Tender to Undertake
Feasibility Study
South and Sturt Roads
Intersection Upgrade

12th March 2014
University of South Australia
12th March, 2014

Professor Julie Mills, Ms. Kirsty Beecham, Mr. Faisal Ahammed

School of Natural & Built Environments,
Mawson Lakes Boulevard,
Mawson Lakes

RE: Expression of Interest – Feasibility Study for the South Road and Sturt Road intersection upgrade

Dear Julie, Kirsty, and Faisal,

Innovative Consulting Engineers (ICE) present to you our tender in regards to the Feasibility Study for the grade separated intersection at Main South Road and Sturt Road, Bedford Park which has been called for by the Department of Planning, Transport and Infrastructure (DPTI). ICE is comprised of a total of 28 unique and talented engineers with specialties in fields of Project Management, Quality Management, Geotechnical, Civil and Structural, Transport and Energy, Water and Environmental disciplines.

ICE has developed a complete feasibility study of the grade separation proposed at the Main South Road and Sturt Road intersection, Bedford Park and has been valued at:

$172,972.80 AUD inc. GST

We appreciate your invitation for submission of the tender, if there are any issues or questions in regards to this tender, you are welcome to contact me directly.

Yours Sincerely,

Ashley Paech
Project Manager
# Contents

1. **Company Profile** ........................................................................................................... 1

1.1 Integrated Consulting Engineers (ICE) ................................................................. 1

1.2 Mission Statement .................................................................................................. 1

1.3 Company Services ................................................................................................. 1

1.4 Company History ................................................................................................... 3

1.5 Financial Backing .................................................................................................... 4

1.6 Company Organization Structure ........................................................................ 5

1.7 Roles and Responsibilities ...................................................................................... 6

1.7 Key Members........................................................................................................... 8

2. **Project Tasks and Methodology** ............................................................................. 13

2.1 Project Description ............................................................................................... 13

2.2 Scope of Works ...................................................................................................... 15

2.3 Feasibility Methodology ......................................................................................... 17

2.3.1 Geotechnical ................................................................................................... 17

2.3.2 Transport .......................................................................................................... 18

2.3.3 Energy/Environment/Water ............................................................................ 19

2.3.4 Civil and Structural ......................................................................................... 20

2.4 Commencement of Design .................................................................................... 22

3. **Feasibility Schedule** ............................................................................................. 23

3.1 Task Interdependencies ......................................................................................... 23

3.2 Project Milestones and Deliverables .................................................................... 23

4. **Cost and Resources Schedule** ............................................................................... 25

5. **Company Policy Statements** ................................................................................ 27

5.1 Quality Policy ......................................................................................................... 27

5.1.1 Quality Procedures .......................................................................................... 27

5.2 Workplace Health and Safety .............................................................................. 27

5.3 Environmental Policy ............................................................................................ 28

Appendix A Resumes of Company Personnel ............................................................ 30
1. **Company Profile**

1.1 **Integrated Consulting Engineers (ICE)**

ICE Engineering is a relatively young company of 28 staff comprising a mix of Senior and Graduate Engineers. Our members come from various specializations within the Civil Engineering sector such as Civil and Structural, Environmental, Geotechnical, Project Management and Transport. Although only established for three years we fill ourselves with excellence in our Engineers who possess unique talents in creativity, innovation, knowledge, leadership, team work and responsibility which enable the delivery of solutions to exceed our client’s expectations.

1.2 **Mission Statement**

The guiding principles ICE incorporate into the projects we deliver are alignment of our goals with that of our client’s goals, being responsive to their needs whilst bringing forward innovative ideas and displaying accountably in our actions.

By following these principles we are able to deliver effective, efficient and safe solutions that also cater to environmental and social issues associated with the projects we undertake thus supporting the interests of all stakeholders.

1.3 **Company Services**

ICE is comprised of engineering staff from various disciplines within the Civil Engineering sector and is therefore able to provide Engineering services in the following areas:

**Project Management Services:**

- Project Management Processes
- Project Scope Management
- Project Time Management
- Project Quality Management
- Project Risk Management

**Civil and Structural Services:**

- Concrete, Steel and Timber Design
Tender to Undertake Feasibility Study of South and Sturt Roads Intersection Upgrade

- Structural Modelling / Design

**Geotechnical Services:**
- Road Pavement Design
- Slab Design
- Slope Stability Design
- Retaining Wall Design
- Dam Design
- Footing / Settlement Design
- Pile Design

**Transport Services:**
- Road Safety Design
- Road System Design
- Road Management Design

**Energy / Water / Environmental Services:**
- Stormwater / Sewer / Potable Water Supply and Design
- Energy System Management
- Environmental / Social / Cultural Management
- Pollution Management
1.4 Company History

In the three years of company operation there has been a diverse range of projects that ICE has delivered in terms of economical and quality orientated solutions to suit our client’s requirements. This has been accomplished by the diversity of engineering fields that ICE employees are drawn from. Below is a list of project that our company has delivered to our clients thus far:

2014 Whyalla Cancer Centre Re-Development Project
- Advanced Concrete Design for Beam and Slabs

2013 Whyalla Cancer Centre Re-Development Project
- Steel Design of Beams, Columns and Structural Roofing
- Reinforced Concrete Design of Beams, Slabs and Columns

2013 Community Meeting Hall, Vanuatu
- Structural and Timber Design of walls, columns, beams and roofing components

2013 Seaford Railway Extension Project
- Retaining Wall Design to support the abutments and backfill of the overpass in order to deduce the obstruction of rail line to the road traffic
- Slope Stability Design for the earth dam that contains a watertight clay core with strong and thick shells which is sat on a clay foundation underlain by sand.
- Footing Design for Seaford Railway Station and multi-storey shopping complex.

2013 Strath-Hub Residential Development Project
- Complete Sewer Design from house to pump station
- Complete Stormwater Design from collection points to detention basins
- Provide a Potable Water Supply distribution network

2012 EWB Challenge Project in Anh Minh District, Vietnam
- Design of waste services for population situated on a waterway.

2011 EWB Challenge Project in Devikulum, India
- Design a rainwater catchment system for the community
- Determine a method to distil the bore water for consumption
1.5 Financial Backing

Since 2011 ICE has evolved and expanded its customer base requiring the establishment of strong financial security. ICE has secured financiers in making available $25m available for company backing. By having these funds available ICE has the capability and confidence to accept and provide diverse range of projects within the Civil Engineering sector.

Our company has insurance policies covering public liability and professional indemnity, and in the case of employing third parties ICE requires third parties show evidence of insurance before contracts are awarded.

By having this security available to our clients and company, the projects ICE undertake are assured.
1.6  Company Organization Structure

![Company Organization Structure Diagram]
1.7 Roles and Responsibilities

Project Manager
The primary role and responsibility of the Project Manager is to ensure the project is kept within its defined scope, budget and timeline. In doing so, the Project manager will need to:

- Plan the tasks and allocation of resources
- Administer project contracts
- Continually monitor the project after initiation
- Communicate with:
  - Client
  - Assistant Project Manager
  - Relevant Stakeholders

Assistant Project Manager
The Assistant Project Manager will work closely with the Project Manager to aid with any managerial responsibilities. The assistant Project Manager will ensure the project commences without interruption by correcting mistakes and providing information to staff that has been specified by the Project Manager.

Other roles of the Assistant Project Manager will also include:

- Managing project files and documentation
- Consulting with the Project Manager
- Consulting with Team Leaders
- Ensuring the project falls into budget
- Verify Project Schedule is being adhered to

Quality Control Manager
The quality control manager will work the Project Manager, Assistant Project Manager and each Engineering Team Leader to ensure the work performed will use the correct processes and produce designs that will conform to the relevant standards. Other responsibilities of the Quality Control Manager will include:
• Ensuring the project falls within the scope
• Ensuring the correct job controls are applied
• Ensuring each team has the correct qualifications, skills and experience
• Ensuring any sub-contractors are suitably qualified

Engineering Team Leaders
The Team Leaders report to the Assistant Project Manager and are responsible for the part of the project they specialise and they also delegate the work to their respective Senior Engineer and are responsible for:
• Preparing the team plans
• Sourcing suitable sub-contractors for the project
• Work with the Quality Control Manager to ensure the work produced complies with relevant standards
• Work with the Assistant Project Manager in estimating cost

Senior Engineers
The Senior Engineers in the company work under the direction of the Team Leaders and provide the extensive knowledge for each team in the field of work they specialise in. They may at times with the Team Leader consult with other Team Leaders and Senior Engineers to obtain advice, or schedule works in specific areas of the project.

Team Engineers
The Team Engineers work under the direction of the Senior Engineers and are responsible for producing the designs according to the project requirements, which will include researching and evaluating various design options for the project. Team Engineers are also responsible for supervising and educating the Graduate Engineers within the company.

Graduate Engineers
Graduate Engineers work under the direction of the Team Engineers. The graduates are responsible for any task delegated to them by the Team Engineers.
1.7 Key Members

Project Manager

Ashley Paech is currently completing a Bachelor of Civil Engineering and Project Management at the University of South Australia. Most recently Ashley has led a geotechnical team on the Seaford Rail Extension, with project management experience being drawn upon through his undertaking of the Professional Engineering Practice course within the University and a WEA course in Project Management.

Ashley is a motivated administrator, committed to leading and delivering a successful project by communicating quality, clear and concise information of a high technical standard whilst working within the project constraints. He draws on a strong discipline of efficiency and thoroughness brought forward from a previous career in the manufacturing industry.

Ashley has been involved in various specializations within his academic studies of the Civil Engineering field. His relevant past projects and technical understanding to draw upon will help compliment the skills required to manage this project include: Preliminary design of a two-lane rural road through undulating terrain; Pavement design for various lifecycles and applications, including knowledge of bituminous materials; Design of Piles and Retaining Walls; Design of Steel and Reinforced Concrete structural components for the Whyalla Cancer Centre Redevelopment; Structural Analysis of composite structures; Design, Construction and Failure analysis of a model bridge; Bridge analysis under the influence of moving vehicles.

Ashley is also an active member of Engineers Australia attending events which cater to his interest in Civil Engineering and Project Management.
Assistant Project Manager

Joel Signorello is currently studying a bachelor of Engineering (Civil & Project Management) at the University of South Australia. Throughout Joel's time at University he has worked on many engineering projects in different specializations including Structural Engineering, Hydraulics & Hydrology and Geotechnical Engineering where he was most recently involved in the redesign of the Seaford Rail Viaduct.

Joel's knowledge and experience extends outside University where he has worked for a Structural Engineering company being involved with the supply, fabrication and erection of structural steel. This practical experience has allowed Joel to visualize such projects and gain an understanding of the process that happens outside the office.

Joel is a consistent hard worker and is able to motivate others around him, which can be seen throughout the success of the projects he has worked on. He has a keen eye for detail and expects high results.

Quality Manager

Li Ho Tat is the Quality manager at the ICE. Quality manager is consulting the project during feasibility study, construction and completion to ensure the entire process strictly observed by quality policy, environmental policy and occupational health and safety policy. Li Ho Tat has been a part of projects in different zone, for example water engineering project that analysing water system for a community, geotechnical engineering project for pavement, transportation engineering for information investigation and structural engineering for timber, steel and reinforced concrete design. The wide experience advantage to familiar and communicate with every roles of the project that is an important ability to accomplish quality manager responsibility.

He is ensuring the entire product and service fit for the company policy, also achieve the
client requirement. Quality manager need not only to communicate with engineers, also explain and connect to customer.

He is skilled in preparing explanatory documents such as charters. The quality management procession and suggestion are recommended by Li according to government standard or regulation. Also, quality manager need to advise improvement to ensure the quality management system is up to day.

**Transport Team Leader**

Zhengyang Gao is currently completing the last year of a Bachelor of Civil Engineering at the University of South Australia. He has completed his diploma degree in Civil Engineering in 2011 from SAIBT. He has currently worked on several projects in study period, throughout those projects may provide him lots of experience and knowledge for the future and he is motivated worker to delivering a successfully project with high quality engineering knowledge.

He has been attended in various projects within the civil engineering sector design. He has been involved with steel and Reinforcement Concrete Design Project of Whyalla Cancer Centre Redevelopment included design concrete beam, continuous beam, one way slab and two way slabs and column design. He also involved structural design and analysis of a model staircase; staircase analyses within person load and wind load by using Strand7; Storm water Design for Strath-Hub residential subdivision in South Australia, completed the engineering drawing and analyses by DRAINS, EPANET, HEC-RAS; Pavement design of several lifecycles and set up the bituminous materials by use CIRCLY.
Civil and Structural Team Leader

Licheng Yang is currently in his final year of Bachelor of Engineering (Civil Engineering) at the University of South Australia. He is interested in many different areas of civil engineering especially in structural engineering. He has obtained good results on structural courses and involved in several project works such as Steel and Timber Design and Reinforced Concrete Design for Whyalla Regional Cancer Centre Redevelopment. He was a member of design team which focused on designing footbridges as the part of metro light rail project in Dubai. Licheng has also participated in the UniSA research project analyzing the properties of rubberized concrete as the promising product for structure and road uses.

Due to his overseas background he can speak Chinese and English which gives him opportunity to learn engineering in different languages and to communicate with non-English background people.

Geotechnical Team Leader

Chanrithy is currently in his final year of bachelor of civil engineering at University of South Australia. Chanrithy is an experience worker that has been working in various projects during the three years period. 2011 in EWB challenge; he worked with a group of young engineering in Waste Management System Project in rural area of India. Later in 2013, he experienced on Whyalla Hospital Extension Project and Strath Hub Development Project with was related to civil engineering field. Recently, He was working with Geotechnical Engineering Team in the Project of Seaford Railway.

He process a unique talent of understand the issue quickly and able to generate the alternative solutions for the problems with balances of quality and economic in mind. Moreover, he has a nice relationship with teammates; provide the best team work during the
Tender to Undertake Feasibility Study of South and Sturt Roads Intersection Upgrade

project to complete the tasks or issues that company is facing. Chanrithy has a good understand with Geotechnical software such CORD, SLOG, GELENA and AutoCAD that is suitable in Geotechnical Division. With a good personality of responsibility, teamwork and leadership, he is chosen to be the leader of the Geotechnical Team in the project.

**Energy/Water/Environmental Team Leader**

Ethan is currently studying a bachelor of engineering and project management with honours at the University of South Australia. Ethan has worked extensively in retail and hospitality sectors during his studies and has developed a keen eye for details and problem solving under pressure. Furthermore his work requires daily testing of water samples, determining water health issues and solving problems from algae removal to reducing level of dissolve metallic.

During his studies Ethan has excelled in environmental subjects, including water quality studies and environmental analysis. His interests include ecology, sustainability and environmental quality and control.

Ethan’s past experiences include the complete design of Spirulena farms for the 2011 EWB challenge, with extensive use of solid works and study of local environmental impacts. Ethan has carried out study’s on environmental qualities, including human impacts and the impacts of urbanisation. Furthermore, through his studies Ethan has been aided in the design of the Whyalla research centre, the redevelopment of the Strath Hub and footing design for the Seaford rail extension.
2. **Project Tasks and Methodology**

2.1 **Project Description**

The Department of Transport, Energy and Infrastructure (DPTI) has called for tenders for a Feasibility Study to be undertaken for the grade separation at the intersection of Main South Road and Sturt Road, Bedford Park. Various design options for this intersection will be required to be investigated and evaluated for determination of the most appropriate design, with the study providing an estimation of the cost and time frame for the final design.

DPTI has identified several strategic problems for this section of Main South Road, these being:

- The current accessibility is poor, increasing travel time, and reduced reliability for business through, and adjacent to, Main South Road is imposing additional cost on business, constraining current and future economic development to the State.

- The Southern ‘Outer Adelaide’ area is characterised by limited local ‘blue collar’ industrial employment opportunities and limited access to wider recreational and social opportunities. Relative isolation and increasing congestion on key north-south transport routes will lead to further social disadvantage. The At-Capacity network contributes to reduced local amenity and severance in Southern ‘Middle Adelaide’ areas.

- The current Southern road network is at capacity and any disruption (such as crashes, breakdowns) has a widespread impact across the rest of the local network.

- The current public transport network lacks connectivity and flexibility that leads to inefficient (costly) provision of services and reduced demand for services, and results in increasing levels of transport disadvantage.
To address these issues, the following goals and objectives have been identified by DPTI to deal with the issues:

**Goals**

- Ensure the National Network Transport Link (South Road) fulfils its role in accordance with both State and National plans, and as a freight link as outlined in the 30-Year Plan for Greater Adelaide.
- Support Adelaide’s future economic prosperity and liveability by ensuring efficient and effective connectivity for people accessing employment, leisure and service opportunities (both regional and local) and optimise the opportunity for integrated land use outcomes.
- Provide an integrated solution that directly and indirectly enhances transport system safety for all road users (including motorists, public transport, pedestrians and cyclists).
- Develop a corridor wide solution that makes the best use of both new and existing transport network infrastructure, and is integrated with the broader multi-modal transport network of Greater Adelaide.
- Develop a sustainable solution that provides the optimal balance between economic, social and environmental outcomes.

**Objectives**

- To protect and provide freight priority consistent with a National Network Transport Link between Wingfield and Darlington to the Port of Adelaide, Adelaide Airport and other industrial and commercial centres consistent with Adelaide’s 30-Year Plan.
- To improve travel time, reliability and vehicle operating costs in Adelaide’s north-south transport.
- To improve accessibility to employment, leisure and service opportunities (including by motorists, public transport, pedestrians and cyclists)
- To contribute to the achievement of the SA Government’s public transport mode share target as outlined in the SA Strategic Plan
• To minimise greenhouse gas emissions and improve air quality within the South Road corridor
• To reduce the incidence and severity of South Road crashes
• To deliver a solution with positive net benefits (monetised plus non-monetised) for South Australia.

2.2 Scope of Works
The scope of works considered in this tender is the undertaking of a Feasibility Study which investigates various design options for a grade separated intersection at Main South Road and Sturt Road, Bedford Park (Figure 1, pg.16). This intersection has been identified as the key proponent for the proposed non-stop North-South Corridor that will typically run along the Main South Road alignment.

Design Requirements
The minimum requirements to be produced in the design of the interchanges and mid-block sections must include:

• Design solution to cater for existing traffic demands
• Free-flowing urban arterial along Main South Road using a grade separation at the Main South Road and Sturt Road intersection
• Design solution to minimize redundant infrastructure and disruption to traffic flow during construction (minimum of two lanes in each direction along Main South Road to be maintained at all times)
• Design speed and level of service in accordance with the road design criteria
• Posted speed: 80km/h
• Drainage design to comply with standards as defined by Council Stormwater Management Plans for the surrounding catchments
Figure 1  Locality Plan for the Study Area
2.3  Feasibility Methodology

2.3.1  Geotechnical
The geotechnical services required in this project will be managed by the ICE Geotechnical Team. Our team is led by a geotechnical team leader Chanrithy Chiv, supported by 2 senior geotechnical engineers who each supervise 2 graduate engineers.

Methodology
As the feasibility study will evaluate a range of possible designs, an in-depth investigation of the geotechnical characteristics of the site will be required. An initial site investigation involving soil sampling, testing and analysis at the commencement of the feasibility study to provide geological profiling of the site is necessary. Surveying of the site and surrounding area to determine existing elevations, road levels or any other features that may impact on any proposed design will also be required to be performed in this investigation. These services will be performed by contractors employed by ICE with the data collected then utilised within the geotechnical team to produce a geotechnical model of the site. The model will be utilised within the company engineering divisions dictating the basis for any proposed design.

Potential pavement designs will give due consideration to fitting within the 30-Year Plan for Greater Adelaide and the Integrated Transport and Land Use Plan, whilst also being designed as an efficient and effective pavement. In order to conduct pavement design options the Geotechnical team will work collaboratively with the ICE Transport Team.

Assumptions/Issues
Due to the underlying complexities in the variance of soil, issues may be encountered that will impact on the project. Therefore consideration must be given to an extensive investigation of the site in the preliminary stage to prevent any issue arising that may present risk to the project.

This investigation may result in remediation of problem areas, or may require due consideration be given in the design of structural features to account for any anomalies arisen. In the event of water tables being situated within close proximity to any proposed designs permanent drains will need to be installed before the commencement of any works.
In the event of cultural artefacts being uncovered during geotechnical works our company will comply with the directive given in ‘Aboriginal Heritage Act 1988 1.1.2012, Part3 – Protection and Preservation of Aboriginal Heritage’.

2.3.2 Transport

The transportation and services required in this project will be provided by the ICE Transportation Team. Our team is led by our team leader Zhengyang Gao, supported by 1 Senior Transportation Engineer overseeing the work of 2 Transportation Engineers who will each supervise a Graduate Engineer.

Methodology

The transport team will investigate and monitor existing conditions and identify any potential transport problems that may arise in the project. The team will develop plans to improve the quality for transit and estimate the impacts of transportation system on environmental features. In analysis of this, the team will collect data from the Department of Planning, Transport and Infrastructure including: existing turn count data for South Road and Sturt Road; existing turn count data for South Road / Marion Street; existing turn count data for South Road / Daws Road; existing turn count data for Sturt Road / Marion Road.

After collecting this information the transport team will undertake the following steps: reviewing current data and renew the past design details; survey of important transport data and analysis of the data; survey and identify locations where traffic jams and accidents occur frequently; design solutions for road users, cyclists and pedestrians at these locations; adjusting traffic signaling so as to control traffic volumes on each road.

A component of works for the team will also include the planning of traffic management around the site during the life of the project. As the current carriageways are heavily used, the design of temporary two lane roadways around the site will be necessary to ensure the current demands of traffic flow are met. Provisions will be given in the design so as not to impede upon construction works, and will also include access points for construction vehicles.
**Assumptions/Issues**

The Transport Engineering Team assumes the data supplied to it will be accurate, with any potential overloading of the roads in terms of volumes or overloaded vehicles to be included within this data.

The reliability of modelling for future capacities may also present a problem in this project. Future modelling will need to be accurate as the demand on South Road is continually increasing with any future, as yet unplanned developments in Southern Adelaide occurring will further increase the loading on this road.

It is assumed that the acquisition of land around the surrounding area will be undertaken without any impediment.

**2.3.3 Energy/Environment/Water**

The structural services required in this project will be provided by the ICE Environmental, Energy and Water (EEW) Team. Our team is led by our EEW team leader Ethan Hender, supported by 1 Senior Structural Engineer overseeing the work of 2 Structural Engineers who will supervise 3 Graduate Engineers.

**Methodology**

It is tasked to the EEW Team to analyze the project area for potential hazards that may occur as well as factoring in the impacts the project will have on the environment, or conversely what impacts the environment will have on the project. Our team strives to reduce any negative effects on the environment, as well as explore and experiment with innovative ideas to implement into this project. The EEW Team will produce an Environmental Impact Statement (EIS) and will endeavor to put forward new, innovate eco-friendly solutions that will benefit the client and the surrounding community.

In initial the environmental phase, the EEW Team will conduct a site analyses over several days, gathering information and samples from the area. Included in the analysis will be the study of hydrological data, soil sampling (through boreholes and test pits) and a review of local legislation.

As data is gathered, the EEW Team will work in conjunction with other company Engineering
Teams to deal with any issues that may arise. Additionally, the EEW Team may need to work closely with the local government and stakeholders to ensure that the proposed EIS satisfies all concerns.

An output of the of EEW Team works will be a final copy of an EIS as well recommendations on alternative energies for services and inclusion of any best options for the hydrology involved in the project.

As the EEW Team will also be responsible for the provision of Communications, Power and Water supplies for this project, initial consideration will need to be given to the design and relocation of these services before construction works can commence. This will involve liaising with the current providers of these services.

**Assumptions/Issues**

As with any project there are always unforeseen circumstances that may arise. When considering a site such as a local intersection it would be appear that the site would be relatively free of any dangerous materials. When working with reputable companies it can also be assumed that they would work within the bounds provided by legislature. Unfortunately this isn’t always the case, being an old, well used, intersection the likely hood of heavy metal contamination and other chemicals is likely. Additionally, once supplied with our companies EIS and our recommendations, it is not always guaranteed that the company constructing the intersection will abide by them.

At ICE our EEW team will strive to make sure that our clients remains well informed on all matters relating to any environmental issues that may arise and in any case will do our upmost to solve said issues swiftly.

**2.3.4 Civil and Structural**

The structural services required in this project will be provided by the ICE Structural Team. Our team is led by our structural team leader Licheng Yang, supported by 1 Senior Structural Engineer overseeing the work of 2 Structural Engineers who will supervise 3 Graduate Engineers.
**Methodology**

ICE has the competence to provide comprehensive structural design in any proposed model, ensuring all relevant specifications and design requirements are met. ICE Structural engineers have previous experience in producing design proposals that implement, but are not limited to Australian standards AS 1170 and AS3600, thus providing knowledge and experience in producing a design that will satisfy our clients expectations and industry standards, therefore ICE guarantee to provide quality and efficient solutions in the structural components for this project.

As the structural works will be undertaken around an existing carriageway any proposed design will give consideration to minimizing the impact on the current traffic network during the construction phase. This will include an assurance that a minimum of two lanes in each direction along Main South Road will be able to be maintained at all times.

The structural designs proposed will investigate the most efficient and effective designs that will provide the best outcome for the *30-Year Plan for Greater Adelaide* and the *Integrated Transport and Land Use Plan* thus ensuring a viable transportation network for Adelaide. As the intersection must be free flowing, potential designs will need to have the inclusion of an overpass or underpass for one the carriageways at this intersection. Close collaboration with the other ICE engineering teams will be necessary to ensure optimal design is produced, whilst minimizing impact on the surrounding area and infrastructure.

**Assumptions/Issues**

As the project construction will be at the intersection of two heavily used roads, any disruption to the traffic flow during construction will be a priority consideration in the feasibility study. Available free space may be a potential issue due to the project location in a pre-existing residential and industrial area. It is assumed that any available land owned by the government and local council will be able to be utilized by the project contractors and in the case of private landholders agreements may need to be sought to lease certain landholdings for the duration of the project. In the case of any anomalies that arise before, or during works causing adjustment to our original design the structural team will guarantee...
the optimal design solution will be provided to suit the circumstance.

2.4 Commencement of Design

In the case of our client accepting our offer to undertake the Preliminary and Detailed Design as presented in the Feasibility Study, ICE shall commence the Preliminary Design. This would consider concept designs and estimates for the main components of the work. Also included will be preliminary drawings of a level of detail to form a basis for environmental assessment and public consultation. Furthermore, ICE will produce a Detailed Design Brief including cost estimates to within 30%. This design brief will include any potential construction issues we may encounter and any land acquisitions that will need to be made.

On acceptance and approval of the Design Brief, ICE will prepare a Detailed Design which will include design calculations, CAD drawings, detailed contract drawings and technical specifications. ICE will also include in this Detailed Design an Environmental Management Plan, Traffic Management Plan and Construction Plan.
3. Feasibility Schedule

See attached documents overleaf.

3.1 Task Interdependencies

With any project that involves several forms of engineering there are several interdependencies. Certain engineering teams are reliant on the other works within this project, for example, a certain degree of civil and structural work cannot begin until environmental and geotechnical teams have completed their analysis and recommendations. On a smaller scale the geotechnical and environmental teams cannot begin their work until site assessment and testing has been completed.

At ICE we endeavour to complete every task as specified in our project schedule, we understand that obstructions to progress may occur and will work at our best to ensure the delivery of a smooth project.

3.2 Project Milestones and Deliverables

In the undertaking of the Feasibility Study for this project major project milestones must be achieved, these being the production and presentation of the Feasibility Study.

Minor team deliverables through the course of the Feasibility Study will include preliminary findings, documentation of the proposed design and the minutes of team meetings.
4. Cost and Resources Schedule

The following cost proposal for the Feasibility Study is shown in Table 1 below, outlined are each individuals hourly rate, which varies based on their role and level of experience. The quotation is divided to distinguish the number of people and the total of each specialty team. A total of 28 members have been considered in the costing.

Table 1  Feasibility Costs for the Intersection Upgrade at South and Sturt Roads, Bedford Park

<table>
<thead>
<tr>
<th>Position</th>
<th>No. People</th>
<th>Hourly Rate ($)</th>
<th>Weeks</th>
<th>Hours/Week</th>
<th>Hours</th>
<th>Cost (ex. GST)</th>
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<td>Geotechnical</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Team Leader</td>
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<td>3</td>
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ICE has calculated the costs shown above to be based on 12 hour weeks, over a period of 3 weeks, as such the total cost for the Feasibility Study becomes $149,760.00AUD excluding GST, or a total of $164,736.00AUD including GST. Due to unforeseen circumstances that may occur over the period, a 5% contingency fee has also been added for an overall total of $172,972.80 AUD.

From preparation and allocation of the resources as shown in table 1 above, ICE have an understanding of the requirement of work to be undertaken in this project. From the resources ICE have available we are confident our company has the capacity to perform the work required.
5. **Company Policy Statements**

5.1 **Quality Policy**

ICE is committed to providing our clients with high quality service and solutions to satisfy their needs. We implement an internal quality management system based upon AS/NZS ISO 9001 ‘Quality Management Systems Guide’ ensuring we deliver products, processes and services of industry standard. Our engineering teams within our company understand the importance on quality control to ensure the designs and services delivered to our client’s will meet and exceed their requirements.

5.1.1 **Quality Procedures**

We as a company continually consult and communicate quality procedures with our staff during company processes to confirm smooth operations, adherence to our guidelines and industry standards, and assure timelines will run to schedule.

Our quality management personnel work directly with the engineering teams to ensure all components of the project are produced to conform within our company Quality Management System. As a company we run an ongoing program dedicated to delivery of continuous improvement in our quality standards.

5.2 **Workplace Health and Safety**

ICE is committed to providing safe workplaces for all employees with safety being a main priority for our company. Our employees have undergone training and been certified in WHS best practice to reduce the risk of incident. Our safety priority is not only limited to within the company but also puts emphasis on the safety of our clients, sub-contractors and public.

Company policy implement the procedures and processes outlined in the ‘Model Work Health and Safety Act’ and the ‘Guide to the Model Work Health and Safety Regulations’, produced by Safe Work Australia. Any design, process or practice undertaken by our company will conform to these guidelines and regulations.
In addition to adherence of the above guidelines and regulation ICE is committed to:

- Strictly enforce company Workplace Health and Safety policy
- Promote Health and Safety trends to employees
- Maintain a continuous exemplary record of Health and Safety performance

5.3 Environmental Policy

ICE understand that we are all sharing this Earth and have an obligation to leave it no worse than when we inherited it. Therefore our team strives to provide solutions that will not only be of benefit to our customers, but will also have minimal impact on our surrounding environment. ICE seeks to minimise negative environmental impact by selecting materials and designs that have proven through testing or experience to have low impact. In the case of inclusion of innovative and unproven concepts or products, ICE may consult with specialists to determine the level of impact if implemented into design.

ICE has established and operates an environmental management system that complies with ‘ISO 14001:2004, Environmental Management Systems’, to ensure we have an effective and socially responsible environmental policy. This company compliance provides a framework that integrates with our business processes to measure, identify, manage and control environmental impacts and risks.

In addition to this compliance ICE use a general set of guidelines for all projects undertaken on our clients behalf, these include:

- Observing and implementing all relevant environmental regulations and standards
- Minimising construction waste and/or re-using and recycling as often as possible
- Construction wastes will be disposed according to company guidelines
- Avoiding excessive energy and water spending
- Continuously seek to make improvements in air, water and noise pollution during construction
- Selecting environmentally friendly materials, products, tools and machines
- Before decision making and designs are approved, consider all the environmental impacts
- Promote environmentally friendly design and construction trends to clients and employees

We as a company understand that by implementing sustainable business practices we not only raise our corporate image with our stakeholders, but we also ensure we pass down this planet for our future generations.
Appendix A  Resumes of Company Personnel

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Personal Details
Ashley Paech
paeat001@mymail.unisa.edu.au

Languages Spoken
English

Work Skills
GALENA, CORD, CIRCLY, SLOG
DRAINS, WaterGEMS, HEC-RAS
Strand7, Spacegass
ArcGIS, Microstation, Solidworks

Education
2010 – 2014  Bachelor of Civil and Project Management
              University of South Australia.

2008 – 2010  Associate Degree in Engineering
              University of South Australia.

Related Industry Experience
2013  Leading a geotechnical team on the Seaford Rail Extension.
      Design of Steel and Reinforced Concrete structural components for the Whyalla
      Cancer Centre Redevelopment.
      Pavement design for various lifecycles and applications.
      Design of Piles and Retaining Walls.

2012  Structural Analysis of composite structures.
      Design, Construction and Failure analysis of a model bridge.
      Bridge analysis under the influence of moving vehicles.
      Investigation of flood mitigation options for the City of West Torrens.

2010  Preliminary design of a two-lane rural road through undulating terrain.
**Personal Details**

Joel Signorello  
sigjp001@mymail.unisa.edu.au

**Languages Spoken**

English

**Work Skills**

Strand7, 12D, Spacegass  
GALENA, CIRCLY, CORD  
Drains, WaterGEMs  
Microsoft Office

**Education**

2011 - Current  
Bachelor of Engineering (Civil & Project Management)

2005 - 2010  
Studied at Rostrevor College

**Related Industry Experience**

2013  
Design of Structural Steel of Whyalla Hospital  
Design of Concrete Slab of Whyalla Hospital  
Strath-Hub Development  
Seaford Rail Viaduct Re-design Project

2011  
Labourer for Structural Engineering Company, P & S Engineering PTY LTD, involved in the supply, fabrication and erection of steel.
Personal Details
Li Ho Tat (Will)
lihy046@mymail.unisa.edu.au

Languages Spoken
English, Mandarin and Cantonese

Work Skills
SolidWorks, Microstation
Strand7, 12D, Spacegass
Matlab
GALENA, CIRCLY, CORD
Drains, WaterGEMs
Microsoft Office

Education
2010-2014 Bachelor of Civil Engineering at University of South Australia
2009 High School Graduation at Choi Hung Estate Catholic Secondary School

Related Industry Experience
2013 Design of steel and reinforcement concrete structural for Whellye Hospital Project of Steel and Timber Course.
Design of timber structures for Resort Project in Steel and Timber Course.
Design of Retaining Wall for Railway Road at Seaford West, SA in Soil mechanics course
Stormwater, Sewer reticulation and Potable water reticulation design

2011 Simulation analysis of circling bus stop in Brazil.
**Personal Details**

Chanrithy Chiv (John)

chicy074@mymail.unisa.edu.au

**Languages Spoken**

Khmer, English

**Work Skills**

AutoCAD

CIRCLY

CORD

SLOG

GALENA

**Education**

2010-2014  Bachelor of Civil Engineering at University of South Australia

2013  OHS Training Achievement

2009  High School Graduation at San Thormok High School

**Industry Related Experience**

2013  Designed steel for Whyalla Hospital Project in Steel and Timber course.

        Designed timber structures for Resort Project in Steel and Timber course.

        Designed Retaining Wall for Railway Road at Seaford West, SA of Soil mechanics course.

        Designed reinforcement concrete for Whyalla Hospital Project.
**Personal Details**

Zhengyang Gao (Stanley)
gaozy003@mymail.unisa.edu.au

**Languages Spoken**

English, Mandarin and Cantonese

**Work Skills**

GALENA, CIRCLY
Microstation, Strand 7
DRAINS, EPANET, HEC-RAS
Microsoft Office

**Education**

2010-2014  Bachelor of Civil Engineering at University of South Australia
2013  Member of Engineers Australia (IEAust)

**Industry Related Experience**

2013  Stormwater Design for Strath-Hub Residential Subdivision, SA.

Reinforced Concrete Design for the Whyalla Cancer Centre Redevelopment.

Steel and Timber Design for the Whyalla Cancer Centre Redevelopment.

Structural analysis of a Stair Case.

Pavement Design.
**Personal Details**

Licheng Yang
yanly028@students.unisa.edu.au

**Languages Spoken**

English, Chinese

**Work Skills**

Strand 7, SpaceGass
Microstation, 12D
CIRCLY, CORD, SLOG, Galena
HEC-RAS, DRAINS
Microsoft Office, Matlab, SolidWorks, C programming

**Education**

**2010-2014**  
Bachelor of Engineering (Civil Engineering)

**2013**  
Member of Engineers Australia (IEAust)

**Industry Related Experience**

**2014**  
University of South Australia Summer Research Project (8th January – 28th February 2014)

**2013**  
Steel and Timer Design for the Whyalla Regional Cancer Centre Redevelopment.
Reinforced Concrete Design for the Whyalla Regional Cancer Centre Redevelopment.
Structural Analysis for a footbridge as the part of the Metro Light Rail project in Dubai.
Water Resources and System Design for the Strath-Hub Subdivision, Stage 1.
Investigation of the properties of rubberized concrete and the feasibility on structures.
**Personal Details**

Ethan Hender
henej001@mymail.unisa.edu.au

**Languages Spoken**

English

**Work Skills**

Solidworks, ArcGIS, Microstation
CIRCLY, CORD, SLOG, GALENA
Strand7, Spacegass
HEC-RAS, DRAINS

**Education**

2011 – 2014  **Bachelor of Civil and Project Management Engineering**
University of South Australia
2006 – 2010  **Blackfriars Priory School**

**Industry Related Experience**

2013  Steel and concrete design for Whyalla Hospital Centre
Design and analysis of Seaford Rail Extension bridge components
Slope stability design for Seaford rail extension.
Water Resource Design for the Strath-Hub Residential Development
Pavement designs using different subgrades and surfaces.
2012  Investigation for flood options for the City of West Torrens.
2011  Design of Spirulena Cultivation tanks