75%. Additional costs for this alternative are estimated at \$92,325. Additional time required is 5-6 weeks.

The third option, which is recommended by Worley Parsons, is to convert the existing hole to the injection bore and drill a new production bore with a modified design. Worley Parsons rates the chances of success around 90%. Additional costs for this option are estimated at \$134,325. Additional time required is 6-7 weeks.

In assessing the available options and taking into account the known ground conditions Worley Parsons has also made recommendations to reduce risk in completing the project. These involve their full time site supervision during critical times, sample drilling with a small drill rig at the next hole to confirm ground conditions in the limestone formation, ongoing investigation to source an expandable reaming tool to be available and drilling around the clock during critical times.

A further option considered was to abandon the project and install a gas boiler to heat the pools and building. Advice from Lincolne Scott, the mechanical consultant indicates that this option would cost \$150,000 to install a boiler with additional costs to reconfigure existing equipment that has now been installed. Additionally the additional running cost for the gas would be approximately \$145,000 per annum.

Should the geothermal project not proceed the City would not be entitled to the \$450,000 government grant that has been offered for the geothermal project. The conditions of the grant require the works to be completed.

Discussions were held with the driller on 15 June 2005 relating to the problems experienced to date and the options presented by Worley Parsons. The driller advised that the total cost to complete the project based on option three would require a further allocation of up to \$300,000 taking the total cost of the project to \$990,000 excluding GST subject to additional problems not being encountered.

A meeting held between Worley, Clifton Coney Group, James Christou Architects and the City to consider all the available options reached the conclusion that the best option was to continue the geothermal project using option three.

Link to Strategic Plan:

CARING FOR THE ENVIRONMENT

- | | | |
|---------|---|--|
| Outcome | The City of Joondalup is environmentally responsible in its activities. | |
| | 2.1 Objectives | To plan and manage our natural resources to ensure environmental sustainability. |
| | 2.1.2 Strategies | Further develop environmentally effective and energy efficient programs. |

ORGANISATIONAL DEVELOPMENT

- | | | |
|---------|--|---|
| Outcome | The City of Joondalup is a sustainable and accountable business. | |
| | 4.1 Objectives | To manage the business in a responsible and accountable manner. |
| | 4.1.1 Strategies | Ensure Financial viability and alignment plan. |

Legislation – Statutory Provisions:

Not Applicable

Risk Management considerations:

In assessing the available options and taking into account the known ground conditions Worley Parsons has also made recommendations to reduce risk in completing the project including their full time site supervision during critical times, sample drilling with a small drill rig at the next hole to confirm ground conditions in the limestone formation, ongoing investigation to source an expandable reaming tool to be available and drilling around the clock during critical times.

A decision on the way forward is urgent for the following reasons:

- standby rates are \$195 per hour (the driller has agreed not to charge until Wednesday 22 June 2005)
- every day the existing hole is left open increases the chances of it closing further
- time delays could disrupt the overall redevelopment of the Leisure Centre (geothermal work was programmed for completion by the end of June)

Financial/Budget Implications:

Breakdown of Geothermal Bore Project Cost Estimates (excluding GST)

	Original Tender Cost
Mobilisation/Demobilisation	\$50,000
Production Bore	\$345,000
Injection Bore	\$215,000
Contingency	\$80,000
Total	\$690,000

	Option 1	Option 2	Option 3
Mobilisation/Demobilisation	\$50,000	\$50,000	\$50,000
Abandoned Hole 1	\$55,000	\$55,000	\$55,000
Develop Hole for Production Bore	\$525,000	N/A	N/A
Injection Bore	\$265,000	N/A	N/A
Convert Hole to Injection Bore	N/A	\$375,000	\$375,000
New Production Bore	N/A	\$425,000	\$465,000
Builder's Margin	\$11,825	\$12,325	\$14,325
Contingency	\$31,500	\$31,500	\$31,500
Total	\$938,325	\$948,825	\$990,825
Identified Success Rate	65%	75%	90%

To date the driller has only submitted a formal claim for the cost of the first abandoned hole for assessment purposes. Builder's margin under the contract is an additional 5% for any amount over \$690,000.

Project Budget Details

	Original Budget	Current Forecast	Final Forecast
Buy Back of Kiosk Lease	\$157,000	\$157,000	\$157,000
Consultants Fees	\$938,000	\$900,000	\$900,000
Furniture & Equipment	\$90,000	\$100,000	\$100,000
Construction Contract	\$8,547,000	\$8,547,000	\$8,547,000
Contingency/Other	\$368,000	\$296,000	\$596,000
Total	\$10,100,000	\$10,000,000	\$10,300,000

Original Budget and Current Forecast only includes \$690,000 for the geothermal works under the construction contract component. Final Forecast includes \$990,000 for option three to complete the geothermal works.

The budget allocation of \$10.1m was set prior to receiving the government grant of \$450,000. Prior to the problems with the geothermal component of the works the project was forecast to be completed \$100,000 under budget. Although the geothermal component of the project requires a further allocation of up to \$300,000 for option three the overall project is forecast to be completed at a total cost of \$10.3m. Should the geothermal works proceed and the completed project costs \$10.3m as forecast the net cost of the project to the City would be \$9,850,000.

It should be noted that the cost to complete the works is an estimate based on ground conditions being similar to that found in drilling the second hole down to 830m.

Policy implications:

Not Applicable

Regional Significance:

Not Applicable

Sustainability implications:

Geothermal heating systems require the least amount of maintenance. The bores' life expectancy is 30 years with the bore pump being 15 years. Geothermal heating is more energy efficient than the gas or heat pump options. Geothermal heating will produce significantly less greenhouse emissions, saving approximately 28,000 tonnes of carbon dioxide over the 30 years life expectancy of the system.

Consultation:

Not Applicable

COMMENT

At this late stage of the Craigie Leisure Centre project changing the method of heating the pools and building is not a decision that can be implemented without significant capital and ongoing operational costs. Geothermal heating was identified in mid 2003 and was chosen as the preferred method of heating. Risks involved in the drilling of holes to depths of 830m and 550m were acknowledged from the outset. Whilst research was carried out as to what could be expected below ground in the area, the conditions encountered were unexpected.

A number of options to proceed have been considered in terms of risk and cost. Option number three to convert the second hole to the injection bore and drill a new production bore based on a modified design is the recommended option. Actions to mitigate further risk will be implemented. The estimated cost to complete the geothermal works for option three is \$990,000 based on the ground conditions that were encountered in the drilling of the second hole. It should be noted that the cost to complete the works is an estimate based on ground conditions being similar to that found in drilling the second hole down to 830m.

ATTACHMENTS

Not Applicable

VOTING REQUIREMENTS

Simple Majority

RECOMMENDATION

That Council:

- 1 PROCEEDS with the geothermal works at Craigie Leisure Centre implementing Option Three, being to convert the existing hole to the injection bore and drilling a new production bore with a modified design to suit the expected ground conditions;**
- 2 NOTES the estimated cost, based on the expected ground conditions, to complete the geothermal project implementing Option three, is up to \$300,000 excluding GST above the original allocation for this component of the Craigie Leisure Centre project.**