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Kemerton Strategic Industrial Area Sidings and Spur

Rail Design Report

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Executive Summary

Background

The Kemerton Strategic Industrial Area (KSIA) was established in 1985 with the primary objective to accommodate heavy industry and resource processing for the South West of Western Australia.

The objective of this study is to identify a rail freight corridor from KSIA to the Bunbury Port, providing a long term compatibility between transport activities, and land planning to ensure project ready status. The study builds on previous studies.

Design Options

The rail alignment design is based on the design standards of Brookfield Rail, the authority which manages the rail freight network in the southern half of Western Australia. A basis of design has been produced for the study, incorporating these standards, and agreed with Brookfield Rail. This is described in more detail in section 2 of this report.

Two rail route options have been considered to connect KSIA to Bunbury Port these are:

- Fast Train Line – allowing the train movements to/from Bunbury via the Australind bypass / Old Coast Road using the proposed Bunbury Fast Train route .
- South West Main Line – this route follows the existing Perth – Bunbury, South West Main Line. The option would potentially require additional infrastructure to be constructed to negate disruption of existing traffic on the route from additional traffic generated from KSIA.

The connection of the KSIA spur to the South West Main Line (SWML) will be a complex arrangement due to the close proximity of the SWML and the parallel South Western Highway. route option has subsequently been broken down into three linkage options. These are

- Option 1 – Realignment of the South Western Highway.
- Option 2 – Vertical realignment of the South Western Highway
- Option 3 – Realignment of the South Western Main Line.

Within the KSIA Core, two options have been considered these are as follows:

- Option A – Sidings only – Proposed spur on the eastern edge of Kemerton Road utilising a simple siding with a run-round loop.
- Option B – Sidings and Balloon Loop – Proposed balloon loop and incorporated siding.

It has been established that each rail alignment option can operate effectively, however each option has its advantages and disadvantages which has influenced the recommendations detailed below.

Recommendations

Using all information available during the design phase of the project the study findings indicate that there is no major impediment to introducing the proposed rail service from KSIA to Bunbury Port, however the following recommendations are made:

- The preferred route option to connect from the proposed KSIA Core to Bunbury Port remains via the South West Main Line Option as described in section 3.1.2, It is considered that this is the most viable option in terms of cost, as it would to utilise the an existing rail alignment, and would require significantly less land acquisition than the proposed Fast Train Option.
- The favoured linkage option to connect the South West Main Line to the proposed KSIA Core is Option 2 – keeping the existing South Western Highway in its current horizontal alignment, but raising the vertical alignment vertically to cross the rail at high level. This option would require minimal rail works to the South West Main Line, would provide a grade separation between the rail line and the South Western Rail Line. Provided retained embankment/reinforced earth techniques are employed, impact on residential property in the area will be minimal.
- The preferred KSIA Core design option is Option A (Siding only). This is based on an assumption the KSIA will attract a number of smaller industries that will require rail freight facilities as this format is unlikely to suit a single, large user..

For further details of all design options refer to section 3 of the report.

Further Studies

As described in section 6, further studies should be conducted to ensure the most appropriate option is selected for construction and to confirm that the studies assumptions are correct. These studies should look into road infrastructure, train operations, land access, Fast Train route alignment and various environmental issues.

Contents

Table Index

Appendices

1. Introduction

1.1 Background

The Kemerton Strategic Industrial Area (KSIA) was established in 1985 with the primary objective of accommodating heavy industry and resource processing for the South West of Western Australia. The KSIA is located approximately 140km south of Perth and 17km North-east of Bunbury (refer Appendix A Kemerton Strategic Industrial Area Location Plan). Surrounded by a buffer zone, the total area occupied by KSIA is 7,508 hectares, comprising of the following:

- Strategic Industry Zone (Core): 2,024ha
- Industry Buffer Zone (Buffer): 5,200ha
- Ancillary Industry Zone (Support Industry): 284ha

The KSIA plays a key role in the industrial and employment framework of the region and in terms employment, will accommodate of up to 2,250 jobs by 2031 equating to a wages and salary value of $118m. At 2031, the production value of Kemerton will be a minimum $371m per annum and is likely to generate additional indirect employment of up to 12,800 persons in WA. Without the KSIA functioning at an optimal capacity these values will be lost to other regions within WA, other Australian States and other countries in today's highly competitive global market economy (source: Syme Marmion 2013 Kemerton Industrial Park Social and Economic Analysis).

The need for rail infrastructure was first identified in the *Bunbury-Kemerton Transport Centre Corridor,* completed on behalf of the Western Australian Planning Commission in 1997. This report identified the need for and justifies the subsequent Government purchase of a 60 m rail reserve on the northern side of Marriott Road in 1989/1990, to provide a link onto the South West Main Line.

Existing industries in the KSIA include:

- Simcoa Operations (Silicon Smelter)
- Cristal Global (Pigment Plant - Titanium Dioxide)
- Nufarm Coogee Pty Ltd (Chlor - alkali Plant)
- BOC Limited (Oxygen and Nitrogen Plant)
- Transfield Services
- Tesla

1.2 Study Objectives

The objectives of this study are to build on previous studies and provide the basis for securing a rail freight corridor from the KSIA to the Port of Bunbury and to achieve long term compatibility between transport activity, land use planning, the community and the environment. This is to be coordinated through the KSIA Structure Plan which will facilitate the project-ready status of the KSIA. The objective of the report is to prepare rail design options for the following:

- KSIA to Bunbury Port Rail Alignment (Options of linking the KSIA to Bunbury Port);
- South West Main Line/Marriott Road Spur Link (Spur link onto South West Main Line); and
- KSIA Core Rail Alignment (Internal rail alignment servicing the KSIA Core).

The study discusses the advantages and disadvantages of each option and recommends the most appropriate design, which shall be incorporated into the Kemerton Structure Plan (refer Appendix B for Draft Structure Plan). The outcomes of this study do not preclude the relevant statutory approvals that will be required to secure the proposed rail concept.

At this stage of the development of the KSIA, it is not known exactly how many industries or which type of industries will need to be serviced by rail. As such, the position of the rail line is indicative only and will ultimately be dictated by the land size requirement of future proponents within the KSIA Core.

1.3 Purpose of this Report

The purpose of this report is as follows:

- Provide a detailed rail concept plans for KSIA including a detailed explanation;
- Develop preliminary alignment design, earthworks design and a rail crossing design;
- Propose rail operational and technical requirements;
- Provide the results of the stakeholder consultation, and
- Determine the operational parameters and responsibilities to manage and operate the rail network.

1.4 Previous Investigations

Information from the following reports have been utilised by GHD in the preparation of this report:

- Kemerton Bunbury Transport Corridor Study 1997 (BSD)

  This study investigated the options for a rail corridor linking the KSIA to the Port of Bunbury. Cabinet decided the preferred route for the rail corridor was along the existing south west rail line. This option still reflects the preferred rail route.

- Kemerton Expansion Study 1998 (BSD)

  This study recommends an expansion of the KSIA Core to cater for the Region's growth over the following 30-50 years, including the need to connect the rail to a deep water port.

- Kemerton– Bunbury Rail Corridor Study 2001 (BSD)

  The Bunbury Rail Corridor Study reviewed the findings of the Kemerton Bunbury Transport Study (1997) and Kemerton Expansion Study (1998), further investigating the options to connect the Marriott Road spur line to the South West Main Line by including the cost estimates, the impact on Rare Flora and Fauna, Aboriginal Heritage, adjoining properties and the possible rail duplication of the rail south of Brunswick. The report concluded there were no major impediments to the development of rail along the Marriott Road rail reserve and linking o the South West Main Line.

- Industry 2030 – Greater Bunbury Industrial land and Port Access Planning 2004 (WAPC)

  The Industry 2030 Study drew on the key access recommendations under the Kemerton Expansion Study, Kemerton Bunbury Transport Corridor Study, Preston Industrial Park Land Use and Port

Access Study and the Bunbury Port Access Road. This report underpinned the expanded KSIA Core, which was rezoned in the Greater Bunbury Region Scheme in 2007.

- Kemerton Rail Spur Economic Evaluation 2004 (SKM)

  SKM were engaged to undertake an economic evaluation of the proposed rail spur, which included preparing options for a rail link onto South Western Highway, assessing the advantages and disadvantages of each option and justifying the preferred design. The report concluded that under a cost benefit analysis approach, construction of the rail spur onto the South West Main Line could not be justified under the demand from existing users unless there is a new major user.

- Kemerton Strategic Industrial Area Strategy Plan 2007

  The Strategy Plan was a precursor to the structure planning studies currently underway. The Strategy Plan proposed an internal rail design of various loops to service the KSIA Core and was linked to the Port of Bunbury via Marriott Road and South West Main line linkage;

1.5 Existing Transport Infrastructure

1.5.1 Road Infrastructure

The KSIA is bound by two primary distributor roads, namely the Perth Bunbury Highway (Old Coast Road/Australind Bypass) to the west and South Western Highway to the east. Three existing roads link Kemerton to these primary distributors, being Marriott Road, Wellesley Road and Treasure Road.

1.5.2 Rail Infrastructure (South West Main Line)

The single, bi-directional track of the South West Main Line runs 4km east of the KSIA alongside South Western Highway and is used for transporting alumina, sodium, coal and the Perth to Bunbury Passenger route. The Coalfields Rail Line joins the South West Main Line at Brunswick Junction, approximately 5km south of the KSIA.

Between the Brunswick Junction to Port of Bunbury, the rail line is currently operating at near capacity, moving 10.6 million tonnes of alumina and caustic soda per annum. The Australind passenger service operates four well utilised services per day between Perth and Bunbury and in recent times, rail congestion has increased. A Western Australian based group has lodged the Greater Bunbury Infrastructure Investment Plan (also known as Roads to Export) with Infrastructure Australia in March 2011. This application seeks funding to duplicate the rail line between Brunswick Junction and Picton to ease congestion into the Bunbury Port. (Refer Appendix C for Greater Bunbury Infrastructure Plan).

1.5.3 Bunbury Port

Access to the Bunbury Port is currently via the South West Main Line and via road links such as the Port Access Road and Old Coast Road. Although there are currently no direct links from the KSIA to the Bunbury Port, future capacity to accommodate the KSIA is proposed in the Port expansion plans, which propose to increase the number of berths from 7 to 15. The *Roads to Export: Greater Bunbury Infrastructure Investment Plan* asserts that the south west's industrial parks must be connected to the Bunbury Port by "efficient and safe road and rail transport linkages in order to realise their economic potential".

It should be noted that although the subject report concerns the rail linkages from the KSIA to the Bunbury Port, road linkages into the Port will also continue to provide a major transportation option.

1.6 Land Ownership

The following table is a breakdown of land area ownership currently at the KSIA:

Total	Core (ha)	Buffer (ha)	Total (ha)
LandCorp	1152	1572	2724
DPaW	220	2091	2311
Industry/Commercial	365	774	1139
Other*	287	794	1392
	2024	5231	7566

*Includes private landowners, reserves and other Government Departments such as the Water Corporation and Local Authorities.

2. Basis of Design

2.1 Design Standards

The design is based on current Brookfield Rail standards, which is the manager and operator of the majority of the rail freight network in the southern half of Western Australia, including the South West Main line.

2.2 Design Criteria

The standards listed below in Table 2-1 were the sources used to determine the adopted design criteria.

Table 2-1: Design Assumptions

Organisation	Document number	Title
WestNet Rail	W190-400-002	Narrow Gauge Mainline Code of Practice
Public Transport Authority (PTA)	8190-400-002	Code of Practice for the PTA Narrow Gauge Mainline
Department of Transport	June 2001	Kemerton – Bunbury Rail Corridor Study
Department of Industry and resources	November 2004	Kemerton Rail Spur Economic Evaluation (SKM)

2.3 Basis of Design Criteria

The criteria to establish the technical basis of design are shown in Tables 2-2 through to Table 2-6. The design is based on Brookfield Rail design criteria, which has been adopted in the Basis of Design tables shown overleaf. Where design criteria are not defined, GHD has utilised its experience from other rail projects and adopted an appropriate value for the KSIA line.

Table 2-2: Basis of Design Criteria – Rail

Item	Adopted
Spur / Branch Speed (Max.)	80 km/hr
Siding Speed (Max.)	25 km/hr
Ruling Grade (Loaded)	1 in 100 (compensated)
Ruling Grade (Unloaded)	1 in 82.5 (compensated)
Balloon Loop Length	4000m
Siding Length	1000 m
Train Length	686 m
Rail Gauge	Narrow Gauge (1067mm)
Axle Load (Max.)	21 tonnes axle loads
Train Load	3832 tonnes
Locomotive Type	As required
Locomotive Length	As required
Wagon Length	14 m
Handling Capacity	As required

Table 2-3: Basis of Design Criteria – Track

Item	Adopted
Design Life Track Infrastructure	50 years
Mainline Turnout	Speed Dependant
Siding Turnout	Speed Dependant
Catchpoint	As required
Horizontal curve radius (spur line)	300m
Horizontal curve radius (sidings)	200m
Superelevation (Spur Line)	75mm
Superelevation Deficiency	60mm
Superelevation Deficiency rate of change	55mm/s
Superelevation Ramp rate	1:500
Superelevation (Siding)	0mm
Vertical Alignment Parameters	As required
Vertical curve radius (Spur line minimum)	3200 m
Vertical curve radius (Mainline minimum)	2000 m
Vertical curve minimum length	40 m
Rail Type Section	50kg/m Rail
Sleeper Type	Narrow Gauge Concrete
Sleeper Spacing	700mm
Ballast Depth	200mm
Track Centres (Minimum)	4000mm
Structure Gauge	Standard BR Structural Clearance Outline

In the absence of detailed Geotechnical advice, Brookfield Rail standards have been adopted for earthworks design. This should be verified prior to construction. Other criteria are based on GHD's previous experience in designing earthworks for rail lines with similar properties to the proposed KSIA line. Many of the values for the criteria listed in Table 2-4 are subject to change once a geotechnical investigation has been completed.

Table 2-4: Basis of Design Criteria – Earthworks

Item	Adopted
Cess Grade (Min.)	1 in 200
Cess Width(Min.)	300mm
Embankments	As required
Formation Cross fall	1 in 50
Capping	230mm
Shoulder Width	3000mm&6500mm
Max. Cut Batter Slope	1 in 3
Max. Fill Batter Slope	1 in 3
Benching	4.0 m wide at 7.0 vertical metres
Shrink Swell Factors	0.8 1.2

Table 2-5: Basis of Design Criteria – Drainage

Item	Adopted
Flood Event	100yr ARI
Culvert Cover (Min.)	1200mm
Culvert Dia. Size (Minimum)	450mm
Culvert Loading	300LA (AS5100.2)

Table 2-6: Basis of Design Criteria – Structures

Item	Adopted
Design Life	50 years
Design Loading (Max.)	300LA (AS5100.2)

2.4 Assumptions

Further to the Basis of Design criteria in section 2.3, the following assumptions have been made. These additional assumptions are shown in Table 2-7 below.

Table 2-7: Design Assumptions

Item	Assumption	Comment
Axle Load	21 tonne (as per Main South West Line)	• Short term 19 tonne • Medium term 21 tonne • In the Long term if axle load increases above 21 tonne then shorter train lengths should be considered • Main South West Line currently runs 21 tonne trains
Wagon Type	14m Wagons	2 No. 20ft containers with a length of 12.4m, extra 1.5m added, making the total length approximately 14m
Maximum loaded operating speed	80 km/h	Typical freight train speed for 3000HP locomotive
Train load	3832 tonne	2 No. 3000 locomotives, 6 axles per locomotive, 1.5HP per tonne therefore 3832 tonne train load
Length of trains	686m	Number of Wagons = 3832/ (21*4) = 46 Train length = 46*14 + 2 locomotives @ 21m = 686m
Sidings Length	1000m	New Brookfield Rail siding length at Worsley
Survey	Lidar coverage to be used	A full survey should be conducted at the detailed design stage of the project
Earthwork Slopes	Wood and Grieve earthworks model to be used	This should be re-evaluated at the next stage of design

2.5 Potential Uses

The types of industries which may potentially utilise lots in the KSIA Core include:

- Urea Plant
- Aluminium Smelter/Refinery
- Fuel Terminal
- Titanium Nitrate Storage
- Xanthate Plant
- Ammonia Plant
- Fertiliser Plant
- Hydrogen Peroxide Plant
- Lithium Metal Facility
- Timber Product Facility
- Tantalum refining plant
- Pulp and Paper Mill
- Synthetic Rutile Plant
- Vanadium Refining Plant

It should be noted that land areas will vary between 5 ha to 200 ha depending upon the nature and scale of the industrial activity.

3. Rail Alignment

This section outlines rail alignment design options to service the KSIA. Each of the rail alignment options can operate effectively, however there are advantages and disadvantages to be considered. In addition to the Basis of Design Standards discussed in Section 2, the following criteria were considered in the preparation of the rail alignment options:

- Minimise crossings with existing/future transport network;
- Reduce impact on existing properties and residences;
- Utilise land holdings in Government ownership;
- Minimise impact on significant environmental features (such as wetlands, native vegetation); and
- Minimise disruption to existing rail operations.

For detail of the horizontal alignment of the rail alignment designs refer to Appendix O.

Two rail line options were considered for connecting the KSIA to Bunbury Port:

- Fast Train Line Option (via Australind Bypass/Old Coast Road); and
- South West Main Line Option.

3.1 Route Options

3.1.1 : Fast Train Line Option

The Draft Greater Bunbury Region Strategy proposes a fast passenger rail link (also referred to as the Perth – Bunbury Fast Train) between Mandurah and Bunbury, which generally follows the alignment of Old Coast Road (Refer Appendix H for Draft Greater Bunbury Strategy). Utilising this alignment has the potential to offer a shorter route to the Bunbury Port compared to the South West Link (refer Appendix H for Kemerton to Bunbury Port Rail Alignment). To facilitate this, access to Old Coast Road is required to travel south of the KSIA Core and through the KSIA Buffer because of the large ridge on the western edge of the Buffer, which will restrict rail transport operations.

From the KSIA Core, the rail alignment intersect Marriott Road to the south. The rail will then continue south through the Kemerton Buffer to meet and travel alongside the proposed Perth – Bunbury Fast Train.

It is proposed that the freight line from KSIA would be located alongside the Fast Train line within the median strip of the Australind Bypass. The proposed alignment for both the Fast Train and KSIA will pass under the Australind Bypass via a dive (tunnel) and then run in a corridor alongside the western boundary of the highway toward Bunbury. Access into the Port will be via the Port Access Road, which would be accessed via the North Preston Industrial Estate in Picton.

- The proposed alignment will require the following road/rail crossings along the Fast Train option, which at the time of writing this report are proposed to be grade separated. The design of which

should be further considered at the next stage of the project. Kemerton Road (proposed), would be located on the Fast Rail Main Line and would require to be grade separated

- Paradise Road (proposed), would be located on the Fast Rail Main Line and would require to be grade separated

Under this option, it is recommended that a further study and review of the internal road network in the KSIA Core be undertaken and fully integrated with rail plan to minimise traffic delays in the area. It should be noted that Brookfield Rail policy is not to adopt new level crossings into their rail network as the road/rail vehicle interface introduces a high level of risk to operations. Part of the integrated road/rail planning exercise will need to consider grade separation of the two transport modes.

Advantages

- Potential shorter travel route into Bunbury Port, however this could potentially result in the slowest travel time;
- Demonstrates an alternative option to the Marriott Road/South West Main Line link to Bunbury Port.
- Grade separation of Kemerton Road will allow efficient rail and road movements.

Disadvantages

- Not suited to more smaller individual and mixed industries utilising KSIA;
- Kemerton Road crossing required, resulting in a significant associated cost;
- Consumes large area of the KSIA Core and could sterilise much of remainder of the core;
- Crossover with Marriott Road in undesirable location, close to industry access ways and high traffic volumes;
- Relies on suitable link via Old Coast Road to Bunbury Port;
- Requires connection or integration with future Perth to Bunbury Fast Rail alignment (not considered as part of this study);
- Requires travel through KSIA Buffer, potentially resulting in harm to wetlands and native vegetation (to be considered in future studies);
- Requires significant amount of new railway to be constructed i.e. Fast Rail ; and
- Possible disruptions to residential dwellings.

3.1.2 Route Option: South West Main Line Option

Under this alignment option, the KSIA is proposed to be linked to the Bunbury Port via the South West Main Line, utilising the existing rail infrastructure (Refer Appendix G South West Main Line Option 1).

It is anticipated that the South West Main Line option would be the fastest and most direct route to Bunbury Port, utilising existing infrastructure and land. However it is unknown if additional infrastructure

would be required to ensure the South West Main Line would continue to operate efficiently in its current form. It is recommended that a further study be conducted to analyse this at the next stage of the project.

In 1989/1990, a 60 m reserve was resumed along Marriott Road between the KSIA and South Western Highway, specifically to accommodate both the railway line and road way. The intention was that the 30 m road reserve would be allocated to the road reserve and 30 m to the rail reserve. Currently the centreline of Marriott Road is aligned approximately from the southern boundary of the Marriott Road road reserve.

The proposed alignment will require only one grade separated crossing with the South Western Highway being diverted over the Rail alignment. The design of which should be further considered at the next stage of the project.

It is recommended that a further study and review of the internal road network in the KSIA Core be undertaken and fully integrated with rail plan to minimise traffic delays in the area. It should be noted that Brookfield Rail policy is not to adopt new level crossings into their rail network as the road/rail vehicle interface introduces a high level of risk to operations. Part of the integrated road/rail planning exercise will need to consider grade separation of the two transport modes.

Advantages

- Utilises the existing Marriott Road rail reserve;
- Infrastructure into Bunbury Port is well established and therefore it is assumed that it would require minimal infrastructure upgrades, allowing for minimal disruption to existing infrastructure and ensuring a more cost effective solution to existing routes;
- Grade separated junction over South Western Highway; and
- Preferable for large industry utilising the whole area.

Disadvantages

- Grade separated junction at South Western Highway could be expensive;
- Impacts on private property;
- Significant road diversion to the existing South Western Highway or South West Main Line (dependent on which SWML/Marriott Road linkage option is selected) will be required.
- Capacity may not be adequate to accommodate all train movements and duplication may be required.

Additional sub-options were developed for the following aspects of the alignment, which may be considered independently of each other:

- South West Main Line/Marriott Road Linkage; and
- KSIA Core Alignment.

3.1.2.1 South West Main Line/Marriott Road Linkage

This chapter of the report discusses the various options to link the Kemerton Rail spur onto the existing South West Main Lane via Marriott Road. The proposed connection of the rail spur to the South West Main Line would be at a location where the road and rail line run parallel to each other at close spacing. Provision of a new triangular junction would require the provision of two heavily skewed level crossings. Consequently, three alternative options were considered for the connection which would negate the requirement for the level crossings and incorporate grade separation of road and rail at the crossing points. Grade separation eliminates traffic delays and safety concerns.

The options considered were:

- Re-align the South Western Highway while retaining the South West Main Line on its existing alignment (Option 1)
- Leave the existing South West Main Line and South Western Highway on their existing horizontal alignments (Option 2)
- Re-align the South West Main Line while retaining the South Western Highway on its existing alignment (Option 3)

All options were designed and advantages and disadvantages of each option are discussed below.

Option 1 – Realignment of the South Western Highway

The spur line to the KSIA would connect to the existing narrow gauge South West Main Line via two new curves to form a triangle enabling trains to access or depart the spur line from either the north or the south. The railway would be constructed at or close to existing ground level. This layout would require installation of turnouts at each of the connection points on the South West Main Line. (Refer to Appendix J for Realignment of the South Western Highway Option 1 for details).

The highway would be relocated to the west of its existing alignment and cross the spur at a point west of the turnout where the north & south chord lines converge. This will allow the highway to cross the railway at a single grade separated crossing point (road over rail bridge), eliminating the need for a double span structure.

Advantages

- Single span bridge over a single line rail track, minimising the span of the structure;
- Grade separated rail / road interface over major highway; and
- Minimal disruption to the existing South West Main Line (majority of the construction could take place off line), and would provide an effective crossing once construction is completed

Disadvantages

- Significant road deviation to the existing South Western Highway, to realign the South Western Highway once the structure is completed off line;
- Significant earth works required for the proposed South Western Highway required to achieve the overbridge structure height;
- Portion of Marriott Road requires to be elevated to tie in with the new highway levels; and
- Significant portion of private land needs to be acquired to the west of the existing South West Main Line

Option 2 – Retain existing horizontal alignments

Option 2 would leave the road and rail alignments in their current horizontal orientation, and elevate the existing South Western Highway to allow the road and rail to be grade separated.

As in option 1, this layout would require the installation of two new turnouts on the South West Main Line, to allow connection to the proposed branch line, and would allow a triangle to be formed enabling trains to access or depart the spur line from either the north or the south. To allow this to occur, the South Western Highway would be required to cross the alignment in two locations via road over rail structures, and it would be necessary to either:

- Construct a long multi-span structure (approximately 600m in length), or
- Construct a retained embankment or a reinforced earth embankment approach to allow two separate bridges to be constructed, and grade separate the road-rail interface but keeping within the restrictive plan footprint of the site.

Refer Appendix K to South West Main Line/Marriott Road Linkage Option 2

Advantages

- Minimal rail works to the South West Main Line;
- Minimal land take requirements;
- Less disruptive to local properties; and
- Grade separated rail / road interface on the South Western Highway

Disadvantages

- Potentially two crossings over the rail alignment, resulting in the construction of an approximately 600m long structure or two individual structures with substantial retained or reinforced earth embankments, and approach roads;
- Portion of Marriott Road needs to be elevated to tie in with the new highway levels; and
- Significant road disruption to the existing South Western Highway during construction.

Option 3 – Realignment of the South West Main Line

Option 3 would entail re-alignment of the existing South West Main Line to the east of its current alignment to eliminate the requirement for significant earthworks & structures works as proposed in option 2 and to avoid affecting local dwelings, as stated in option 1.

The rail alignment would need to be diverted approximately 300 m to the east to avoid existing wetlands in the surrounding area. The minimum radii adopted for the rail alignment is 1200m, which allows for a line speed of 155 kph if maximum values were to be adopted. As in the previous two options, the spur line would be connected to the South West Main Line via two turnouts and a triangle formed to allow for rail traffic to access KSIA from both the north and south.

It would be necessary to alter the vertical alignment of the South Western Highway to allow for the road / rail grade separation (road over rail bridge), however as in option 1 this would be a single span bridge over a single line track, minimising the span of the structure as far as reasonably practical.

(Refer Appendix L for South West Main Line/Marriott Road Linkage Option 3)

Advantages

- Single span bridge over a single line rail track, minimising the span of the structure;
- Grade separated rail / road interface, minimising road and rail disruptions; and
- Minimal disruptions to local dwellings.

Disadvantages

- Requires the greatest amount of rail works in relation to the Main Line compared to options 1 and 2;
- Significant earth works would be required to the proposed South Western Highway to achieve the required overbridge structure height;
- Portion of Marriott Road needs to be elevated to tie in with the new highway levels; and
- Significant portion of private land to be acquired to the east of the existing South West Main Line.

3.2 Core Alignment

This section discusses the options for the internal rail alignment within the KSIA Core. Two options were considered:

- Siding
- Siding & Balloon Loop

3.2.1 Option A – Siding

KSIA Core Rail Alignment Option A proposes a rail spur on the eastern edge of Kemerton Road, running north of Wellesley Road and linked via Marriott Road to the South West Main Line. The concept utilises a relatively simple siding and run round loop on the south west corner of the Kemerton Road/Mitchell Road intersection (refer Appendix D for KSIA Core Rail Alignment - Option A).

The siding under Option A is approximately 1330m in length and a run-round loop has been designed to allow for single locomotive running to be adopted, giving greater flexibility in movement. Between the new siding and the loop it has been proposed that a minimum of 25m width of hard standing be provided to allow for loading and unloading of wagons. At the northern end of the siding, an additional straight length of approximately 60m has been included past the turnout to incorporate a head shunt. This will allow up to two locomotives to detach from an arriving train and run round to the rear of the train.

Although level crossings are not permitted on Brookfield Rail's infrastructure, it would be possible to provide level crossings within the core of KSIA, however it is recommended that a further study and risk assessment be carried to ensure suitability and efficiency of the proposed crossings. The following crossings would be required at the following locations.

- Occupational crossing to farmhouse;

- Campbell Road;
- Partridge Road;
- Bernbrooke Place; and
- Wellington Road.

Advantages

- Accommodates both freight and bulk train movements well;
- Loading/unloading of all materials in one central location;
- Preferable for a larger number of smaller lots, potentially serving many small industries;
- Allows the retention of large areas of significant land in the KSIA Core; and
- Requires less rail construction within the KSIA Core.

Disadvantages

- Not suited to one large industry;
- Interference with existing/proposed road and infrastructure crossings;
- Less efficient loading and unloading (requires shunting of wagons & locomotives) than option B, thus being less operationally efficient for the proposed client;
- Locomotive required for a shunting operation to be introduced in comparison with option B which would require one movement for bulk resources; and
- Interfaces with proposed roads within the Core would likely be level crossings

3.2.2 Option B – Siding with Balloon Loop

KSIA Core Rail Alignment Option B proposes a balloon loop at the northern end of the KSIA Core where bulk material such as coal and iron ore will be loaded and unloaded, in addition a siding would be provided to allow freight containers could be loaded/unloaded separately increasing capacity to the site.(Refer Appendix E for KSIA Core Rail Alignment Option B).

As with option A above it is assumed level crossings will be utilised within the KSIA Core, however it is recommended that a further study and risk assessment be carried to ensure suitability and efficiency of the proposed crossings

- Occupational crossing to farmhouse;
- Campbell Road;
- Partridge Road;
- Bernbrooke Place; and

- Wellington Road.

Advantages

- Preferable for one large industry;
- More efficient in allowing loading and unloading of bulk materials whilst utilising the proposed siding for loading and unloading freight containers and cargo; and
- Eliminates the need for shunting through the loop.

Disadvantages

- Not suitable for large numbers of smaller industries;
- Interfaces with proposed roads within the KSIA Core would likely be level crossings;
- Sidings would require a run round as in option A, but for only for freight containers freeing the loop to handle all bulk resources; and
- Requires more rail to be constructed in the KSIA Core.

A sub-option B siding with balloon loop arrangement is presented (Refer Appendix F for KSIA Core Rail Alignment Option B – Fast Train Sub-Option). This sub-option will carry the same disadvantages & disadvantages as for the main Option B.

3.3 Comparison of route options

A summary of the key constraints and which route option they affect is presented in the table below.

Table 3-2.3 Constraints

Constraint	Option Affected
Structure Plan layout	Within KSIA
Existing Roads	Both
Wetlands	South West Main Line
South Western Hwy	South West Main Line
Australind Bypass	Fast Train
Narrow median strip	Fast Train
Land acquisition	Both
Dwellings	Both
Existing Industry	Fast Train

Opportunities

There were several opportunities that would prove advantageous to the KSIA rail spur that have been incorporated into the alignment design. The opportunities are listed in Table 3-2.

Table 3-2.4 Opportunities

Opportunity	Option Affected
Use Existing Marriot Road Reserve	South West Main Line
Utilise Fast Train Corridor	Fast Train
Utilise Australind Bypass median strip	South West Main Line
Connect to South West Main Line	South West Main Line

Comparison

Characteristics of Option 1 and Option 2 are summarised in Table 3-3. The length shown is the length of track to be constructed for that option.

Table 3-3 Comparison Summary

Route	South West Main Line	Fast Train
Length of New Track	11,000m*	17,000m*
Structures	1 x Bridge (SWML/MR linkage option 1and 3) or 2 x Bridges (SWML/MR linkage option 2)	1 x Tunnel
Land Acquisition	Significant	Minor
Impacts	Wetlands Highway Existing Dwellings Existing roads	Existing roads Narrow median strip Land acquisition Existing dwellings Existing infrastructure

*Length of track required from Main Line connections

Each of the proposed alignment options has distinct advantages and disadvantages. Table 3-4, summarises the advantages and disadvantages of each route option. Tables 3-5 and 3-6 summarise the advantages and disadvantages of the South West Main Line/Marriot Road linkage and KSIA Core Alignment options respectively.

Table 3-4 Advantages and Disadvantages – Route Options

	Advantages	Disadvantages
South West Main Line	Utilises the existing Marriott Road rail reserve; Infrastructure into Bunbury Port is well established and therefore it is assumed that it would require minimal infrastructure upgrades, allowing for minimal disruption to existing infrastructure and ensuring a more cost effective solution to existing routes; Grade separated junction over South Western Highway; and Preferable for large industry utilising the	Grade separated junction at South Western Highway could be expensive; Impacts on private property; Significant road diversion to the existing South Western Highway will be required. Capacity may not be adequate to accommodate all train movements and duplication may be required.

	whole area	
Fast Train	Potential shorter travel route into Bunbury Port, however could potentially be the slowest travel time; Demonstrates an alternative option to the Marriott Road/South West Main Line link to Bunbury Port Grade separation of Kemerton Road will allow efficient rail and road movements.	Fast Train Line not yet built Not suited to more smaller individual and mixed industries utilising KSIA; Kemerton Road crossing required, with a significant associated cost; Crossover with Marriott Road in undesirable location, close to industry access ways and high traffic volumes; Relies on suitable link via Old Coast Road to Bunbury Port; Possible disruptions to residential dwellings.

Table 3-5 Advantages and Disadvantages – Marriott Road/South West Main Line link options

	Advantages	Disadvantages
Option 1 (Realignment of South Western Highway)	Single span bridge over a single line rail track, minimising the span of the structure; Grade separated rail / road interface over major highway; and Minimal road disruption to the existing South West Main Line (majority of the construction could take place off line), and would provide an effective crossing once construction is completed	Significant road deviation to the existing South Western Highway, to realign the South Western Highway once the structure is completed off line; Significant earth works required for the proposed South Western Highway required to achieve the overbridge structure height; Portion of Marriott Road requires to be elevated to tie in with the new highway levels; and Significant portion of private land needs to be acquired to the west of the existing South West Main Line
Option 2 (Retain existing horizontal alignments)	Minimal rail works to the South West Main Line; Minimal land take requirements; Less disruptive to local properties; and Grade separated rail / road interface on the South Wester Highway	Potentially two crossings over the rail alignment, resulting in the construction of an approximately 600m long structure or two individual structures with substantial retained or reinforced earth embankments, and approach roads; Portion of Marriott Road needs to be elevated to tie in with the new highway levels; and Significant road disruption to the existing South Western Highway during construction.
Option 3 (Realignment of the South West Main Line)	Single span bridge over a single line rail track, minimising the span of the structure; Grade separated rail / road interface, minimising road and rail disruptions; and Minimal disruptions to local dwellings.	Requires the greatest amount of rail works in relation to the Main Line compared to options 1 and 2; Significant earth works would be required to the proposed South Western Highway to achieve the required overbridge structure height; Portion of Marriott Road needs to be elevated to tie in with the new highway

		levels; and Significant portion of private land to be acquired to the east of the existing South West Main Line.

Table 3-6 Advantages and Disadvantages – KSIA Core Alignment options

	Advantages	Disadvantages
Option A (Siding)	Accommodates both freight and bulk train movements well; Loading/unloading of all materials in one central location; Preferable for more smaller lots, allowing for a lot of small industries; Allows the retention of large areas of significant land in the KSIA Core; and Requires less rail construction within the KSIA Core.	Not suited to one large industry; Interference with existing/proposed road and infrastructure crossings; Less efficient loading and unloading (requires shunting of wagons & locomotives) than option B, thus being less operationally efficient for the proposed client; Locomotive required for a shunting operation to be introduced in comparison with option B which would require one movement for bulk resources; and Interfaces with proposed roads within the Core would likely be level crossings
Option B (Siding + Balloon Loop)	Preferable for one large industry; More efficient in allowing loading and unloading of bulk materials whiles utilising the proposed siding for loading and unloading freight containers and cargo; and Eliminates the need for shunting through the loop.	Not suitable for lots of smaller industry's Interfaces with proposed roads within the KSIA Core would likely be level crossings; and Sidings would require a run round as in option A, but for only for freight containers freeing the loop to handle all bulk resources. Requires more rail to be constructed in the KSIA Core

4. Summary of Rail Operations

4.1 Train Product Load Requirement

Table 4-1 shows the requirements for transport, handling and storage of materials of products that are proposed to be transported by rail.

Table 4-1: Product Requirements

Product	Transport	Handling	Storage
LPG	Tank	Reach Stacker	Transfer and store in protected tanks
Ethane	Tank	Reach Stacker	Transfer and store in protected tanks
Petrol	Tank	Dry break transfer equipment	Transfer to road vehicle
Timber (woodchips)	Hopper	Dump	Bunded stock pile
Alumina Powder	Hopper	Dump	
Synthetic Ammonia	Tank		Transfer and store in protected tanks
Coal	Hopper	Dump	Bunded stock pile
Sodium Chloride	Hopper		Transfer and store in Hoppers
Silica (quartz or quartzite)	Hopper	Dump	Bunded stock pile
Petroleum Coke	Hopper	Dump	Bunded stock pile
Chloride	Tank		Transfer and store in protected tanks
Rutile	Hopper		Bunded stock pile
Hydrochloric Acid	Tank		Transfer and store in protected tanks
Containers	Flat	Reach Stacker	Container stacks

4.2 Proposed Operating Overview

The KSIA Terminal should have appropriate operating protocols that ensure the safe operation of rail pickup and drop off movements within the sidings.

There will have to be two levels of operating protocols:

1. Those required for the internal operation within the yard; and
2. Those required at the interface point between KSIA and the Main South West Line.

4.3 Operation of Trains on the Arrival Road and within the KSIA Terminal

Outlined below are the protocols for the safe operation of trains on the Arrival Road and within the KSIA Terminal. The role and responsibilities of the KSIA Terminal Operations Manager is described and the protocols have been divided between those for arriving trains and those for departing trains.

4.3.1 Operations Manager

The KSIA Terminal Operations Manager (OM) will be responsible for safe rail operations within the KSIA sidings which not only affects the rail activities but also impacts on the safety of all personnel working within the KSIA precinct. The OM must ensure that rail movements within the sidings are managed in accordance with the accepted procedures.

4.4 Operating Process for the Management of Movements at the Interface of KSIA Siding

4.4.1 Management of Arriving Movements

All movements proceeding into KSIA sidings are signalled by the Brookfield Rail Network Controller onto the KSIA Terminal Arrival Road. The process for an arriving train is outlined in Section 4.4.2. A2A gate is located across the track into the KSIA sidings and is opened for rail movements by the OM. A notice board is to be provided for arriving movements at the entrance gates into the KSIA Terminal with the following wording: “contact KSIA Operations Manager prior to proceeding”.

The driver of an arriving train must contact the KSIA Terminal Operations Manager prior to proceeding beyond this notice board. The driver must obtain details regarding the train’s arrival into the KSIA Terminal and the arrangements within the yard. This is not required if the terminal is un-manned.

4.4.2 Shunting Movements

A signal will be located on the Arrival Road at the entrance of the KSIA Terminal for departing trains and is provided to ensure that a train does not depart the siding without authorisation. This signal will be set to proceed for shunting purposes. When a train is required to shunt out of the KSIA Terminal precinct the train crew must contact the Brookfield Rail Network Controller and advise that a shunt movement is about to occur. Provided there are no conflicting movements, the network controller will place a signal to proceed and the shunt movement may then take place. A notice board is to be provided at the exit from KSIA siding with the following wording: “contact Brookfield Rail Network Control prior to proceeding”

4.4.3 Departing Trains

The crew of a train movement wishing to depart the KSIA Terminal must first contact the Brookfield Rail Network Controller and provide the appropriate train details for the movement. Provided the departing train can be accepted, the network controller will advise the train crew and place a signal to proceed for the movement to commence onto the main line.

4.4.4 Track Maintenance Operations

Whenever it becomes necessary to perform track maintenance operations on the KSIA Terminal lead, the track maintenance supervisor must first contact the Brookfield Rail network controller and advise of the works. Should the works be significant enough to require the Terminal to be closed, then the track maintenance supervisor must book out the applicable entry point into the sidings. The Brookfield Rail Network Controller must set the applicable points away from the KSIA Terminal Arrival Road and place a blocking command on the points until advised that the Terminal entry is again safe for normal traffic. The track maintenance supervisor must also liaise with the KSIA Terminal Operations Manager and ensure that any rail operations within the KSIA sidings do not enter the maintenance works area. The derail devices blocks must be applied and locked preventing departure from the sidings.

4.5 Consultation and Accreditation

4.5.1 Risks

The establishment of a new rail terminal or set of rail sidings and allowing open access to rail operators requires the establishment of a safety management system including a risk register. The establishment of the KSIA Terminal does have associated risks that will require a risk assessment process to be undertaken and mitigation measures to be put in place that either remove or reduce the risk to an acceptable level event. One of the key risks within the KSIA Terminal will be the difficulty of ensuring the employment of competent operational personnel that are ‘railway aware’ and are suitably qualified for rail operations within a working rail environment.

4.5.2 Rail Operators

It is intended that the KSIA Terminal will be operated as an Open Access Terminal where rail operators will access the sidings on established schedules as arranged between the KSIA Terminal Operator and the rail operators. The OM will provide time allocations to rail operators that allow access to the sidings that will then allow the rail operators to seek a train path from Brookfield Rail. It is not intended to provide shunt qualified staff at the KSIA siding and the rail operators will be responsible for the detaching and attaching of locomotives to the trains that arrive and depart. The sidings are structured to facilitate block train operations. Any train remarshalling requirements, should not be undertaken within the KSIA sidings unless there is an agreement with the OM.

4.5.3 KSIA Terminal Operations Manager

The KSIA Terminal Operator should have the KSIA Terminal Operations Manager on duty for the arrival, departure and duration of all rail activities within the siding. This person will most likely be a supervisor who will be multi-tasked to perform other duties outside of the rail task within the terminal. The OM need not be qualified as a shunter and as such will not perform any shunting tasks, including attaching and detaching of locomotives and or wagons within the sidings.

The Operations Manager must be qualified in the appropriate track awareness level suitable for operating within rail sidings and with additional competencies in:

- Operation of the hand points within sidings, and setting of the points for arriving and departing trains;

- Operation of the hand locking bars at the entry points of the sidings;
- Operation of the gates for the arrival and departure of trains;
- Operation of the derail devices for the arrival and departure of trains;
- Operation of warning devices during rail activities;
- Operating protocols for the operation of trains within the sidings, both internal and external;
- Communication protocols with train crews and train control;
- Emergency management procedures for rail activities within the KSIA rail sidings and within the KSIA precinct overall; and
- Any other rail safety related activities including the supervision of activities within the sidings during rail operations.

4.5.4 Maintenance

KSIA must have a maintenance regime in place that ensures that the sidings remain 'fit for purpose' for sidings activities at all times. Appropriate consultative processes with affected stakeholders should be arranged.

4.5.5 Management of the Sidings

In line with the requirements, KSIA must establish a safety management system that provides for safe rail operations within the sidings.

The safety management system should include:

- An interface co-ordination plan detailing the operations of the siding, the maintenance regime and the conditions of access for rail operators using the sidings;
- An Interface agreement with KSIA and the Brookfield Rail;
- An incident management plan for rail operations within the siding;
- A competency based training process for rail workers, which must be undertaken and reviewed biannually;
- Any other requirement in accordance with the Railway Safety Act 2006 as directed by the safety director.

KSIA will arrange appropriate risk assessments covering the commissioning and the operations of the new sidings and ensure that all affected stakeholders participate in the risk establishment process and will put in place mitigation measures for all identified risks.

4.5.6 Construction and Commissioning Processes

During the construction phase of the sidings there will be minimal impacts on current rail operations on the Brookfield Rail main line. The KSIA siding will be commissioned in line with Brookfield Rail requirements. KSIA will ensure that all regulatory requirements are in place well prior to the commissioning of the new sidings and appropriate approvals have been obtained.

4.5.7 Train Notices and Advices

In line with Brookfield Rail processes, KSIA will arrange the issue of the appropriate train notices and advices to Brookfield Rail in a timely fashion. Ensuring that all affected stakeholders are advised of any changes, or when any access to the Brookfield Rail operated track is required for the works.

5. Stakeholder Consultation

5.1 Brookfield Rail

A meeting was held with Brookfield Rail representatives (Lisa Allsopp, Christian Guest, Paul Hamersley and Ivan Ursic) on 23 January 2012 to discuss KSIA rail planning. Points raised during that meeting were:

- No issues and concerns were raised by Brookfield Rail with regard to the proposed concept rail alignment for KSIA;
- Brookfield Rail advised that the most efficient rail management system is where Brookfield manages the mainline, PTA manages the line following the Fast Train alignment and a private entity would manage rail through KSIA; and
- A Brookfield signalling system will be used throughout the rail line.

A copy of the minutes is included in Appendix N.

5.2 Main Roads WA

Main Roads representatives Gerry Zoetelief, Lou Pilandri and Peter Bromley attended a meeting with representatives of GHD and LandCorp to discuss the interfaces of the proposed KSIA rail line and main roads. The meeting was held on 2 April 2012. Issues raised by the Main Roads representatives were:

- Level crossings controlled by Main Roads;
- Level crossings should accommodate longest vehicle between level crossing and intersection;
- Level crossings need to be shown in detail;
- The median near the Port of Bunbury cannot accommodate another rail line; and
- Intersections near the port are very problematic.

Overall, Main Roads representatives were of the opinion that the proposed infrastructure associated for the KSIA rail line is feasible. A copy of the minutes is included in Appendix N.

5.3 Shire of Harvey

A meeting with representatives of the Shire of Harvey (SoH) was held on 2 April 2012, The SoH was represented by Simon Hall and Cecil Hensley. Issues raised by the SoH representatives were:

- Land acquisitions and dwelling relocations may have a large impact on the project if South Western Highway is re-aligned;
- “Big players” required to initiate and fund construction of the proposed rail line;
- Possibility of using proposed rail lines for local passenger traffic;
- Concerns regarding houses lying within the proposed rail corridor;
- Land acquisition and dwelling re-location may slow or halt proposal; and
- Shire of Harvey will relay future plans to the public.

A copy of the minutes is included in Appendix N.

5.4 PTA, Brookfield Rail and Department of State Development

A meeting was held on 12 September 2012 to present the 3 options for alignment of the proposed Kemerton Spur at the junction with the South West Main Line in the vicinity of the South Western Highway. Representatives of the Department of State Development, Landcorp, Brookfield Rail, PTA and GHD attended the meeting.

Agreement was reached in the meeting that preferred option is that which involves regrading the South Western Highway to pass over the proposed Kemerton Spur railway on two bridges as detailed in 3.3.1 and shown in drawing 61-27426-C028 (Appendix K). Issues raised during the meeting were:

- Landcorp do not intend the spur to be constructed at this time but require that land be bought or reserved;
- Brookfield Rail has a policy of not introducing additional level crossings and required that any crossing be grade separated;
- Noted that the layout does not yet address possible operational issues;
- One leg of the triangular junction may not be required;
- Facility may operate in a similar fashion to the Kwinana freight facilities;
- Brookfield Rail requested details of the limits of their operations;
- Normal PTA requirement for rail reserve is 40m;
- PTA requested clarification of limit of their liability; and
- Landcorp own most of land required for construction of proposed spur except in the vicinity of the junction with the mainline.

A copy of the minutes is included in Appendix N.

6. Further Studies

6.1 KSIA Road Infrastructure

This report considered only the design of the interface where the proposed rail alignment intersected certain roads within KSIA. GHD suggests further study and analysis of the roads within the KSIA Core. This includes Marriott, Paradise and Moore Roads. A possible grade separation may be required at the Marriott Road intersection. A study and review of the roads in the KSIA Core will need to be undertaken and a fully integrated road and rail plan needs to be developed to minimise traffic delays in the area. Further details on crossings need to be provided and examined leading up to construction as part of this study. Further studies will need to consider the Brookfield Rail requirement that no new level crossings should be introduced into their network.

6.2 Land Access

In addition to the need to consider grade separation in the road and rail crossing points, there will be a need to determine treatments where the rail alignment affects access from existing infrastructure onto properties where the rail line will effectively form a barrier to that access or the rail alignment bisects a parcel of land and access is required between the separated sections of land. Consideration will need to be given to the Brookfield Rail requirement that no new level crossings should be introduced into their network.

6.3 Road Infrastructure and Fast Train Alignment

As part of the feasibility studies for the South West Main Line route, an interchange ramp needs to be considered at the point where the proposed freight line connects with the existing South West Main Line near chainage 28000m. Similarly for the Fast Train route, GHD suggests that the feasibility of having both the Fast Train Line and the freight line to KSIA within the Australind Bypass median strip needs to be further investigated. Furthermore, study and analysis of roads affected along the proposed Fast Train alignment may also be required.

6.4 Noise

LandCorp advised GHD that any residence within 100m of the proposed KSIA spur line would be required to have a noise study carried out prior to final design.

The following residences were identified as being within 100m of the proposed spur line alignment for Option 1:

- Farmhouse at approximate chainage 5500m.
- Farmhouse at approximate chainage 6100m.

The following residences were identified as being within 100m of the proposed re-alignment of the South Western Highway as part of Option 1:

- Farmhouse at highway approximate chainage 1400m.
- Farmhouse at highway approximate chainage 21500m.

6.5 Additional Further Studies

In addition to those listed above, the following studies should be carried out at the next stage of the project:

- Aboriginal heritage study;
- Environmental surveys & studies;
- Geotechnical study (including testing for acid sulfate soils);
- Drainage and flood study;
- Risk assessments on proposed level crossings within the core;
- Train operations study focusing on the South West Main Line; and
- Road planning & operations study.

7. Summary and Recommendations

As described in section 1 of the report, the objective of this study is to identify suitable rail alignment options to service the Kemerton Strategic Industrial Area (KSIA) and define the associated land use issues. In general there appears to be no major impediment to introducing a rail service to the KSIA and this in part, is due to the current flexibility associated with the large areas of undeveloped land.

This study confirms that several rail alignment options can be developed to adequately service the operations of the KSIA. In this respect, the following recommendations arise from the study:

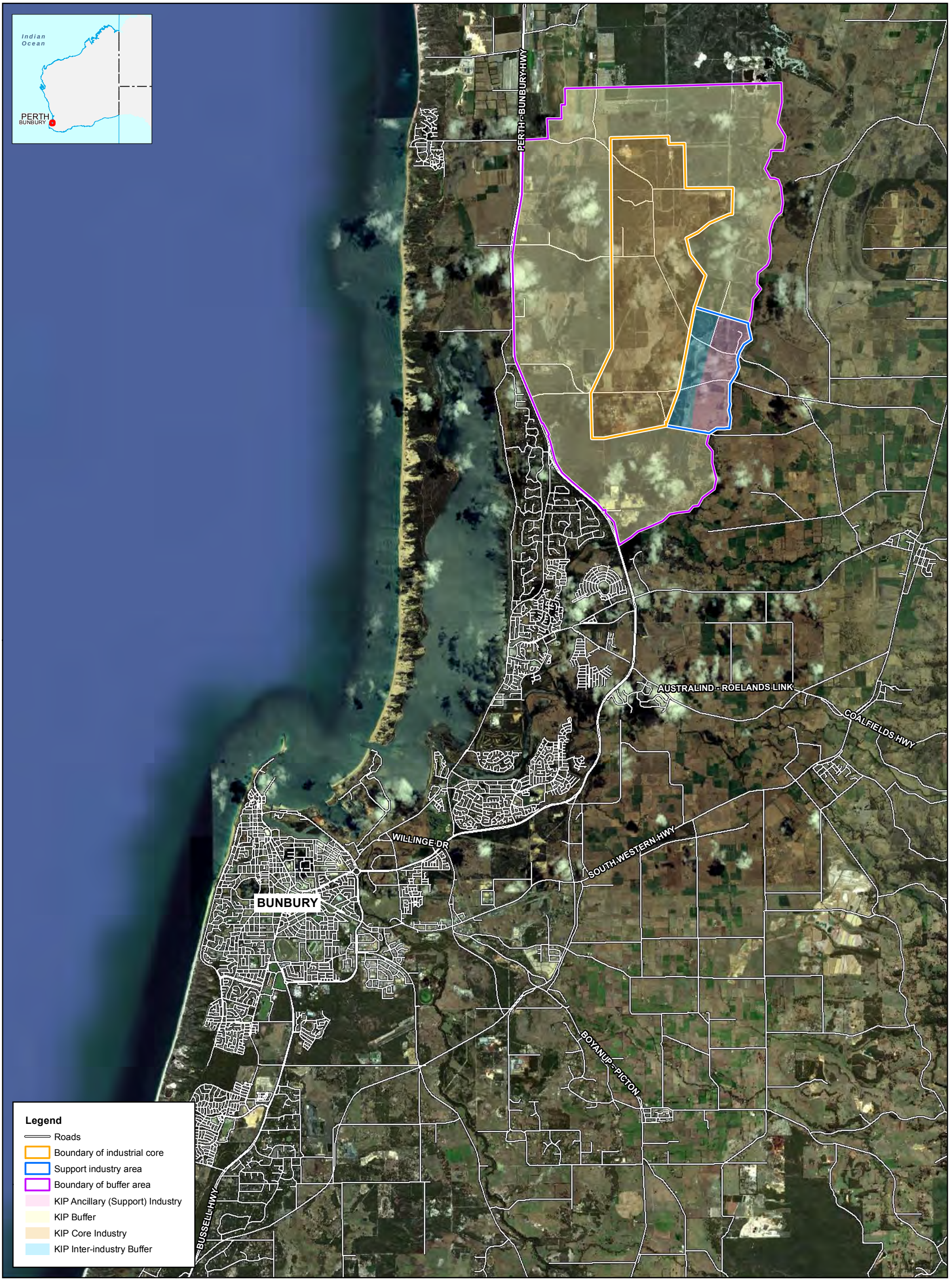
1. The preferred alignment into Bunbury Port remains via the South West Main Line option as described in section 3.1.2. It is considered that whilst the Fast Train Route offers a shorter distance of travel, the establishment of new rail infrastructure and additional land purchasing will require significantly more investment than utilising the existing infrastructure than the South West Main Line. In addition, travelling through the Kemerton Buffer should be avoided because it erodes the functionality of the Buffer.
2. The preferred linkage onto the South West Main Line from the KSIA Core is via the existing South Western Highway on its current horizontal alignment (Option 2) because it involves minimal rail works to the South West Main Line, Minimal land take requirements, less disruption to nearby landholdings and residences, and provides a grade separation between the South West Main Line and the South Western Highway, However this should be revisited closer to the time of construction to assess the design and cost of the proposed structure required.
3. The favoured KSIA Core design to be incorporated into the Structure Plan is the siding only option (option A) as thisoption services the entire KSIA without interfering with the fundamental operations of the KSIA Core and is located in a space of the Core that is central, thereby in proximity to service the majority of industries if the intent is to utilise the industry area with many smaller industry's. Notwithstanding this however, should an industrial proponent demand a large proportion of the central key area of the Core, the balloon loop and sidings option (option B) could be incorporated into the development at the next phase of design.

Further investigation are necessary at the next phase of the project as described in section 6.5 to evaluate the options in more detail. The main studies which should be considered are a noise impact assessment for all dwellings being closer than 100m to the proposed rail or road alterations. In addition a risk assessment should be carried out to determine the safety and efficiency of the proposed level crossings within the KSIA Core.

Although the designs presented within this report offer preferred options and meet relevant design standards, the designs are conceptual and may change according to the specific needs of industrial proponents, the conclusions of this report should be revisited once the further studies have been conducted to ensure the proposed options meet the requirements of the project.

Appendix A

Kemerton Strategic Industrial Area Location Plan



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Scale: 1:100,000 at A4

Coord. System.: MGA50 GDA94

Drawing No.: 2117168A-GIS-F017		
Revision: B	Date: 01/12/2011	
Drawn By: SH	Checked by: AK/JS	
Source: Landgate SLIP, PB (2010)		

LandCorp

Kemerton Industrial Park Environmental Management Plan

Site location
Figure 1

GIS File: \\AUPERF\proj\L\Landcorp\2117168A_KEMERTON_INDUSTRIAL_PARK_ENVI\10_GIS\Projects\Drawings_Figures_Sketches\2117168A_GIS_F017_B.mxd

Appendix B

Draft Kemerton Strategic Industrial Area Structure Plan

Sand Quarry
Kemerton Terminal
KEMERTON ROAD
Kemerton Power Station
TREASURE ROAD
9.6ha
TREASURE ROAD
OLD COAST ROAD
KEMERTON ROAD
WELLINGTON ROAD
ROSAMEL RD
14.2ha
4.4ha
WELLESLEY ROAD
1.5ha
W.W.T.P
MARRIOTT ROAD
Rail to connect with Southwest main line and Bunbury Port
Cristal Global Plant
Sub Station
Simcoa Silicon Smelter
5.8ha
PAYNE ROAD
MOORE ROAD
0.25ha
DEVLIN ROAD
Potential road link subject to future development of inter-industry buffer
OLD COAST ROAD

LEGEND
- Subject Site
- Proposed Roadways
- Proposed Lots
- Substation
- Wetlands
- KIP Buffer
- KIP Inter- industry Buffer
- KIP Core Industry
- KIP Ancillary (Support) Industry
- Drainage
- River and Wetland Conservation
- Vegetation

0 m 750 1500 m

N

Kemerton Industrial Park
Updated Local Structure Plan

Date: 8th February 2013 Designer: MR
Scale: 1: 35 000 @ A3 Drawn: PR
Drawing No. 710-065 ST1 (PCG94) UPDATED LSP 070213.dwg

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The Planning Group WA Pty Ltd
ABN 36 097 273 222

Appendix C

Greater Bunbury Infrastructure Plan

N

Distance to Bunbury Port (Current road network)	
Collie-Shots Industrial Park	67 km
Kemerton Industrial Park	21 km
Preston Industrial Park (North)	9.5 km

Trade from north of the Region to Bunbury Port 9,700,821

Bunbury Port

Trade from south of the Region to Bunbury Port 2,031,981

Perth

Bunbury

Collie

Kemerton Industrial Park

Marriott Road

Dampier-Bunbury Gas Pipeline (main)

Brunswick Junction

South West Main Line
Narrow gauge
Single track

Perth-Bunbury Highway

Port Access Road Stage 1
(Complete)

Preston Industrial Park
(Northern Precinct)

Coalfields Highway

South Western Highway(north)

BUNBURY

Eelup Roundabout

Proposed BORR (Stage 3)

Collie-Shotts Industrial Park

Halifax Light Industrial Area

Picton Junction

Port Access Road Stage 2
(Planning underway)

Boyanup-Picton Road

Preston Industrial Park
(Southern Precinct)

Bussell Highway

Bunbury Outer Ring Road (BORR) Stage 1
South Western Highway to Boyanup-Picton Rd
(Planning underway)
Stages 1 & 2 unfunded.

South Western Highway(south)

Proposed BORR (Stage 2)

Picton-Greenbushes Rail Line
(Out of Service)

Industry Linkages in Greater Bunbury

0 0.5 1 2 3 4 5 Kms

Data Source: Landgate (Base map/rail) DPI (GBRS) Issued 25 October 2011

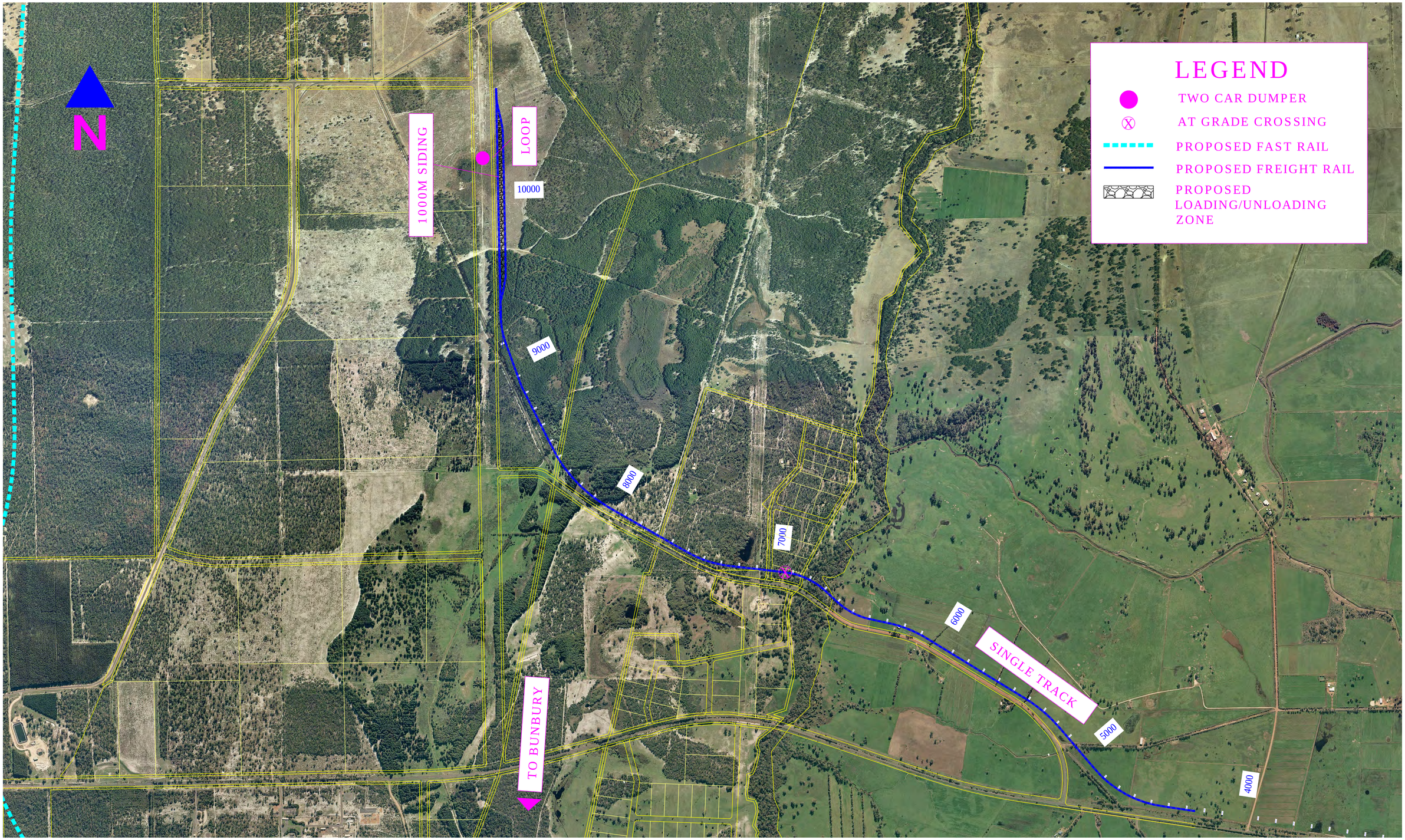
This map is intended as a guide only. No business decision should be made on the basis of information shown on this map.

- Industrial Land
- Light Industrial Land
- Bunbury Port
- Port Berth
- Major Roads
- Railway
- DBNGP
- New Strategic Intersections
- Strategic New Roads

SOUTH WEST DEVELOPMENT COMMISSION

Appendix D

Kemerton Core Rail Alignment – Option A



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SCALE 1:10,000 AT ORIGINAL SIZE

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			1.5.12

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DO NOT SCALE

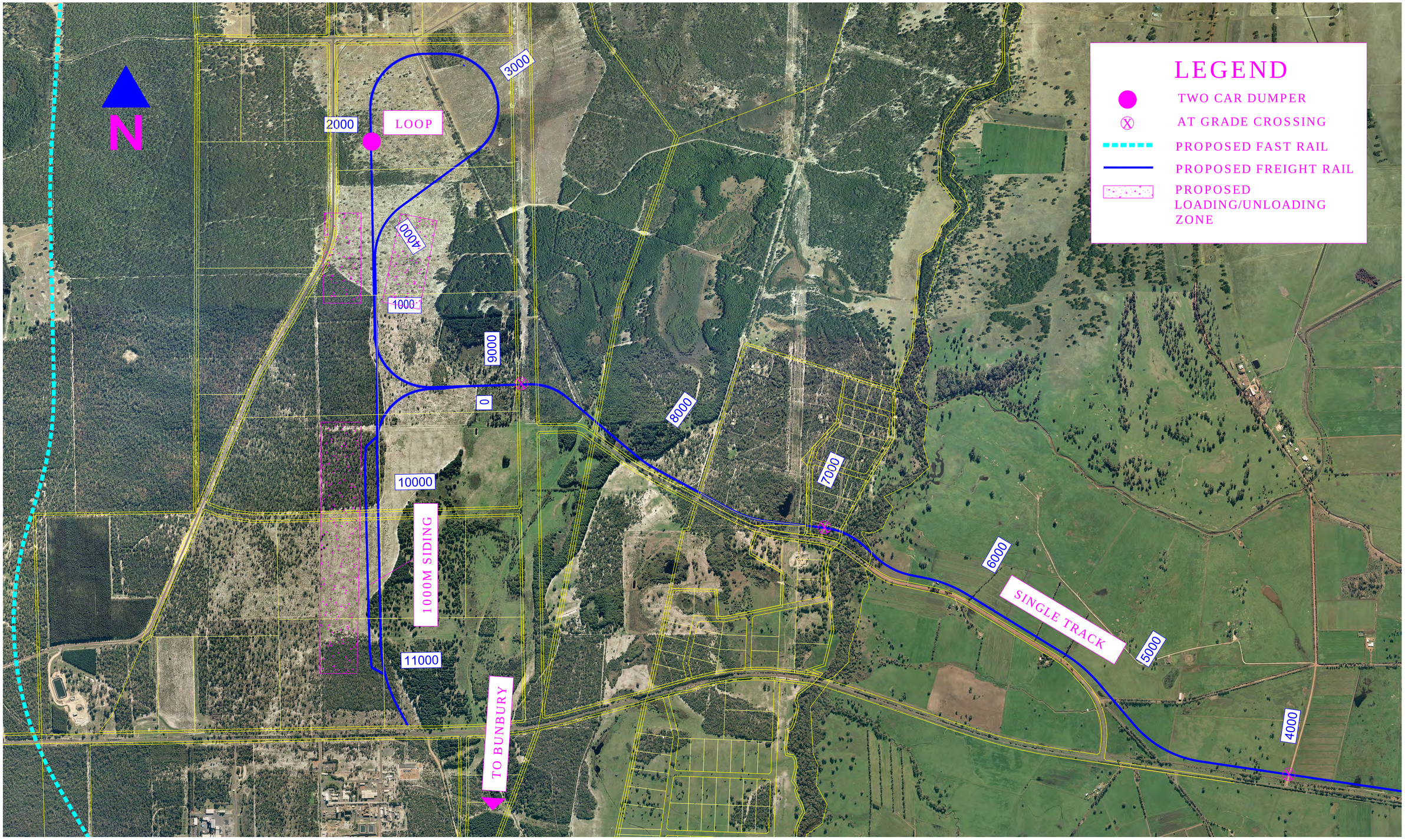
Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	LANDCORP
Project	KEMERTON STRATEGIC INDUSTRIAL AREA
Title	KSIA CORE RAIL ALIGNMENT - OPTION A

Original Size **A1** **Drawing No:** **Rev:** B

Appendix E

Kemerton Core Rail Alignment – Option B



0 100 200 300 400 500m

SCALE 1:10,000 AT ORIGINAL SIZE

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			1.5.12

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DO NOT SCALE

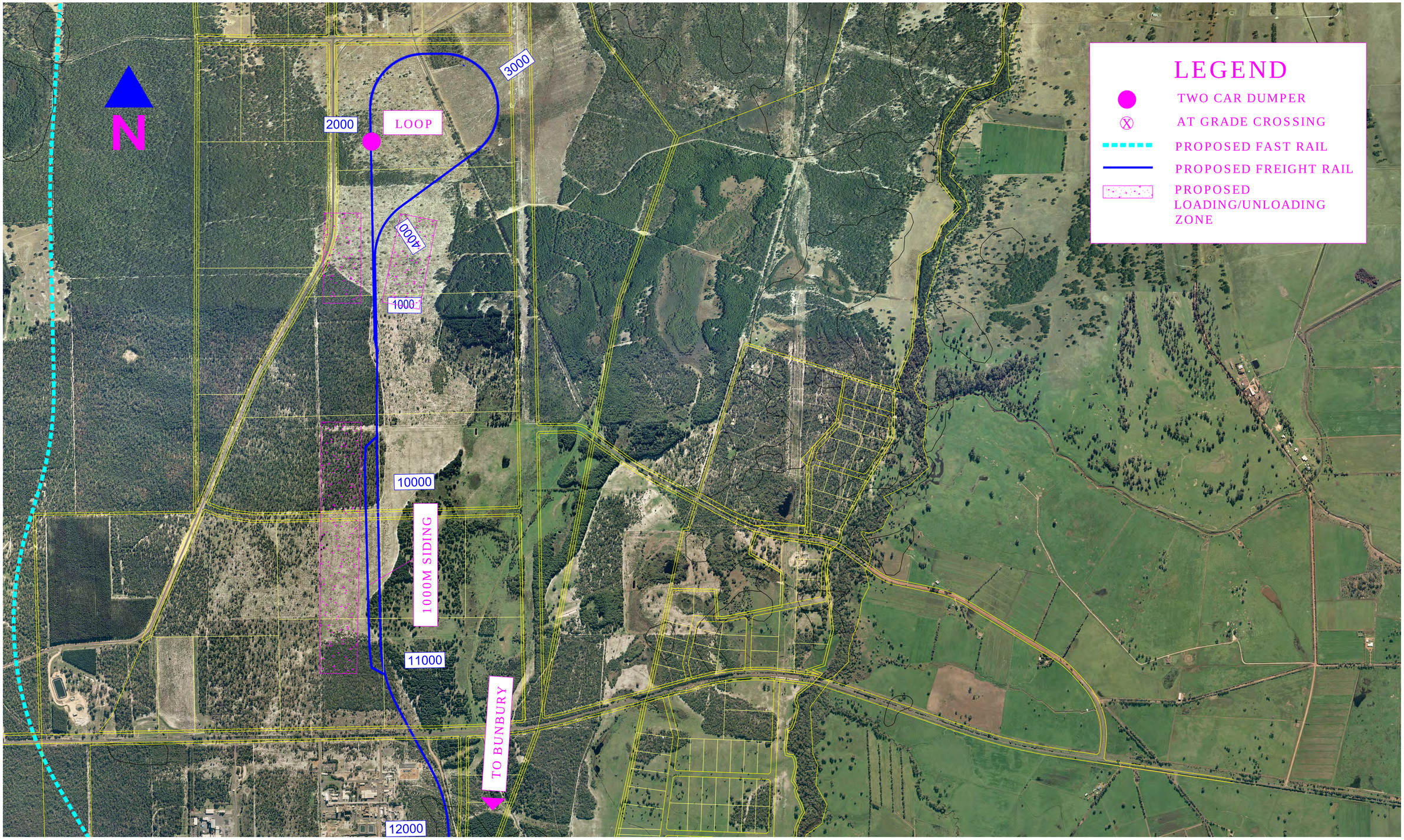
Drawn	B.YAO	Designer	V.SINAGRA
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON STRATEGIC INDUSTRIAL AREA
Title KSIA CORE RAIL ALIGNMENT - OPTION B TO SOUTH WEST MAIN LINE

Original Size **A1** **Drawing No:** **Rev:** B

Appendix F

Kemerton Core Rail Alignment – Option B, (Fast Train Sub-Option)



0 100 200 300 400 500m

SCALE 1:10,000 AT ORIGINAL SIZE

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			1.5.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

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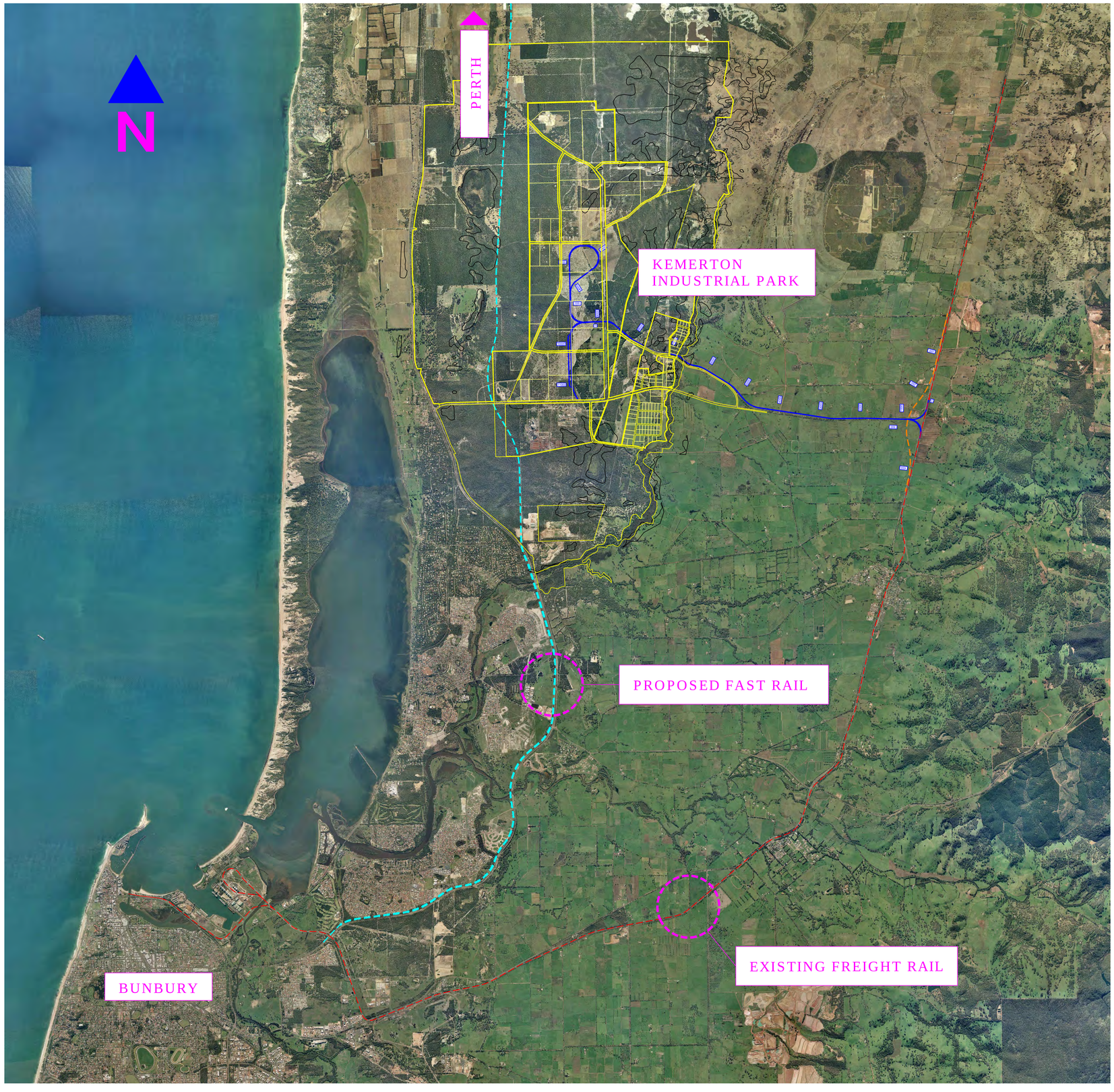
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON STRATEGIC INDUSTRIAL AREA
Title KSIA CORE RAIL ALIGNMENT - OPTION B
TO OLD COAST ROAD / AUSTRALIND BYPASS

Original Size **A1**
Drawing No:
Rev: B

Appendix G

Route Option: South West Main Line Option



LEGEND

- PROPOSED FAST RAIL
- PROPOSED FREIGHT RAIL
- PROPOSED HWY DEVIATION
- EXISTING FREIGHT RAIL

0 500 1000 1500 2000 2500m

SCALE 1:50,000 AT ORIGINAL SIZE

No.	Revision	Drawn	Job Manager	Project Director	Date

Drawing Revisions

Note: * indicates signatures on original issue of drawing or last revision of drawing

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Client LANDCORP

Project KEMERTON STRATEGIC INDUSTRIAL AREA

Title SOUTH WEST MAIN LINE OPTION

Scale AS SHOWN	**DO NOT SCALE**
Drawn B.YAO	Designer V.SINAGRA
Drafting Check E.WRIGHT	Design Check E.WRIGHT
Approved (Project Director)	
Date	

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Drawing No. SK6127426-06-01 v3

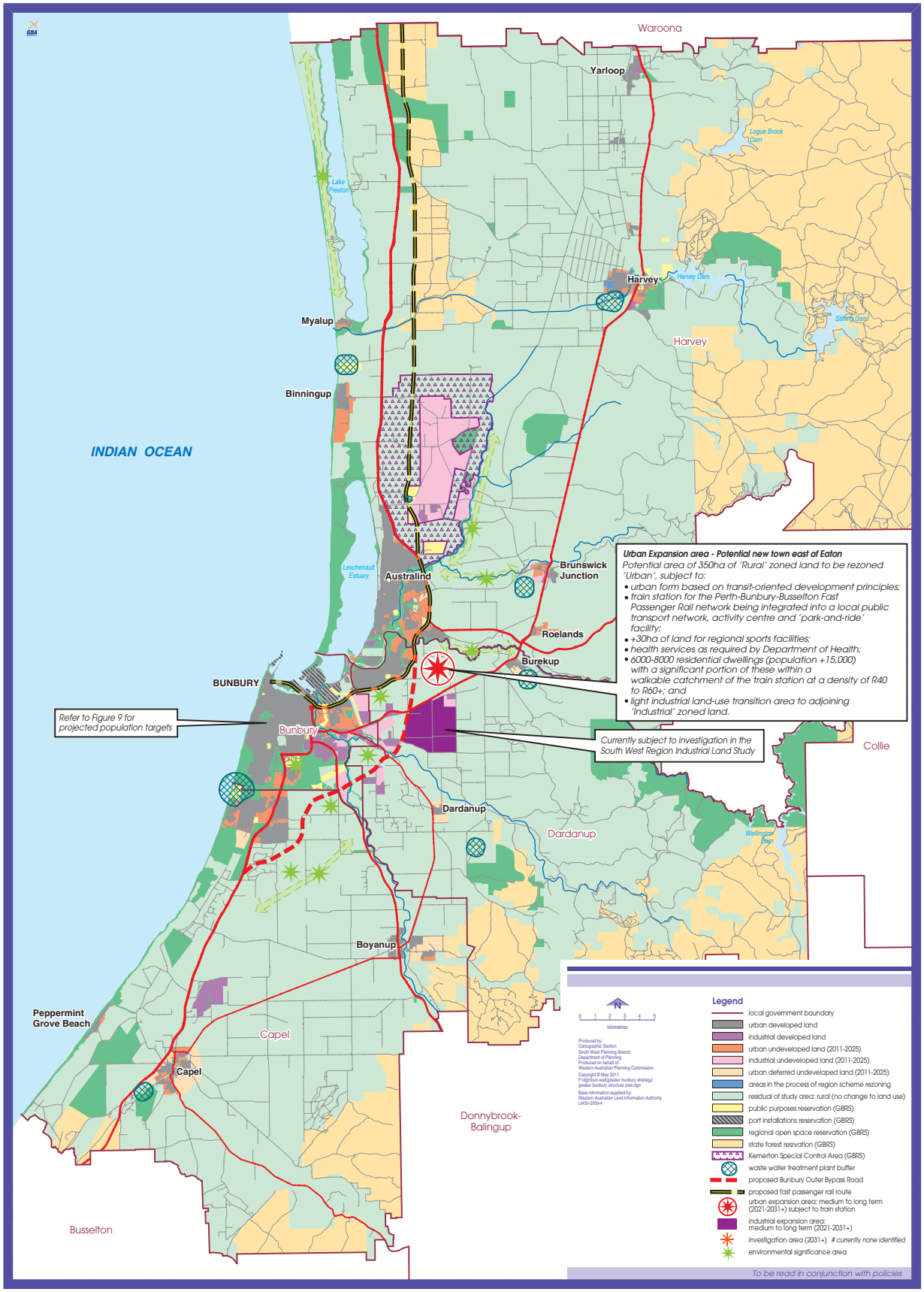
Original Size **A1**

Rev.

Appendix H

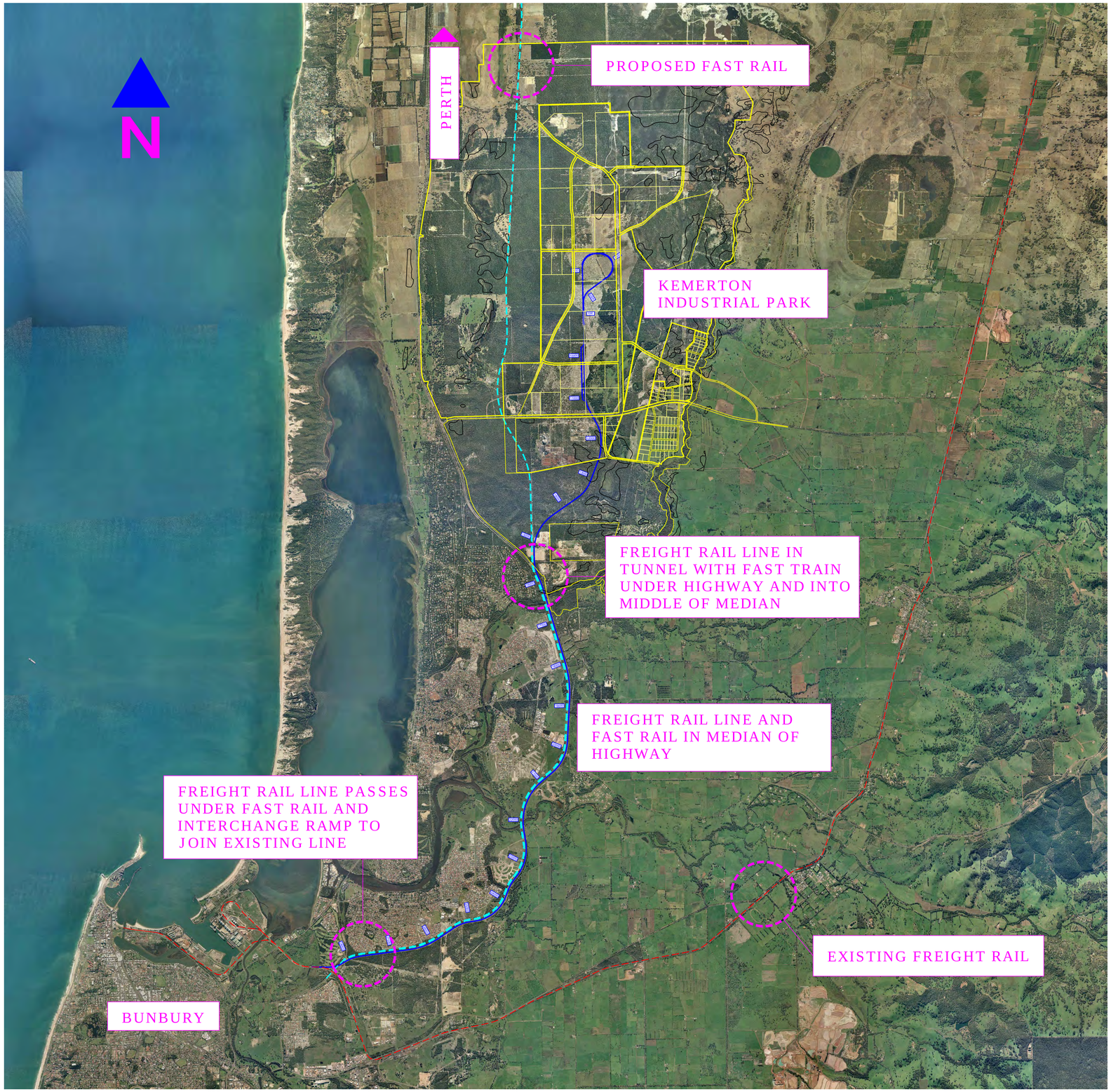
Draft Greater Bunbury Strategy

Figure 8: Greater Bunbury Structure Plan 2011-2031+



Appendix I

Route Option: Fast Train Option



LEGEND

- PROPOSED FAST RAIL
- PROPOSED FREIGHT RAIL
- PROPOSED HWY DEVIATION
- EXISTING FREIGHT RAIL

0 500 1000 1500 2000 2500m

SCALE 1:50,000 AT ORIGINAL SIZE

No.	Revision	Drawn	Job Manager	Project Director	Date

Drawing Revisions

Note: * indicates signatures on original issue of drawing or last revision of drawing

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Client LANDCORP

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Title FAST TRAIN LINE - OPTION

Scale	AS SHOWN	**DO NOT SCALE**	
Drawn	B.YAO	Designer	V.SINAGRA
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			

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Drawing No. SK6127426-07-01 v3

Original Size **A1**

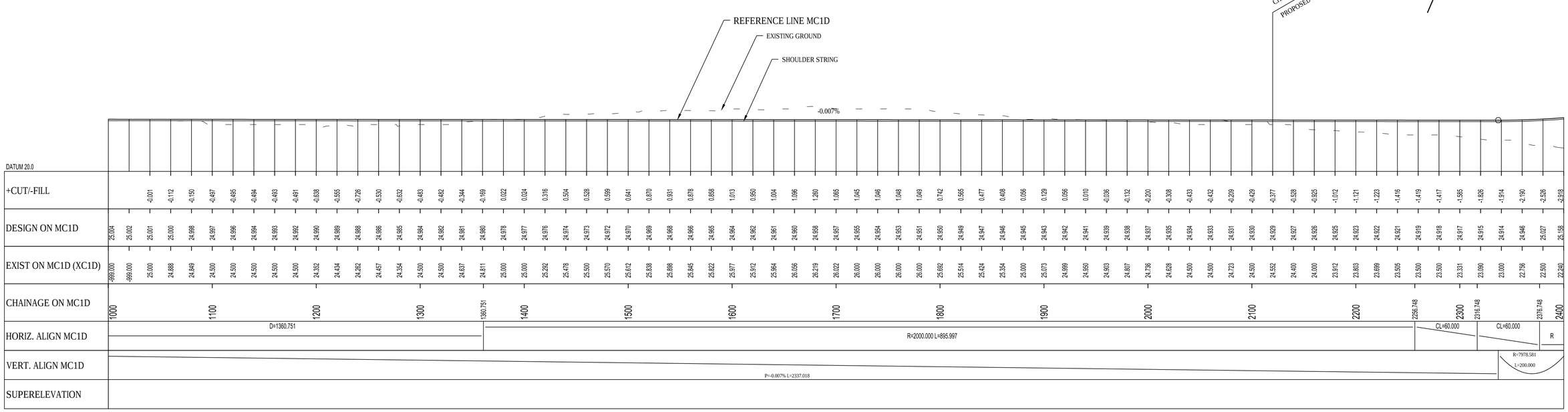
Rev.

Appendix J

South West Main Line/Marriot Road Linkage – Option 1

PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MC1D

SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

VERTICAL 1:200 AT ORIGINAL SIZE
0 2 4 6 8 10m
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 20 40 60 80 100m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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Drawn S. GEERLINGS | Designer S. GEERLINGS
Drafting Check S. GEERLINGS | Design Check E. WRIGHT
Approved (Project Director)
Date
Scale AS SHOWN

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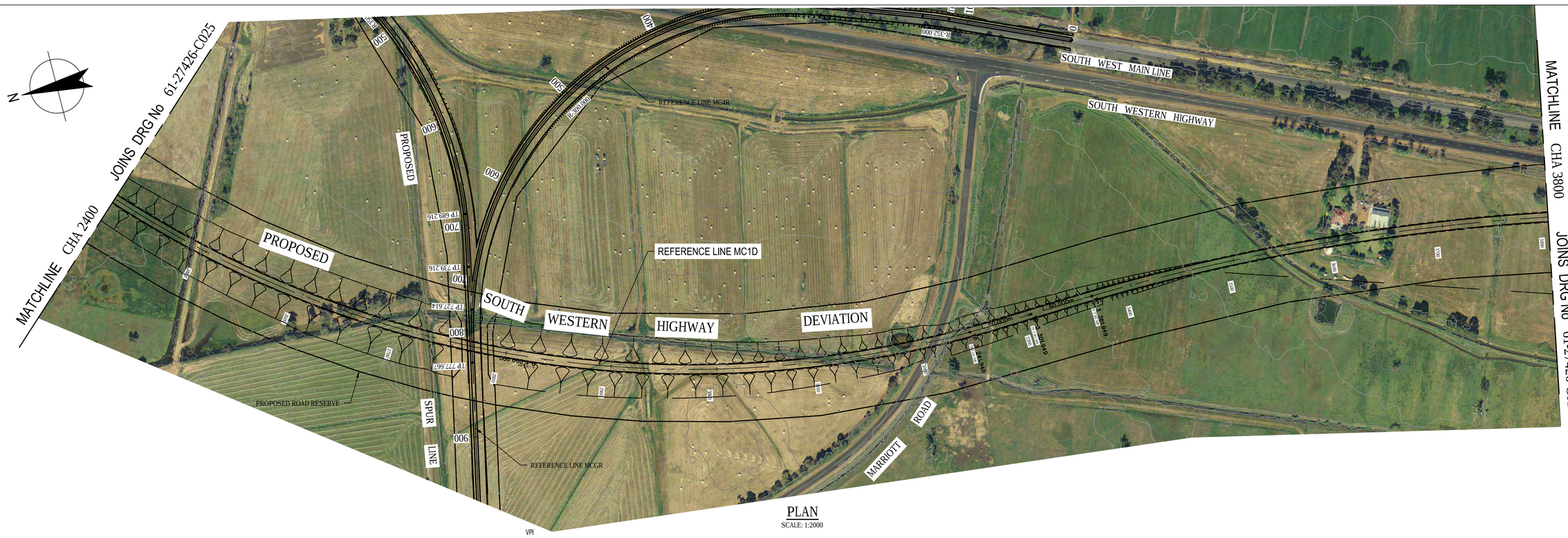
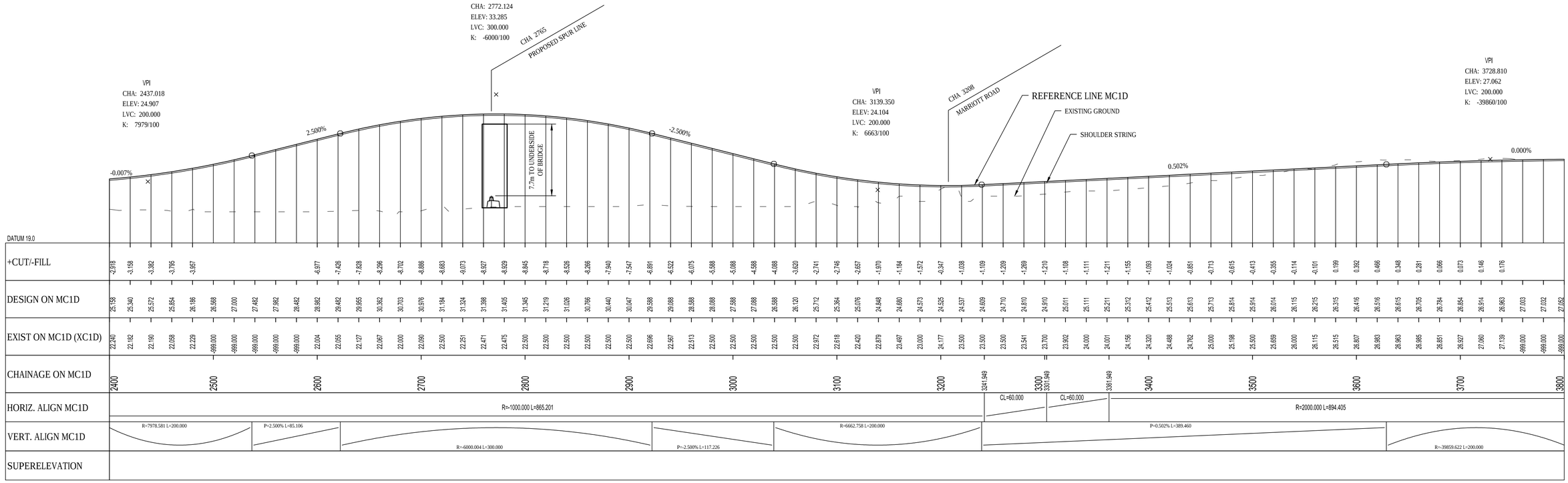
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY DEVIATION CHA 1000 - CHA 2400

Original Size A1
Drawing No: 61-27426-C025
Rev: B

Plot Date: 18 March 2015 - 2:41 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C025.dwg



PLAN
SCALE: 1:2000



LONGITUDINAL SECTION - MC1D
SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
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VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
SCALE 1:2000 AT ORIGINAL SIZE

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Drafting Check | Design Check
Approved (Project Director)
Date
Scale AS SHOWN
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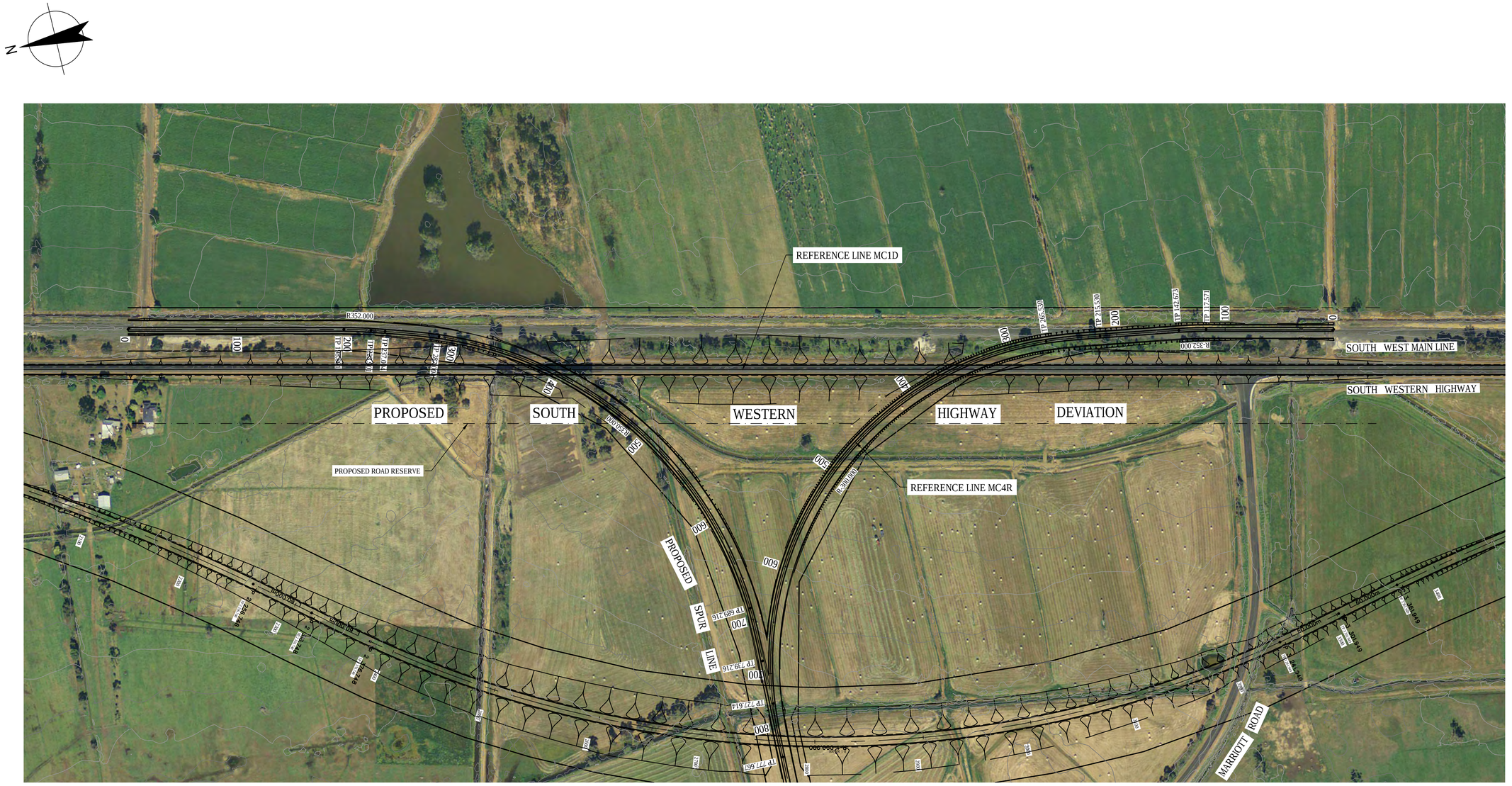
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY DEVIATION CHA 2400 - CHA 3800

Original Size A1
Drawing No: 61-27426-C026
Rev: B

Plot Date: 18 March 2015 - 2:47 PM
Plotted by: Tom Nguyen
Cad File No: G:\61\31700\CADD\Drawings\61-27426-C026.dwg

Appendix K

South West Main Line/Marriot Road Linkage – Option 2



PLAN
SCALE: 1:2000

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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DO NOT SCALE

Drawn J. TEMPORAL | Designer A. MANSFIELD
Drafting Check | Design Check
Approved (Project Director)
Date
Scale AS SHOWN
This Drawing must not be used for Construction unless signed as Approved

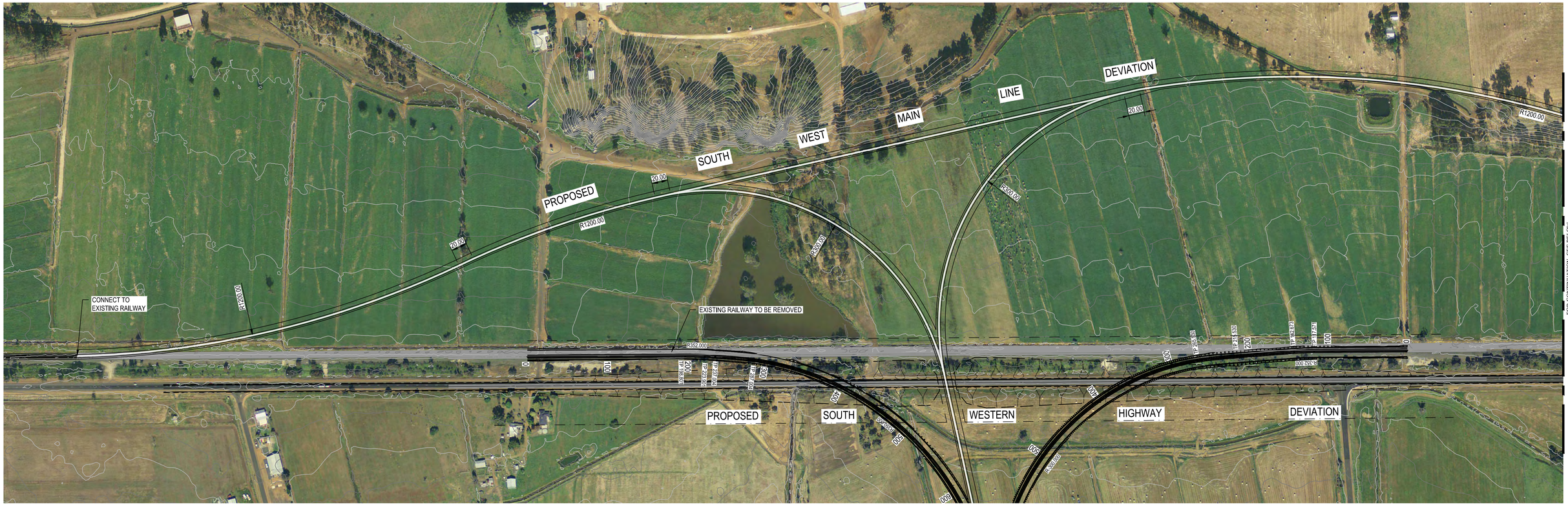
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY REGRADING MAINTAIN EXISTING ALIGNMENT

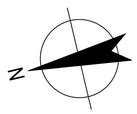
Original Size A1
Drawing No: 61-27426-C028
Rev: B

Plot Date: 18 March 2015 - 2:51 PM
Plotted by: Tom Nguyen
Cad File No: G:\61\31700\CADD\Drawings\61-27426-C028.dwg

Appendix L

South West Main Line/Marriot Road Linkage – Option 3





PLAN
SCALE: 1:2500

CONCEPT

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			01.05.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

0 25 50 75 100 125m
SCALE 1:2500 AT ORIGINAL SIZE

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DO NOT SCALE

Drawn R. PACIENTE | Designer A. MANSFIELD
Drafting Check | Design Check
Approved (Project Director)
Date
Scale 1:2500m
This Drawing must not be used for Construction unless signed as Approved

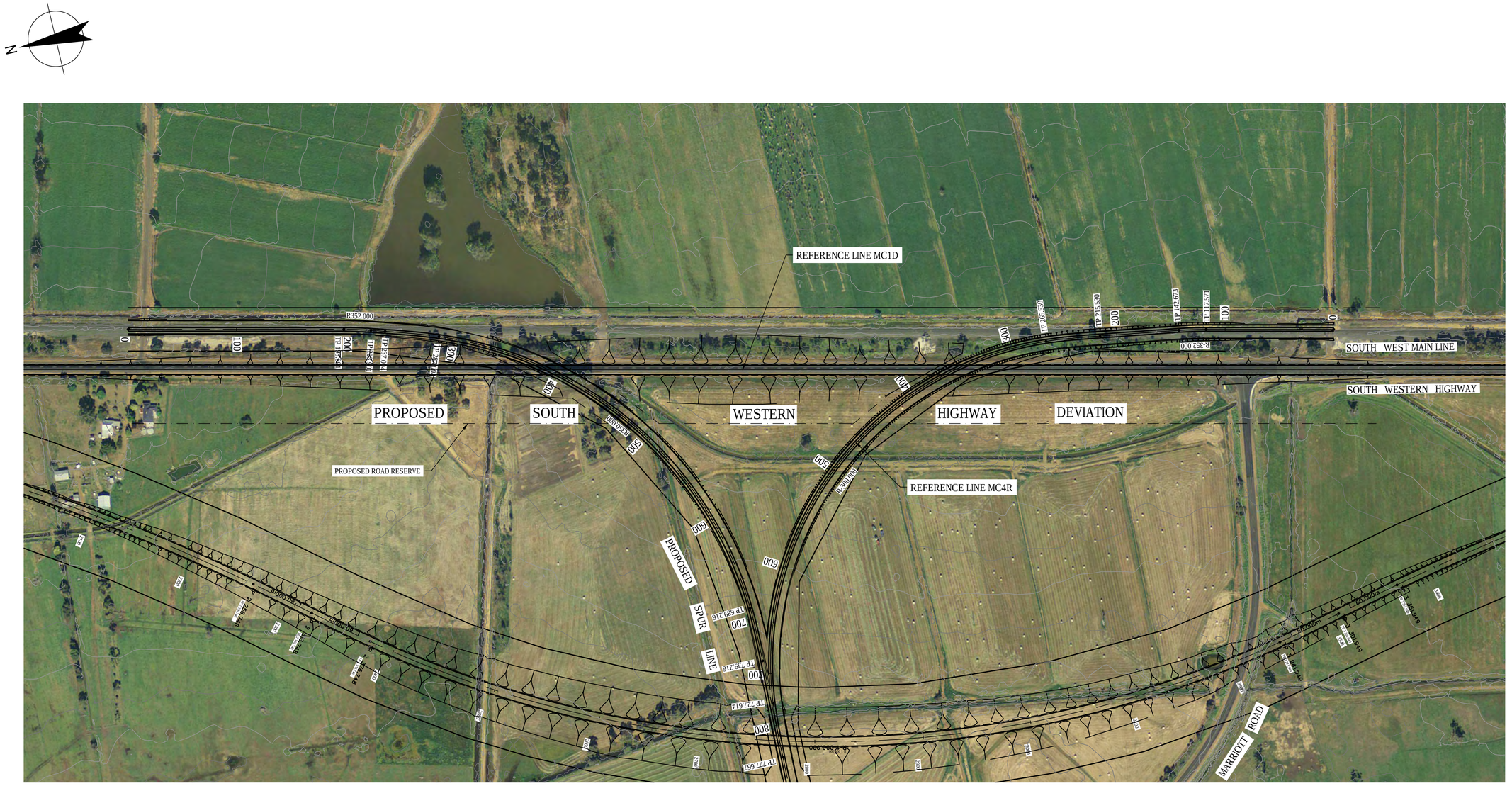
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WESTERN HIGHWAY REGRADING AND SOUTH WEST MAIN LINE DEVIATION

Original Size A1
Drawing No: 61-27426-C029
Rev: B

Plot Date: 18 March 2015 - 2:53 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C029.dwg

Appendix M

Agreed Rail Line PTA/Brookfield



PLAN
SCALE: 1:2000

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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Drawn J. TEMPORAL | Designer A. MANSFIELD
Drafting Check | Design Check
Approved (Project Director)
Date
Scale AS SHOWN
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Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY REGRADING MAINTAIN EXISTING ALIGNMENT

Original Size A1
Drawing No: 61-27426-C028
Rev: B

Plot Date: 18 March 2015 - 2:51 PM
Plotted by: Tom Nguyen
Cad File No: G:\61\31700\CADD\Drawings\61-27426-C028.dwg

Appendix N

Minutes from Stakeholder Consultation

Minutes

23 January 2012

Project	Rail Planning Kemerton Industrial Park	From	Ezzeddine Tayari
Subject	Concept Plan - Rail Impacts	Tel	08 6222 8238
Venue/Date/Time	Brookfield Rail Office / 23/01/2012 / 9:00 AM	Job No	6127426
Copies to			
Attendees	LA: Lisa Allsopp (BR) PH: Paul Hamersley (BR) IU : Ivan Ursic (BR) CG : Christian Guest (BR) ET: Ezzeddine Tayari (GHD)		

Minutes

A briefing of the GHD proposed rail alignment was given to Brookfield Rail. PH has highlighted that the main line will be upgraded to increase the capacity. The increase of the capacity likely will happen before the construction of the Kemerton Park track, hence no concerns has been raised regarding the congestion of the mainline.

Details of our concept plan were conveyed. No issues and concerns were raised in regards to the proposed concept rail alignment. Brookfield Rail has advised that the most efficient rail management system is where Brookfield manages the mainline, PTA manages the line following the fast train and a private entity manages rail through the park. A Brookfield signalling system will be used throughout the rail line.

Ezzeddine Tayari

JobNumber /DocNumber
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Minutes

02 April 2012

Project	Kemerton Industrial Park	From	Tom Nguyen
Subject	Concept Planning - Social Impacts	Tel	(08) 6222 8770
Venue/Date/Time	Shire of Harvey Office / 02/04/2012 / 11:00 AM	Job No	6127426
Copies to	Shire of Harvey GHD Pty Ltd LandCorp		
Attendees	JR: Jonathan Roach (LandCorp) ET: Ezzeddine Tayari (GHD) TN: Tom Nguyen (GHD) SH: Simon Hall (Shire of Harvey) Cecil Hensley (Shire of Harvey)	Apologies	Theo Naude (Shire of Harvey)

Minutes

ET gave briefing to options of rail alignment proposed, and the preferred option that will be implemented. Details of our concept plan were conveyed.

SH pointed out the road reserves and he land use that is needed for the proposed alignment. TN and SH both agreed that cost of constructing two bridges and keeping the same alignment of the road compared to deviation of the road bridge over the rails for the South Western Highway intersection may be more cost effective. Reasons were land acquisitions and dwelling relocations may have a huge impact to the overall cost of the project if our preferred option was to be approved.

Perth to Bunbury fast train linkage option was also discussed and details were conveyed.

JR and SH discussed the main clients who will be using the rail once constructed. JR stated that 'big players' was needed to kick off and fund for the construction. It was mentioned that Brookefield will not help lead the project, but are willing to maintain the tracks once it was up and running.

JR stated that a structure plan report will be derived, which will then be passed on to other members associated with this project.

SH asks if it is feasible to combine both proposed freight lines with passengers, therefore making the tracks to accommodate for people within the area. This option will be looked into.

Main points that Shire of Harvey are concerned with are the houses that lie on the path of the concept design plans, in which case the cost of land acquisitions and dwelling relocations will be significant and hence may slow or even halt the project plans. Shire of Harvey will be relay future plans to the public.

Tom Nguyen
Rail & Transport Engineer

JobNumber / XXXXXXXX
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Minutes

04 April 2012

Project	Rail Planning Kemerton Industrial Park	From	Tom Nguyen
Subject	Concept Plan - Road Impacts	Tel	08 6222 8770
Venue/Date/Time	Main Roads Bunbury Office / 02/04/2012 / 2:00 PM	Job No	6127426
Copies to	Shire of Harvey GHD Pty Ltd LandCorp		
Attendees	JR: Jonathan Roach (LandCorp) ET: Ezzeddine Tayari (GHD) TN: Tom Nguyen (GHD) GZ: Gerry Zoetelief (MR) LP : Lou Pilandri (MR) PB : Peter Bromley (MR)		

Minutes

After briefing to Main Roads about concept plan, GZ mentions issues regarding a potential grade separation of Marriot Road, South Western Highway might possibly be rezoned. GZ has also mentioned the upgrade of the Main line to accommodate for dual carriage. LP stated that this the plan conveyed for Kemerton Industrial Park (KIP) can be done, and plans have not been locked down and certain. LP mentions that Main Roads will be interested in the Marriot Road during construction, and therefore design plans and construction near or involving Marriot Road will need to be shown. Marriot Road also needs to accommodate for high wide load.

LP has also stated that railway crossings will be controlled by Main Roads, and the rail crossings that will be constructed inside KIP that are near intersections will be a problem.

GZ informs that the median near the Bunbury port is not big enough to fit another rail track in. LP input relating to the port is that the intersections near the port areas are very problematic.

Other issues with KIP are the railway crossings, which need to be shown in detail within KIP and spaces before the wailway crossing will need to accommodate for the biggest vehicle.

Overall, Main Roads needs information regarding the future road plans, and the overall plans and will liaise with LandCorp.

Tom Nguyen
Rail & Transport Engineer

JobNumber /DocNumber
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Minutes

12 September 2012

Project	Rail Planning Kemerton Industrial Park	From	Paul Breame
Subject	Rail Realignment Proposals at Junction with Main Line	Tel	61 8 6222 8187
Venue/Date/Time	Govt. of WA Department of State Development, 04/09/12, 10.00am	Job No	61/27426
Copies to	All attendees		
Attendees	JR Jonathan Roach (Landcorp) TG Tom Grigson (Dept of State Development) SH Sharon Havenhand (Dept of State Development) PH Paul Hamersley (Brookfield Rail) LA Lisa Allsopp (Brookfield Rail) PA Peter Arul (PTA) MP Mark Pearce (PTA) PB Paul Breame (GHD)	Apologies	None

Minutes	Action
1. JR introduced purpose of meeting - principally to present and seek preference on 3No. rail/highway alignment options at junction of Kemerton Spur and Perth – Bunbury main line in vicinity of South Western Highway. Intention of options is to avoid disruption to residences along highway at the junction	
2. Agreement reached that preferred option which involves regrading South Western Highway to pass over railway on two bridges (represented on drawing 61-27426-C028)	Note
3. JR stated that Landcorp do not intend for railway spur to be constructed at present, rather Landcorp to buy/reserve land for later construction	
4. LA stated Brookfield Rail policy is not to introduce additional level crossings to the network. Construction of new railway is likely to sever blocks of land & landowners will need to gain access between severed sections. Grade separated accesses will need to be provided.	
5. Discussion regarding spur operations was held. Noted that layout as presented does not yet address possible operational issues (e.g. numbers of tracks, passing loops). Triangular junction may not be	

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Minutes	Action
installed in its entirety when spur is constructed. One leg of the junction may not be required for initial operations. Alumina facility is likely to be serviced. Facility may operate in similar fashion to Kwinana freight facilities with numerous commodities moving in and out of industrial park.	
6. LA & PH requested detail of limits of Brookfield Rail operation. Exact limits are unclear at present and arrangements will be dependent on whether facilities are single-user or multi-user. If latter, limits likely to be at first diverging junction, with private sidings beyond (non-signal controlled & maintained by user)	
7. PA suggested normal PTA requirements for rail reserve is 40m width ("100 feet"). PB to confirm.	PB
8. PA asked for clarification of limits of liabilities for PTA as state asset owner (i.e. which sections will be state owned, which will be private sidings)	JR
9. JR stated that Landcorp own most of land required to build main sine of rail spur but do not own land in vicinity of junction onto main line.	

Paul Breame
Principal Rail Engineer (Structures)

Appendix O

Design Drawings

LANDCORP
KEMERTON INDUSTRIAL PARK
61-27426

LOCALITY PLAN
NOT TO SCALE

DRAWING LIST

DRG No.	DRAWING TITLE
61-27426-C001	LOCALITY PLAN AND DRAWING INDEX
61-27426-C005	TYPICAL CROSS SECTIONS
61-27426-C010	SPUR LINE - CHA 0 - CHA 1400
61-27426-C011	SPUR LINE - CHA 1400 - CHA 2800
61-27426-C012	SPUR LINE - CHA 2800 - CHA 4200
61-27426-C013	SPUR LINE - CHA 4200 - CHA 5600
61-27426-C014	SPUR LINE - CHA 5600 - CHA 7000
61-27426-C015	SPUR LINE - CHA 7000 - CHA 8400
61-27426-C016	SPUR LINE - CHA 8400 - CHA 9800
61-27426-C017	SPUR LINE - CHA 9800 - CHA 11000
61-27426-C020	LOOP LINE - CHA 0 - CHA 600
61-27426-C021	LOOP LINE - CHA 600 - CHA 2000
61-27426-C022	LOOP LINE - CHA 2000 - CHA 3400
61-27426-C023	LOOP LINE - CHA 0 - CHA 600
61-27426-C025	PROPOSED SOUTH WESTERN HIGHWAY DEVIATION
61-27426-C026	PROPOSED SOUTH WESTERN HIGHWAY DEVIATION
61-27426-C027	PROPOSED SOUTH WESTERN HIGHWAY DEVIATION
61-27426-C028	MAINTAIN EXISTING ALIGNMENT
61-27426-C030	CROSS SECTIONS MCGR CHA 0 - CHA 800
61-27426-C031	CROSS SECTIONS MCGR CHA 450 - CHA 1250
61-27426-C032	CROSS SECTIONS MCGR CHA 1300 - CHA 1950
61-27426-C033	CROSS SECTIONS MCGR CHA 2000 - CHA 2650
61-27426-C034	CROSS SECTIONS MCGR CHA 2700 - CHA 3300
61-27426-C035	CROSS SECTIONS MCGR CHA 3350 - CHA 3950
61-27426-C036	CROSS SECTIONS MCGR CHA 4000 - CHA 4650
61-27426-C037	CROSS SECTIONS MCGR CHA 4700 - CHA 5350
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61-27426-C042	CROSS SECTIONS MCGR CHA 7800 - CHA 8350
61-27426-C043	CROSS SECTIONS MCGR CHA 8400 - CHA 9100
61-27426-C044	CROSS SECTIONS MCGR CHA 9150 - CHA 9800
61-27426-C045	CROSS SECTIONS MCGR CHA 9850 - CHA 10450
61-27426-C046	CROSS SECTIONS MCGR CHA 10500 - CHA 11000
61-27426-C047	CROSS SECTIONS MCGR CHA 11000 - CHA 11200
61-27426-C055	CROSS SECTIONS MCER CHA 0 - CHA 650
61-27426-C056	CROSS SECTIONS MCER CHA 700 - CHA 1300
61-27426-C057	CROSS SECTIONS MCER CHA 1350 - CHA 2050
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61-27426-C059	CROSS SECTIONS MCER CHA 2850 - CHA 3400
61-27426-C060	CROSS SECTIONS MCER CHA 3450 - CHA 4150
61-27426-C061	CROSS SECTIONS MCER CHA 4200 - CHA 4260
61-27426-C065	CROSS SECTIONS MC1D CHA 1040 - CHA 1650
61-27426-C066	CROSS SECTIONS MC1D CHA 1700 - CHA 2350
61-27426-C067	CROSS SECTIONS MC1D CHA 2400 - CHA 2850
61-27426-C068	CROSS SECTIONS MC1D CHA 2900 - CHA 3500
61-27426-C069	CROSS SECTIONS MC1D CHA 3550 - CHA 3750

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

LANDCORP

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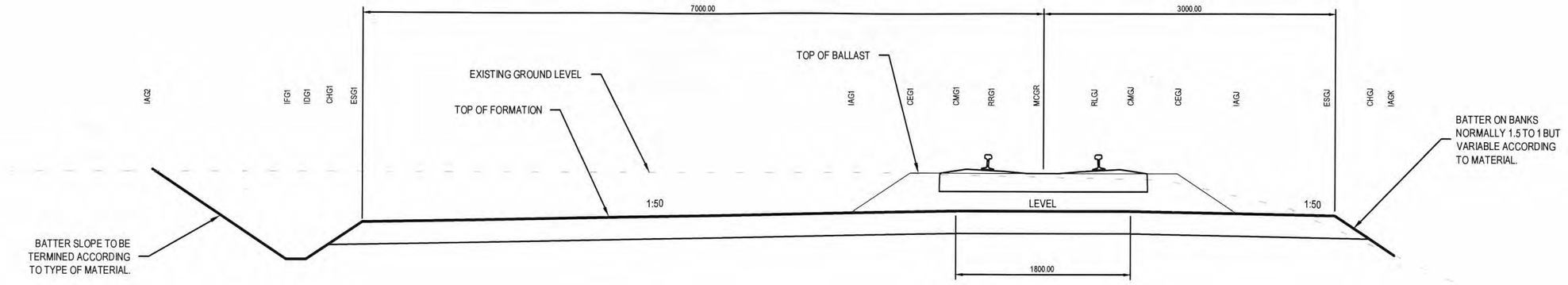
Drawn A. HORTON | Designer S. GEERLINGS
Drafting Check | Design Check
Approved (Project Director)
Date
Scale AS SHOWN
This Drawing must not be used for Construction unless signed as Approved

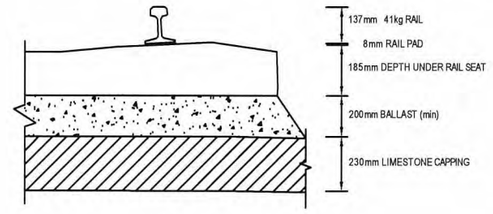
Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **LOCALITY PLAN AND DRAWING INDEX**

Original Size **A1** Drawing No: **61-27426-C001** Rev: **B**

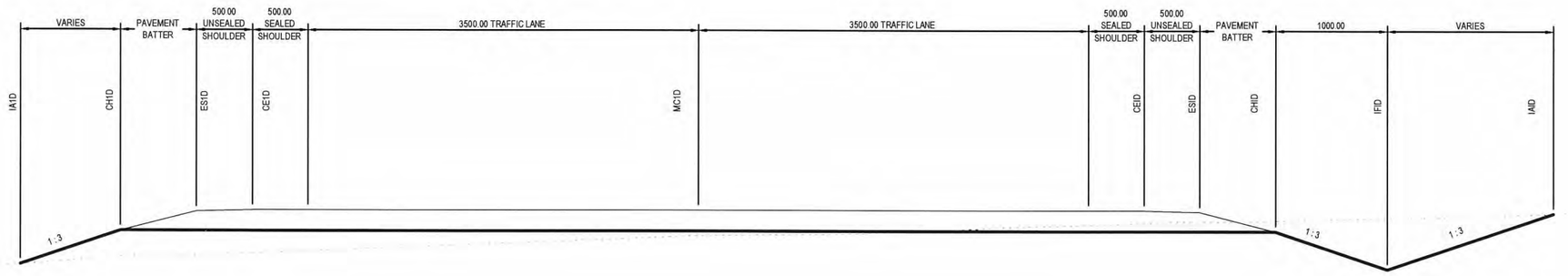
Plot Date: 18 March 2015 - 2:38 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C001.dwg



SINGLE TRACK
TYPICAL CROSS SECTION
SCALE: 1 : 25



DETAIL



HIGHWAY TYPICAL CROSS SECTION
SCALE: 1 : 25

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 0.25 0.5 0.75 1.0 1.25m
SCALE 1:25 AT ORIGINAL SIZE

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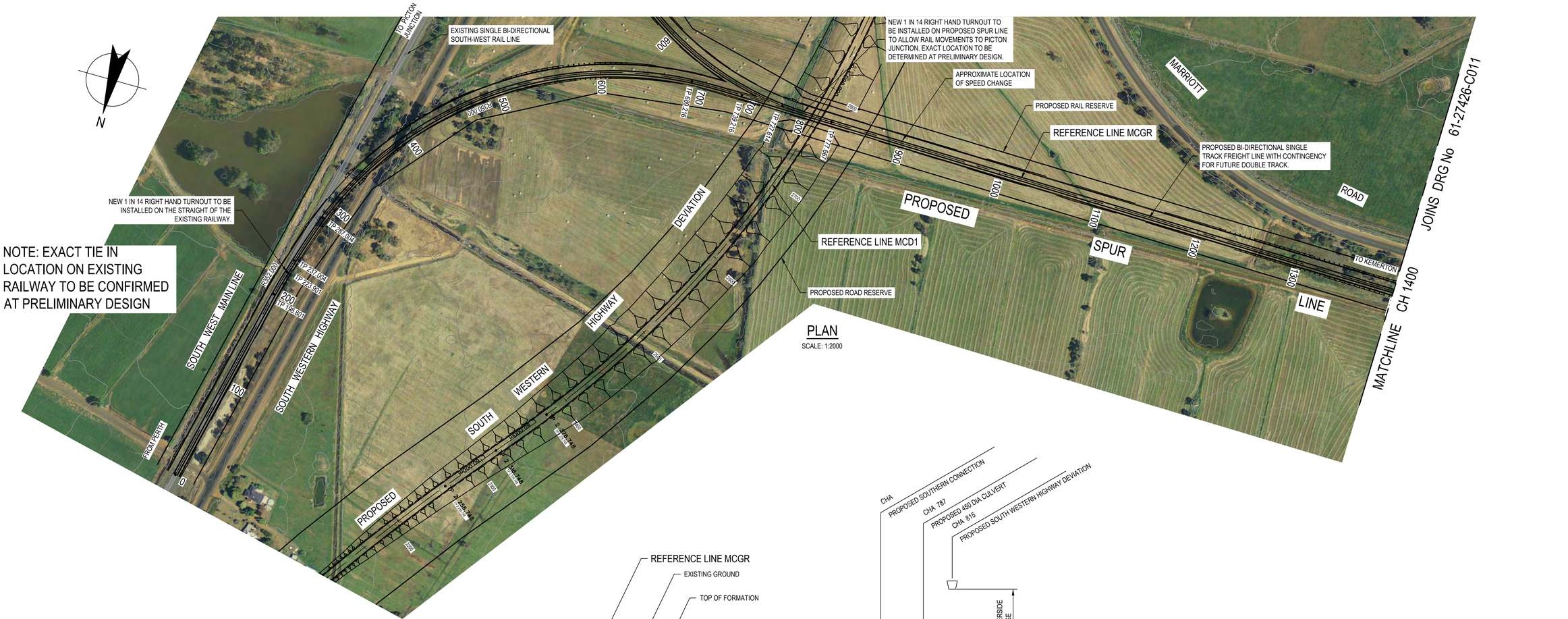
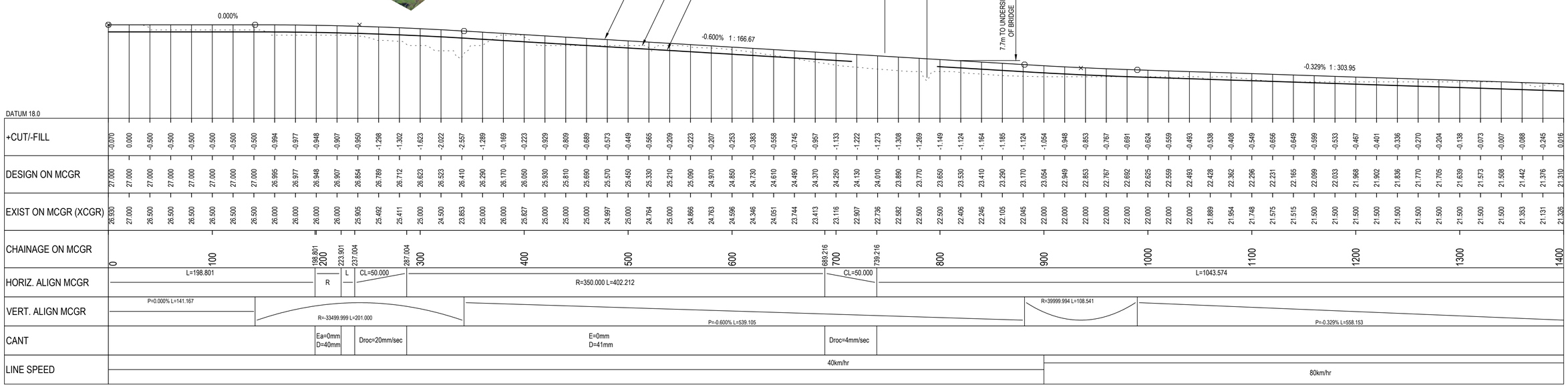
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **TYPICAL CROSS SECTIONS ROAD AND RAIL**

Original Size **A1** Drawing No: **61-27426-C005** Rev: **A**

Plot Date: 13 February 2012 - 2:11 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C005.dwg





LONGITUDINAL SECTION - MCGR

SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

VERTICAL 1:200 AT ORIGINAL SIZE (0 2 4 6 8 10m)
HORIZONTAL 1:2000 AT ORIGINAL SIZE (0 20 40 60 80 100m)
SCALE 1:2000 AT ORIGINAL SIZE

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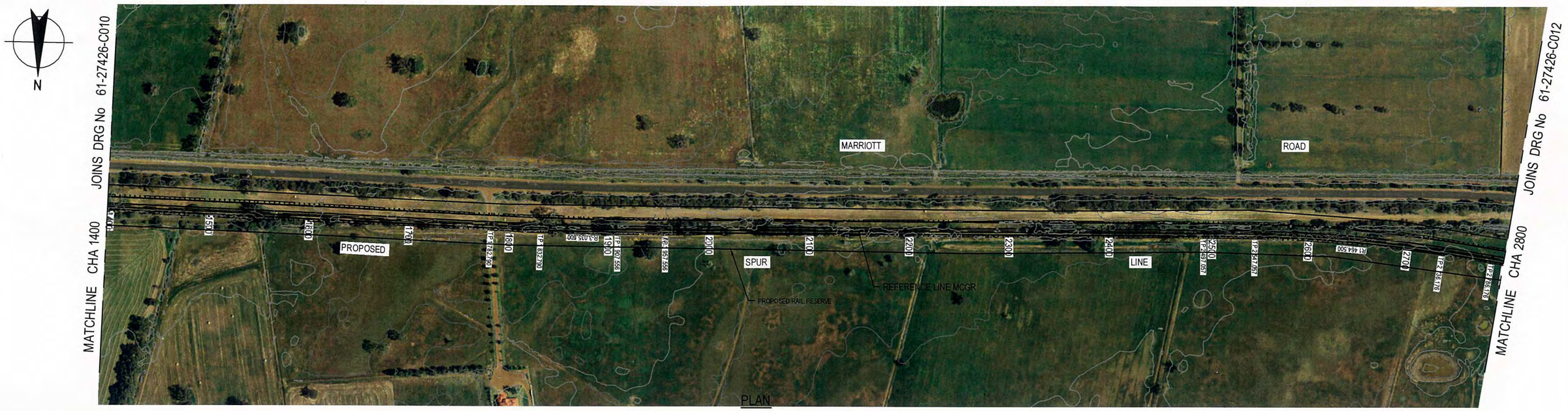
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check	S. GEERLINGS	Design Check	E. WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: SPUR LINE CHA 0 - CHA 1400

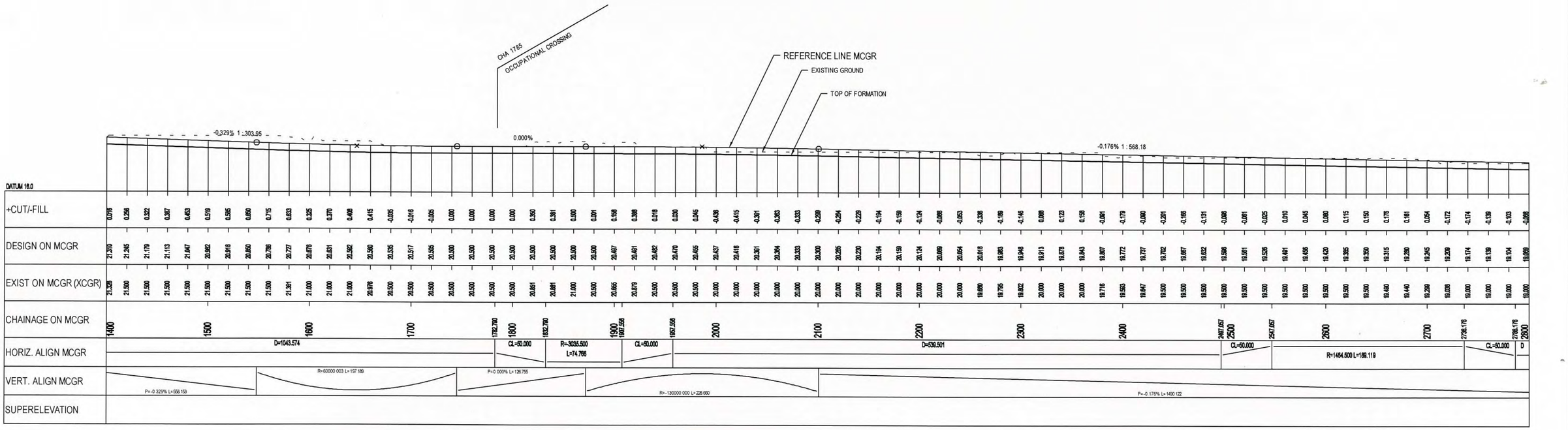
Original Size: A1
Drawing No: 61-27426-C010
Rev: B

Plot Date: 18 March 2015 - 2:40 PM
Plotted by: Tom Nguyen
Cad File No: G:\61\31700\CADD\Drawings\61-27426-C010.dwg



PLAN

SCALE 1:2000



LONGITUDINAL SECTION - MCGR

SCALE HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 2 4 6 8 10m
0 20 40 60 80 100m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

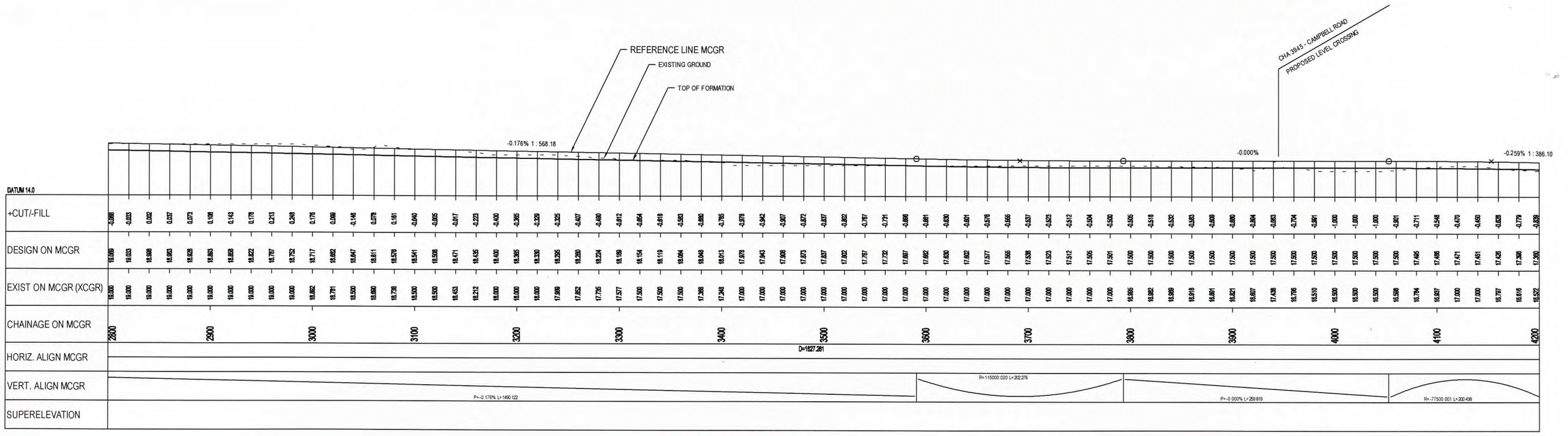
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 1400 - CHA 2800

Original Size A1
Drawing No: 61-27426-C011
Rev: A

Plot Date: 13 February 2012 - 1:47 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C011.dwg

PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MCGR

SCALE: HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 2 4 6 8 10m
0 20 40 60 80 100m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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Drafting Check		Design Check	
Approved (Project Director)			
Date			
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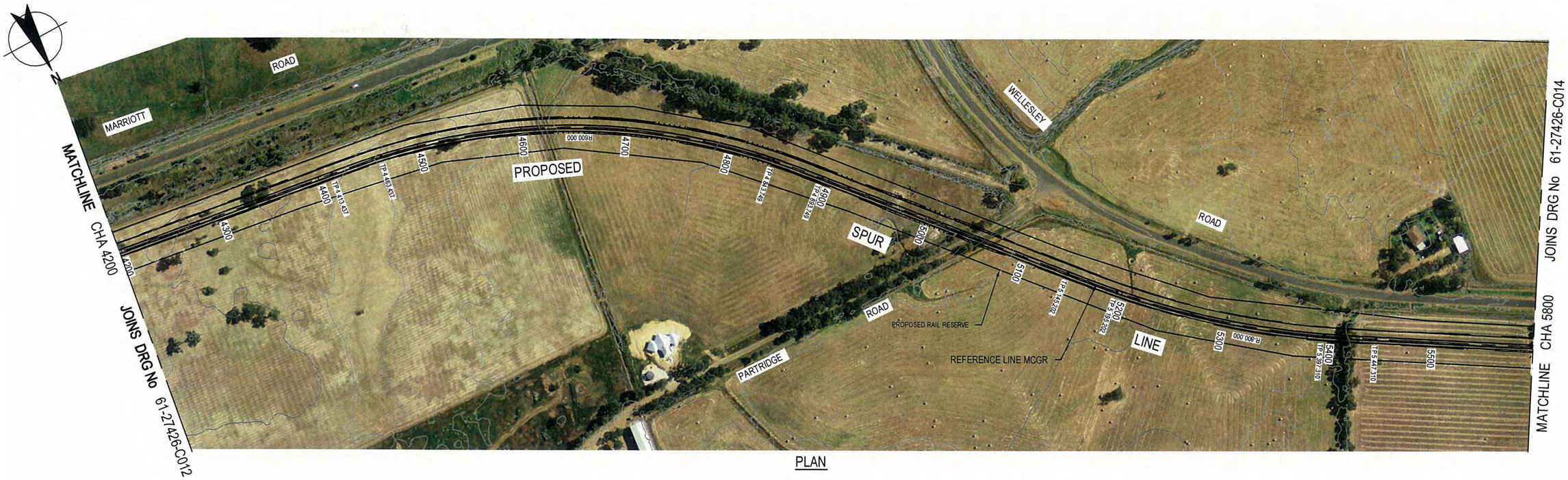
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 2800 - CHA 4200

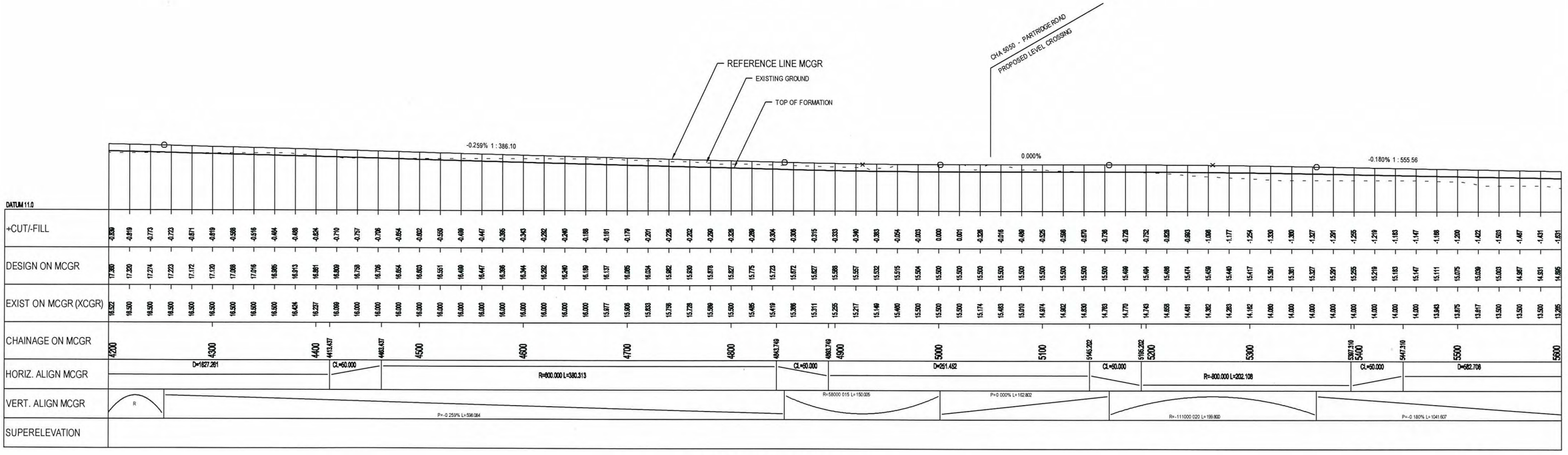
Original Size A1 **Drawing No: 61-27426-C012** **Rev: A**

Plot Date: 13 February 2012 - 1:47 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C012.dwg



PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MCGR

SCALE: HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE — 0 2 4 6 8 10m

HORIZONTAL 1:2000 AT ORIGINAL SIZE — 0 20 40 60 80 100m

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

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Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

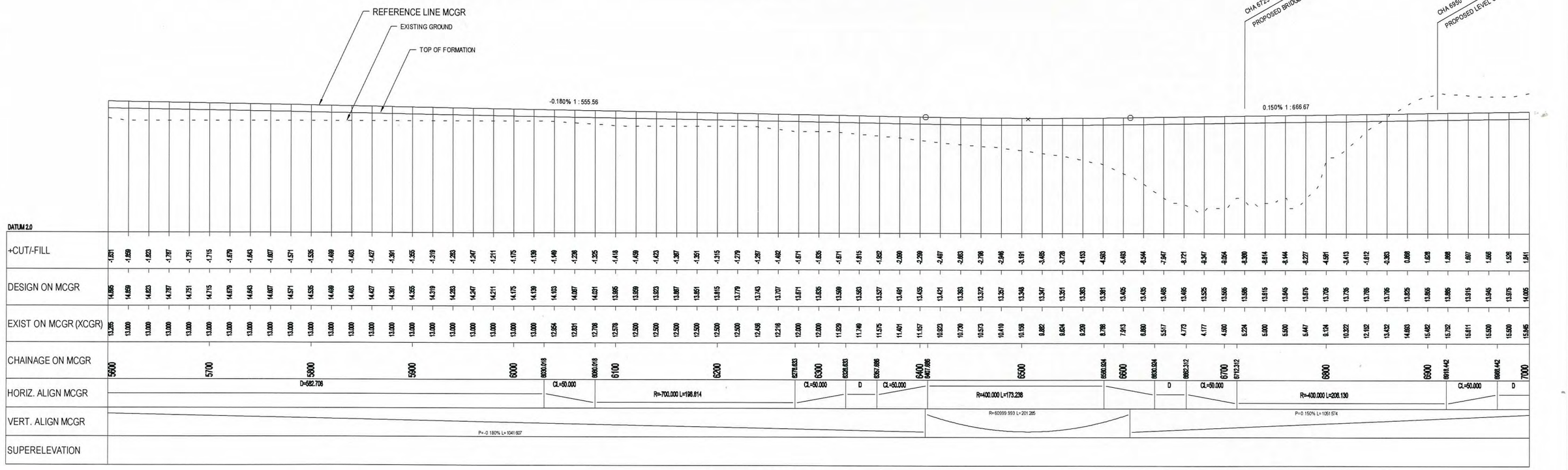
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 4200 - CHA 5600

Original Size A1 — Drawing No: 61-27426-C013 — Rev: A

Plot Date: 13 February 2012 - 1:47 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C013.dwg

PLAN

SCALE 1:2000



LONGITUDINAL SECTION - MCGR

SCALE: HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 2 4 6 8 10m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

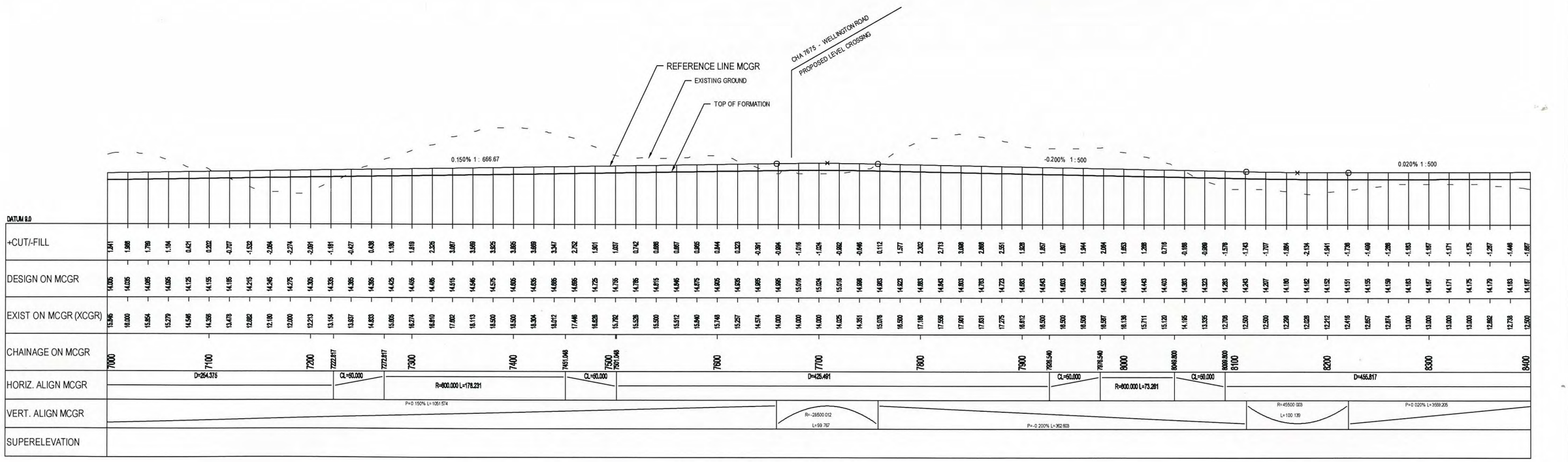
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 5600 - CHA 7000

Original Size A1
Drawing No: 61-27426-C014
Rev: A

Plot Date: 13 February 2012 - 1:51 PM Plotted by: Susan M Geerlings/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C014.dwg

PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MCGR

HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
SCALE 1:2000 AT ORIGINAL SIZE

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DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

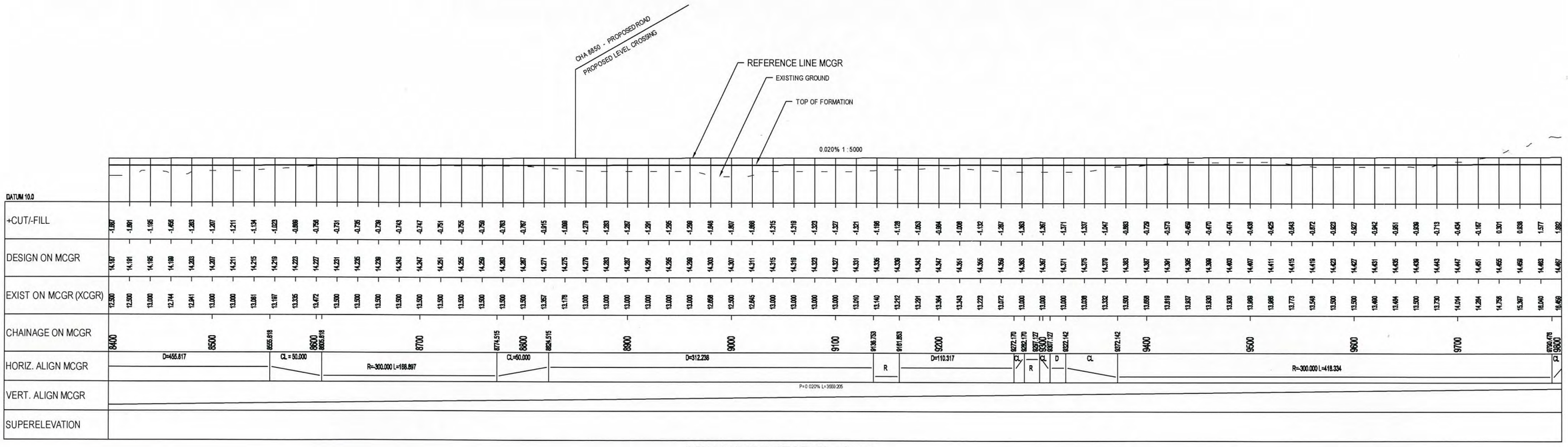
Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: SPUR LINE
CHA 7000 - CHA 8400

Original Size: A1
Drawing No: 61-27426-C015
Rev: A

Plot Date: 13 February 2012 - 1:48 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C015.dwg

PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MCGR

HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 2 4 6 8 10m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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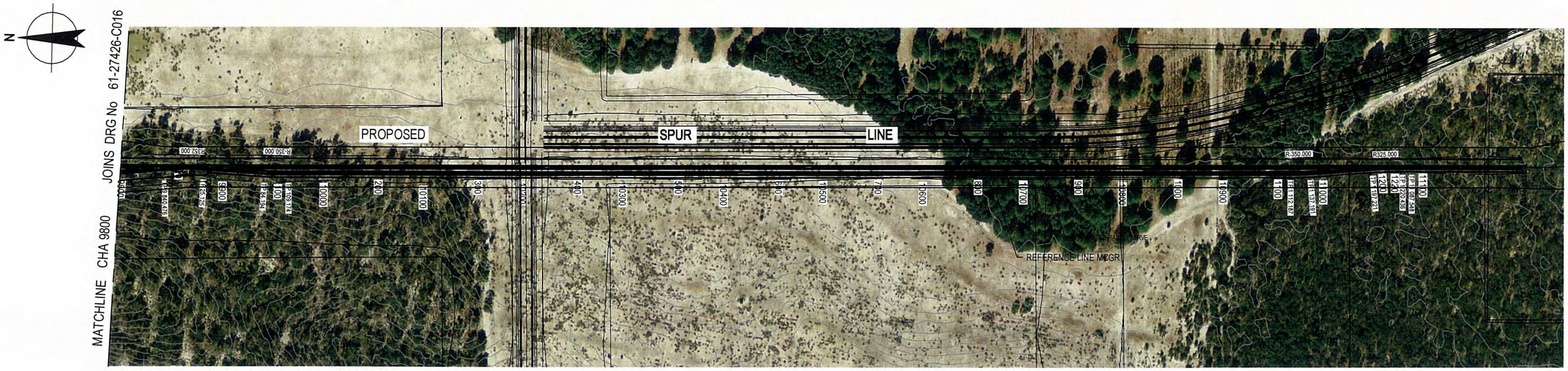
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

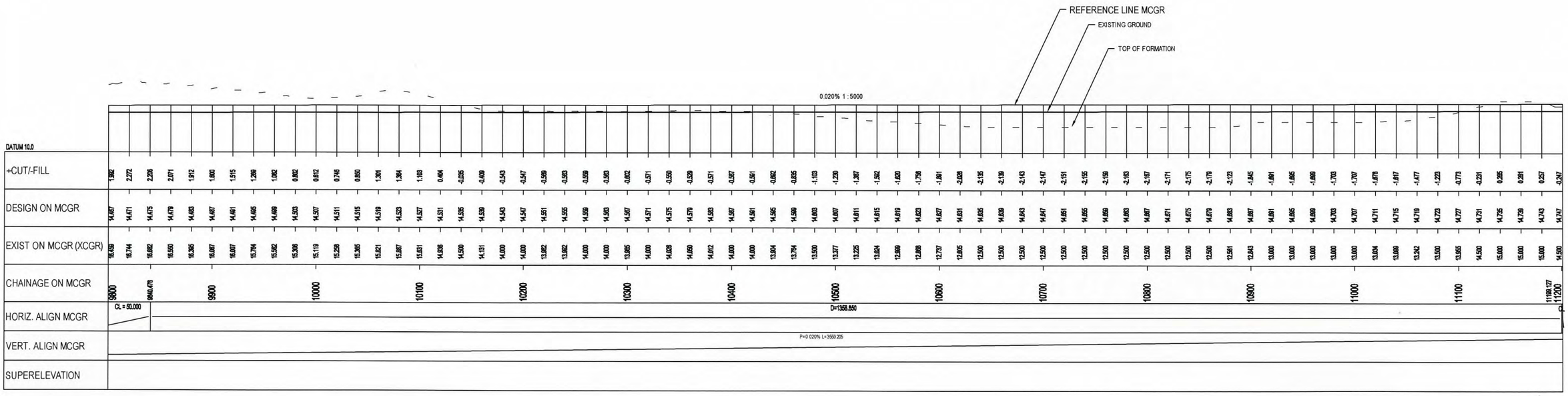
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 8400 - CHA 9800

Original Size A1
Drawing No: 61-27426-C016
Rev: A

Plot Date: 13 February 2012 - 1:48 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C016.dwg



PLAN
SCALE: 1:2000



LONGITUDINAL SECTION - MCGR
HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
SCALE 1:2000 AT ORIGINAL SIZE

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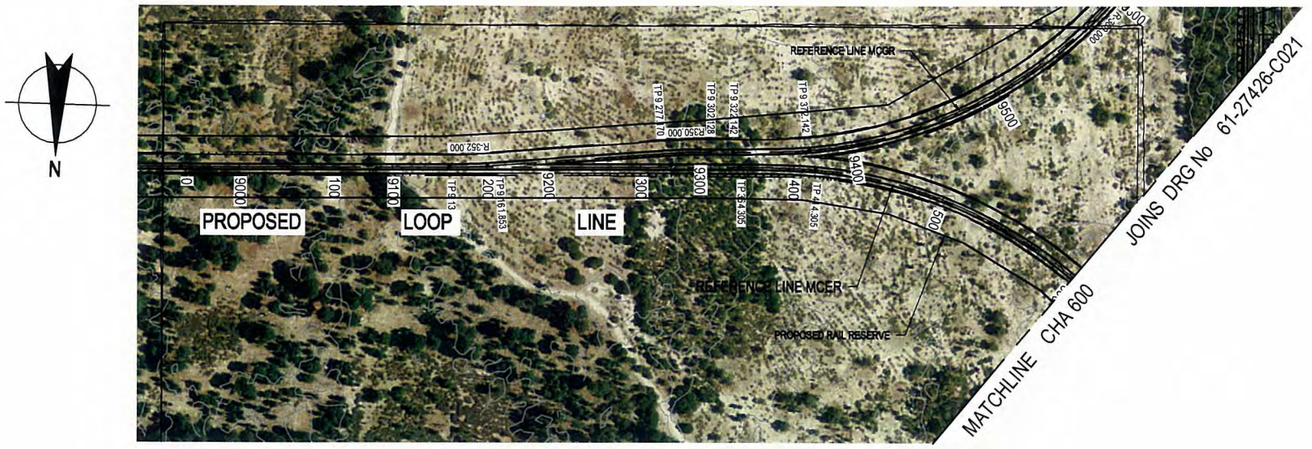
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

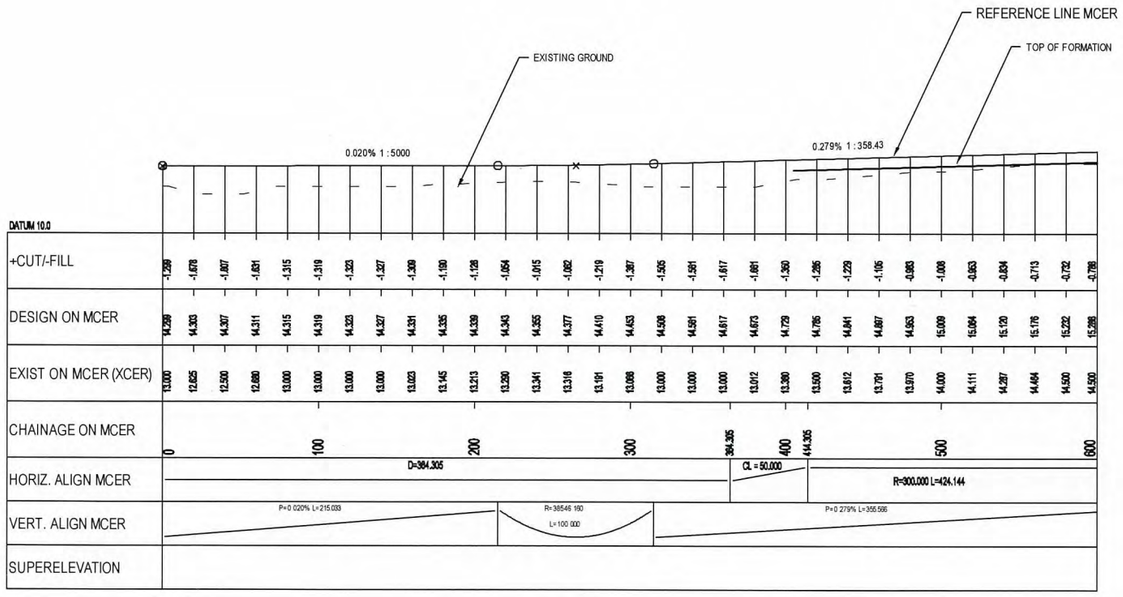
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 9800 - CHA 11000

Original Size A1
Drawing No: 61-27426-C017
Rev: A

Plot Date: 13 February 2012 - 1:48 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C017.dwg



PLAN
SCALE: 1:2000



LONGITUDINAL SECTION - MCER
SCALE: HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
0 2 4 6 8 10m
0 20 40 60 80 100m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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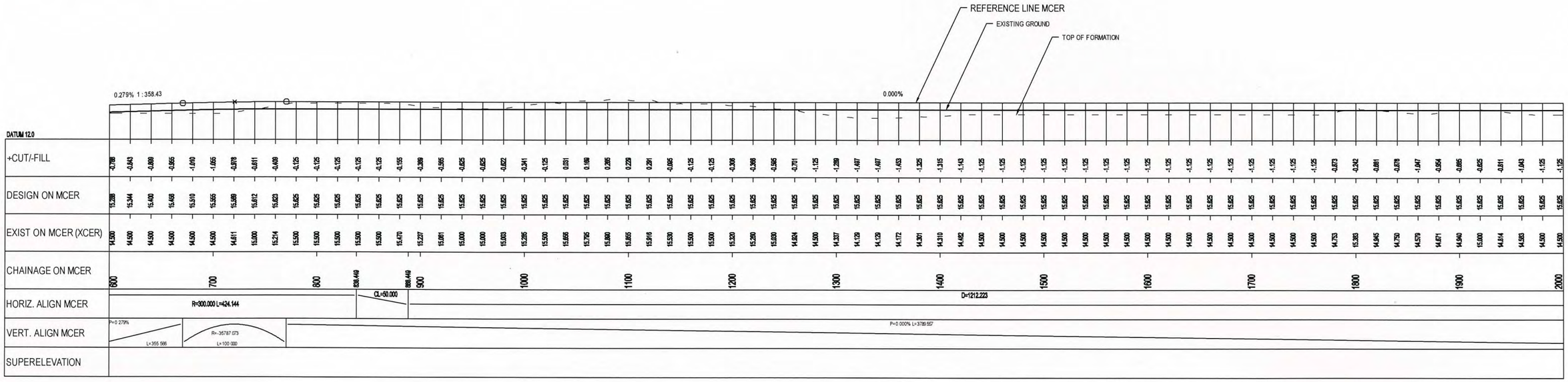
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	LANDCORP
Project	KEMERTON INDUSTRIAL PARK
Title	LOOP LINE - MCER CHA 0 - CHA 600
Original Size	A1
Drawing No:	61-27426-C020
Rev:	A

Plot Date: 13 February 2012 - 1:48 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C020.dwg

PLAN
SCALE: 1:2000



LONGITUDINAL SECTION - MCER
SCALE: HORZ 1:2000, VERT 1:200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

VERTICAL 1:200 AT ORIGINAL SIZE
HORIZONTAL 1:2000 AT ORIGINAL SIZE
SCALE 1:2000 AT ORIGINAL SIZE

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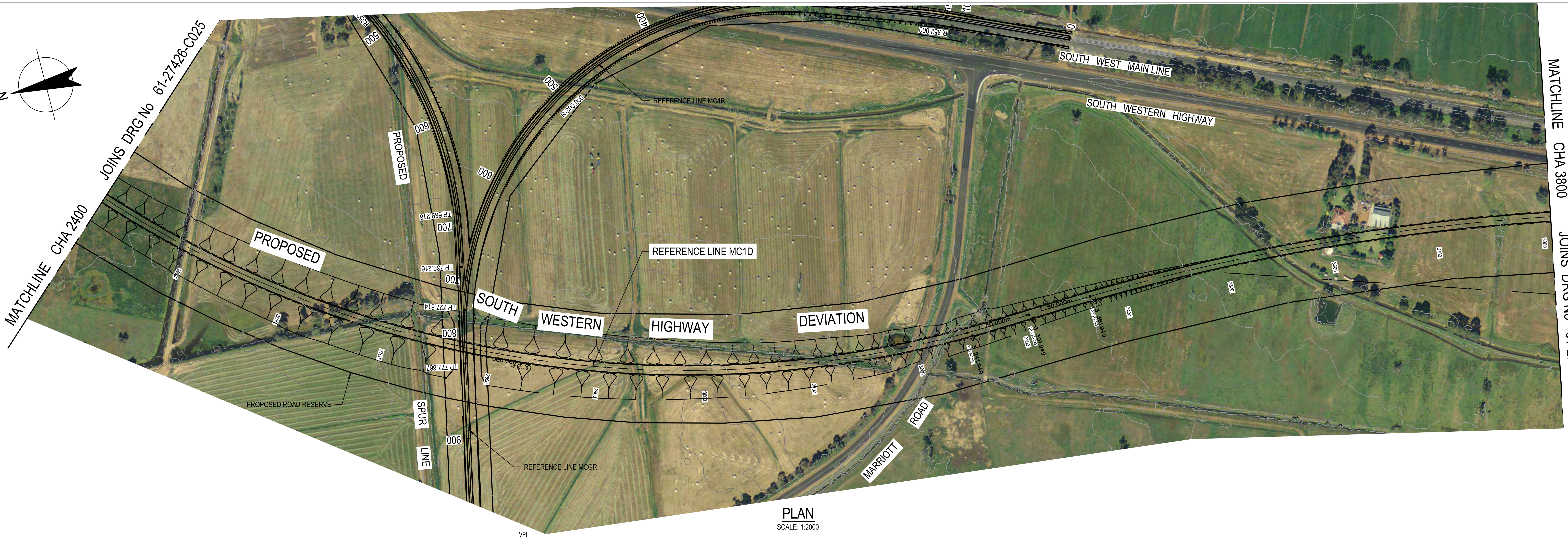
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title LOOP LINE CHA 600 - CHA 2000

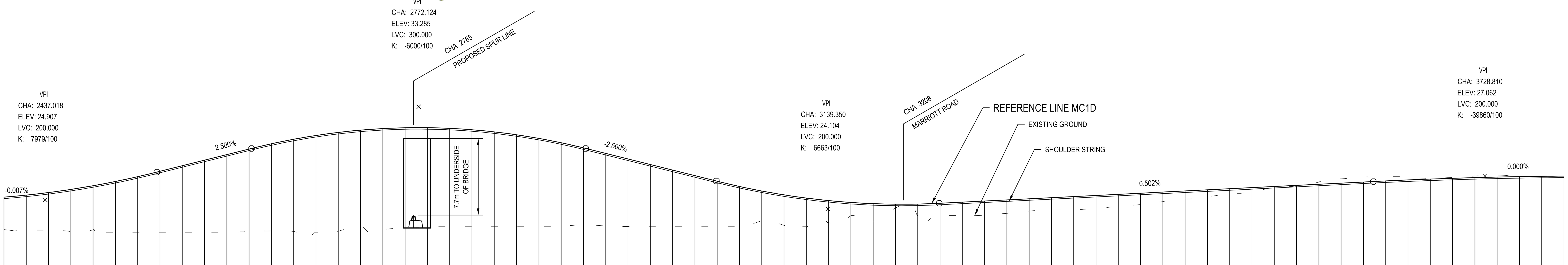
Original Size A1
Drawing No: 61-27426-C021
Rev: A

Plot Date: 13 February 2012 - 1:49 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C021.dwg



PLAN

SCALE: 1:2000



CHAINAGE ON MC1D	+CUT/-FILL	DESIGN ON MC1D	EXIST ON MC1D (XC1D)
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	-3.158	25.340	22.182
	-3.382	25.572	22.190
	-3.795	25.854	22.058
	-3.957	26.186	22.229
2500		26.568	-999.000
		27.000	-999.000
		27.482	-999.000
		27.982	-999.000
		28.482	-999.000
2600	-6.977	28.982	22.004
	-7.426	29.482	22.055
	-7.828	29.955	22.127
	-8.296	30.362	22.067
	-8.702	30.703	22.000
2700	-8.886	30.976	22.090
	-8.683	31.184	22.500
	-9.073	31.324	22.251
	-8.927	31.398	22.471
	-8.929	31.405	22.475
2800	-8.845	31.345	22.500
	-8.718	31.219	22.500
	-8.526	31.026	22.500
	-8.266	30.766	22.500
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	-6.522	29.088	22.567
	-6.075	28.588	22.513
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	-4.088	26.588	22.500
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3100	-2.746	25.364	22.618
	-2.657	25.076	22.420
	-1.970	24.848	22.879
	-1.184	24.680	23.497
	-1.572	24.573	23.000
3200	-0.347	24.525	24.177
	-1.038	24.537	23.500
3241.949	-1.109	24.609	23.500
	-1.209	24.710	23.500
	-1.269	24.810	23.541
3300 / 3301.949	-1.210	24.910	23.700
	-1.108	25.011	23.902
	-1.111	25.111	24.000
3361.949	-1.211	25.211	24.001
	-1.155	25.312	24.156
3400	-1.093	25.412	24.320
	-1.024	25.513	24.488
	-0.851	25.613	24.762
	-0.713	25.713	25.000
	-0.615	25.814	25.198
3500	-0.413	25.914	25.500
	-0.355	26.014	25.659
	-0.114	26.115	26.000
	-0.101	26.215	26.115
	0.199	26.315	26.515
3600	0.392	26.416	26.807
	0.466	26.516	26.983
	0.348	26.615	26.963
	0.281	26.705	26.985
	0.066	26.784	26.851
3700	0.073	26.854	26.927
	0.146	26.914	27.060
	0.176	26.963	27.139
		27.003	-999.000
		27.032	-999.000
3800		27.052	-999.000

HORIZ. ALIGN MC1D: R=-1000.000 L=865.201 | CL=60.000 | CL=60.000 | R=2000.000 L=894.405

VERT. ALIGN MC1D: R=7978.581 L=200.000 | P=2.500% L=85.106 | R=-6000.004 L=300.000 | P=-2.500% L=117.226 | R=6662.758 L=200.000 | P=0.502% L=389.460 | R=-39859.622 L=200.000

SUPERELEVATION

LONGITUDINAL SECTION - MC1D

SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			01.05.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

VERTICAL 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10m
HORIZONTAL 1:2000 AT ORIGINAL SIZE 0 20 40 60 80 100m
0 20 40 60 80 100m SCALE 1:2000 AT ORIGINAL SIZE

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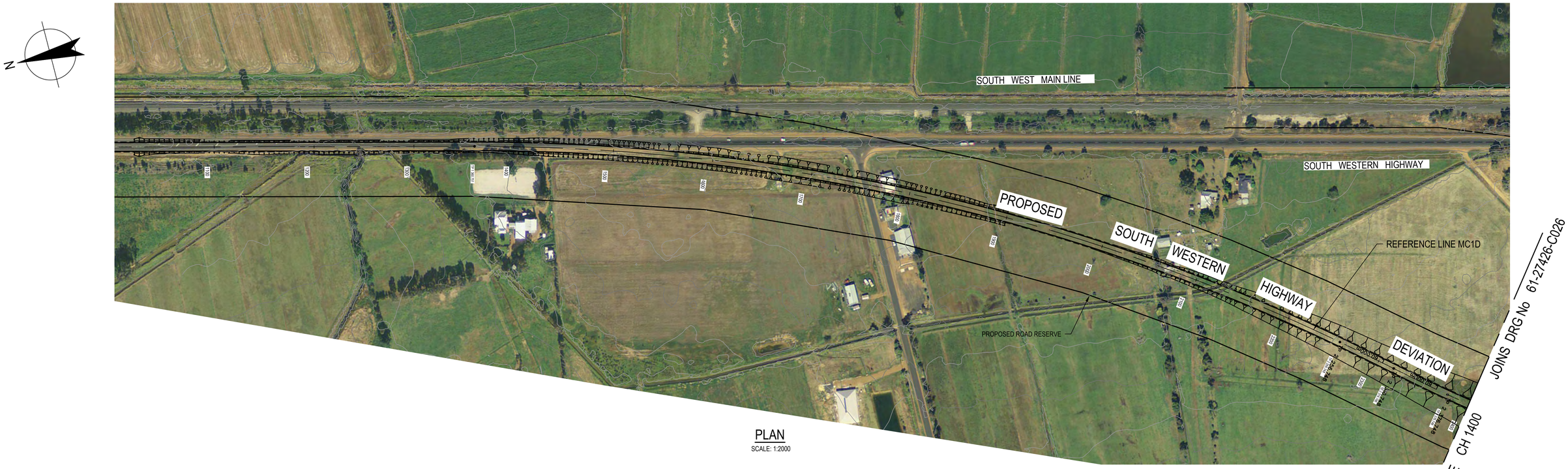
DO NOT SCALE

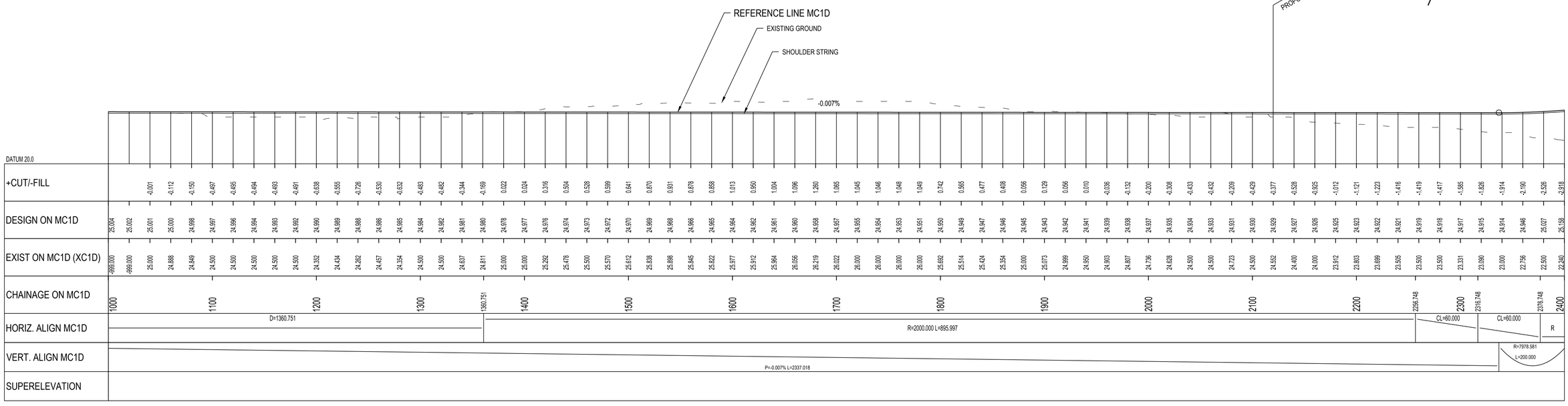
Drawn S. GEERLINGS | Designer S. GEERLINGS
Drafting Check | Design Check
Approved (Project Director)
Date
Scale AS SHOWN
This Drawing must not be used for Construction unless signed as Approved

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **PROPOSED SOUTH WEST HIGHWAY DEVIATION CHA 2400 - CHA 3800**
Original Size **A1** **Drawing No: 61-27426-C026** **Rev: B**

Plot Date: 18 March 2015 - 2:47 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C026.dwg



PLAN
SCALE: 1:2000



LONGITUDINAL SECTION - MC1D

SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			01.05.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

VERTICAL 1:200 AT ORIGINAL SIZE 0 2 4 6 8 10m
HORIZONTAL 1:2000 AT ORIGINAL SIZE 0 20 40 60 80 100m
0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

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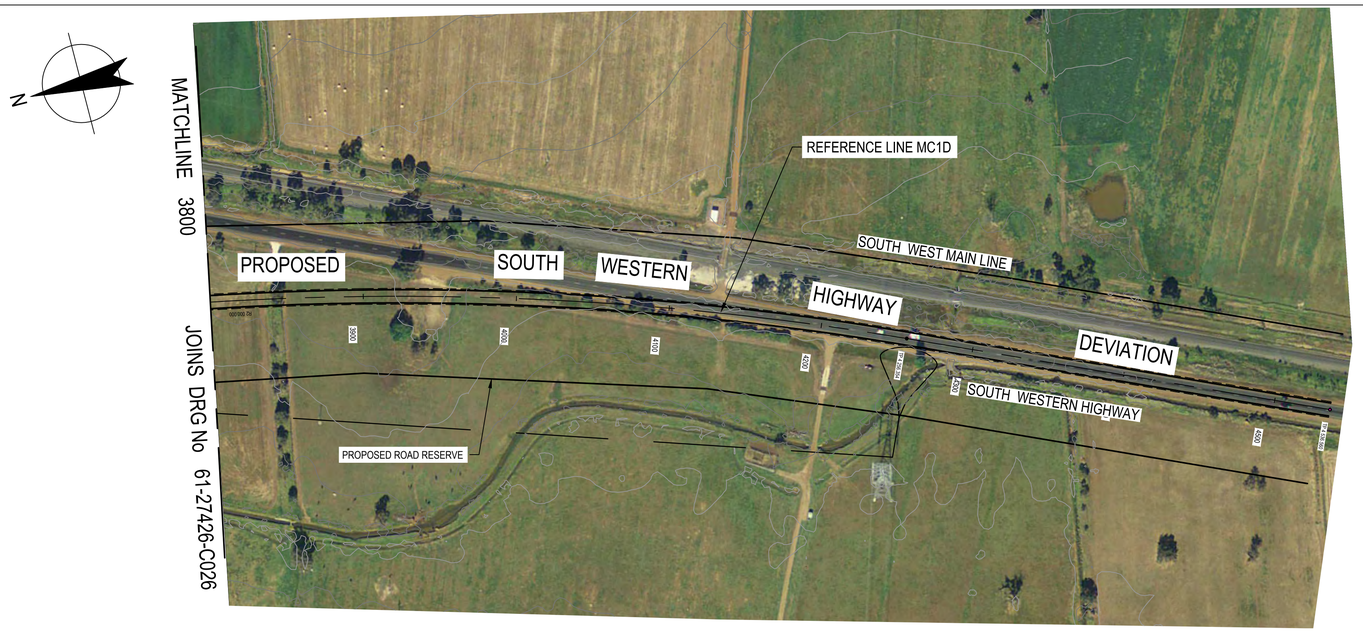
Drawn	S. GEERLINGS	Designer	S. GEERLINGS
Drafting Check	S. GEERLINGS	Design Check	E. WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY DEVIATION CHA 1000 - CHA 2400

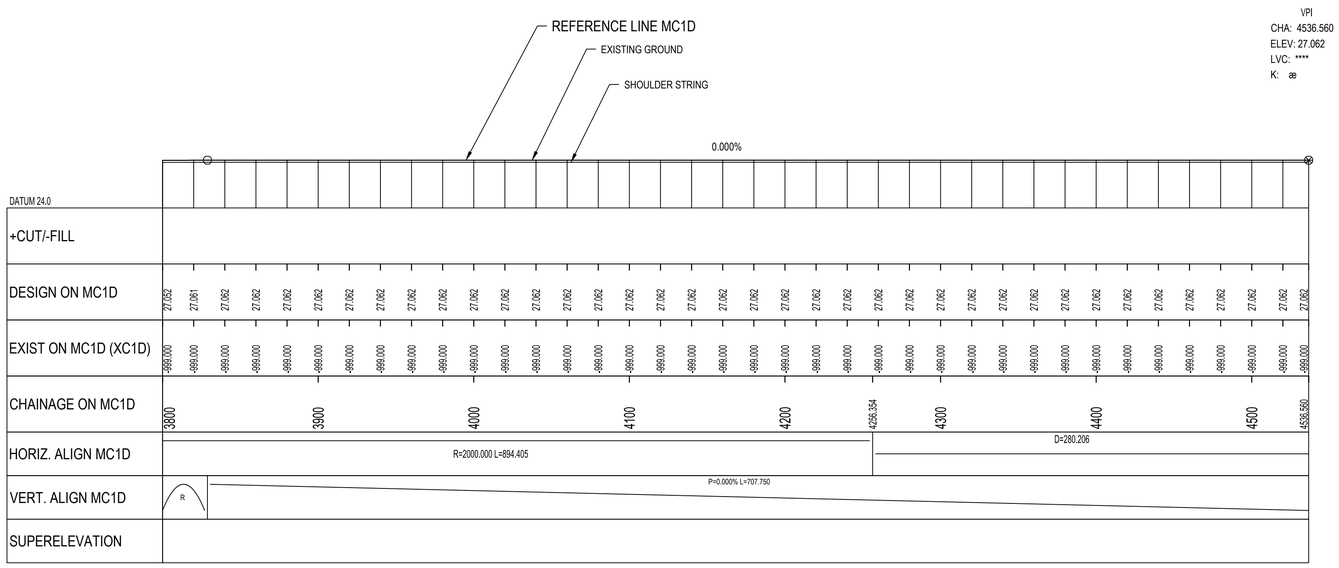
Original Size A1
Drawing No: 61-27426-C025
Rev: B

Plot Date: 18 March 2015 - 2:41 PM
Plotted by: Tom Nguyen
Cad File No: G:\61\31700\CADD\Drawings\61-27426-C025.dwg



PLAN

SCALE: 1:2000



LONGITUDINAL SECTION - MC1D

SCALE : HORZ 1:2000, VERT 1:200

CONCEPT

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK		KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW		SMG			01.05.12

VERTICAL 1:200 AT ORIGINAL SIZE — 0 2 4 6 8 10m

HORIZONTAL 1:2000 AT ORIGINAL SIZE — 0 20 40 60 80 100m

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

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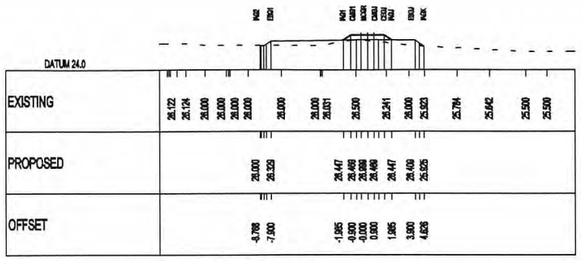
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title PROPOSED SOUTH WEST HIGHWAY DEVIATION CHA 3800 - CHA 4536.56

Original Size A1 — Drawing No: 61-27426-C027 — Rev: B

Plot Date: 18 March 2015 - 2:49 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C027.dwg



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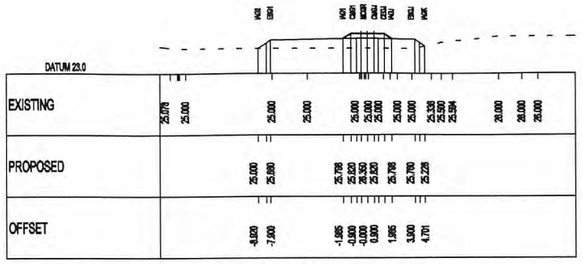

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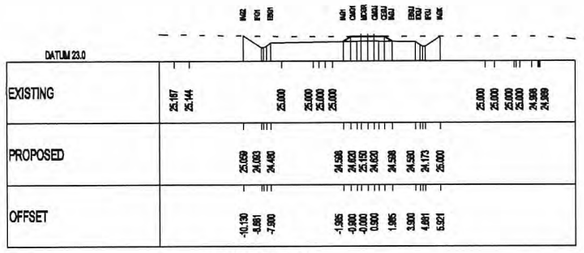

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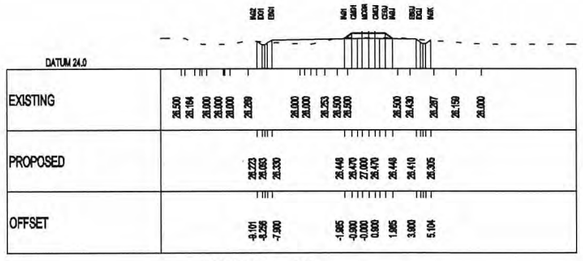

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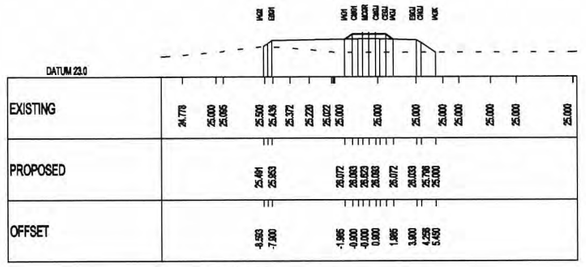

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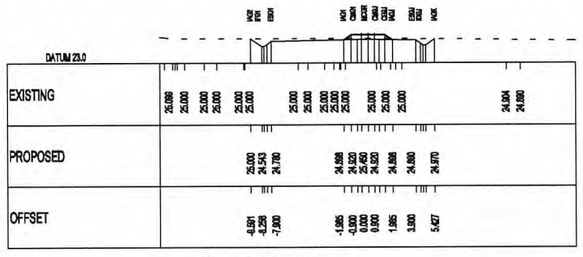

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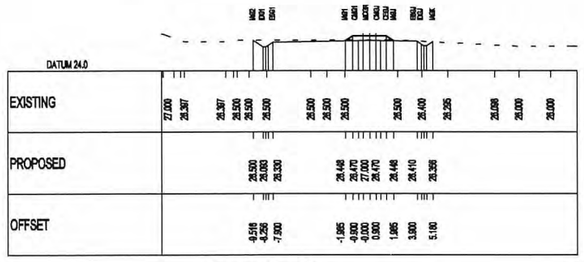

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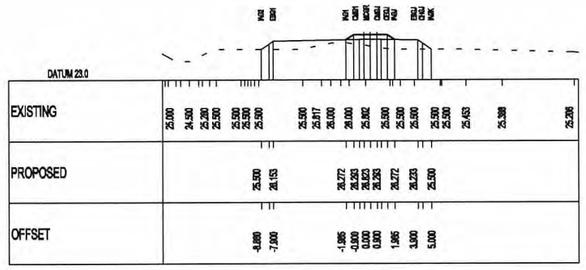

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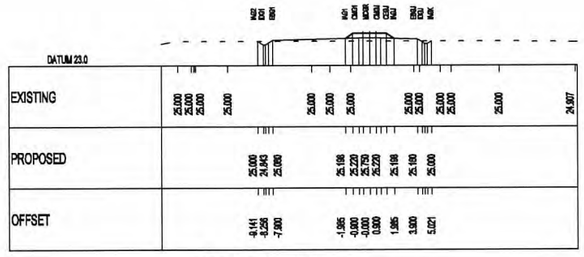

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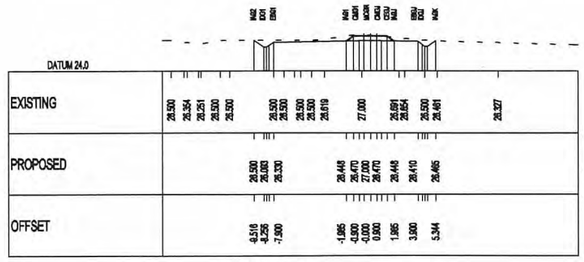

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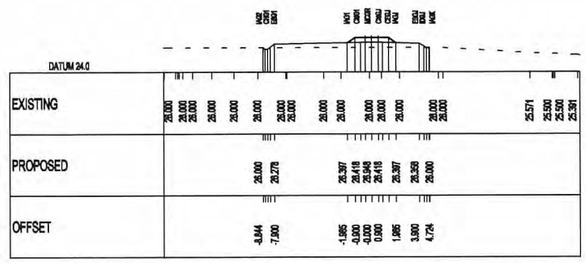

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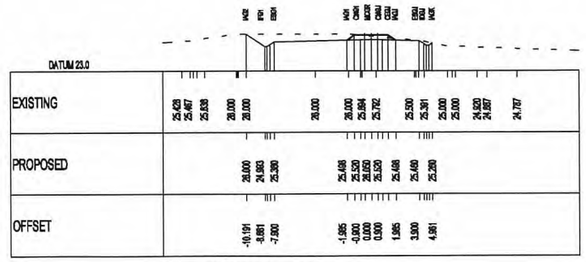

CHAINAGE 400

PRELIMINARY

No.	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

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Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

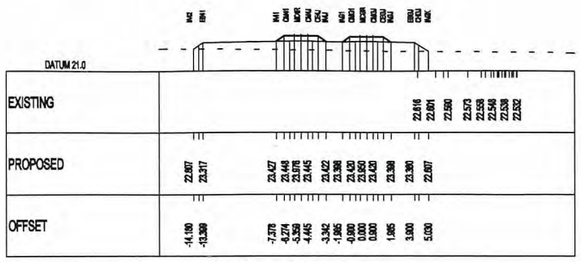
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR
CHA 0 - CHA 550

Original Size A1

Drawing No: 61-27426-C030

Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C030.dwg



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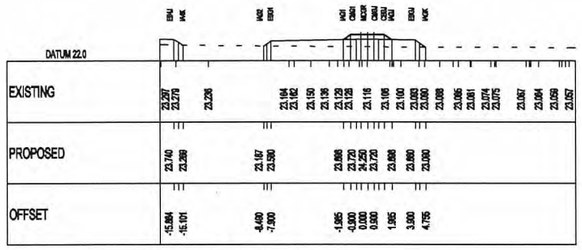

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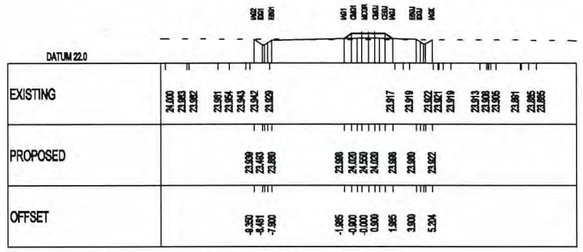

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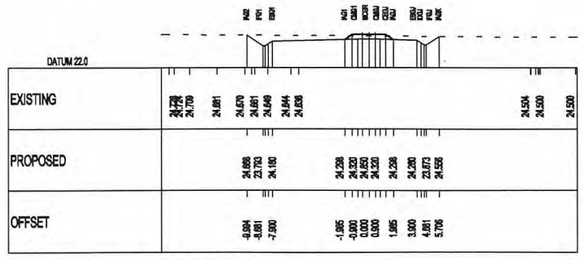

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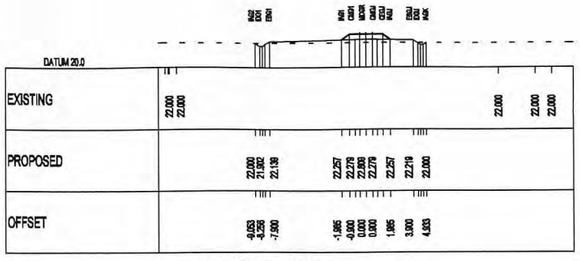

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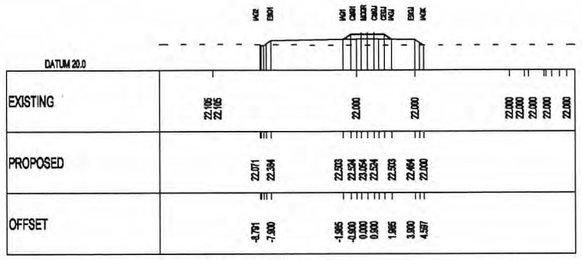

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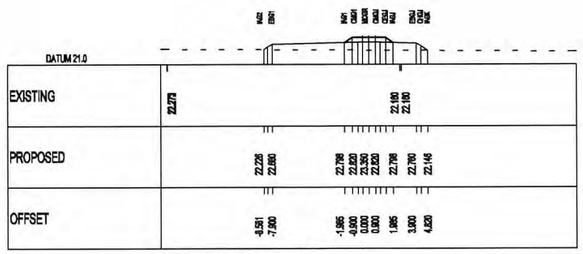

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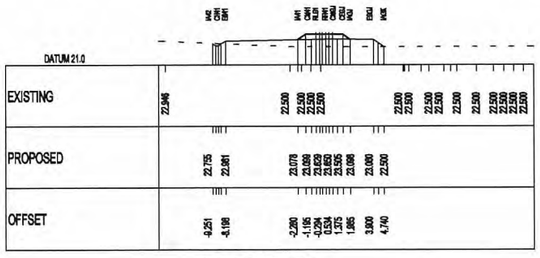

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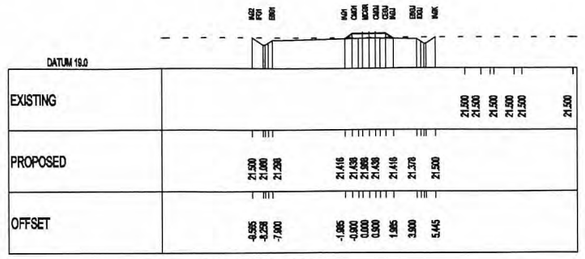

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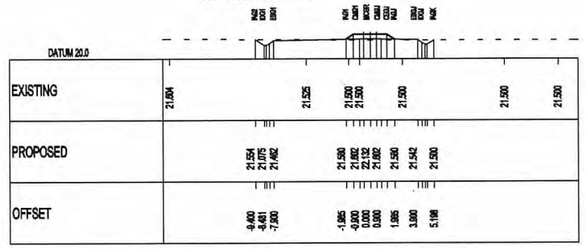

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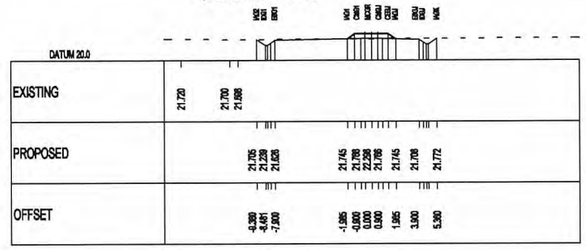

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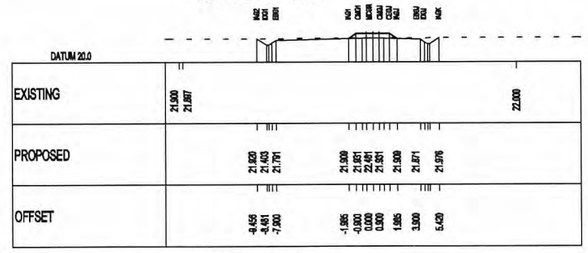

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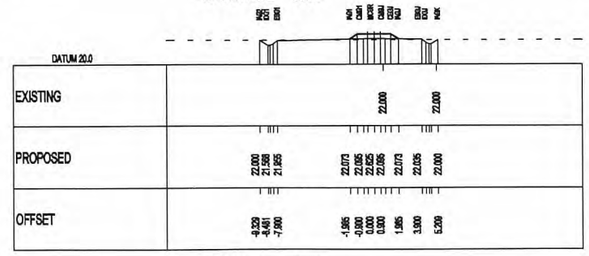

CHAINAGE 1000

PRELIMINARY

No.	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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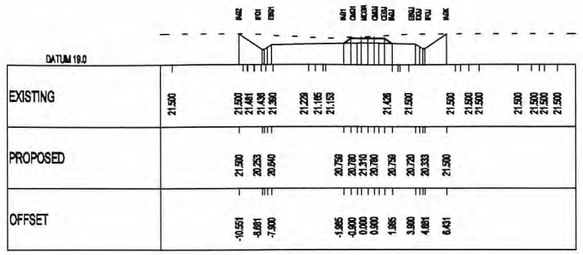
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR CHA 600 - CHA 1200

Original Size A1
Drawing No: 61-27426-C031
Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hui/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C031.dwg



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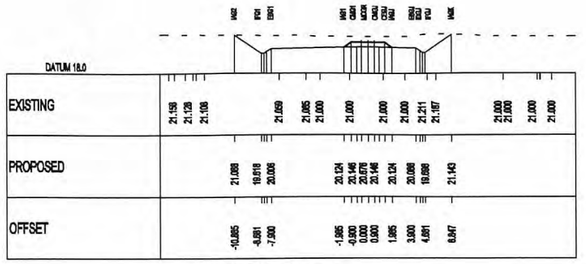

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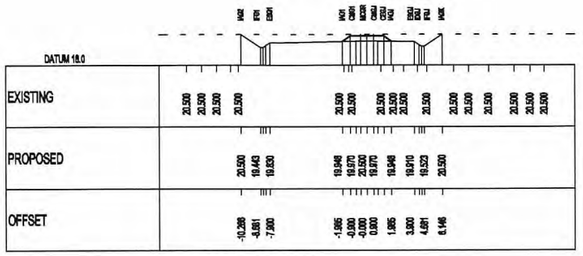

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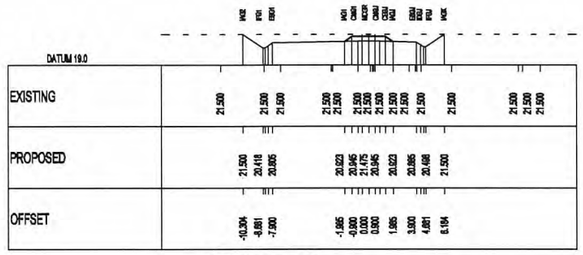

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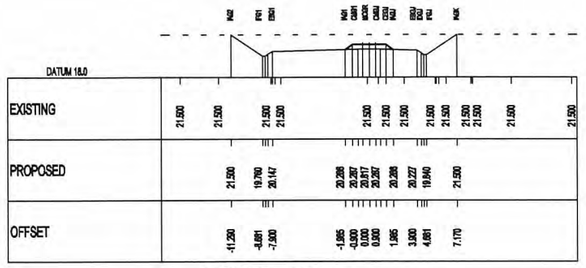

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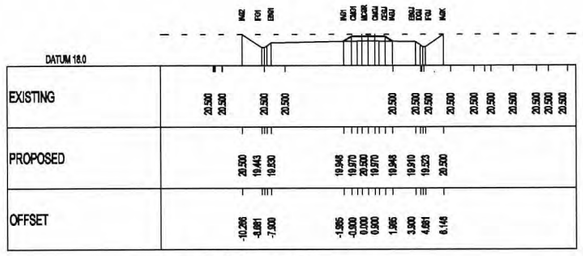

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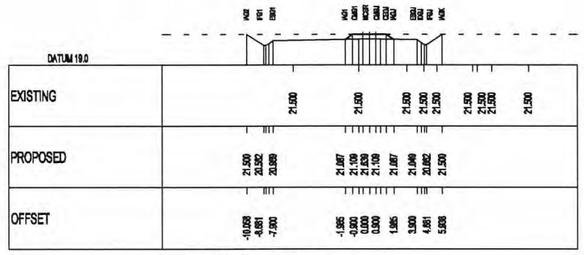

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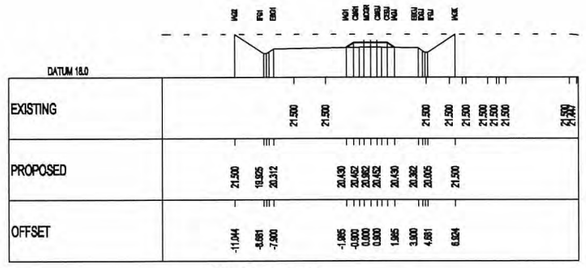

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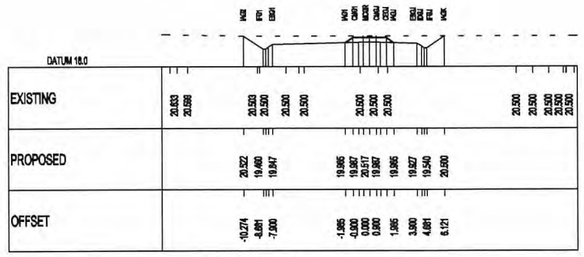

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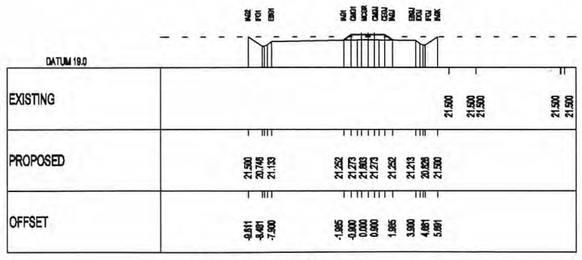

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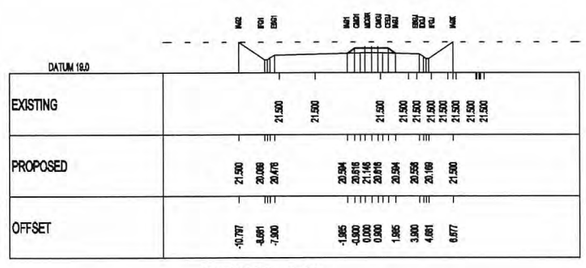

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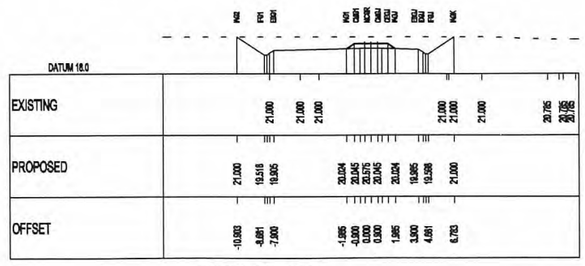

CHAINAGE 1650

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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E permail@ghd.com.au W www.ghd.com

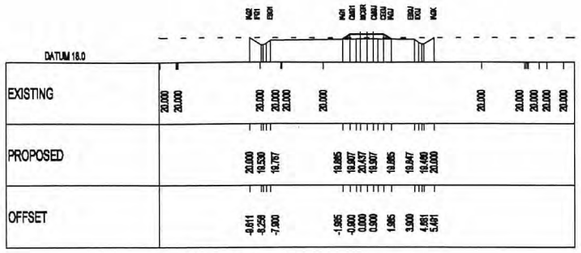
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

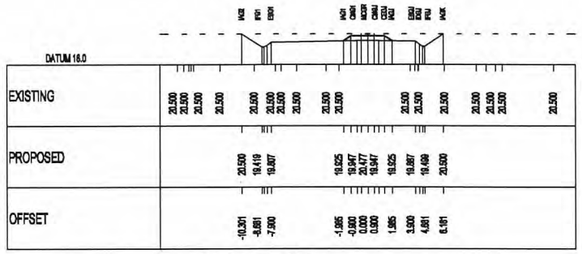
Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR
CHA 1250 - CHA 1800

Original Size A1 Drawing No: 61-27426-C032 Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C032.dwg



CHAINAGE 2000



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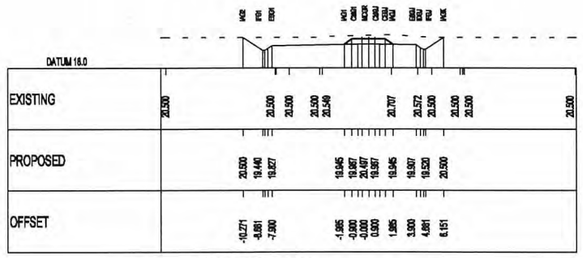

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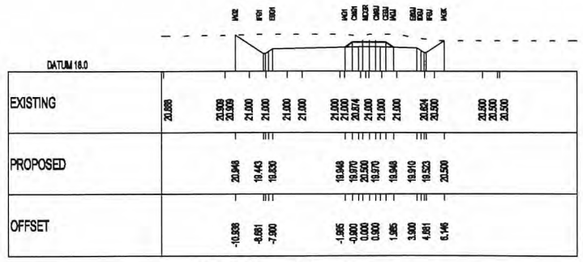

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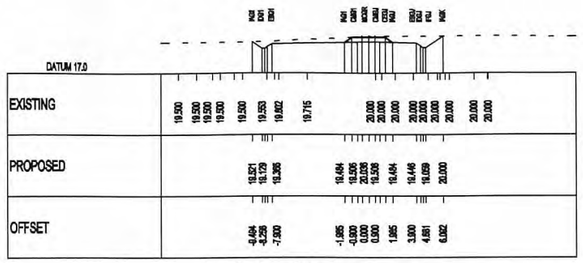

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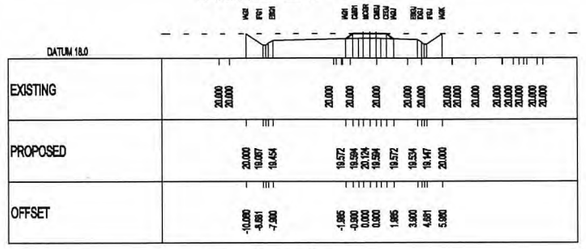

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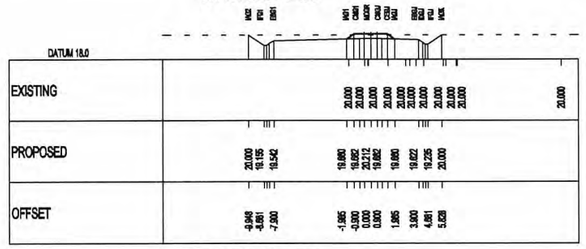

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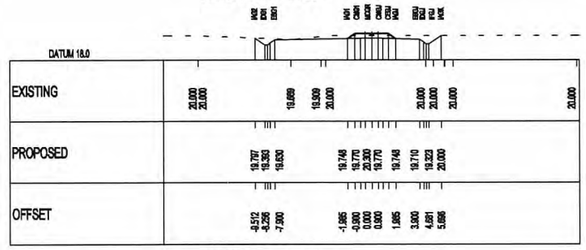

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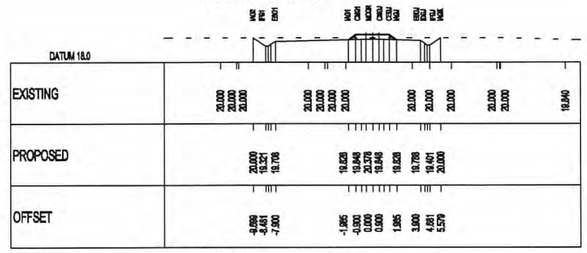

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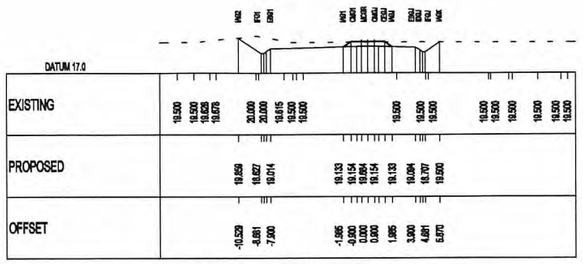

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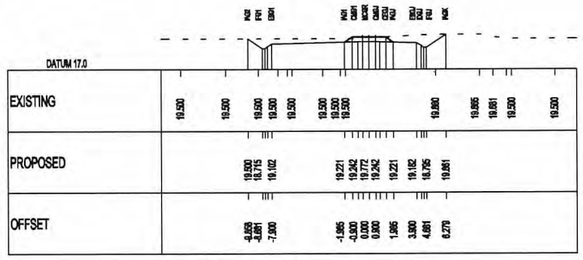

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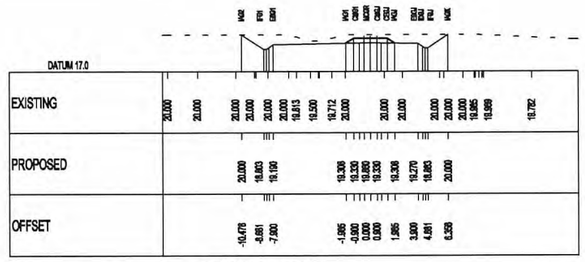

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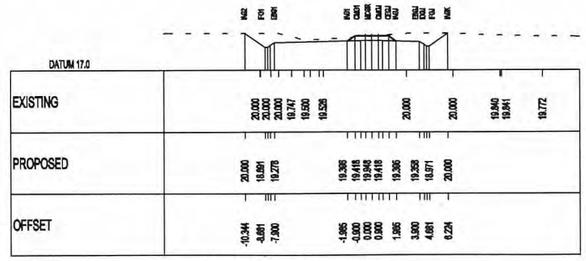

CHAINAGE 2300

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1 250 AT ORIGINAL SIZE

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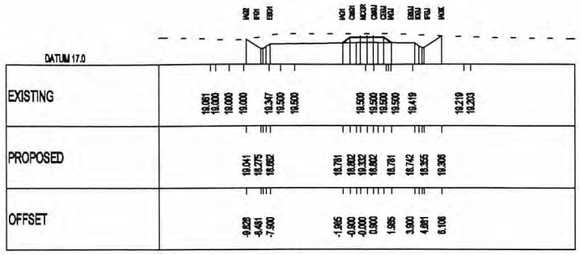
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR
CHA 1850 - CHA 2450

Original Size A1 Drawing No: 61-27426-C033 Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C033.dwg



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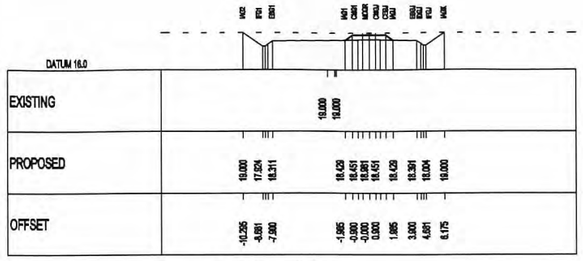

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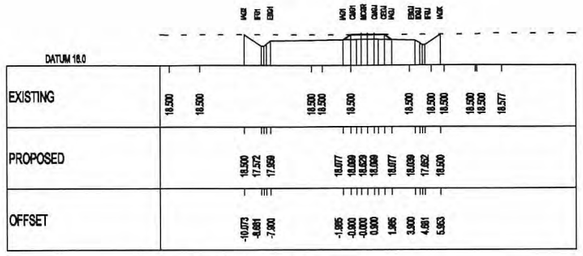

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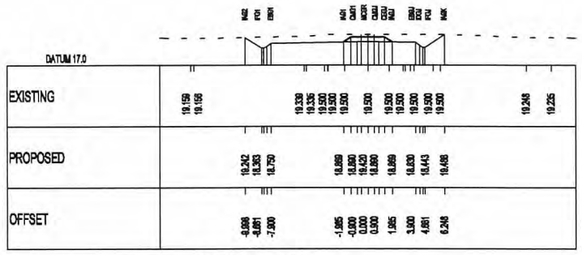

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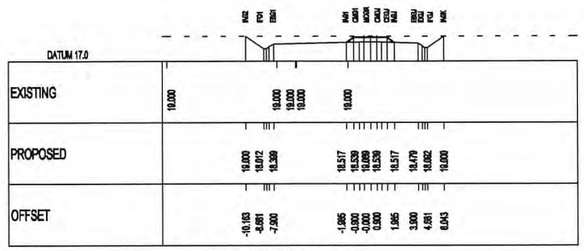

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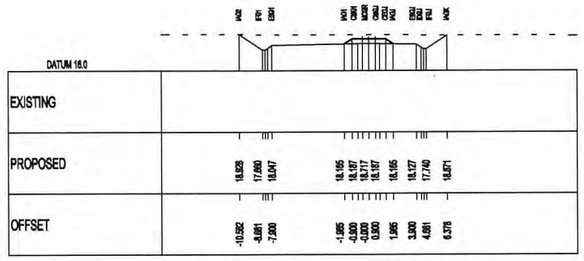

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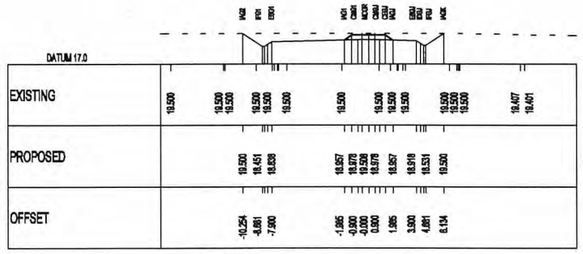

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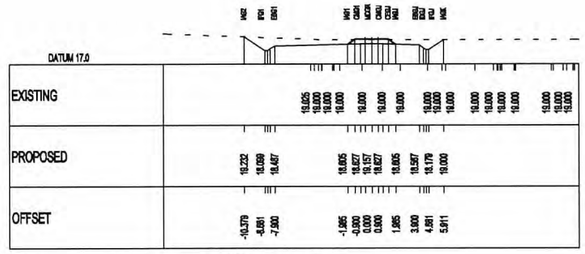

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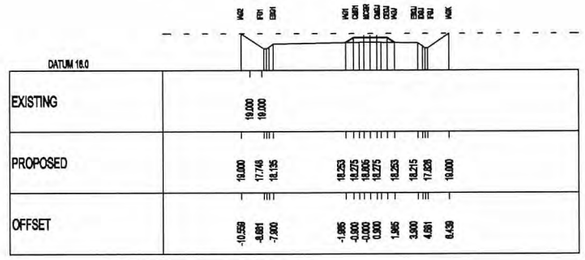

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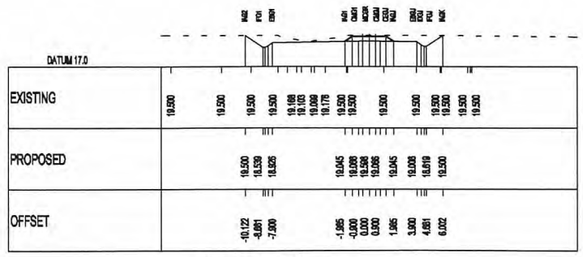

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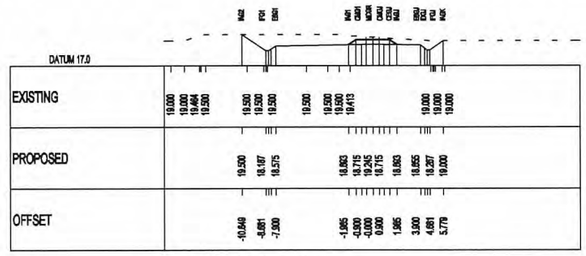

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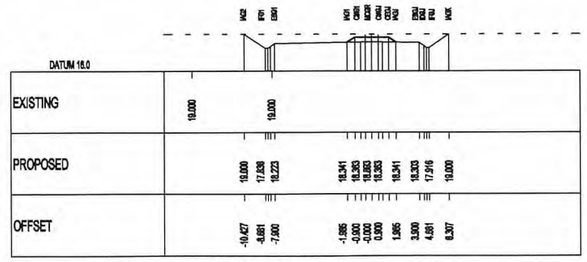

CHAINAGE 2900

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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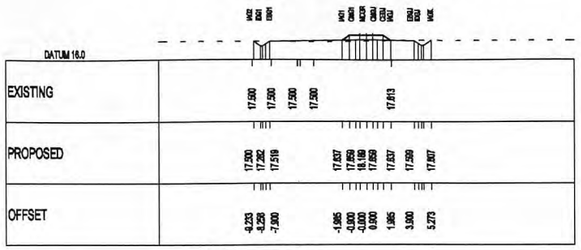
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: CROSS SECTIONS - MCGR CHA 2500 - CHA 3050

Original Size: A1
Drawing No: 61-27426-C034
Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C034.dwg



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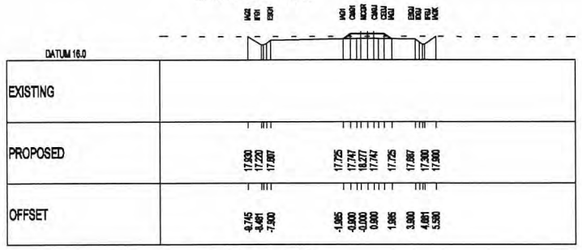

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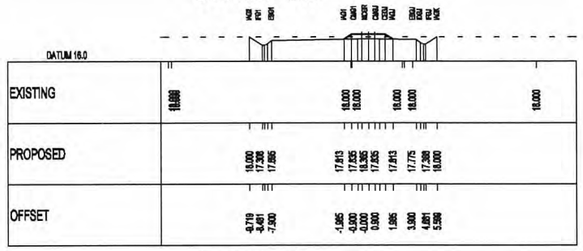

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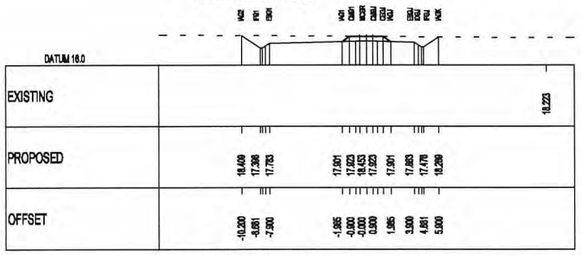

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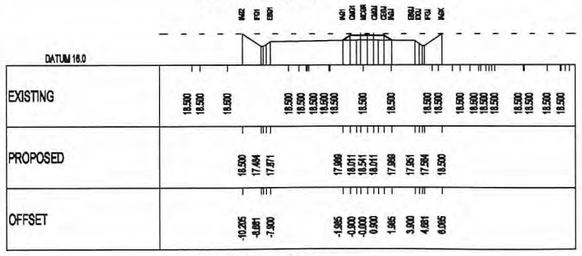

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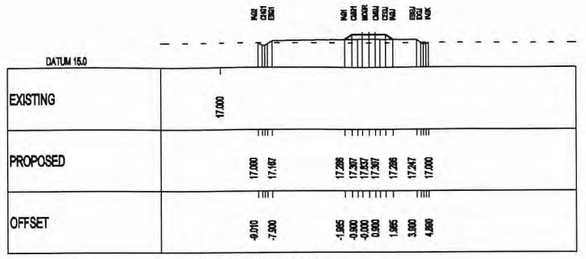

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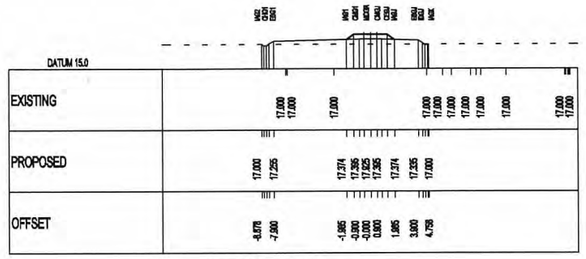

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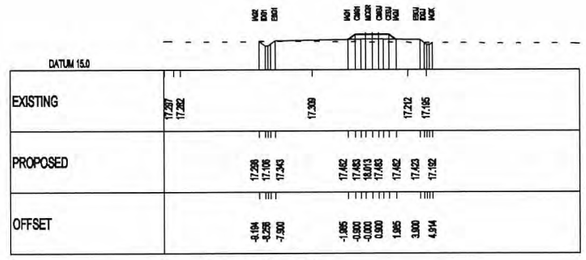

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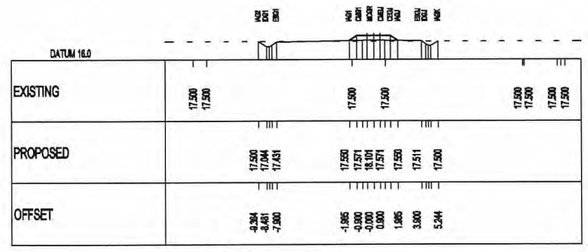

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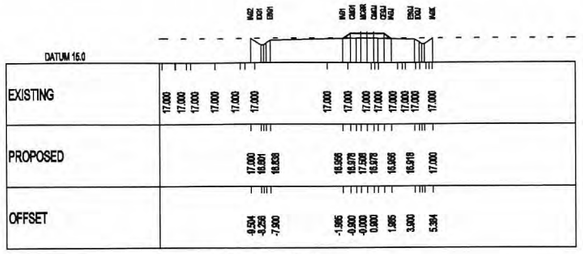

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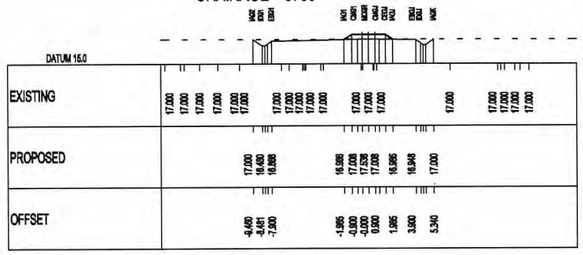

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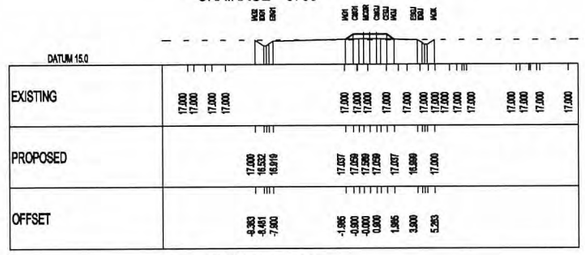

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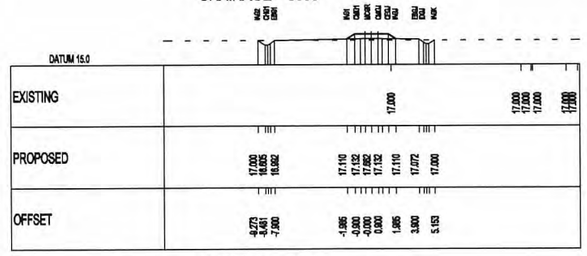

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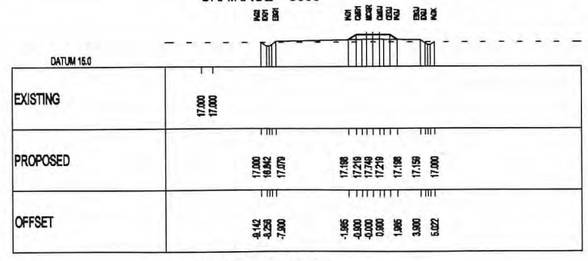

CHAINAGE 3550

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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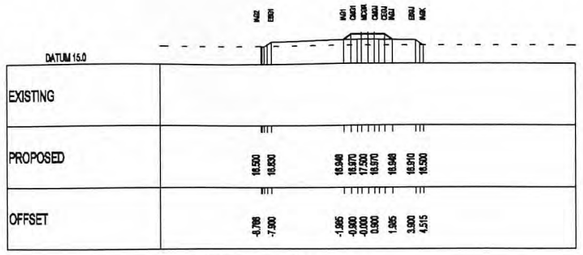
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	
Drafting Check	Design Check	
Approved (Project Director)		
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **CROSS SECTIONS - MCGR CHA 3100 - CHA 3750**

Original Size **A1** Drawing No: **61-27426-C035** Rev: **A**

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C035.dwg



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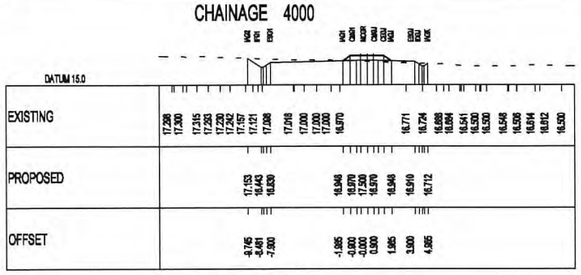

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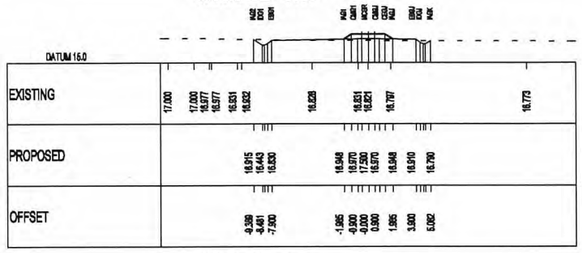

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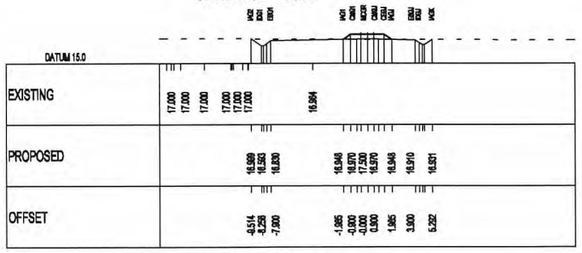

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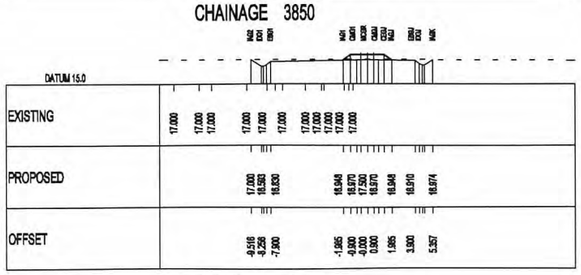

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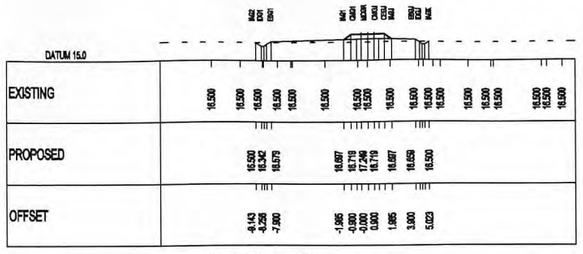

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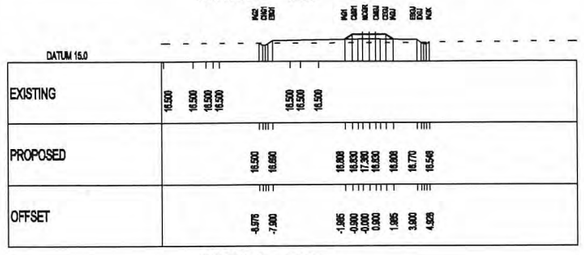

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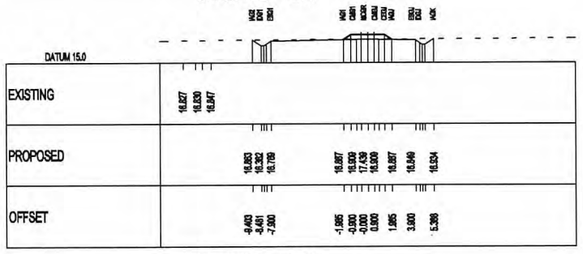

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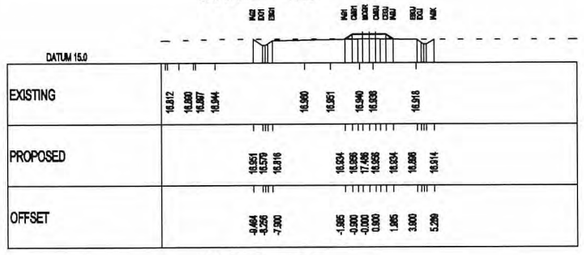

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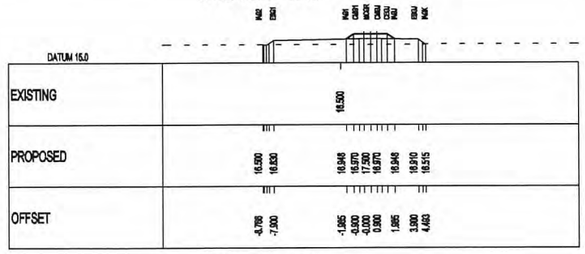

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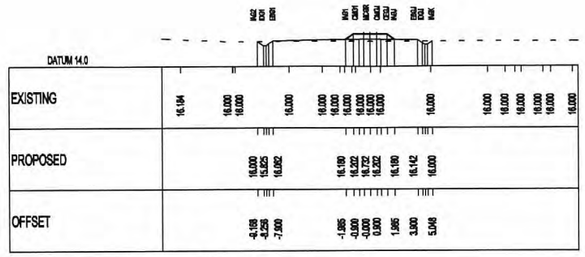

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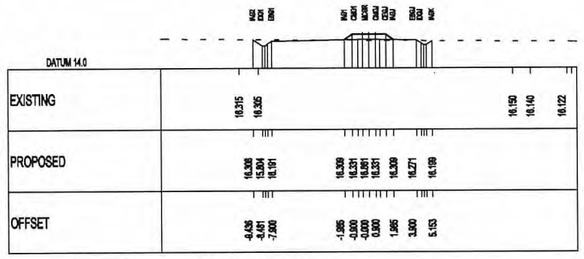

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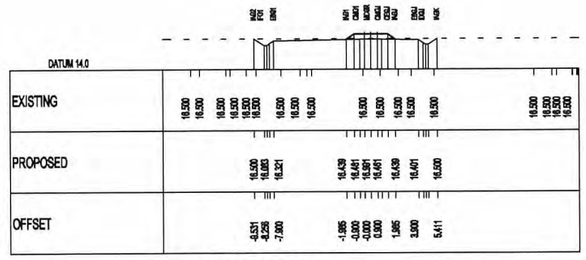

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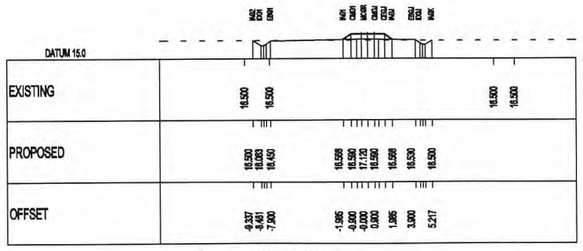

CHAINAGE 4300

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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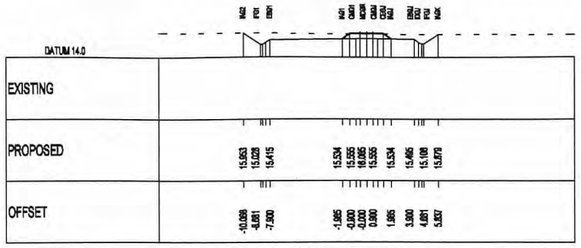
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	Client LANDCORP
Drafting Check	Design Check	Project KEMERTON INDUSTRIAL PARK
Approved (Project Director)		Title CROSS SECTIONS - MCGR CHA 3800 - CHA 4450
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size A1 Drawing No: 61-27426-C036 Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C036.dwg



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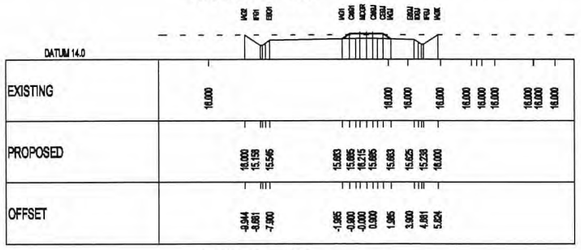

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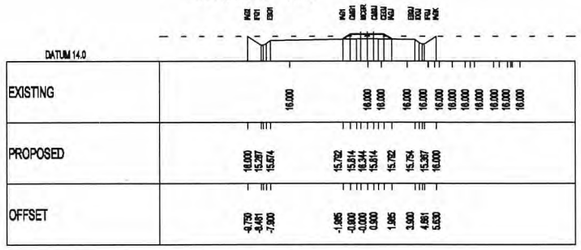

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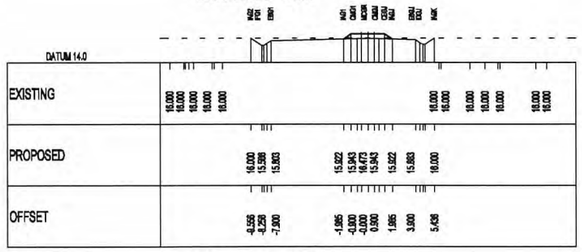

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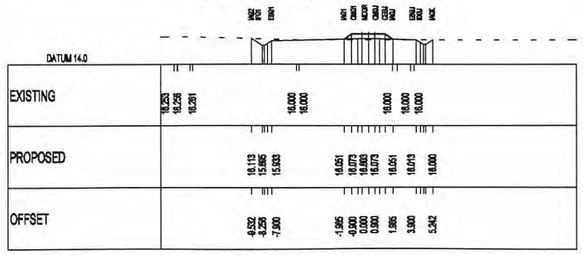

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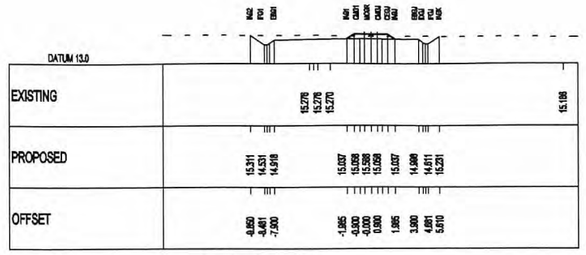

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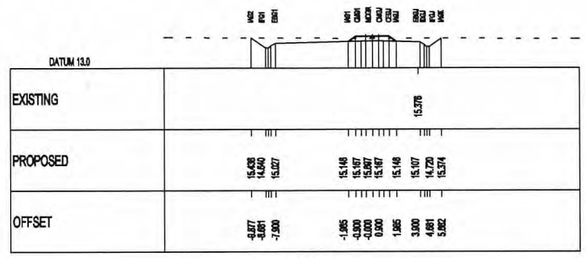

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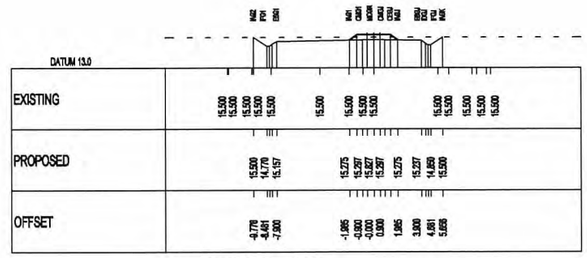

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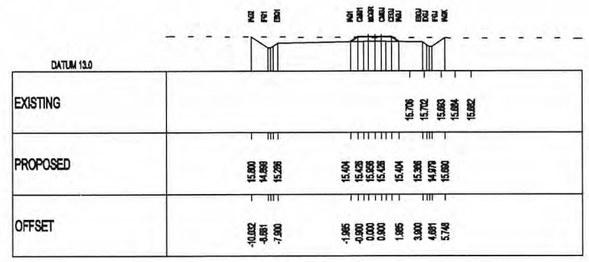

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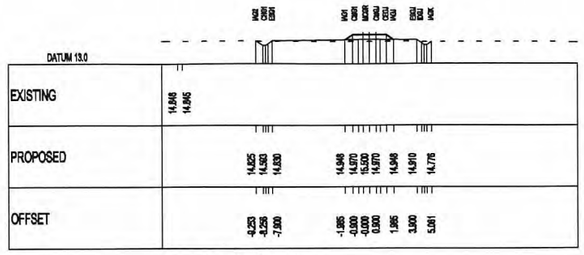

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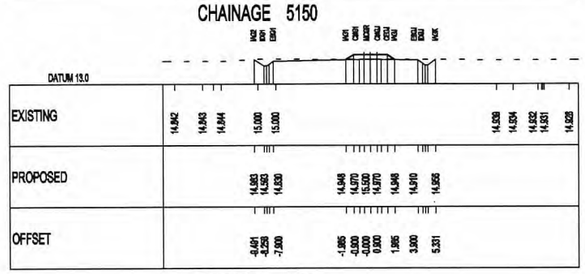

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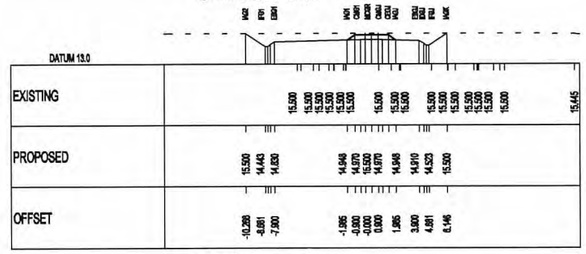

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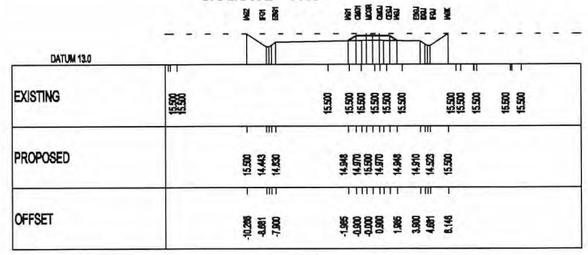

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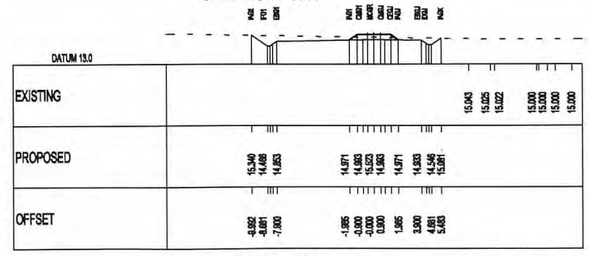

CHAINAGE 4950

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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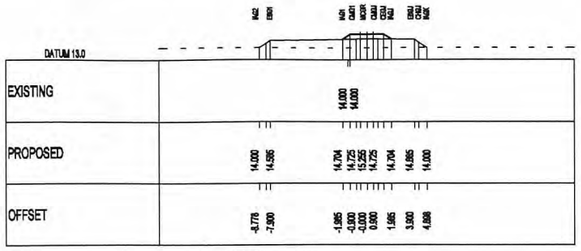
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	
Drafting Check	Design Check	
Approved (Project Director)		
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **CROSS SECTIONS - MCGR CHA 4500 - CHA 5150**

Original Size **A1** Drawing No: **61-27426-C037** Rev: **A**

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C037.dwg



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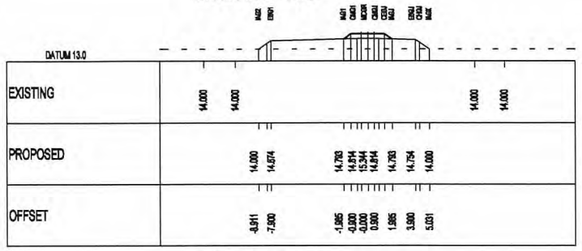

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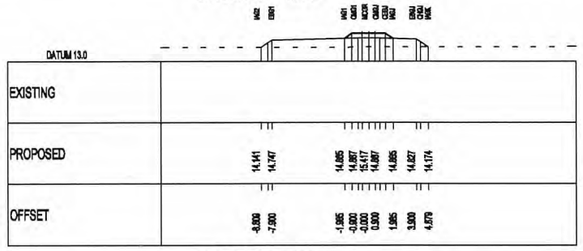

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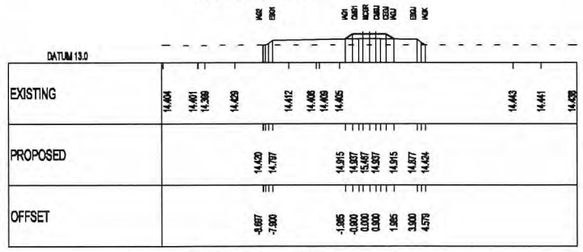

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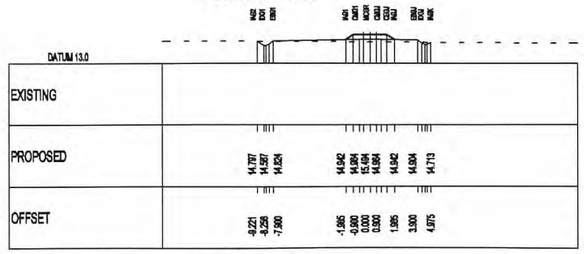

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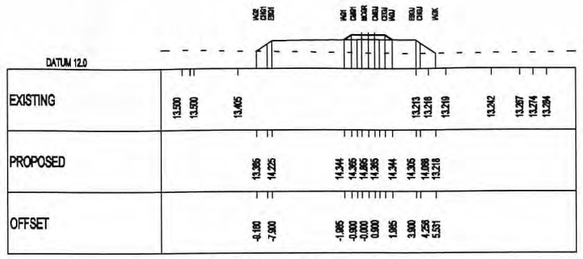

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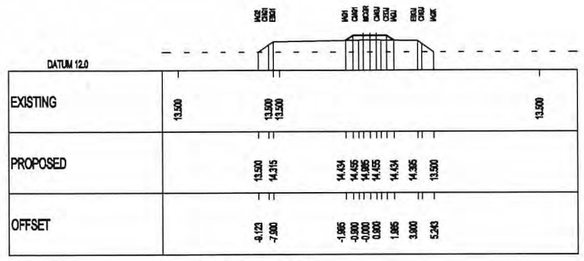

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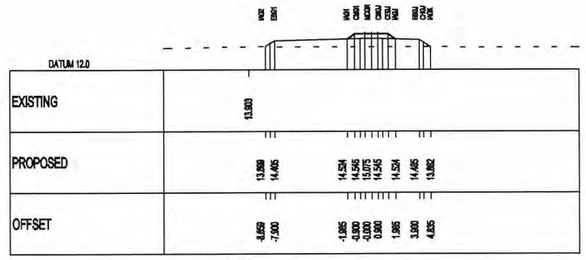

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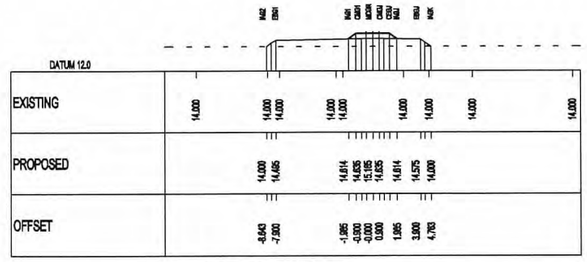

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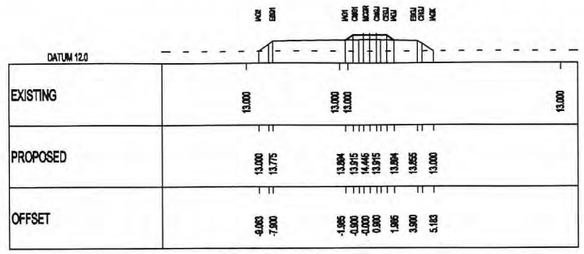

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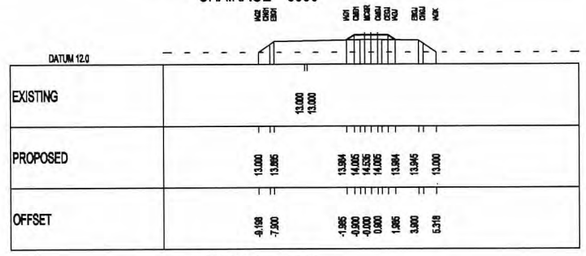

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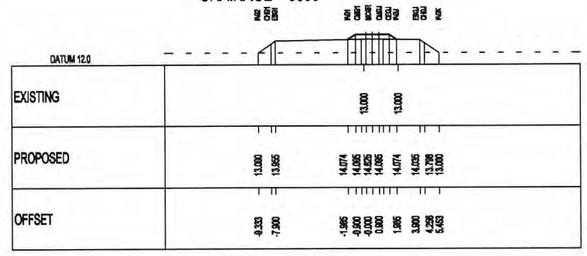

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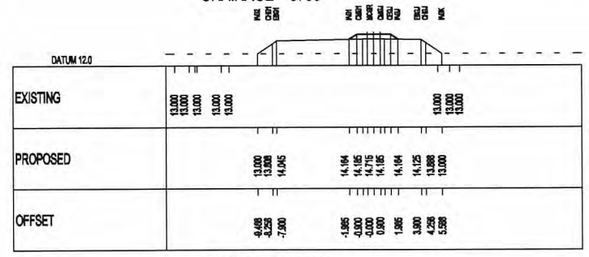

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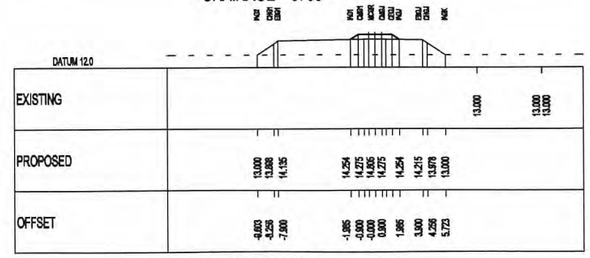

CHAINAGE 5650

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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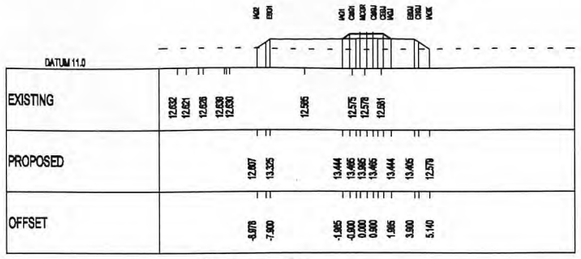
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **CROSS SECTIONS - MCGR CHA 5200 - CHA 5850**

Original Size **A1** Drawing No: **61-27426-C038** Rev: **A**

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C038.dwg



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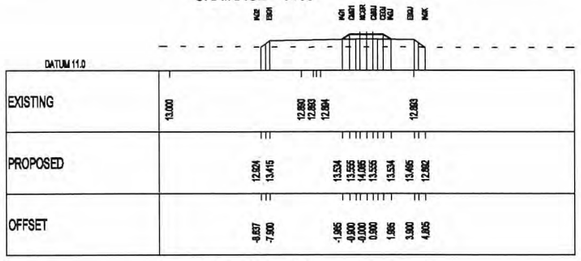

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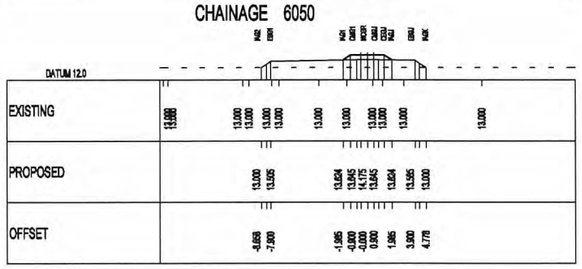

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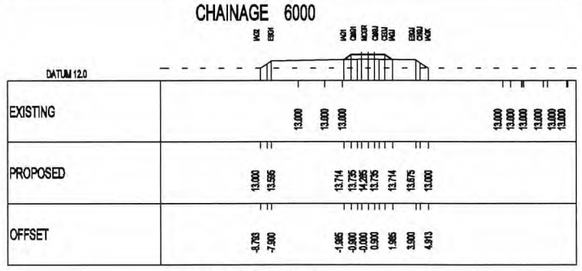

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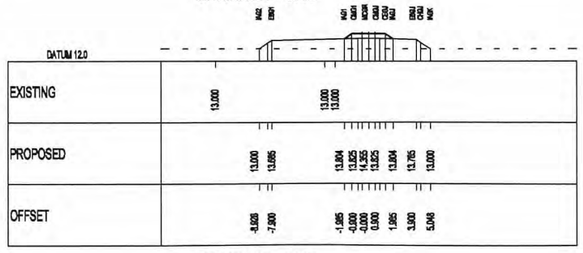

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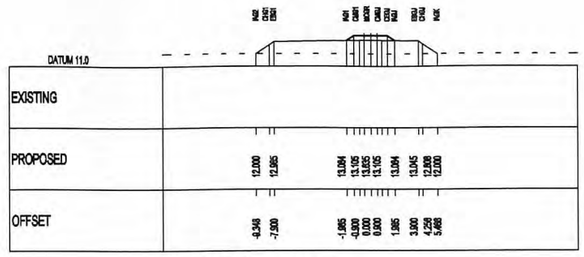

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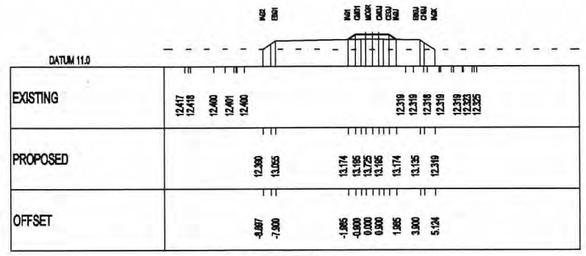

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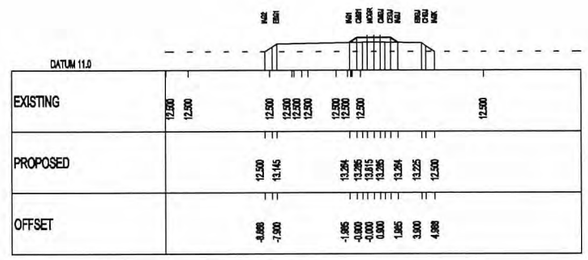

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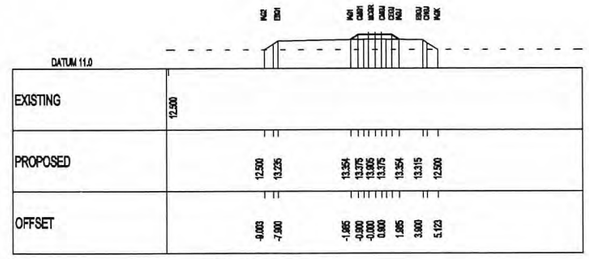

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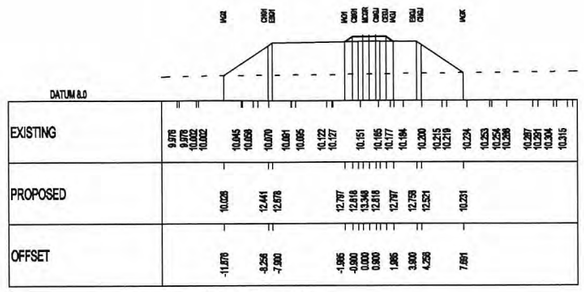

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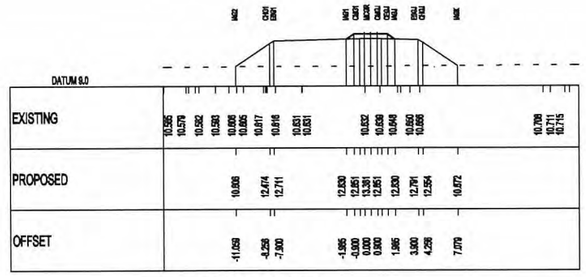

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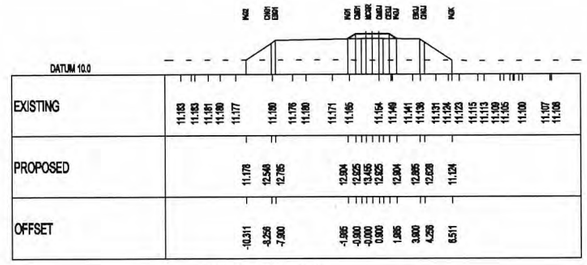

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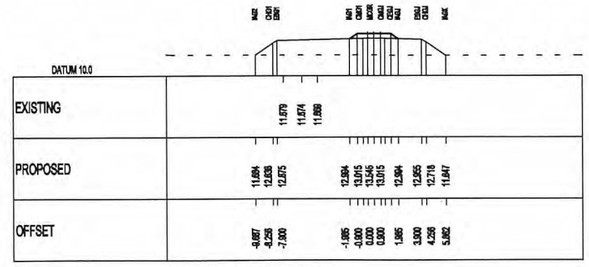

CHAINAGE 6350

PRELIMINARY

No.	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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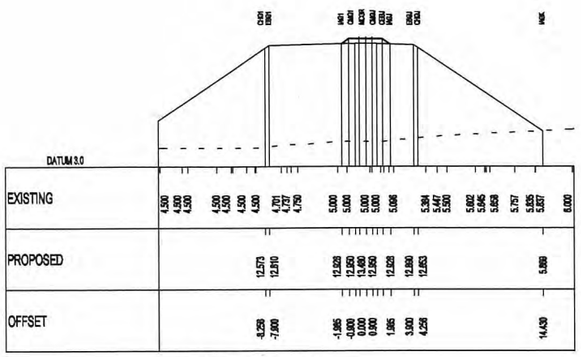
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **CROSS SECTIONS - MCGR CHA 5900 - CHA 6500**

Original Size **A1** Drawing No: **61-27426-C039** Rev: **A**

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C039.dwg



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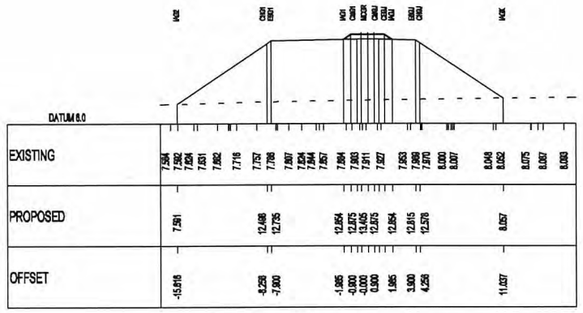

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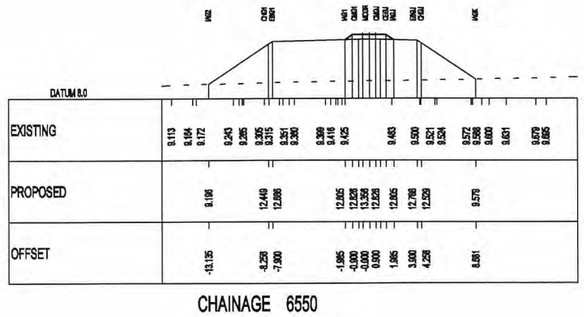

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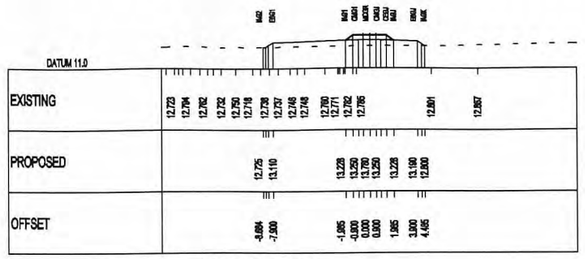

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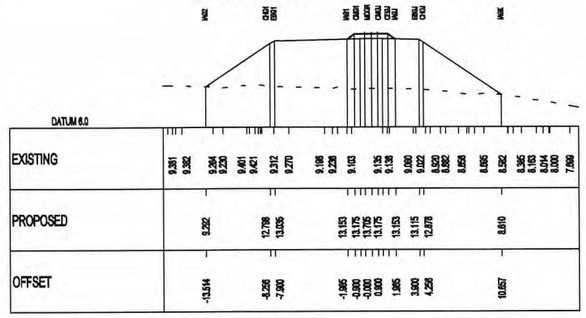

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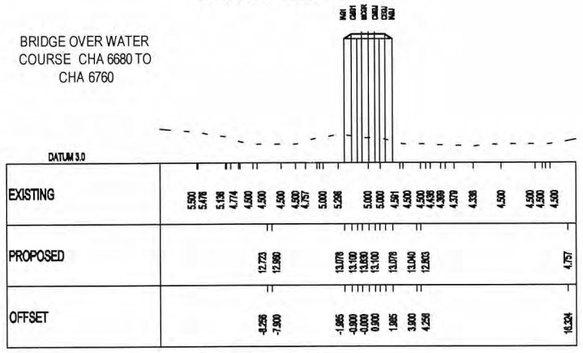
BRIDGE OVER WATER COURSE CHA 6680 TO CHA 6760



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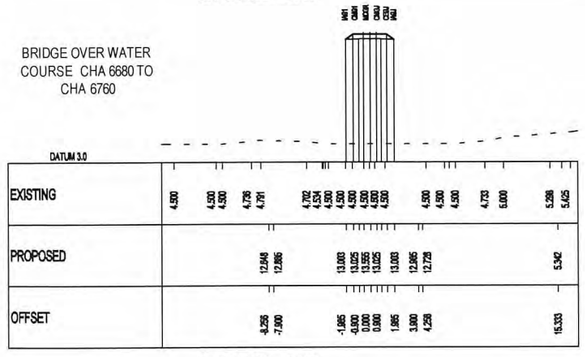
BRIDGE OVER WATER COURSE CHA 6680 TO CHA 6760



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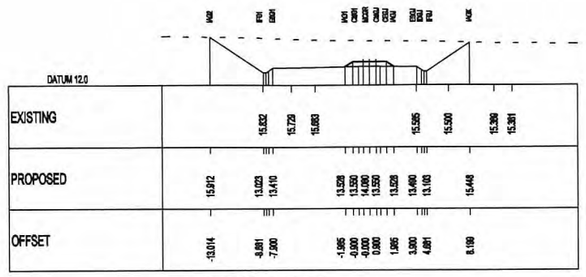

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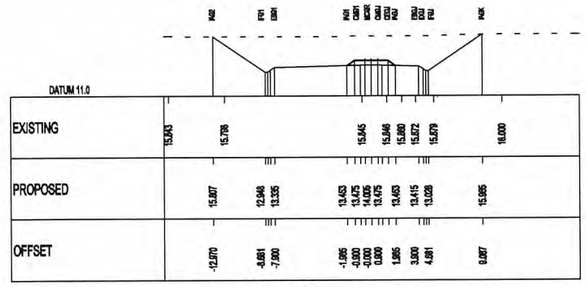

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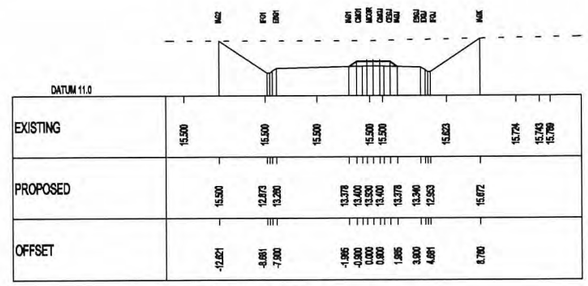

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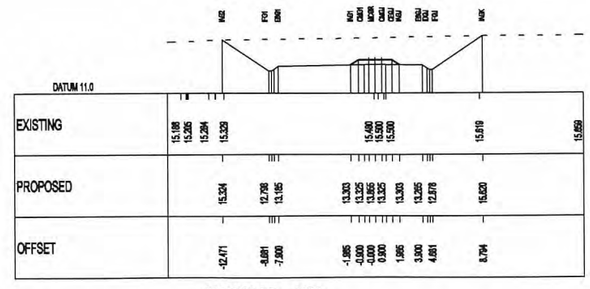

CHAINAGE 6900

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m

SCALE 1 250 AT ORIGINAL SIZE

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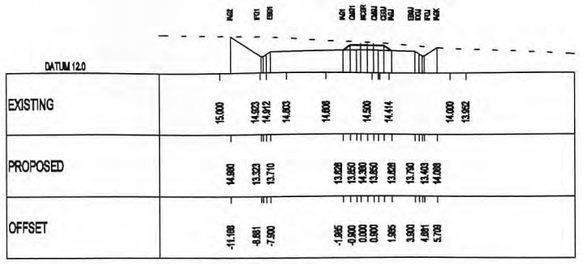
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR CHA 6550 - CHA 7050

Original Size A1
Drawing No: 61-27426-C040
Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C040.dwg



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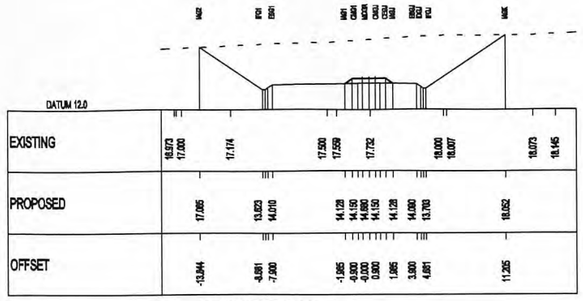

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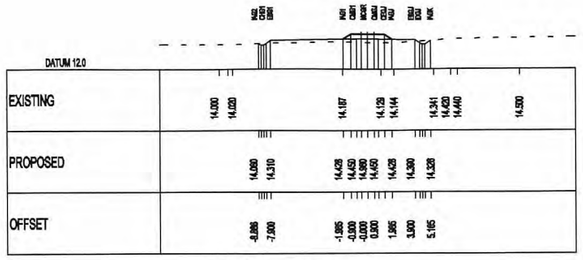

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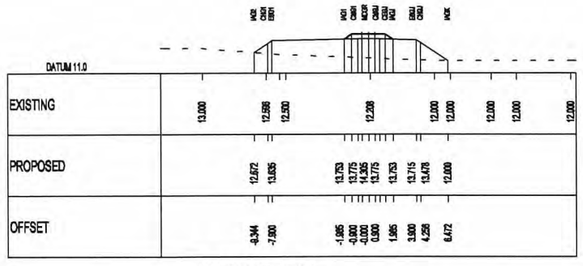

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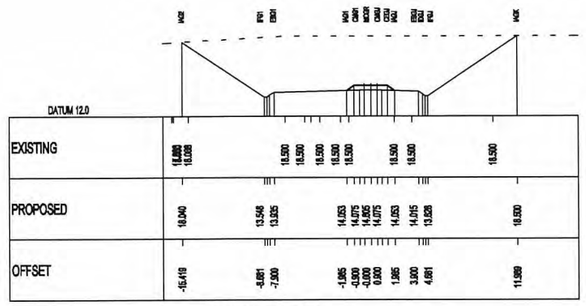

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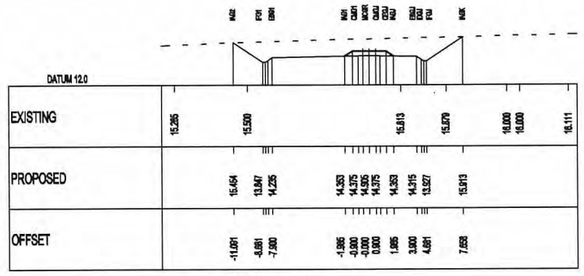

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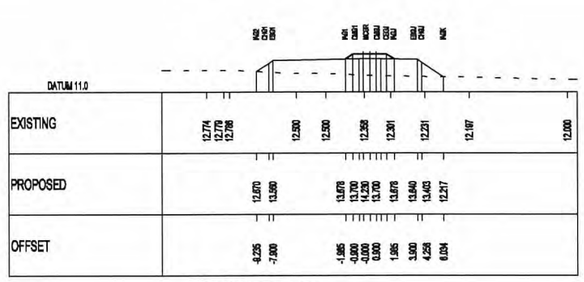

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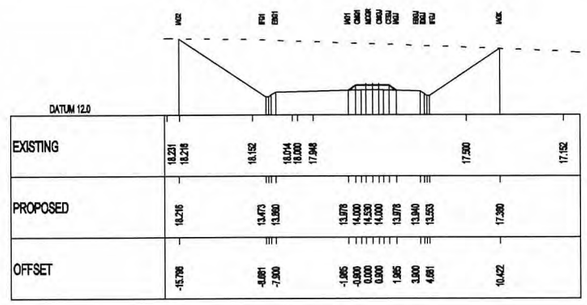

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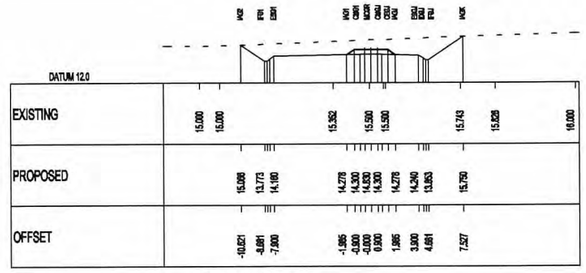

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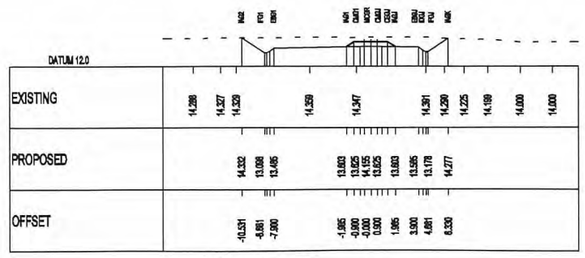

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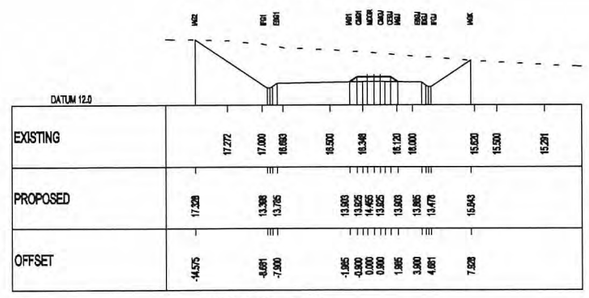

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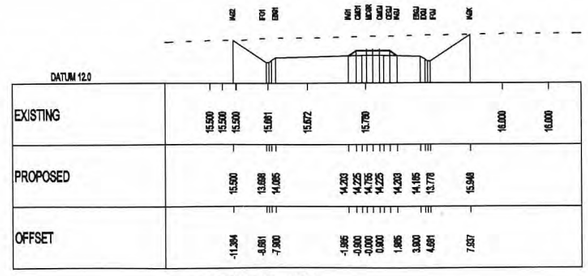

CHAINAGE 7500

PRELIMINARY

No.	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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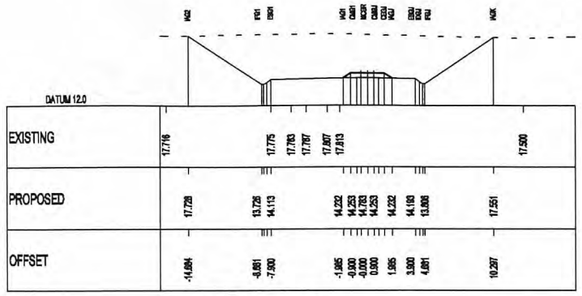
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	Client LANDCORP
Drafting Check	Design Check	Project KEMERTON INDUSTRIAL PARK
Approved (Project Director)		Title CROSS SECTIONS - MCGR CHA 7100 - CHA 7650
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size A1 Drawing No: 61-27426-C041 Rev: A

Plot Date: 13 February 2012 - 2.02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C041.dwg



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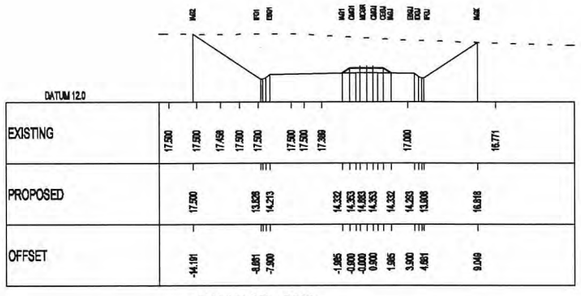

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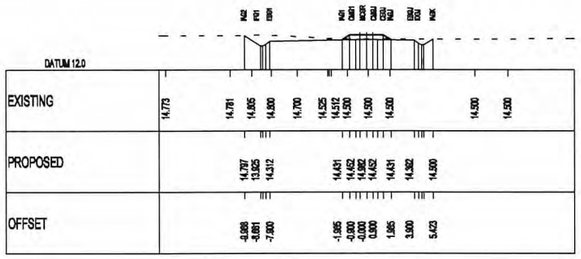

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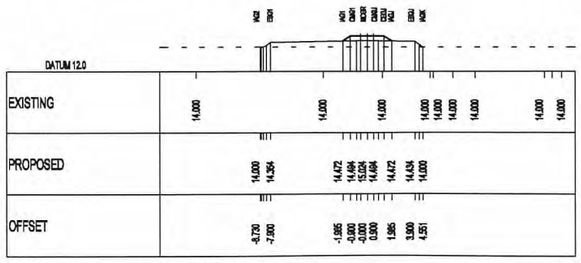

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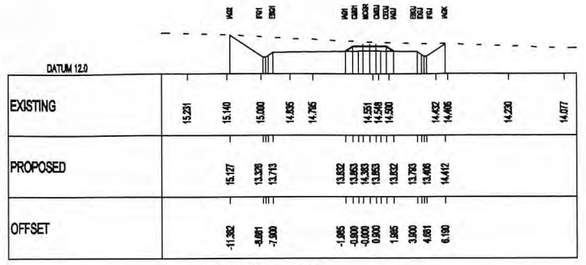

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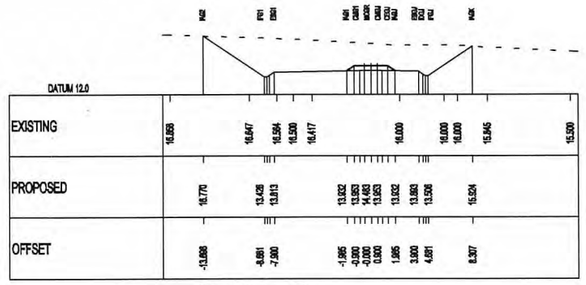

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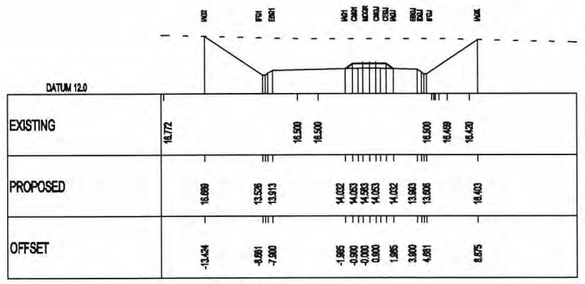

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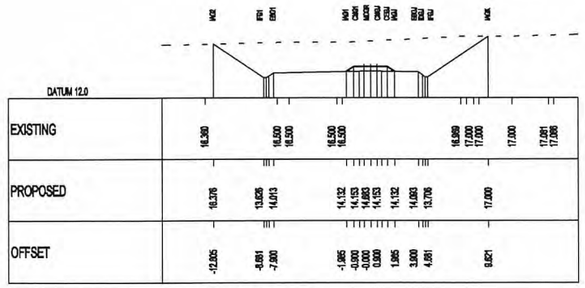

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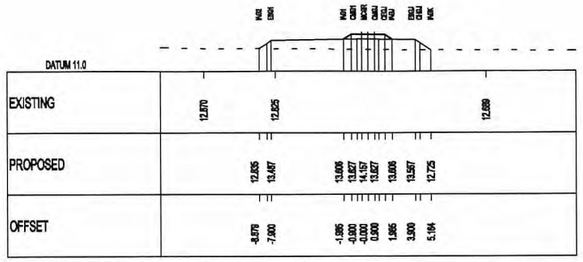

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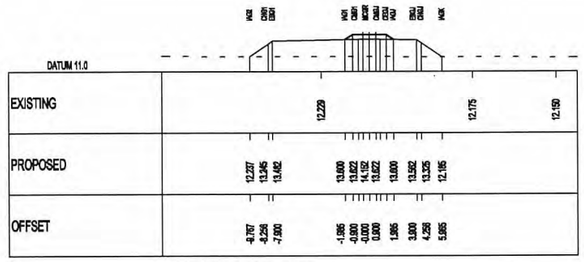

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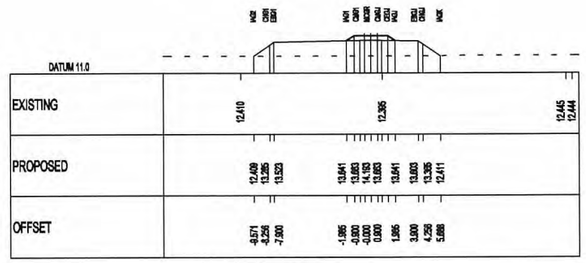

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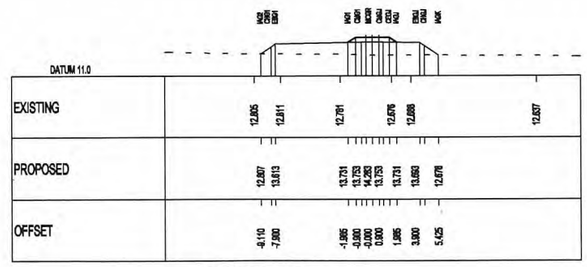

CHAINAGE 8100

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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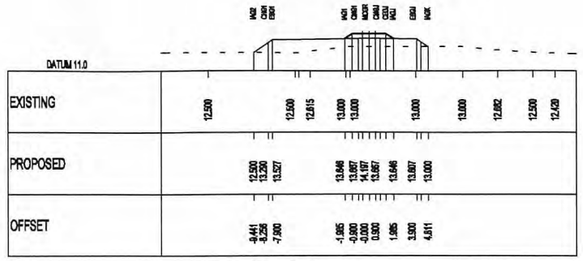
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

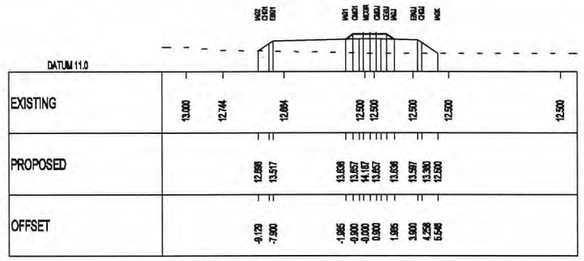
Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: CROSS SECTIONS - MCGR CHA 7700 - CHA 8250

Original Size: A1
Drawing No: 61-27426-C042
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C042.dwg



CHAINAGE 8450



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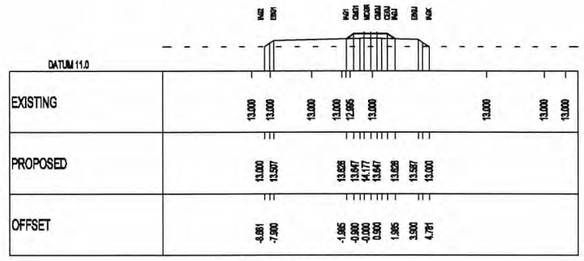
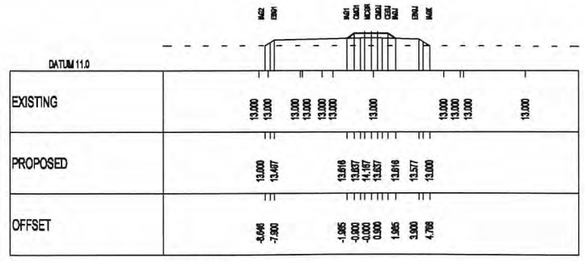


CHAINAGE 8350



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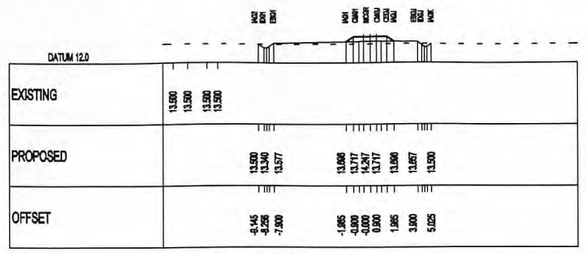

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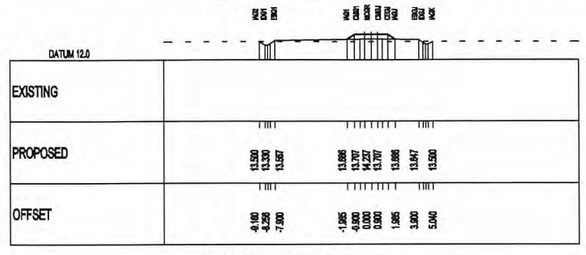

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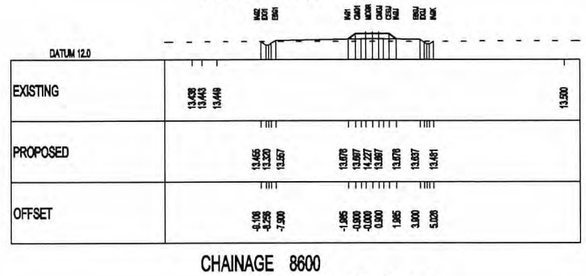

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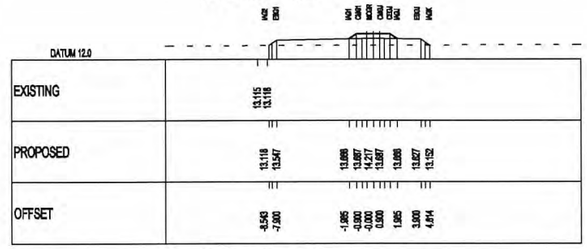

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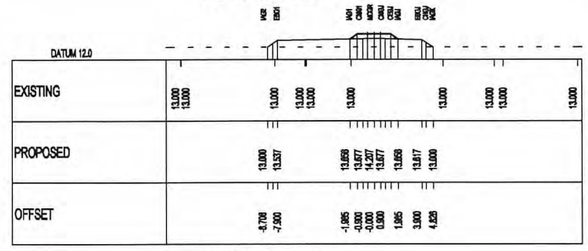

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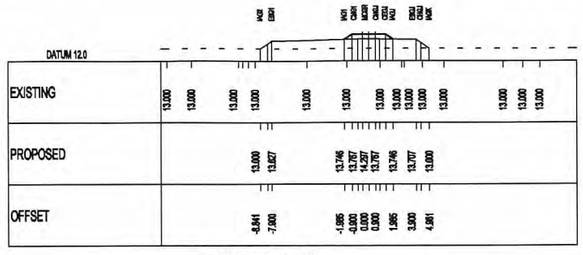

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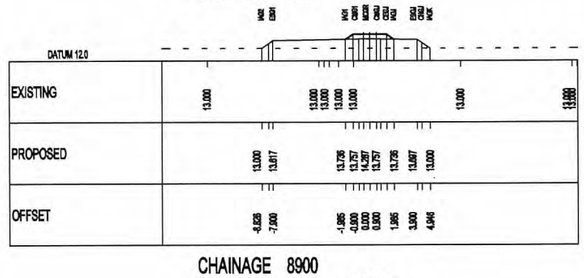

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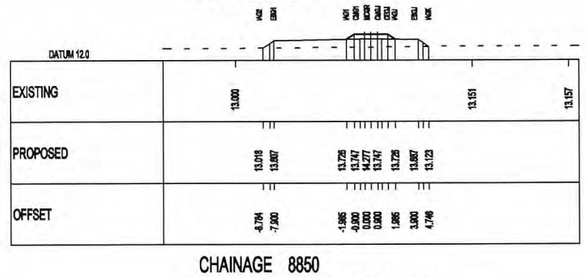

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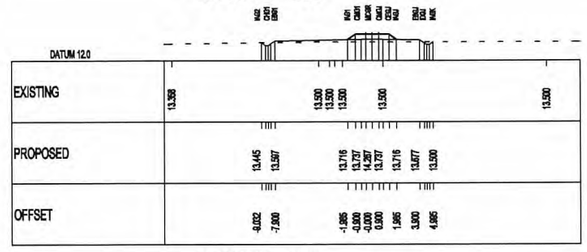

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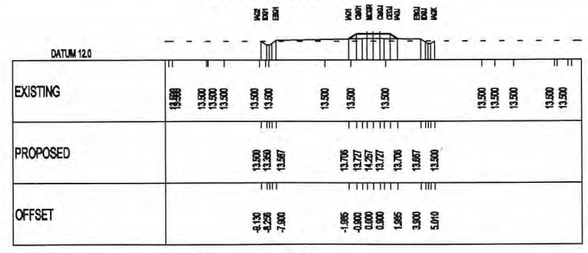

CHAINAGE 8750

PRELIMINARY

No.	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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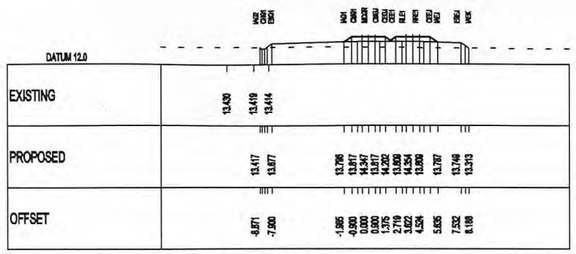
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR CHA 8300 - CHA 8950

Original Size A1
Drawing No: 61-27426-C043
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C043.dwg



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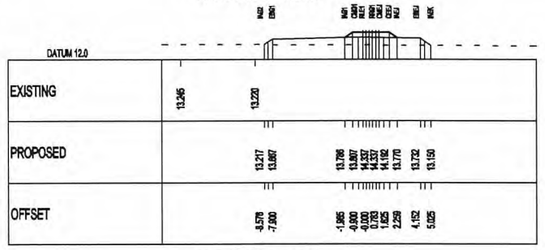

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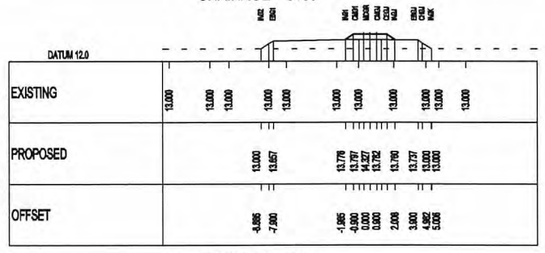

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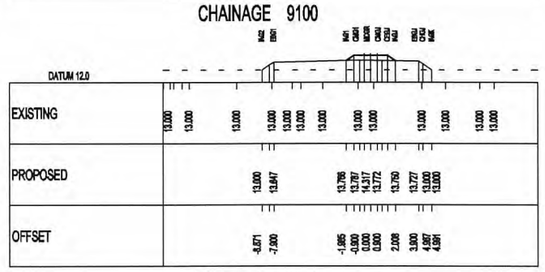

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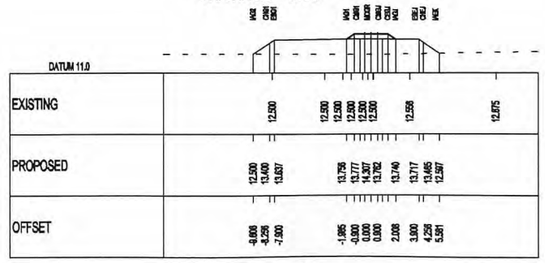

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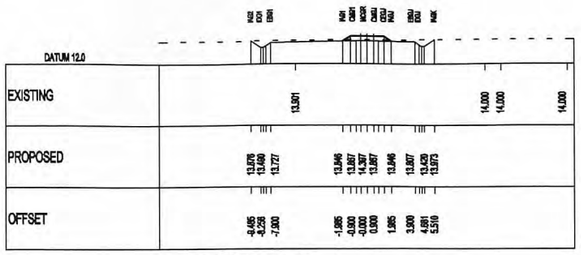

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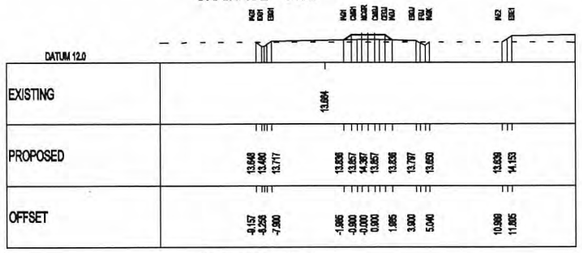

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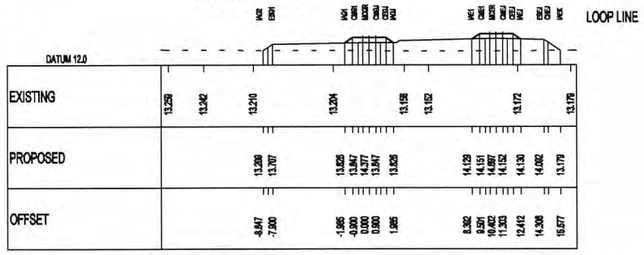

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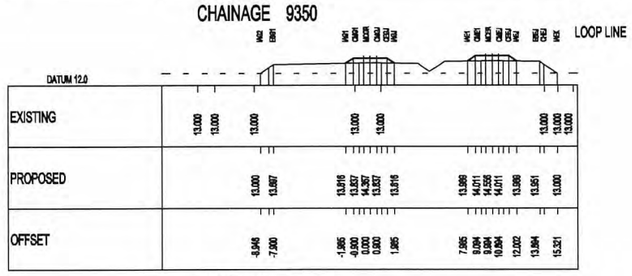

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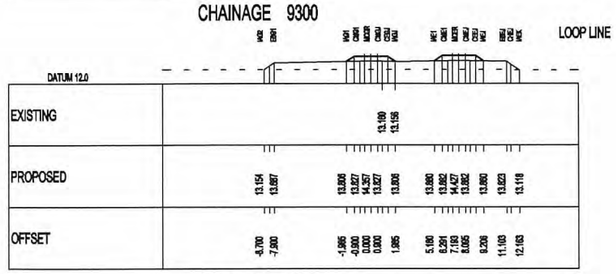

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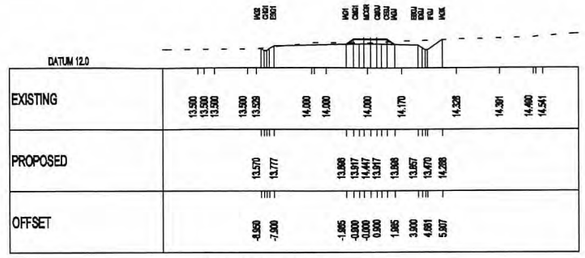

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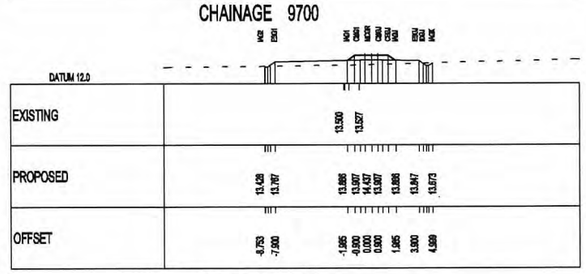
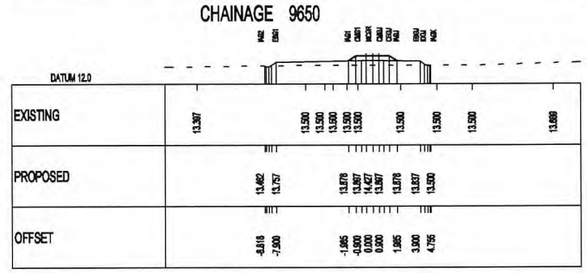


CHAINAGE 9650



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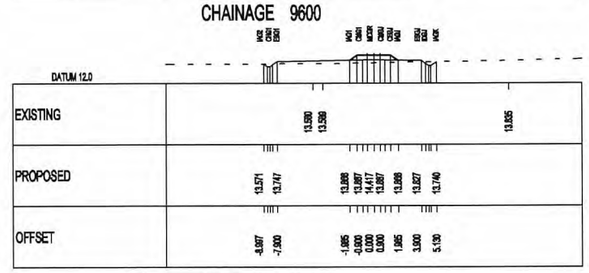

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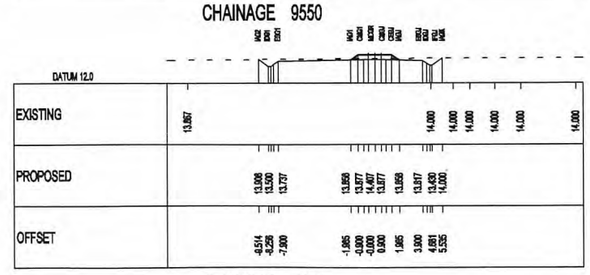

CHAINAGE 9500

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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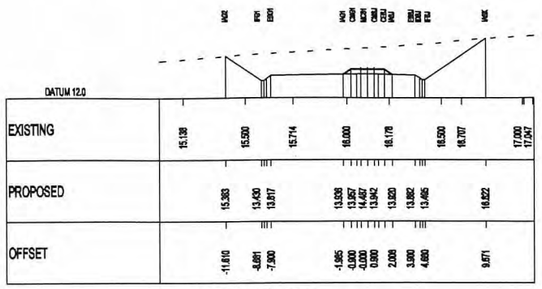
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: CROSS SECTIONS - MCGR
CHA 9150 - CHA 9800

Original Size: A1
Drawing No: 61-27426-C044
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU
Cad File No: G:\61\27426\CADD\Drawings\61-27426-C044.dwg



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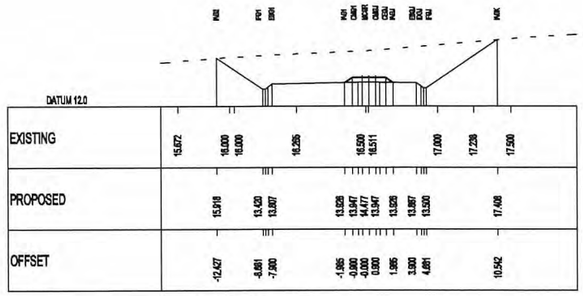

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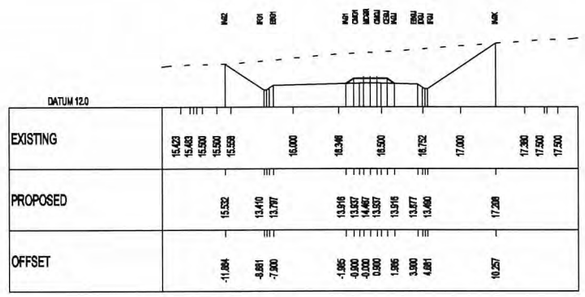

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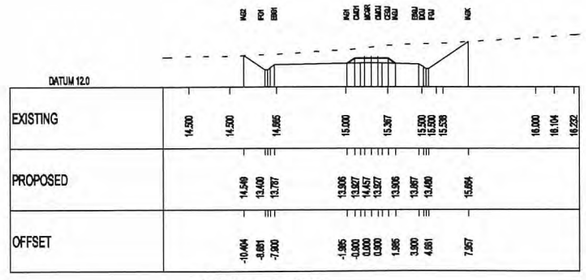

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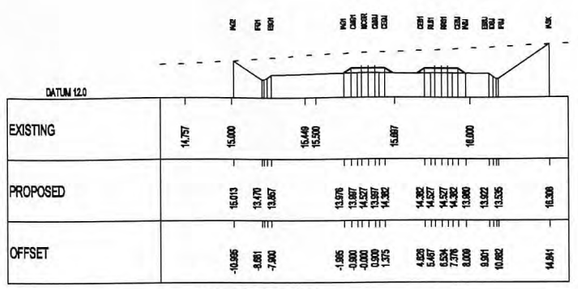

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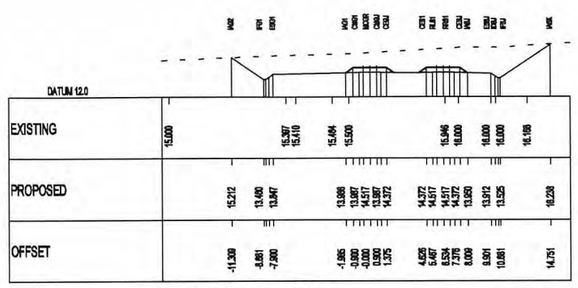

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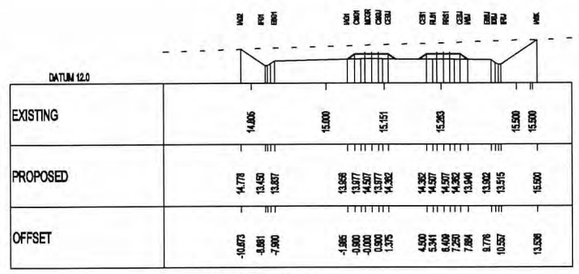

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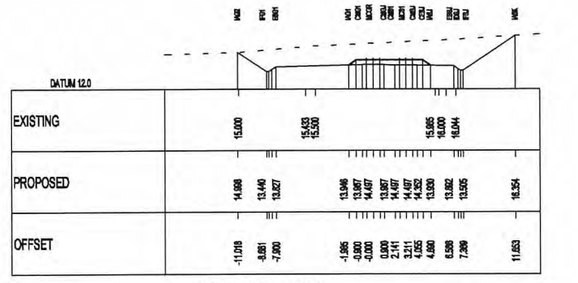

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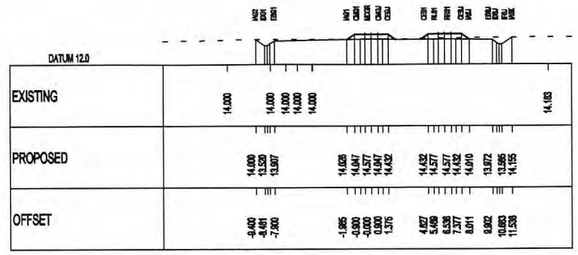

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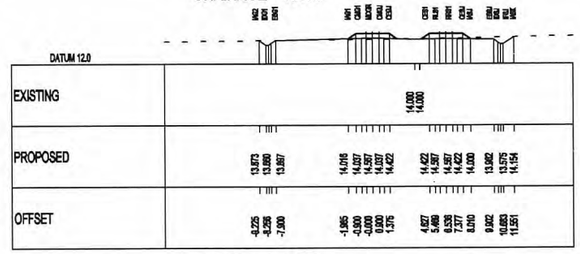

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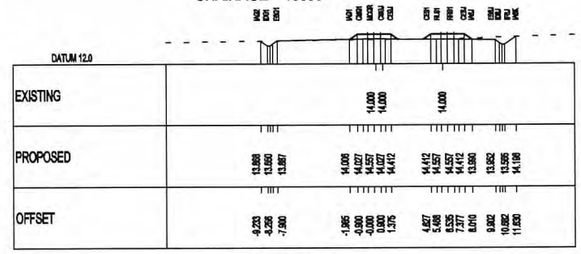

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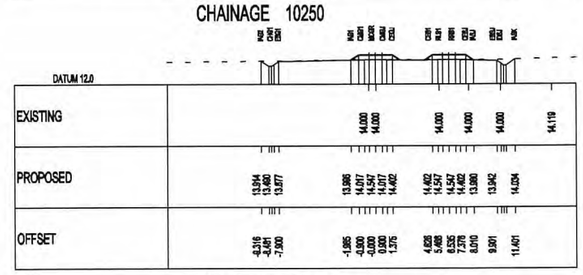

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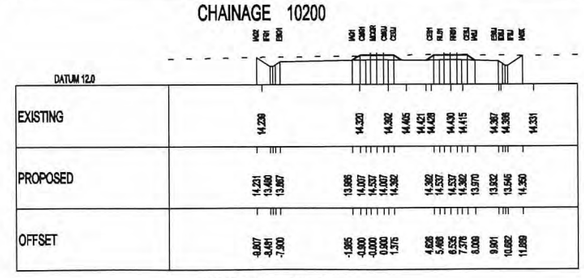

CHAINAGE 10150

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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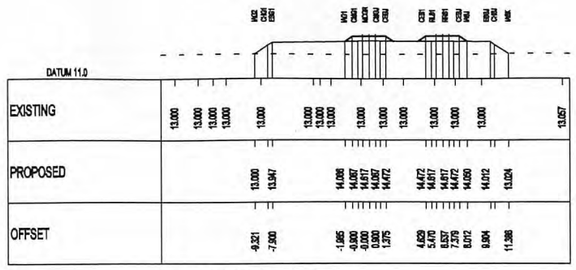
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR
CHA 9750 - CHA 10350

Original Size A1
Drawing No: 61-27426-C045
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C045.dwg



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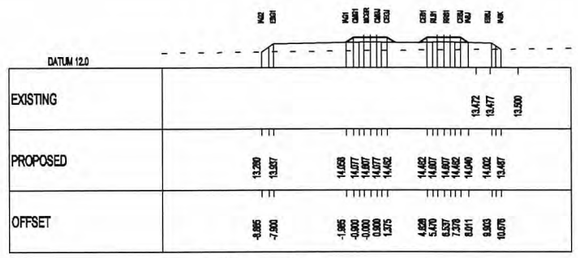
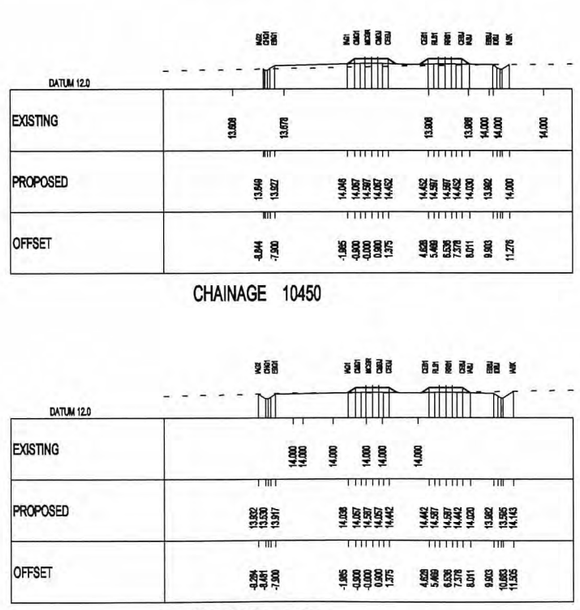


CHAINAGE 10500

CHAINAGE 10450



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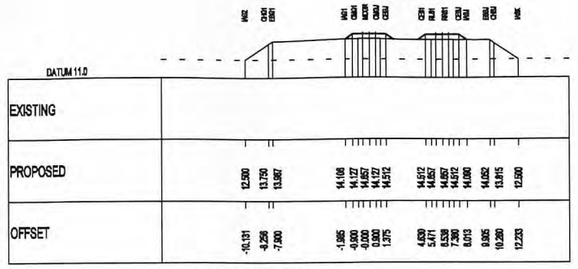

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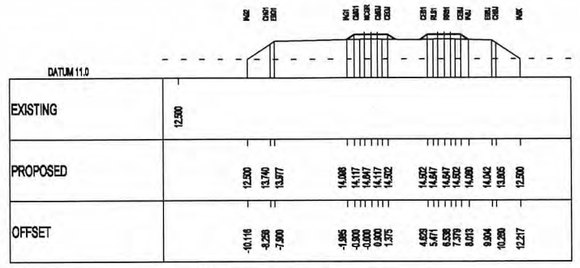
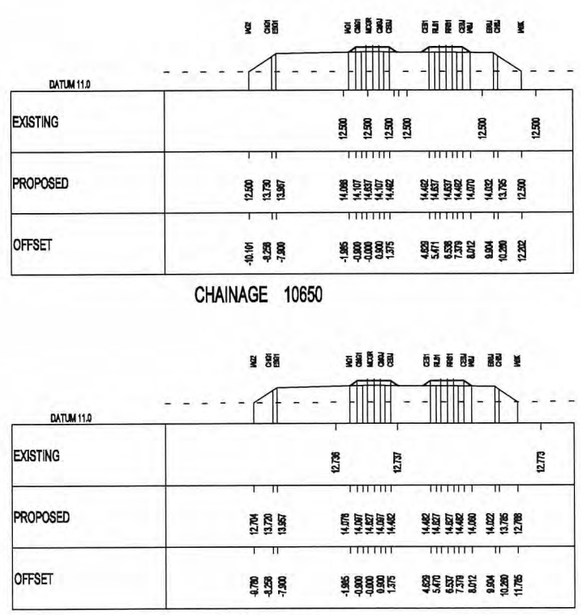


CHAINAGE 10700

CHAINAGE 10650



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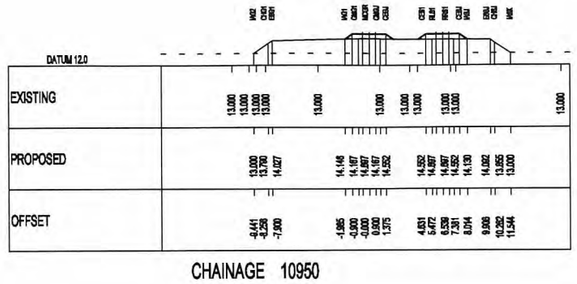

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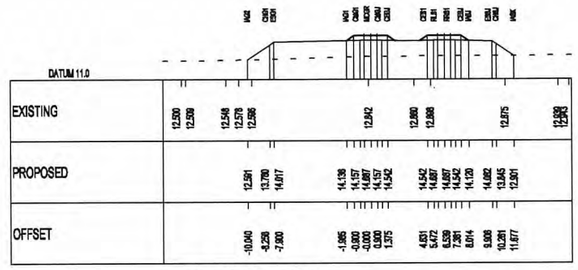

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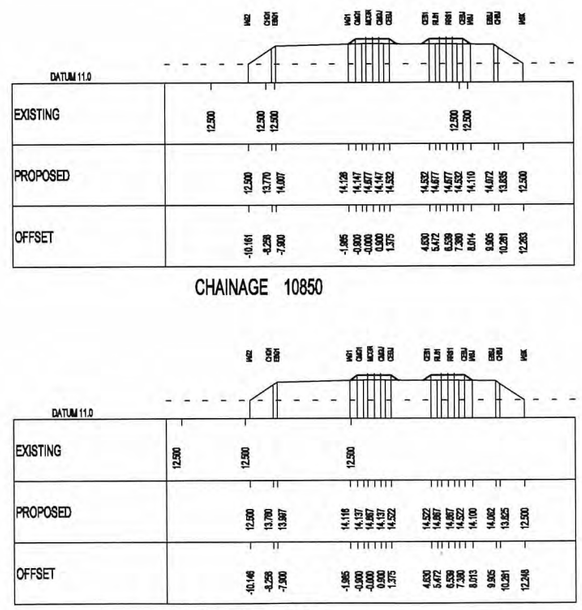

CHAINAGE 10800

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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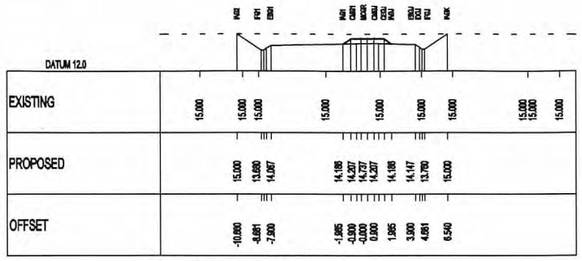
DO NOT SCALE

Drawn A. HORTON		Designer S. GEERLINGS	
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved		

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR
CHA 10400 - CHA 10950

Original Size A1 Drawing No: 61-27426-C046 Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C046.dwg



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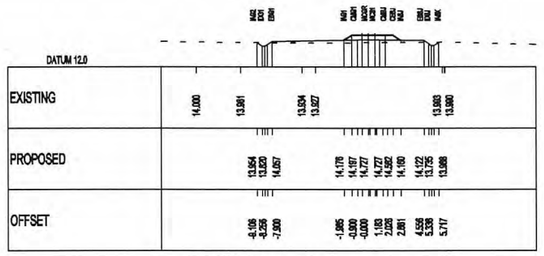

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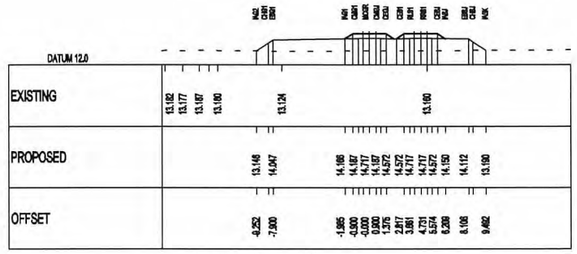

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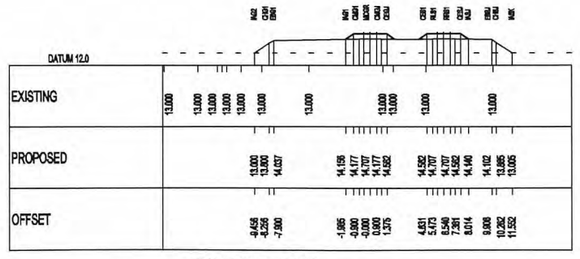

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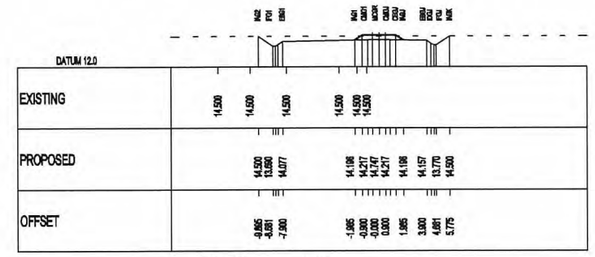

CHAINAGE 11200

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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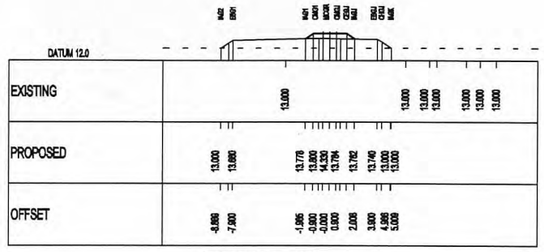
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCGR CHA 11000 - CHA 11200

Original Size A1 | Drawing No: 61-27426-C047 | Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C047.dwg



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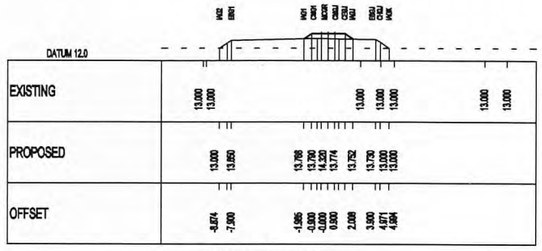

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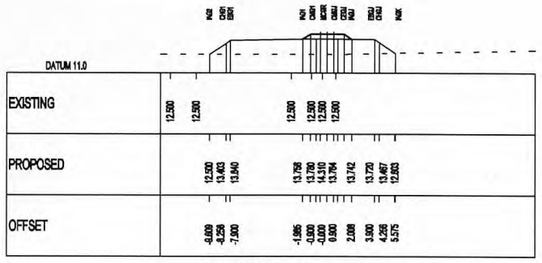

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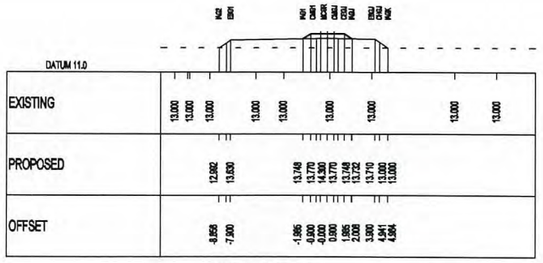

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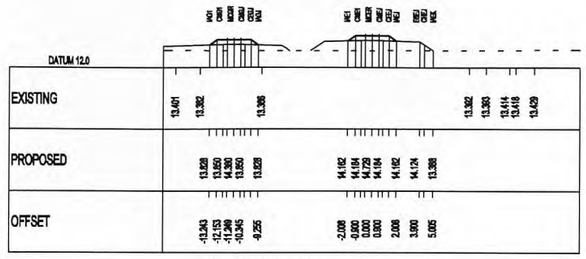

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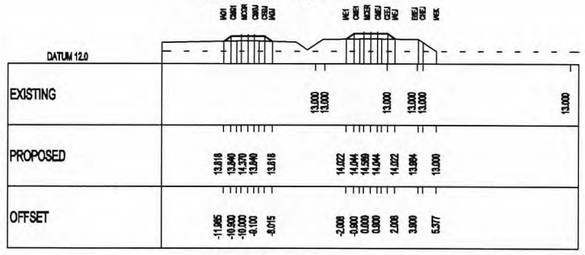

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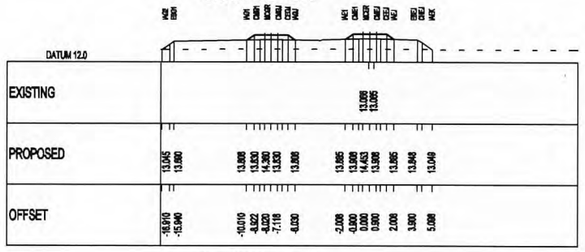

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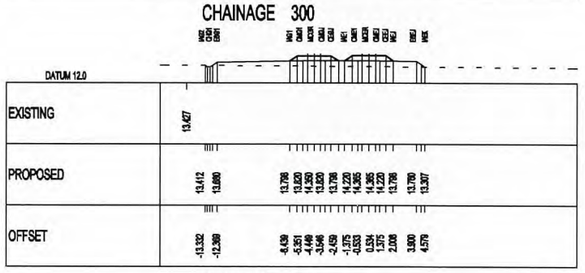

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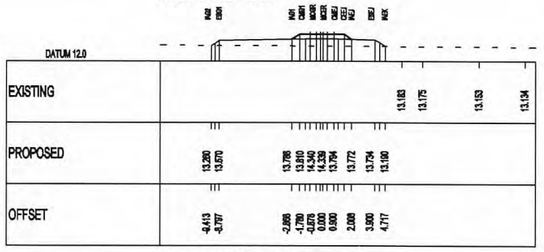

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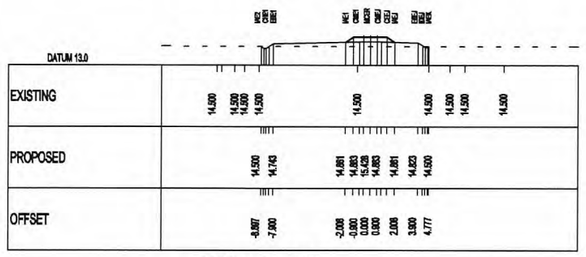

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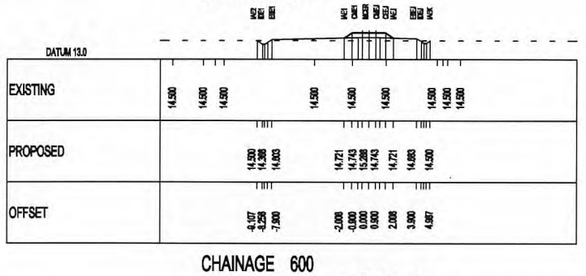

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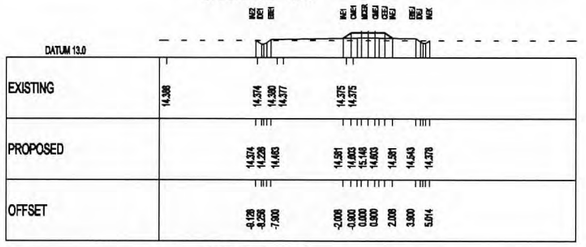

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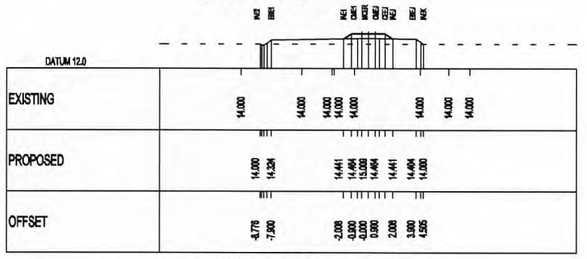

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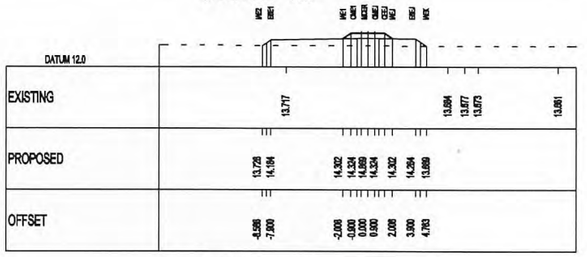

CHAINAGE 450

PRELIMINARY

No	Revision Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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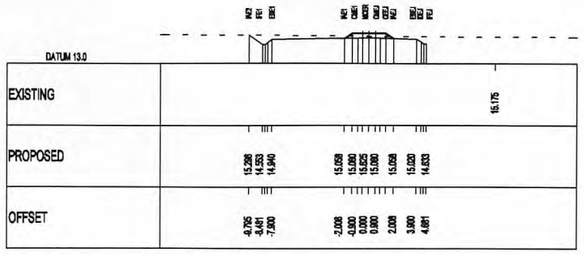
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCER
CHA 0 - CHA 650

Original Size A1 Drawing No: 61-27426-C055 Rev: A

Plot Date: 13 February 2012 - 2:01 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C055.dwg



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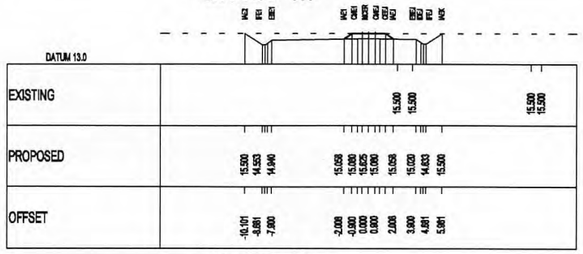

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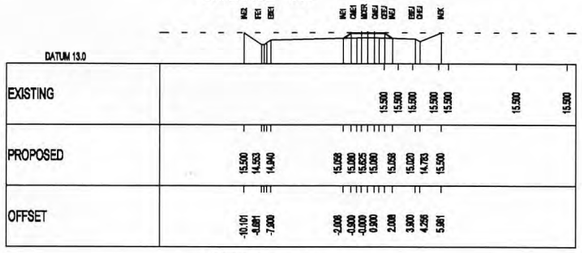

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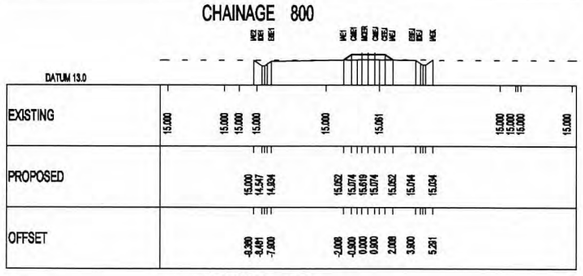

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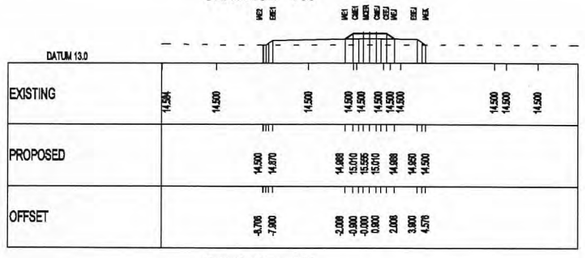

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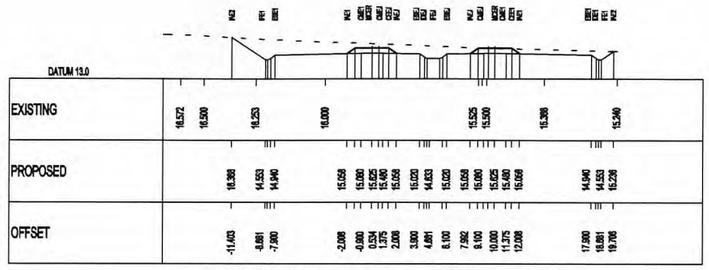

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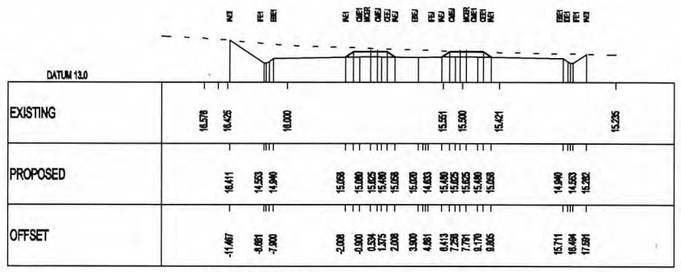

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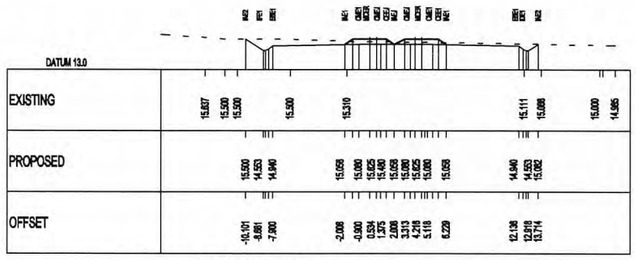

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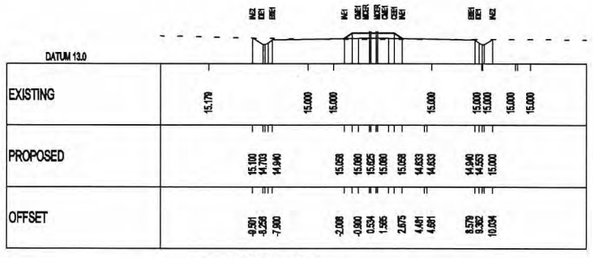

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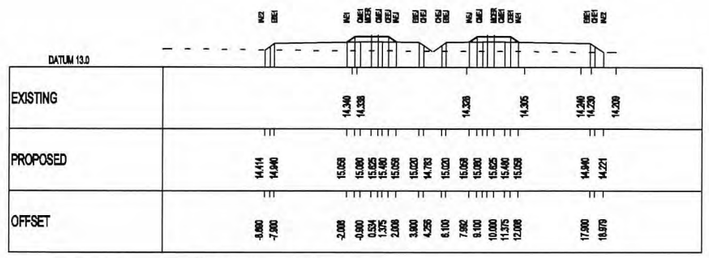

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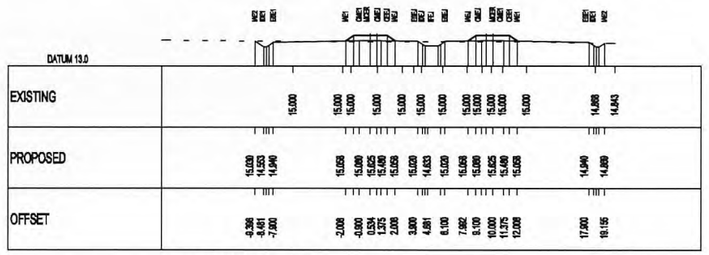

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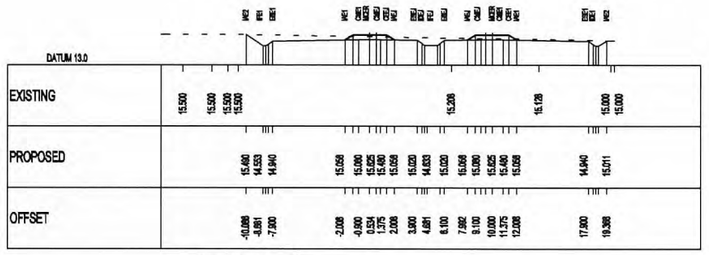

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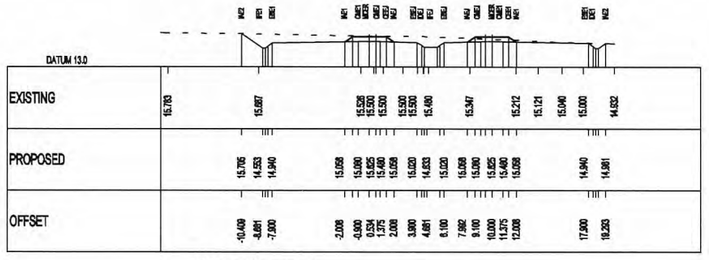

CHAINAGE 1150

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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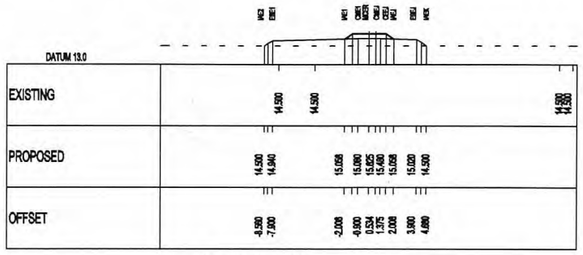
DO NOT SCALE

Drawn A. HORTON		Designer S. GEERLINGS
Drafting Check		Design Check
Approved (Project Director)		
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCER
CHA 700 - CHA 1300

Original Size A1
Drawing No: 61-27426-C056
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C056.dwg



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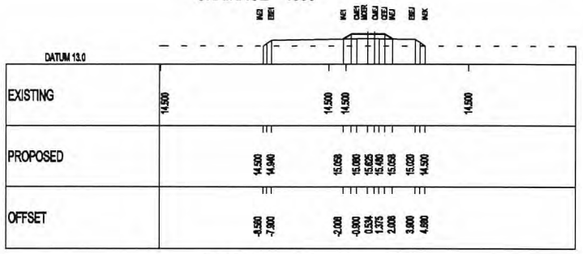

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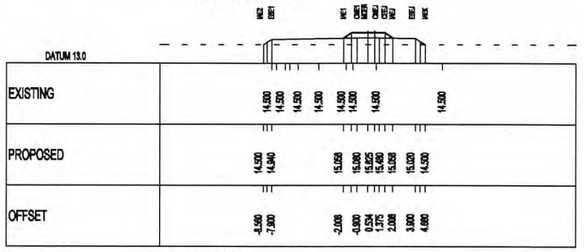

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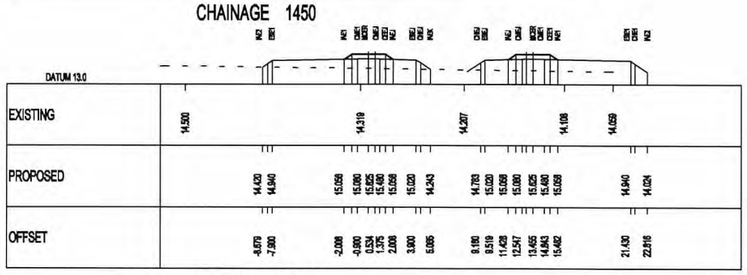

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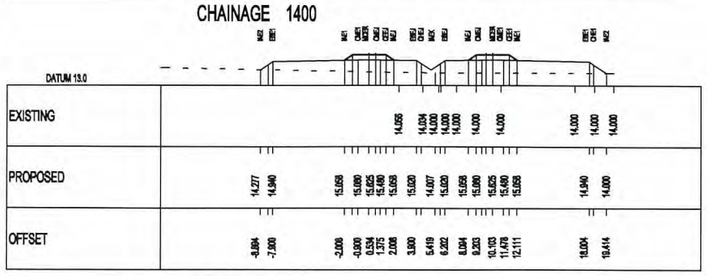

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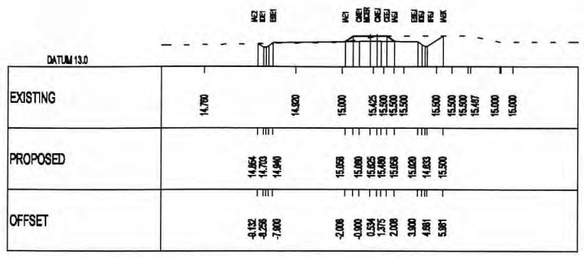

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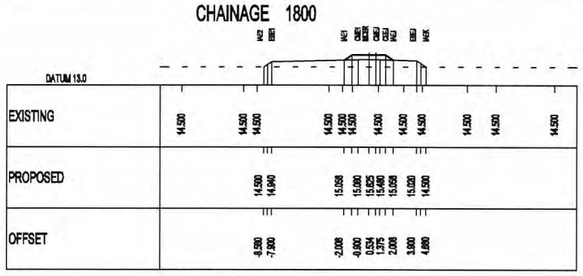

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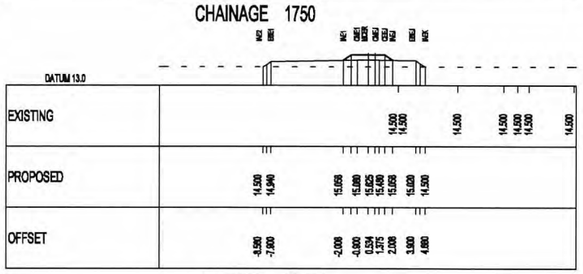

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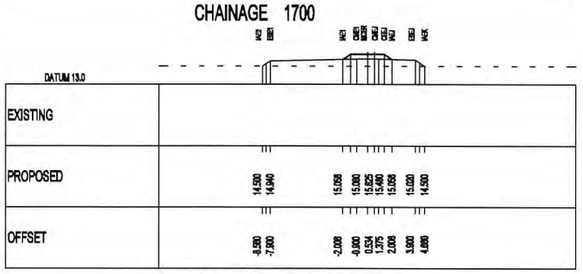

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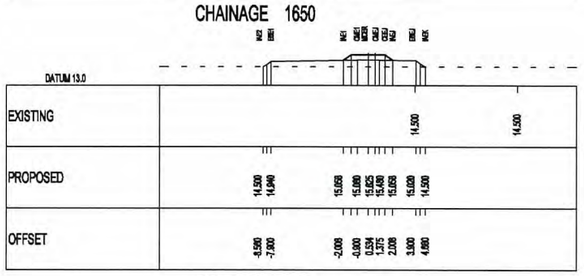

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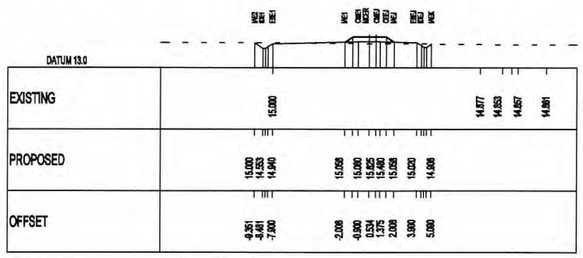

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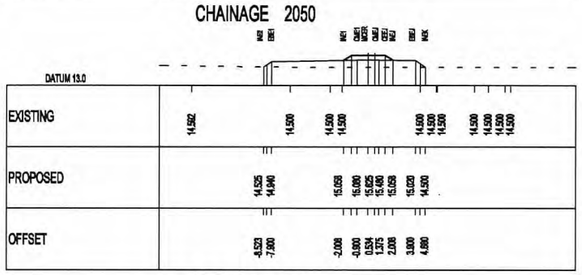

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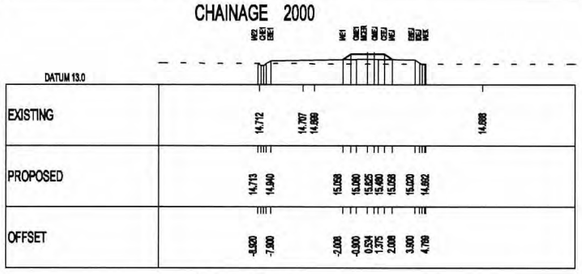

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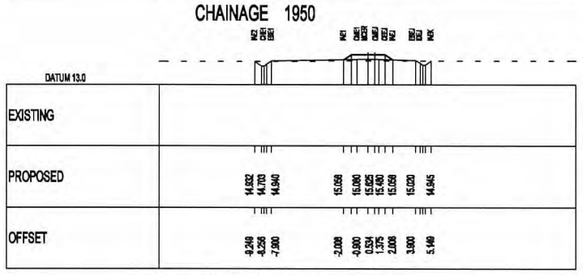

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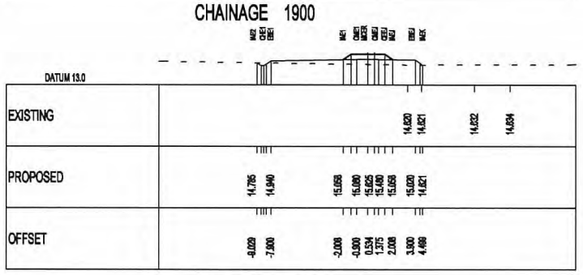

CHAINAGE 1850

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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SCALE 1:250 AT ORIGINAL SIZE

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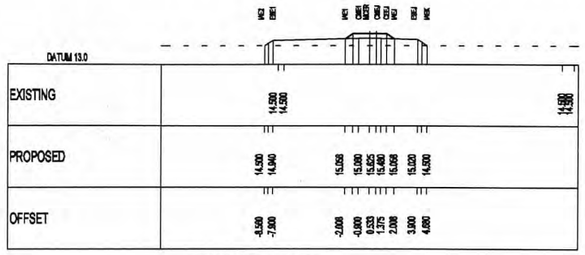
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: CROSS SECTIONS - MCER
CHA 1350 - CHA 2050

Original Size: A1
Drawing No: 61-27426-C057
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C057.dwg



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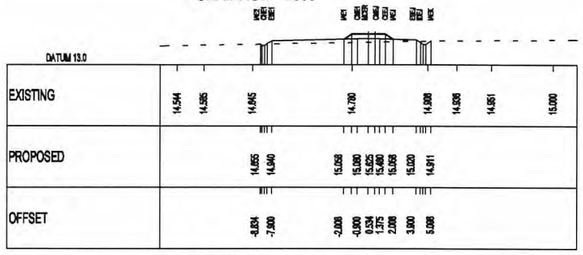

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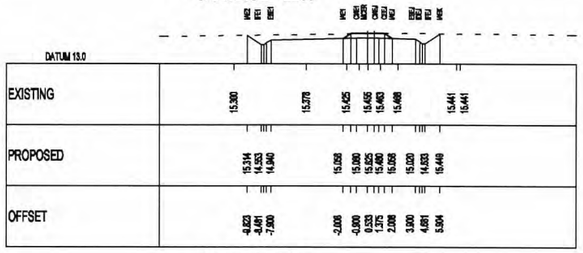

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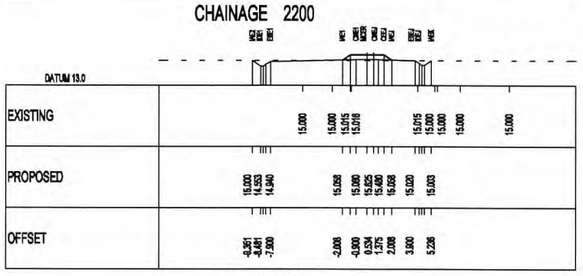

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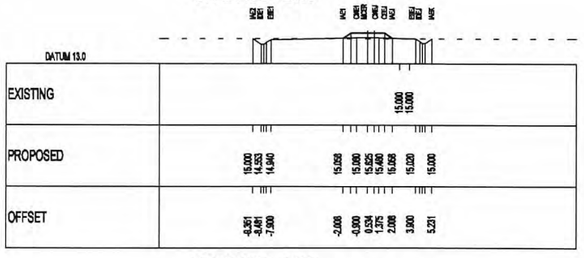

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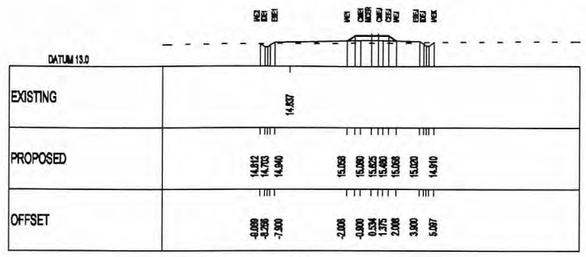

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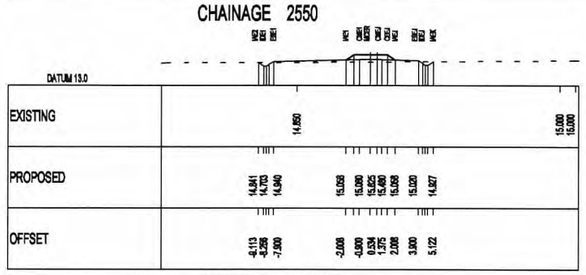

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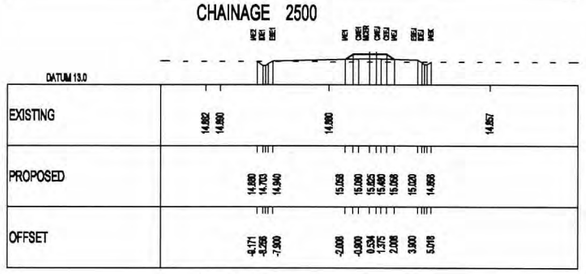

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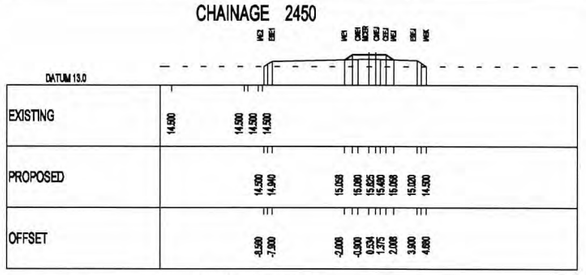

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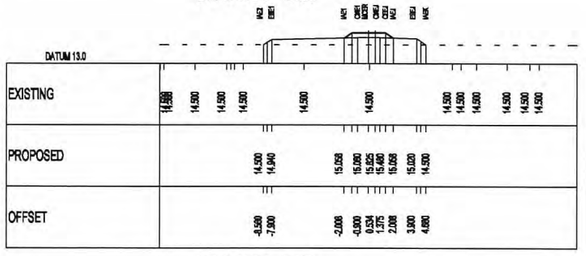

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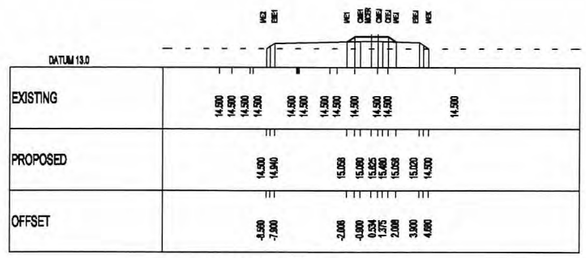

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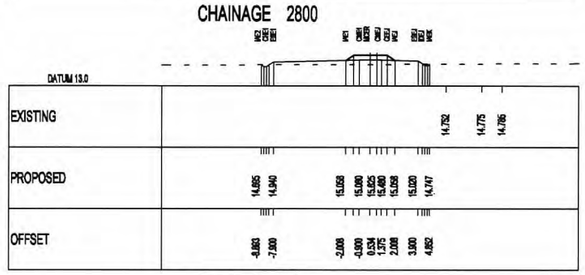

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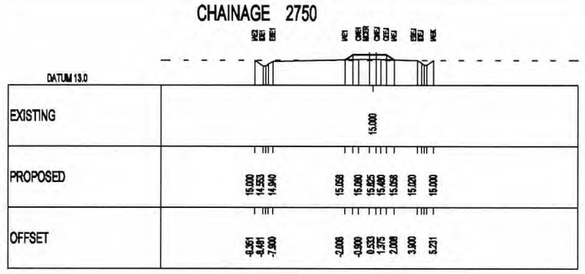

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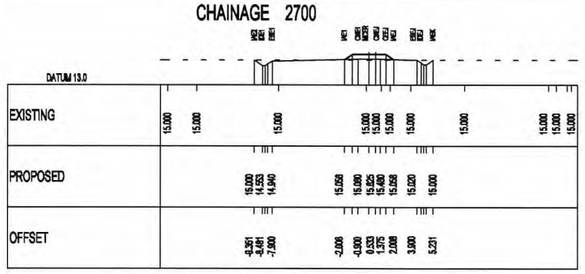

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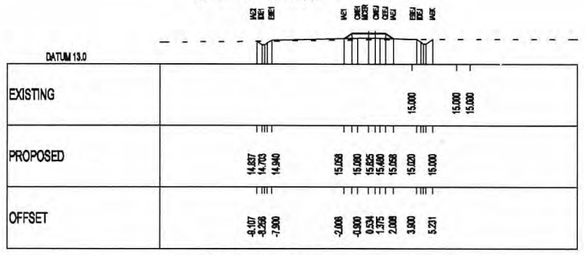

CHAINAGE 2600

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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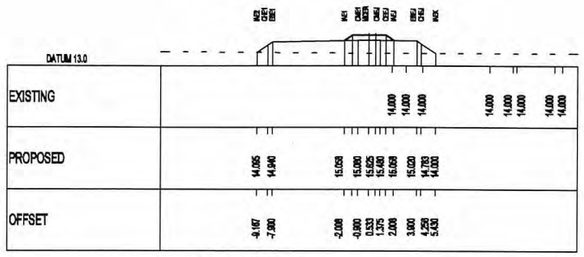
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client: LANDCORP
Project: KEMERTON INDUSTRIAL PARK
Title: CROSS SECTIONS - MCER
CHA 2100 - CHA 2800

Original Size: A1
Drawing No: 61-27426-C058
Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C058.dwg



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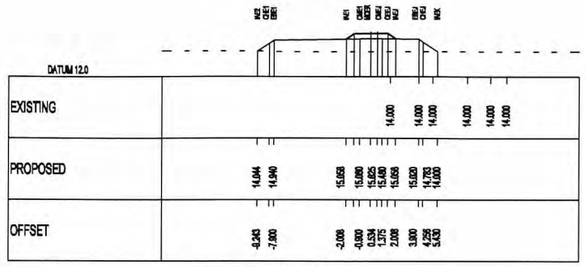

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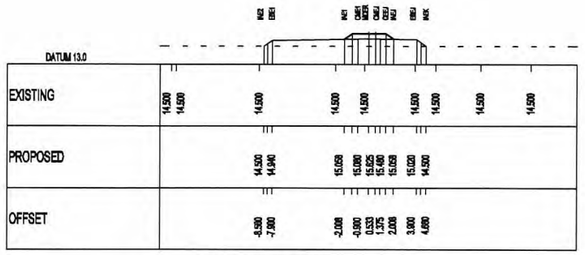

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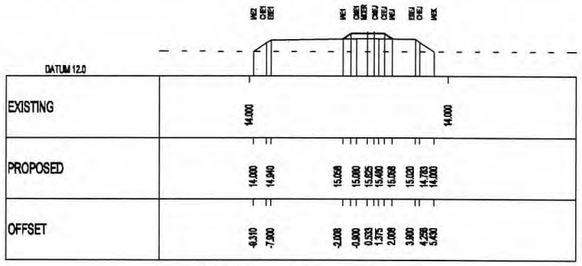

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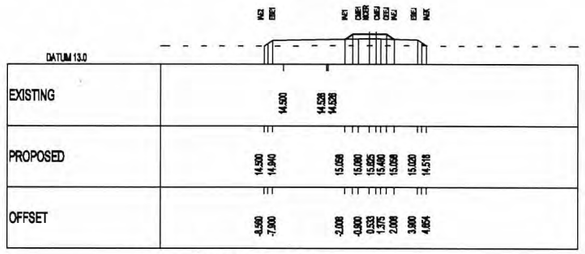

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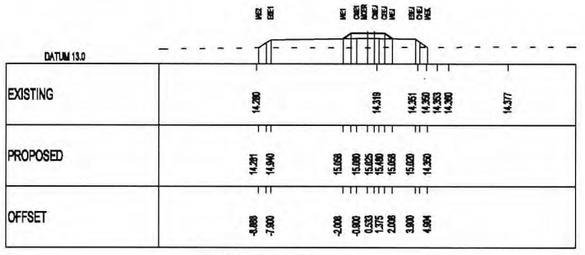

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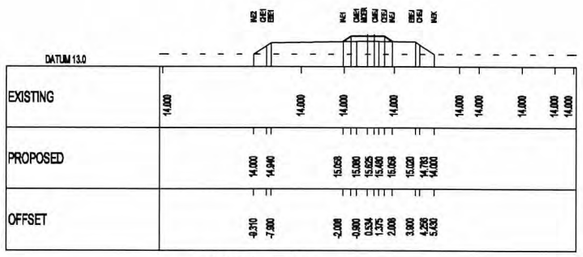

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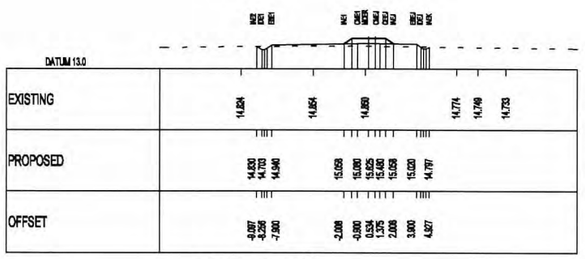

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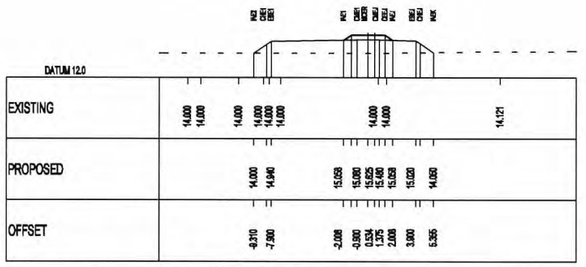

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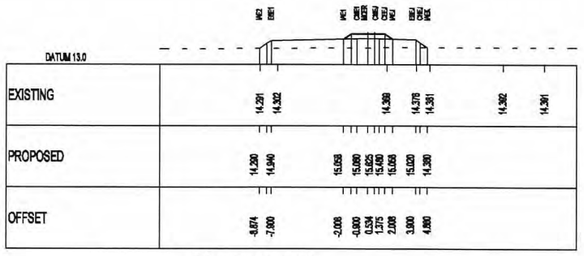

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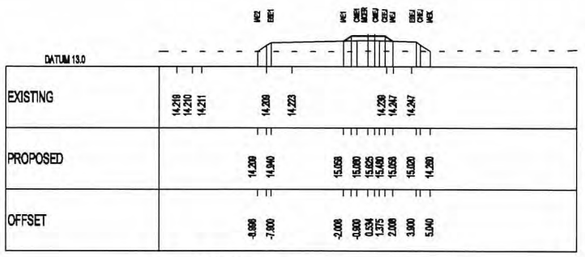

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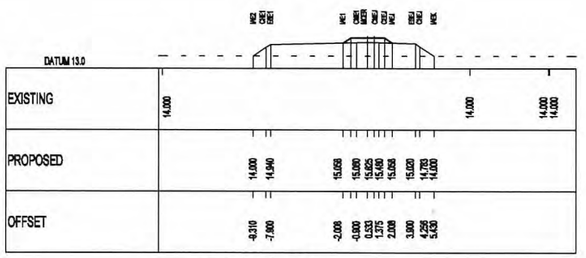

CHAINAGE 3250

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

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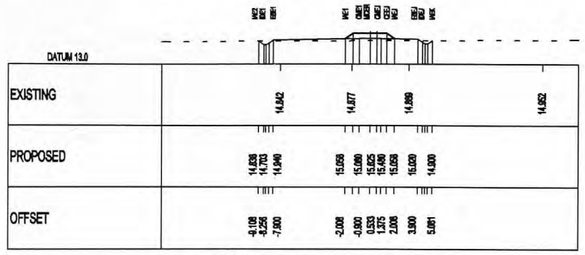
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	Client **LANDCORP**
Drafting Check	Design Check	Project **KEMERTON INDUSTRIAL PARK**
Approved (Project Director)		Title **CROSS SECTIONS - MCER CHA 2850 - CHA 3400**
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size **A1** Drawing No: **61-27426-C059** Rev: **A**

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C059.dwg



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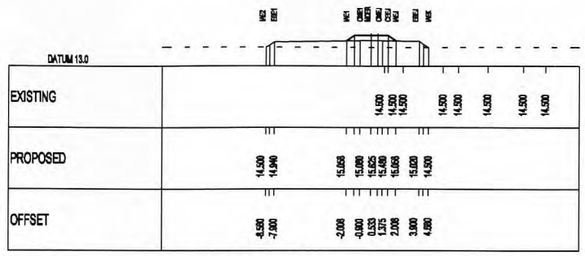

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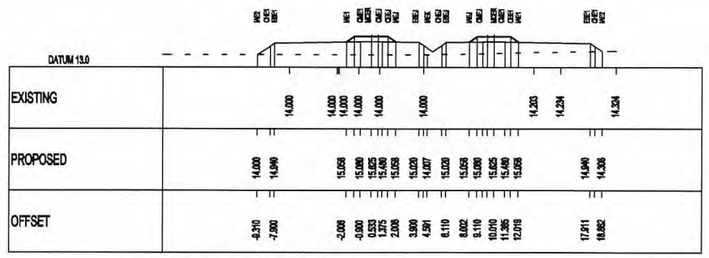

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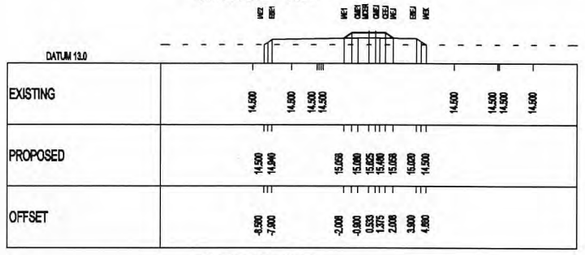

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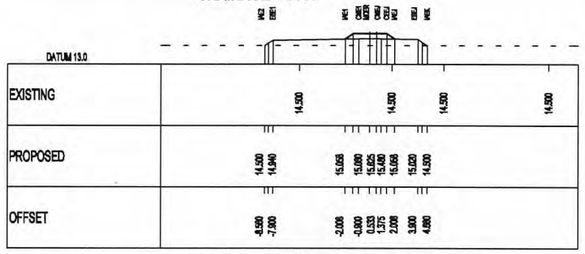

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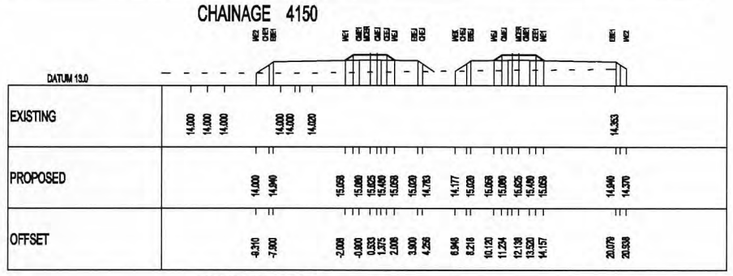

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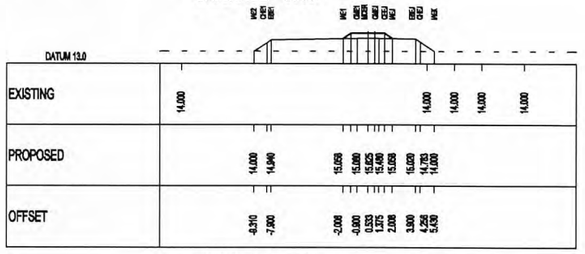

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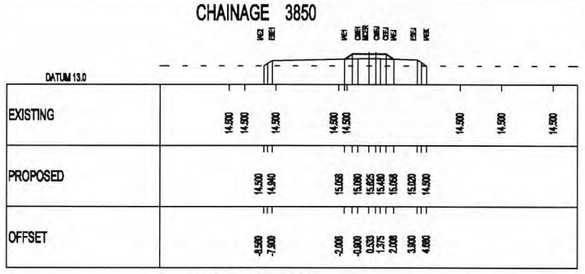

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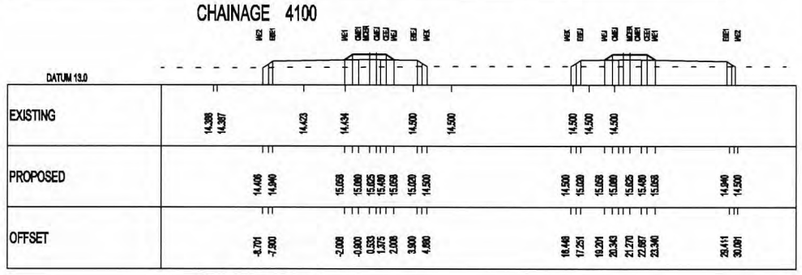

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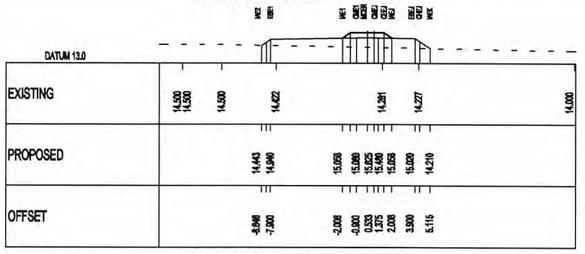

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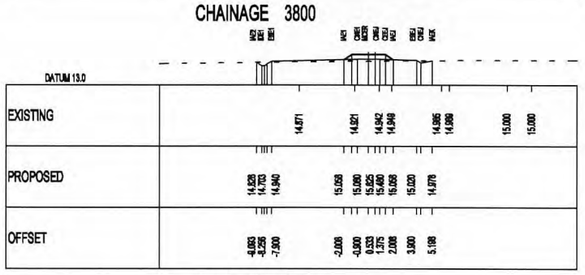

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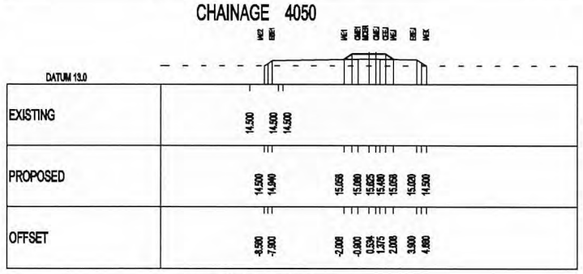

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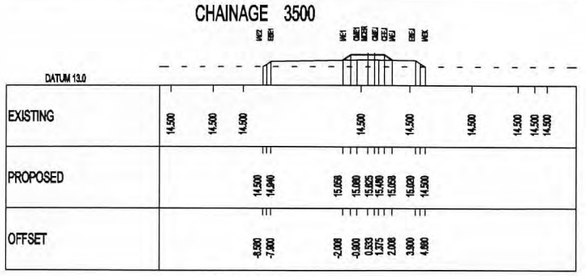

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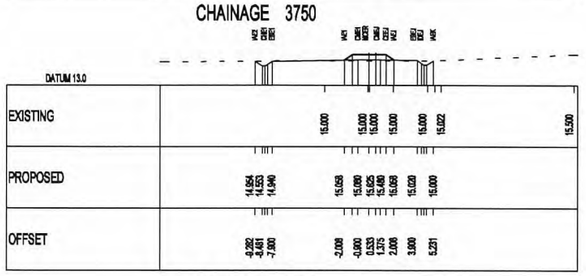

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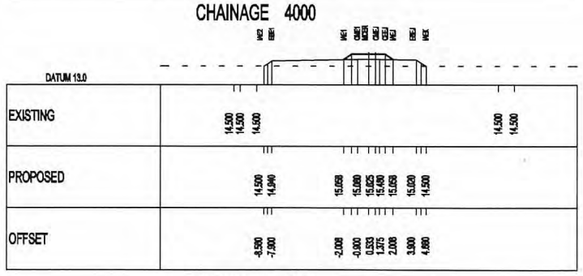

CHAINAGE 3950

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m

SCALE 1:250 AT ORIGINAL SIZE

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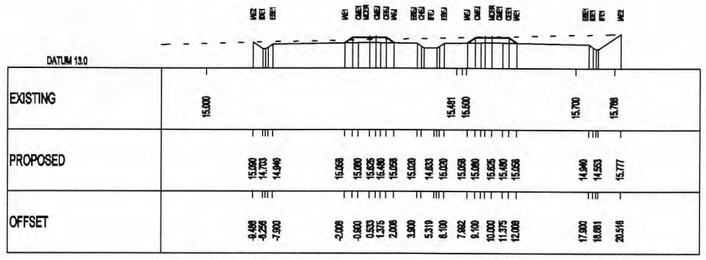
Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MCER CHA 3450 - CHA 4150

Original Size A1 Drawing No: 61-27426-C060 Rev: A

Plot Date: 13 February 2012 - 2:02 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C060.dwg



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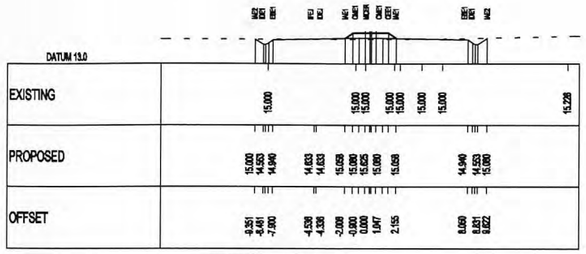

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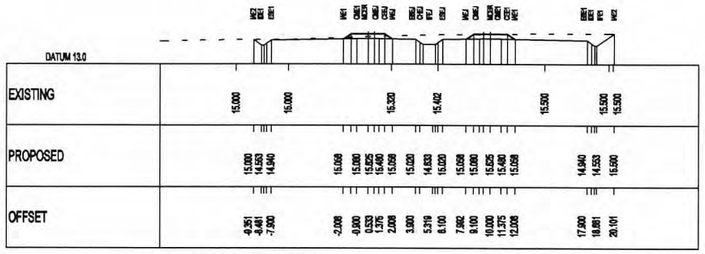

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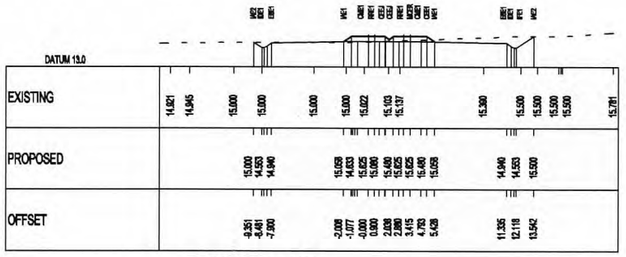

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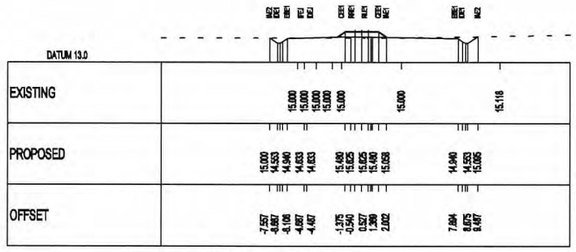

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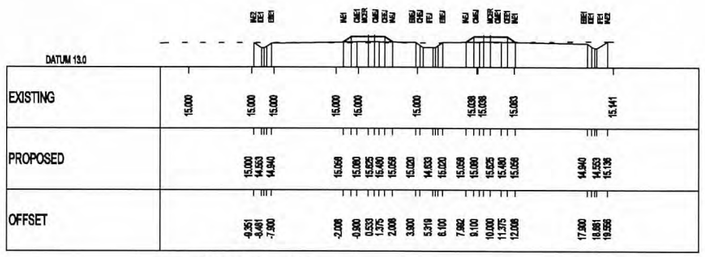

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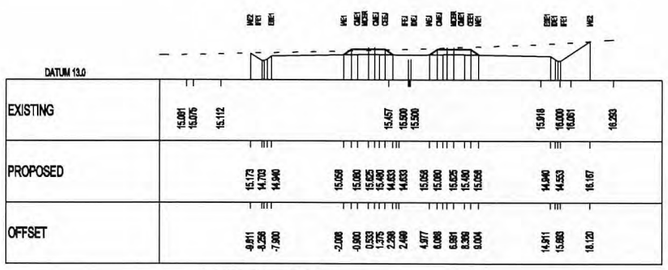

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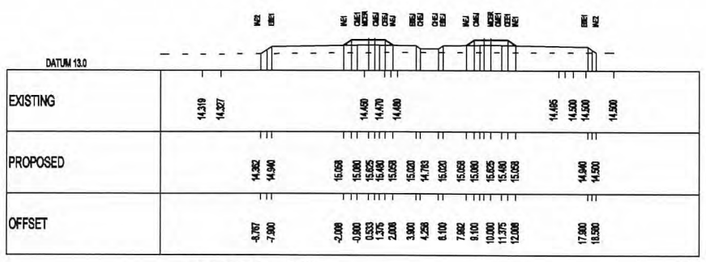

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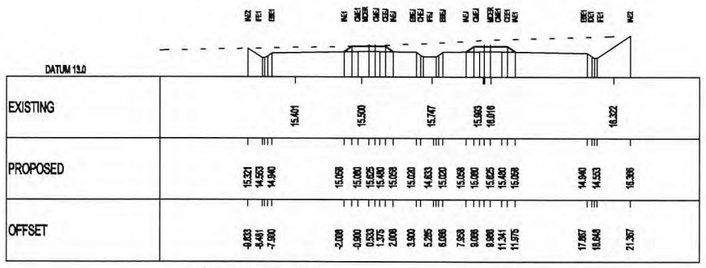

CHAINAGE 4400

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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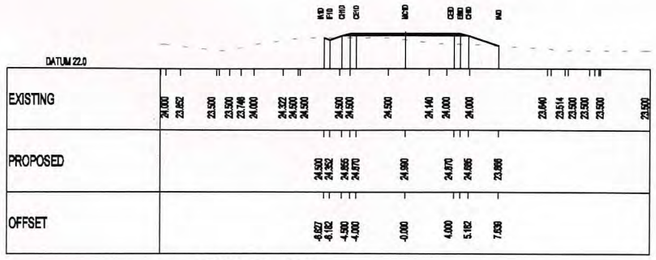
Drawn A. HORTON	Designer S. GEERLINGS	Client LANDCORP
Drafting Check	Design Check	Project KEMERTON INDUSTRIAL PARK
Approved (Project Director)		Title CROSS SECTIONS - MCER CHA 4200 - CHA 4260
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size A1

Drawing No: 61-27426-C061 Rev: A

Plot Date: 13 February 2012 - 2:04 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C061.dwg



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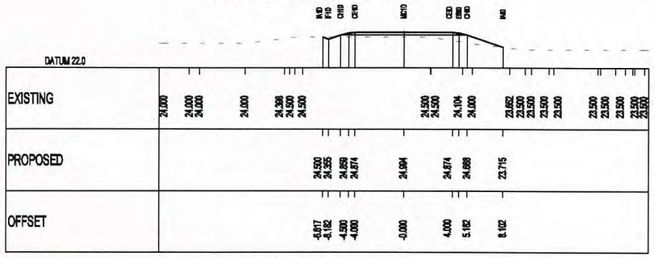

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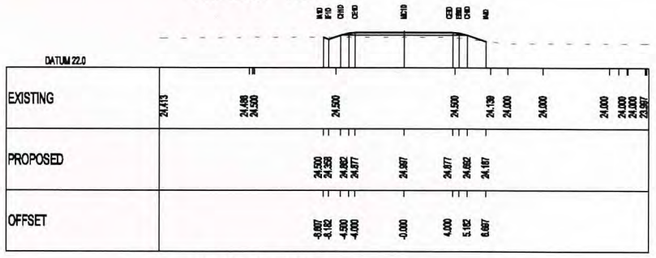

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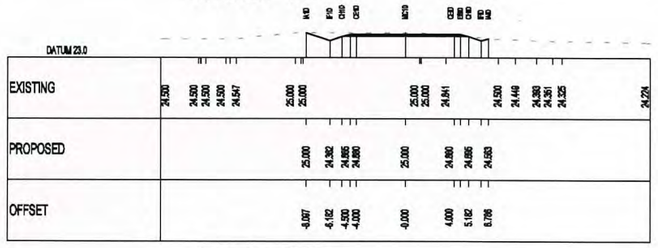

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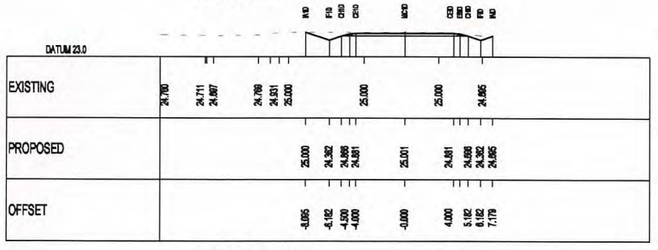

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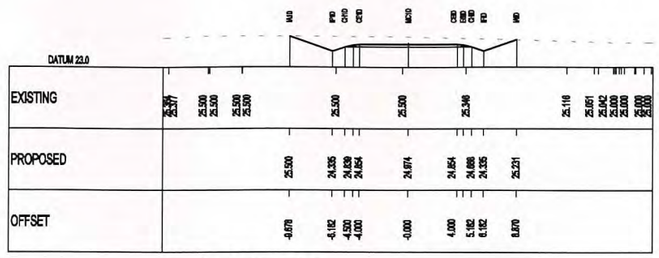

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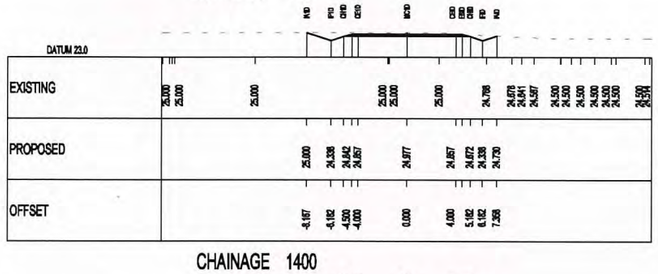

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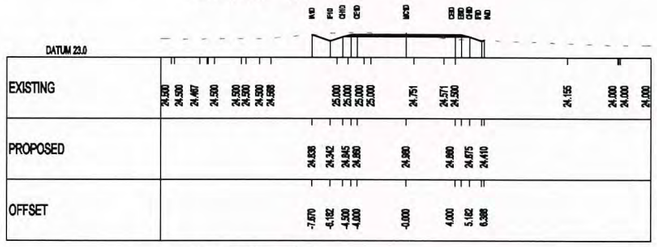

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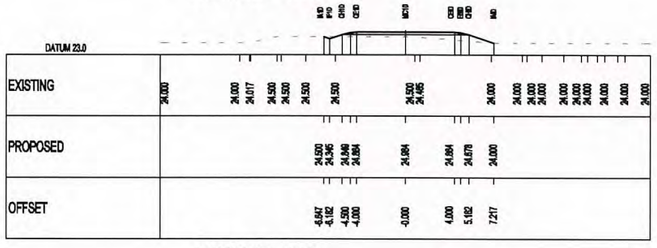

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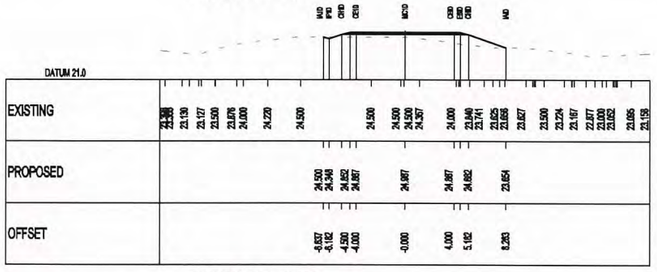

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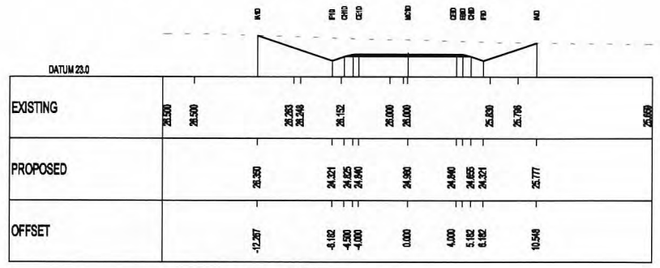

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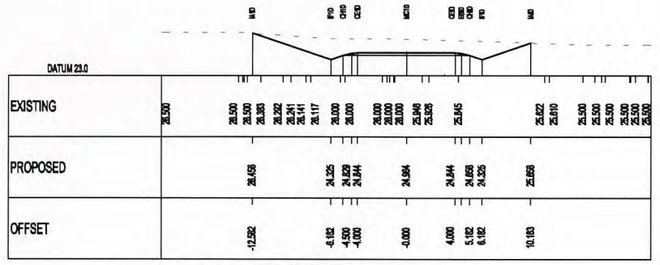

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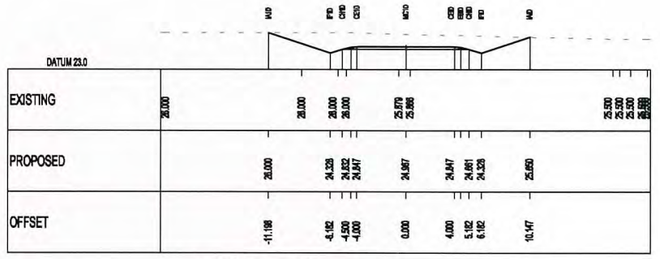

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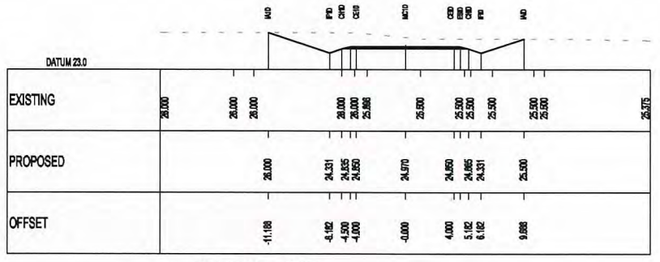

CHAINAGE 1500

PRELIMINARY

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SCALE 1:250 AT ORIGINAL SIZE

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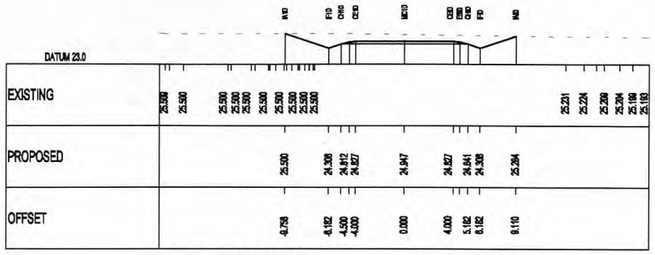
DO NOT SCALE

Drawn A. HORTON		Designer S. GEERLINGS	
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size A1	Drawing No: 61-27426-C065 Rev: A

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MC1D
CHA 1040 - CHA 1650

Plot Date: 13 February 2012 - 2:04 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C065.dwg



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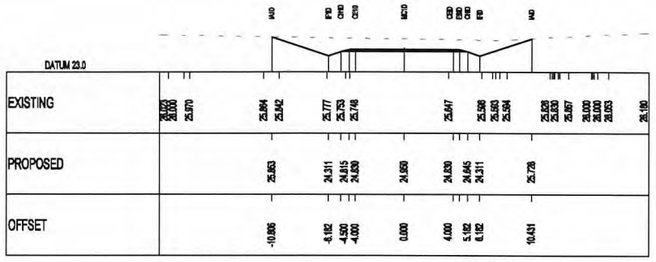

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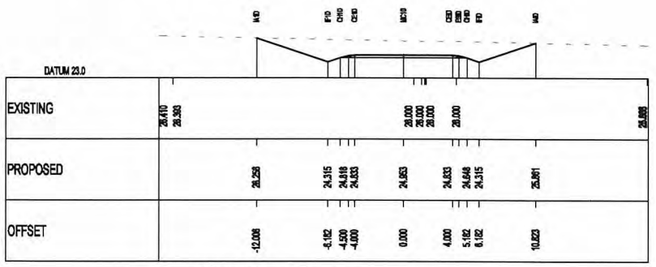

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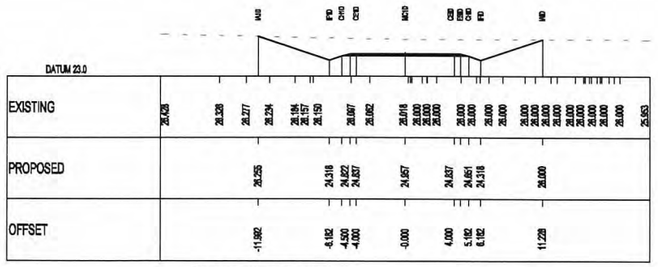

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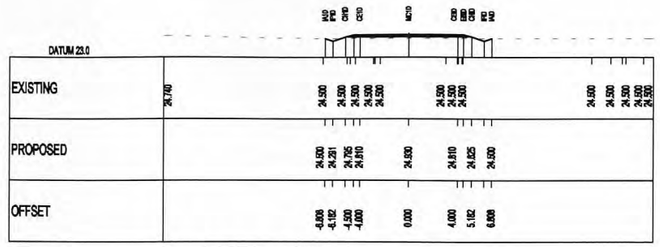

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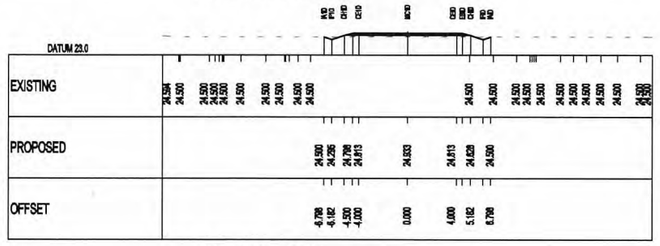

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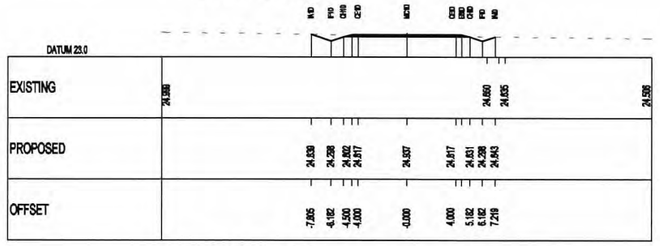

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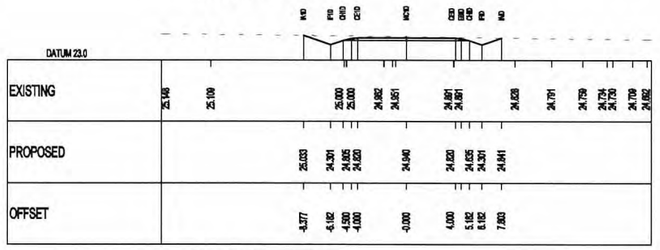

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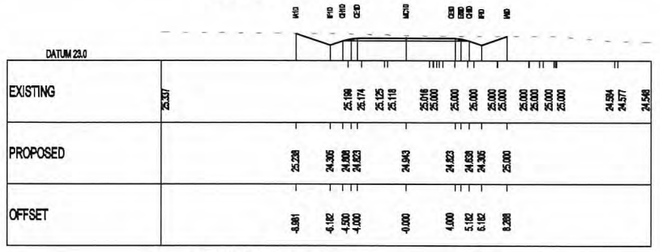

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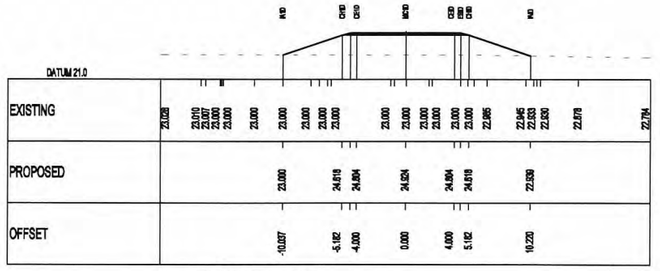

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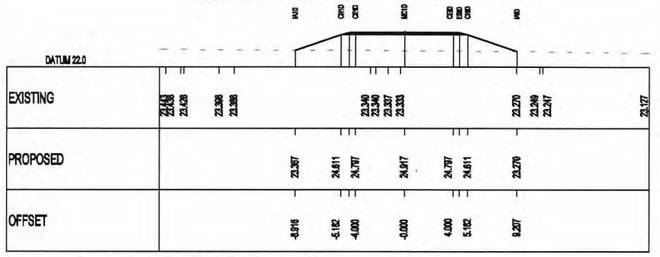

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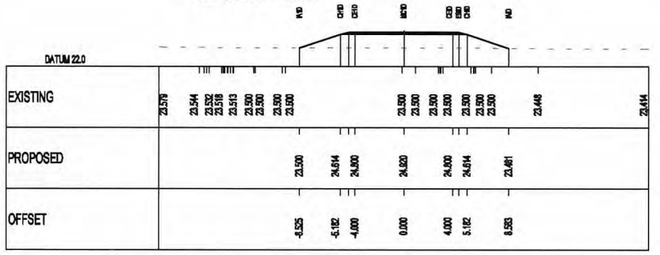

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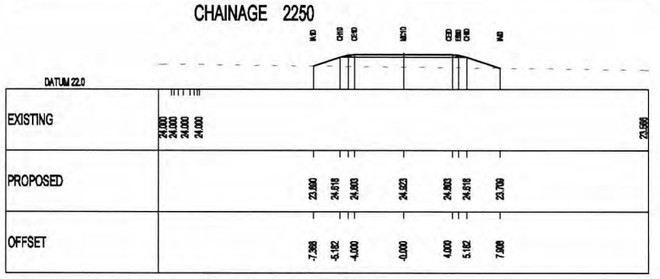

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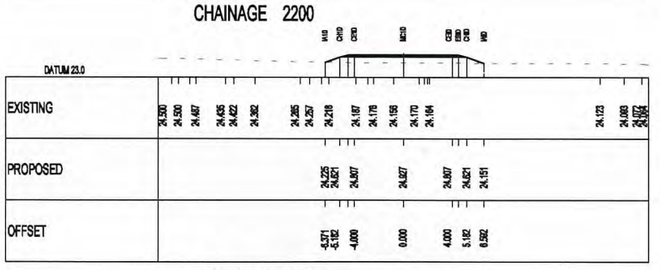

CHAINAGE 2150

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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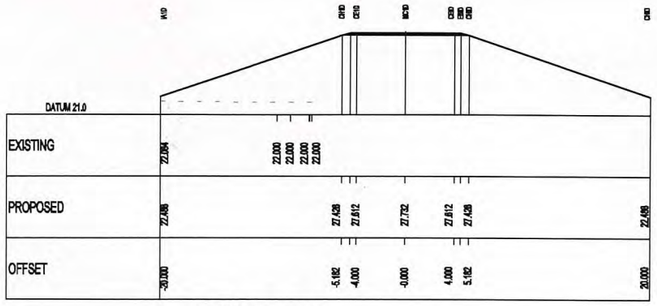
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **CROSS SECTIONS - MC1D**
CHA 1700 - CHA 2350

Original Size **A1** Drawing No: **61-27426-C066** Rev: **A**

Plot Date: 13 February 2012 - 2:04 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C066.dwg



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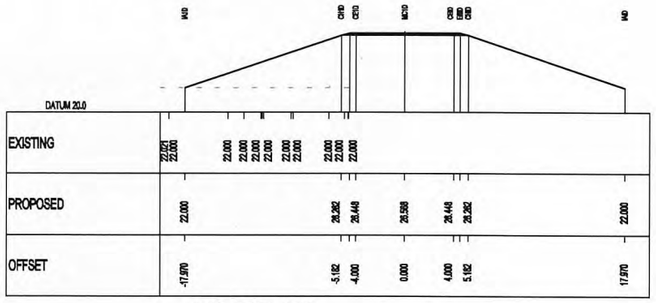

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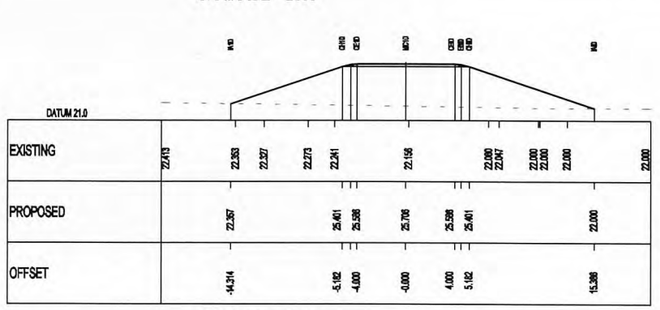

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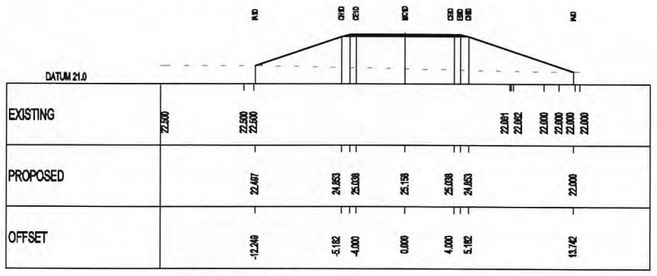

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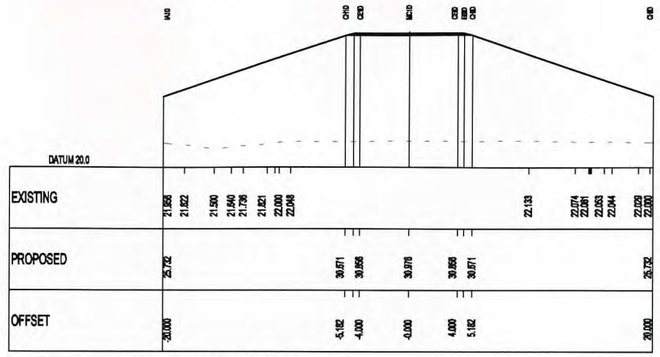

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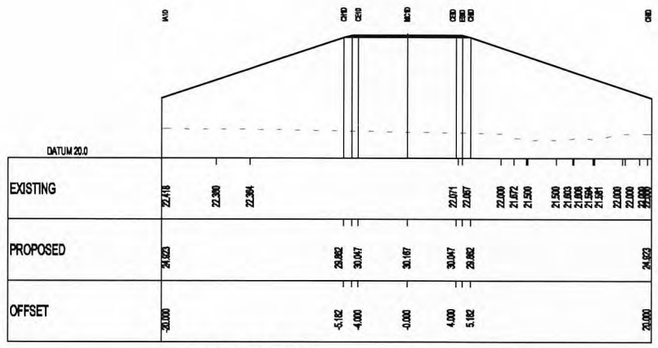

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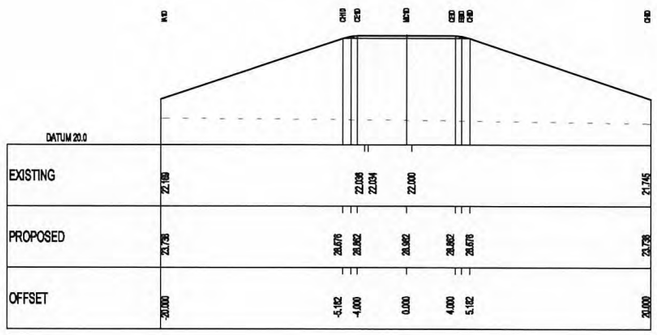

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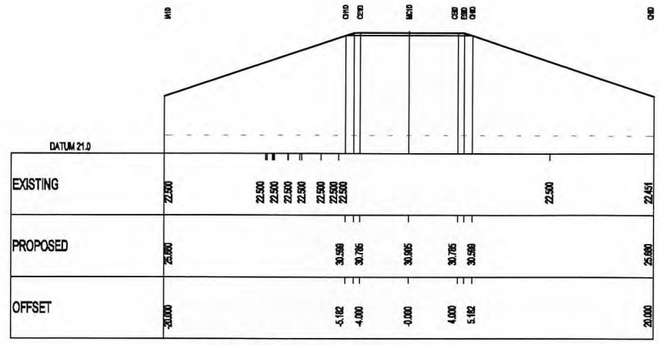

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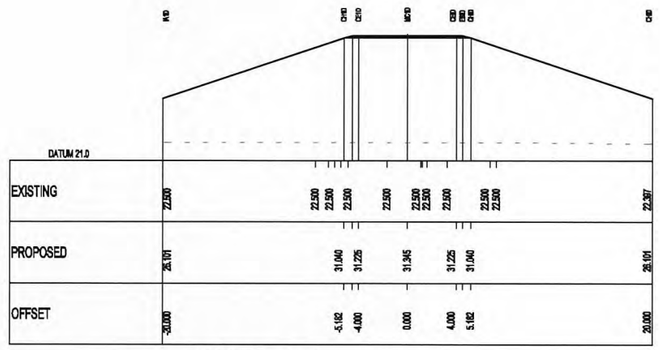

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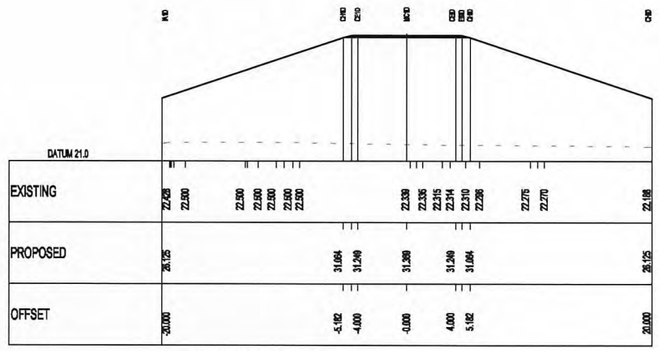

CHAINAGE 2750

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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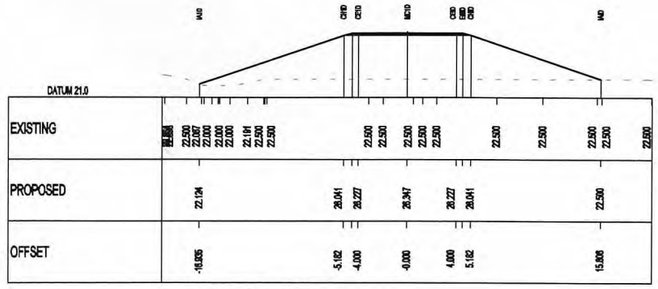
DO NOT SCALE

Drawn	A. HORTON	Designer	S. GEERLINGS
Drafting Check		Design Check	
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title CROSS SECTIONS - MC1D
CHA 2400 - CHA 2850

Original Size A1
Drawing No: 61-27426-C067
Rev: A

Plot Date: 13 February 2012 - 2:04 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C067.dwg



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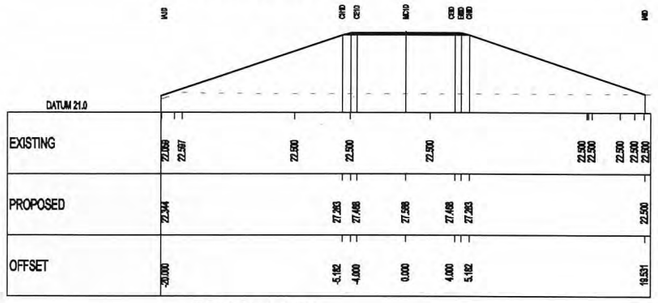

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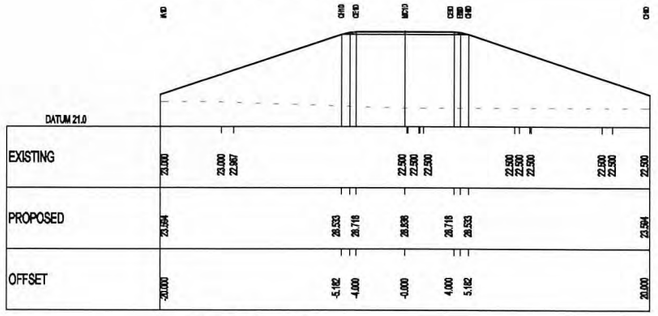

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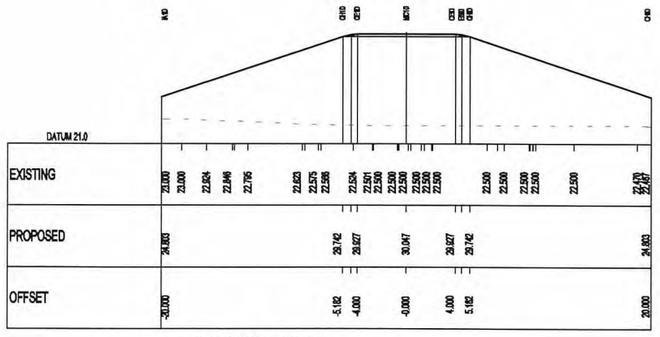

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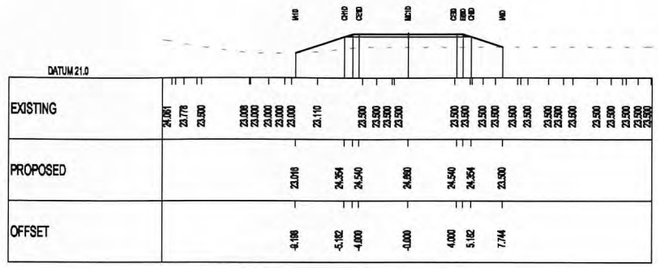

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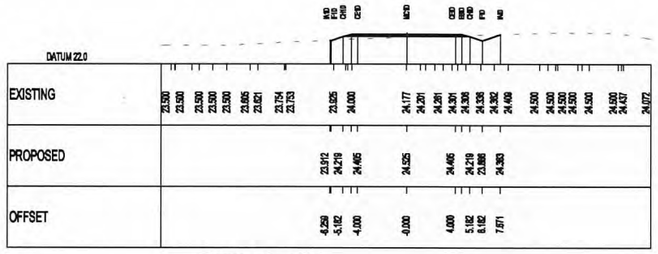

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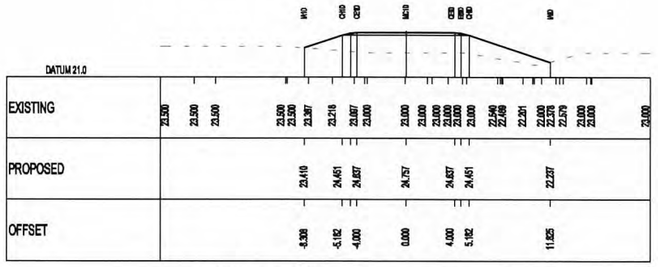

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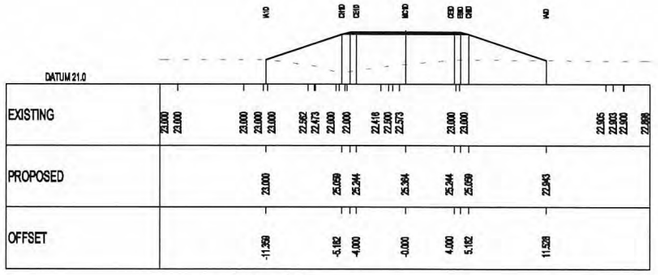

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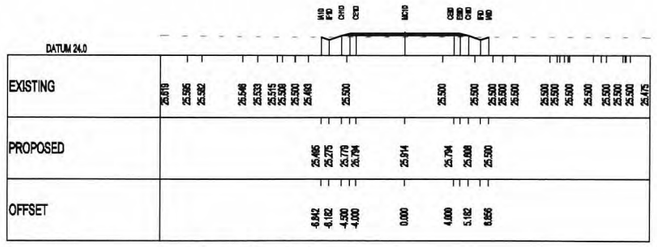

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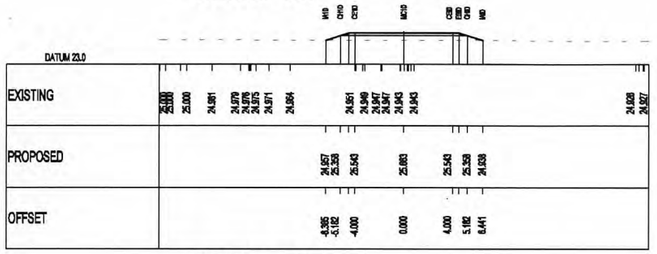

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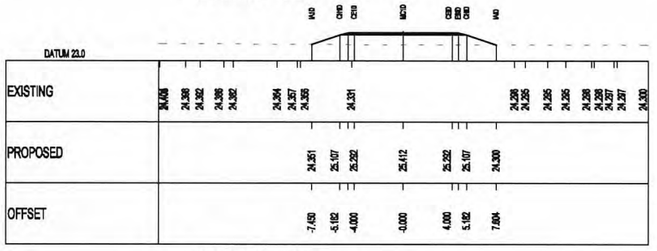

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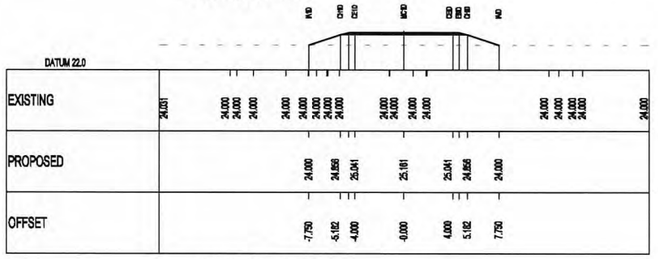

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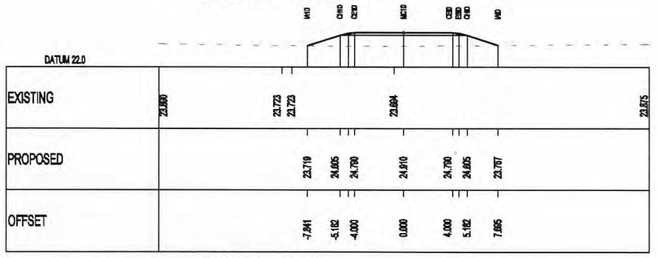

CHAINAGE 3300

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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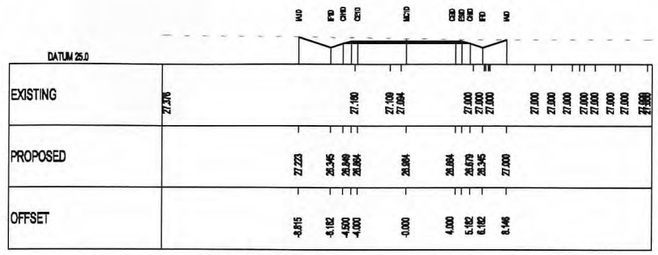
DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	Client **LANDCORP**
Drafting Check	Design Check	Project **KEMERTON INDUSTRIAL PARK**
Approved (Project Director)		Title **CROSS SECTIONS - MC1D CHA 2900 - CHA 3500**
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size **A1** Drawing No: **61-27426-C068** Rev: **A**

Plot Date: 13 February 2012 - 2:04 PM Plotted by: Yu-Chi Hu\Perth\GHD\AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C068.dwg



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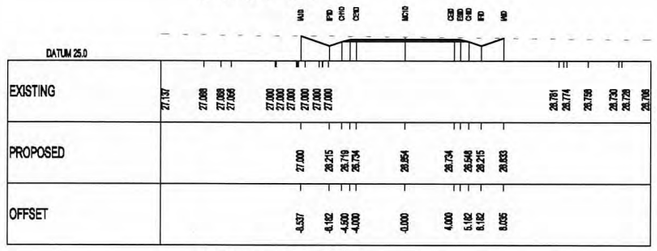

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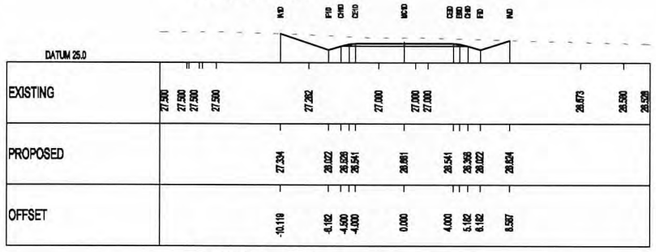

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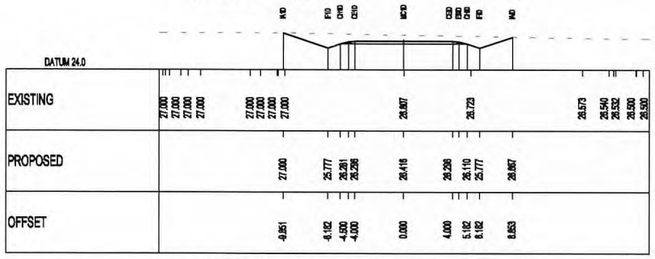

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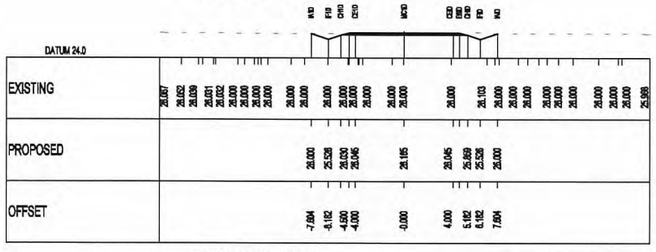

CHAINAGE 3550

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

0 2.5 5 7.5 10 12.5m
SCALE 1:250 AT ORIGINAL SIZE

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DO NOT SCALE

Drawn A. HORTON	Designer S. GEERLINGS	Client LANDCORP
Drafting Check	Design Check	Project KEMERTON INDUSTRIAL PARK
Approved (Project Director)		Title CROSS SECTIONS - MC1D CHA 3550 - CHA 3750
Date		
Scale AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	Original Size A1

Drawing No: 61-27426-C069 Rev: A

Plot Date: 13 February 2012 - 2:05 PM Plotted by: Yu-Chi Hu/Perth/GHD/AU Cad File No: G:\61\27426\CADD\Drawings\61-27426-C069.dwg

LANDCORP

KEMERTON INDUSTRIAL PARK

61-27426

DRAWING LIST

DRG No.	DRAWING TITLE
61-27426-C101	LOCALITY PLAN AND DRAWING INDEX
61-27426-C110	SPUR LINE - CHA 0 - CHA 1400
61-27426-C111	SPUR LINE - CHA 1400 - CHA 2800
61-27426-C112	SPUR LINE - CHA 2800 - CHA 4200
61-27426-C113	SPUR LINE - CHA 4200 - CHA 5600
61-27426-C114	SPUR LINE - CHA 5600 - CHA 7000
61-27426-C115	SPUR LINE - CHA 7000 - CHA 8400
61-27426-C116	SPUR LINE - CHA 8400 - CHA 9400
61-27426-C117	SPUR LINE - CHA 9400 - CHA 10800

LOCALITY PLAN

NOT TO SCALE

CONCEPT

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			01.05.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

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DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title LOCALITY PLAN AND DRAWING INDEX

Original Size A1
Drawing No: 61-27426-C101
Rev: B

Plot Date: 18 March 2015 - 2:54 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C101.dwg

JOINS DRG NO. 61-27426-C111

PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

CONCEPT

No	Revision	Drawn	Job Manager	Project Director	Date
B	MINOR CHANGES TO TITLE BLOCK	KA	EW	PB	20.03.15
A	ISSUED FOR CLIENT REVIEW	SMG			01.05.12

Note: * indicates signatures on original issue of drawing or last revision of drawing

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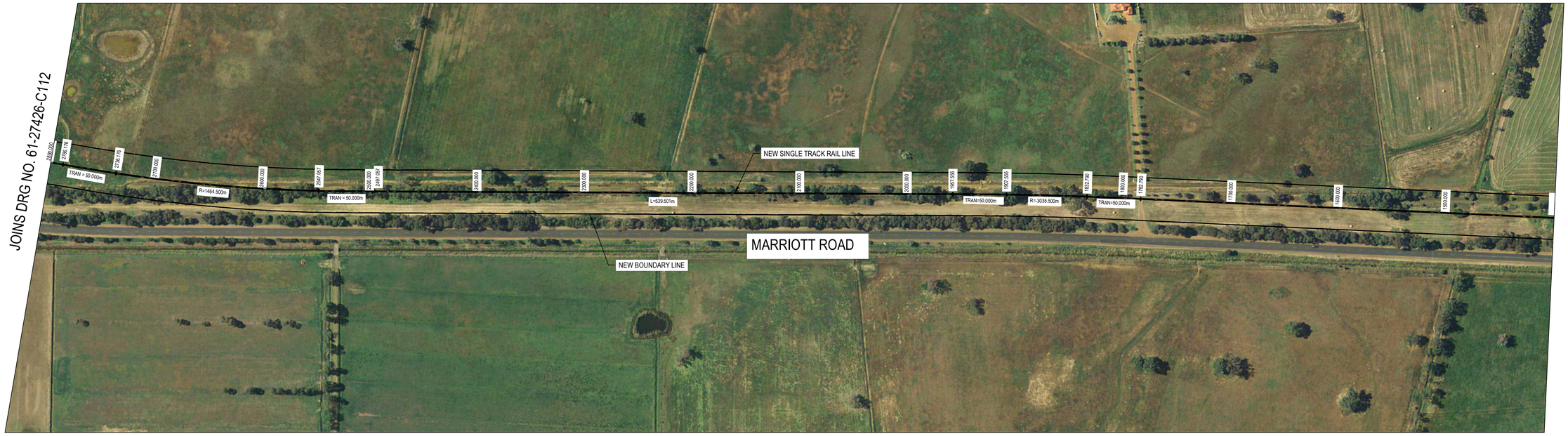
DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **SPUR LINE**
CHA 0 - CHA 1400

Original Size **A1** Drawing No: **61-27426-C110** Rev: **B**

Plot Date: 18 March 2015 - 2:55 PM Plotted by: Tom Nguyen Cad File No: G:\61\31700\CADD\Drawings\61-27426-C110.dwg



PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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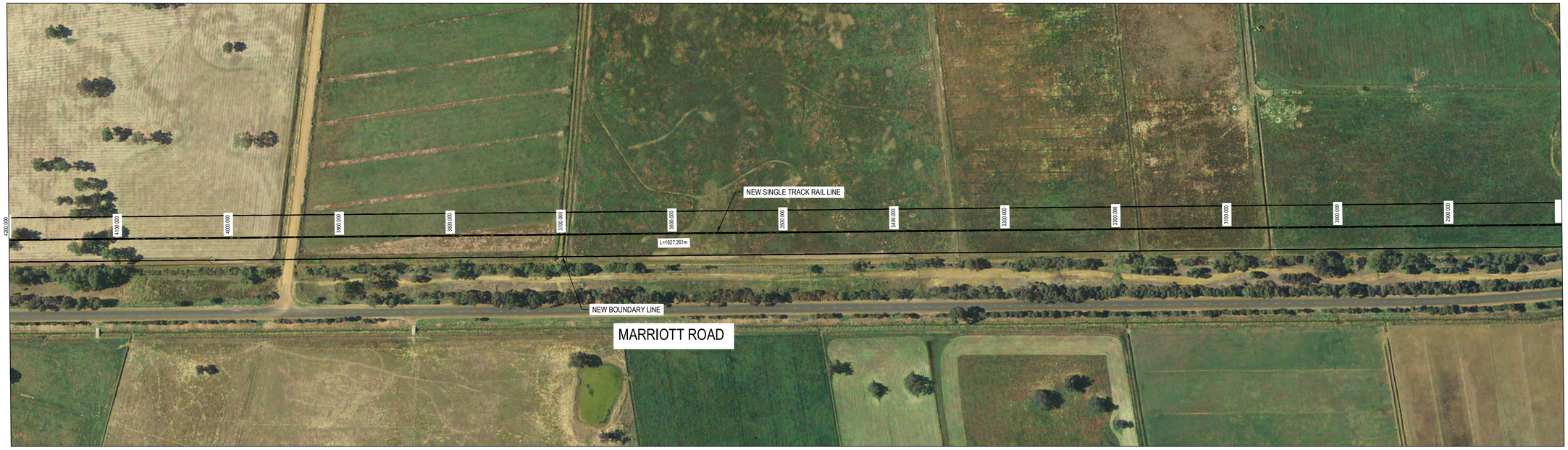
Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 1400 - CHA 2800

Original Size A1 **Drawing No: 61-27426-C111** **Rev: A**

Plot Date: 27 November 2012 - 4:40 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C111.dwg

JOINS DRG NO. 61-27426-C113



JOINS DRG NO. 61-27426-C111

PLAN

0 20 40 60 80 100m
SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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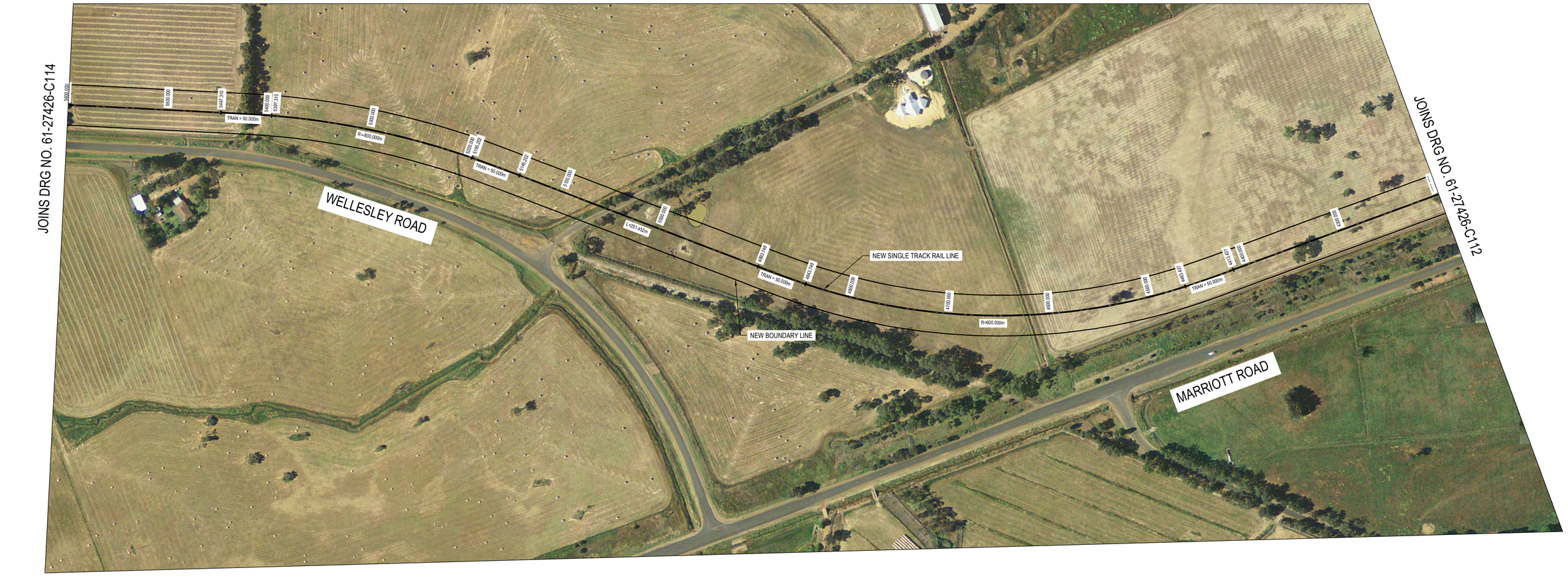
DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **SPUR LINE**
CHA 2800 - CHA 4200

Original Size **A1**
Drawing No: 61-27426-C112
Rev: A

Plot Date: 27 November 2012 - 4:51 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C112.dwg



PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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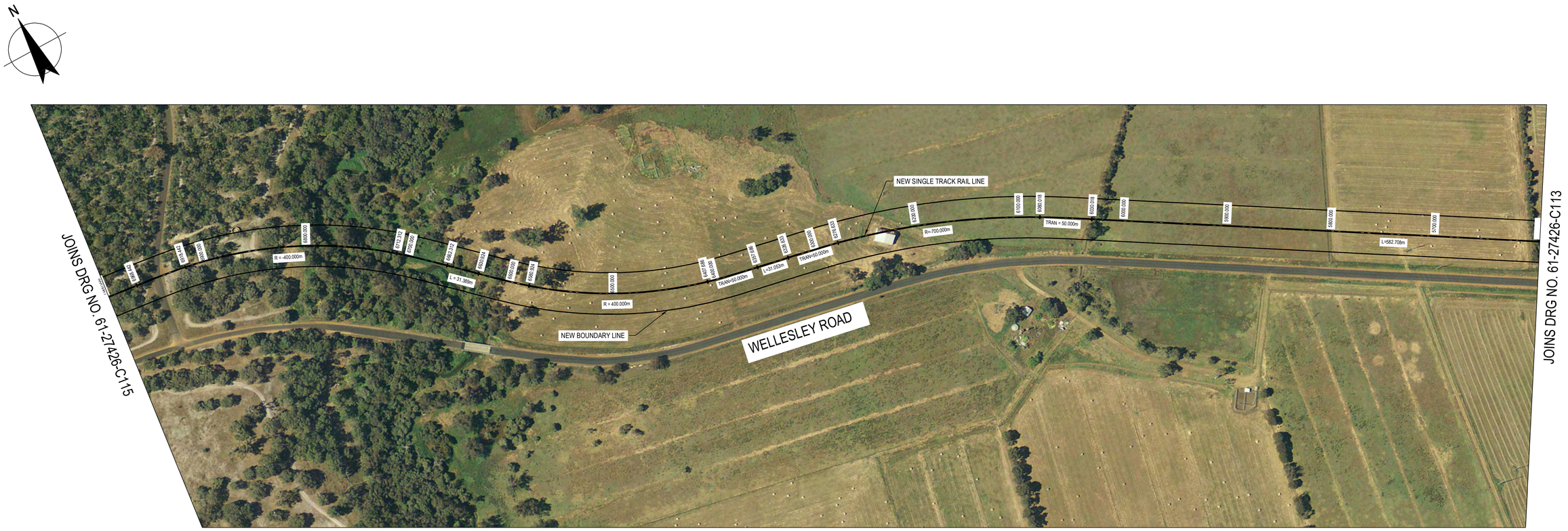
Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client	**LANDCORP**
Project	**KEMERTON INDUSTRIAL PARK**
Title	**SPUR LINE CHA 4200 - CHA 5600**
Original Size	**A1**
Drawing No:	**61-27426-C113**
Rev:	**A**

Plot Date: 27 November 2012 - 4:56 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C113.dwg



PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **SPUR LINE**
CHA 5600 - CHA 7000

Original Size **A1**
Drawing No: 61-27426-C114 **Rev: A**

Plot Date: 27 November 2012 - 5:35 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C114.dwg

PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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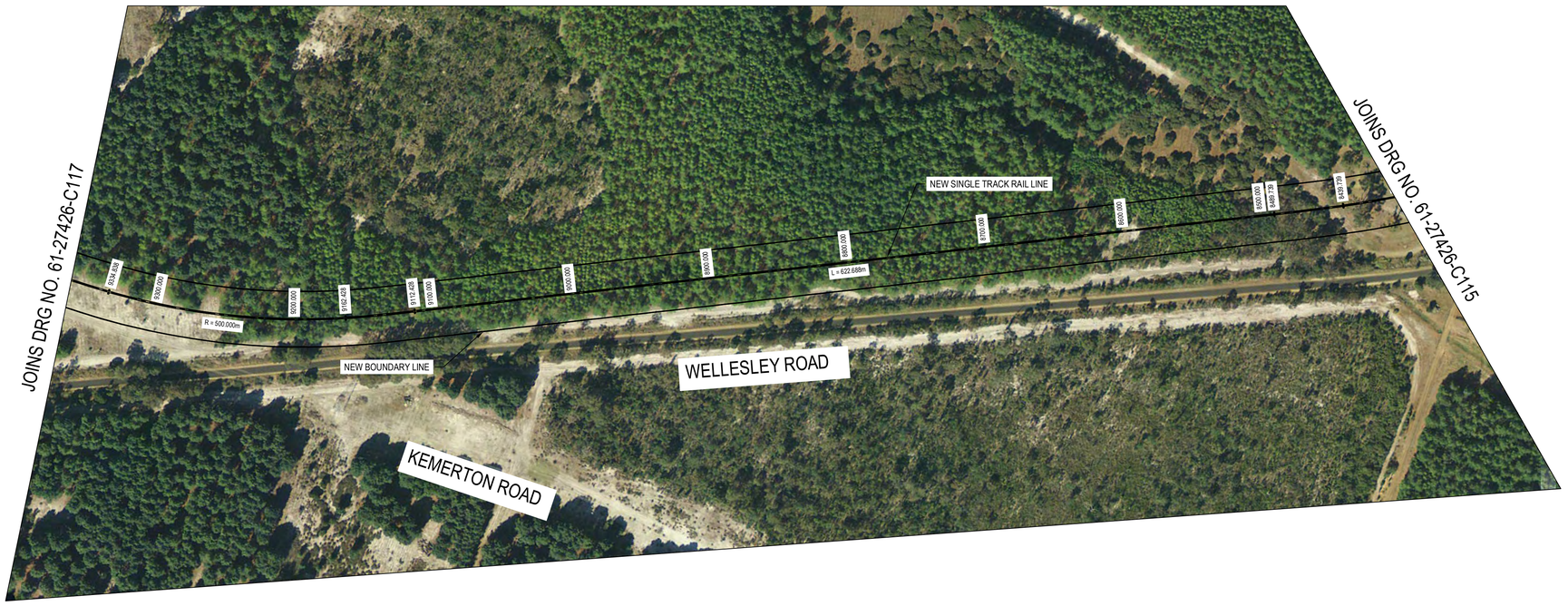
DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client LANDCORP
Project KEMERTON INDUSTRIAL PARK
Title SPUR LINE
CHA 7000 - CHA 8400

Original Size A1 **Drawing No: 61-27426-C115** **Rev: A**

Plot Date: 27 November 2012 - 5:43 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C115.dwg



PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

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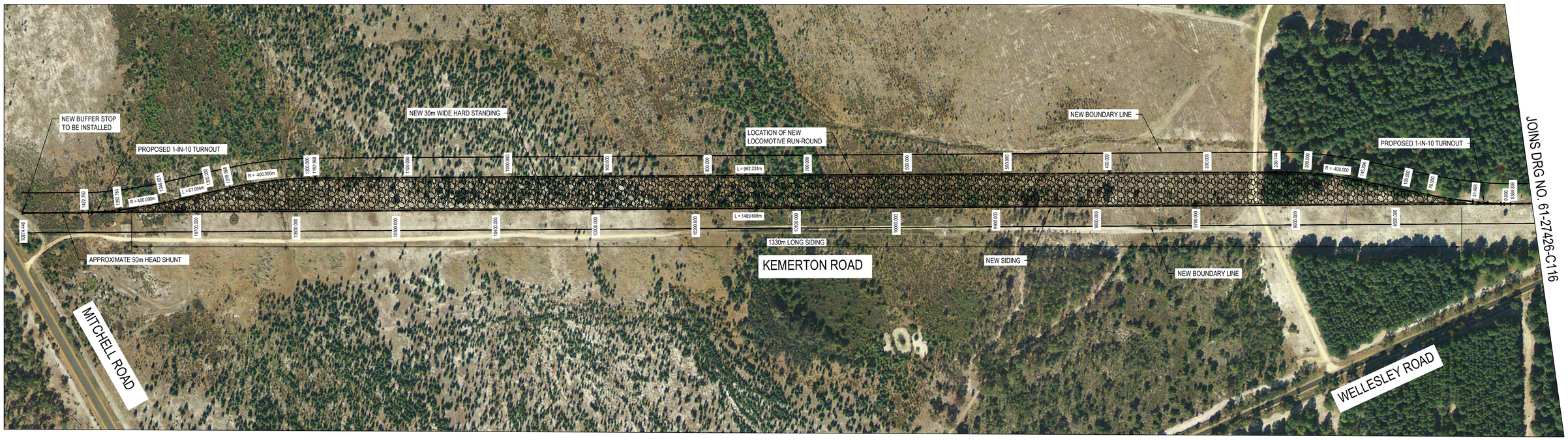
DO NOT SCALE

Drawn	B.YAO	Designer	B.YAO
Drafting Check	E.WRIGHT	Design Check	E.WRIGHT
Approved (Project Director)			
Date			
Scale	AS SHOWN	This Drawing must not be used for Construction unless signed as Approved	

Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **SPUR LINE**
CHA 8400 - CHA 9400

Original Size **A1** **Drawing No: 61-27426-C116** **Rev: A**

Plot Date: 27 November 2012 - 5:48 PM Plotted by: Elaine Wright Cad File No: G:\61\27426\CADD\Drawings\61-27426-C116.dwg



PLAN

0 20 40 60 80 100m

SCALE 1:2000 AT ORIGINAL SIZE

PRELIMINARY

No	Revision	Note: * indicates signatures on original issue of drawing or last revision of drawing	Drawn	Job Manager	Project Director	Date

LANDCORP

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Client **LANDCORP**
Project **KEMERTON INDUSTRIAL PARK**
Title **SPUR LINE**
CHA 9400 - CHA 10800

Original Size **A1**
Drawing No: 61-27426-C117
Rev: A

Plot Date: 28 November 2012 - 1:39 PM Plotted by: Elaine Wright Cad File No: \\ghdnet.internal\ghd\AU\Perth\Projects\61\27426\CADD\Drawings\61-27426-C117.dwg

Appendix P

References

1. The Greater Bunbury Structure Plan 2011-2031 (2011), Department of Planning.
2. Kemerton Industrial Park Envirionmental Management Plan (May 2012), Parsons Brinckerhoff.
3. Roads to Export – Greater Bunbury Infrastructure Investment Plan (June 2012), South West Development Commission.
4. Kemerton Industrial Park Local Structure Plan (Feb 2013), The Planning Group.

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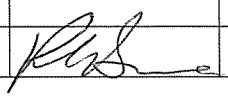
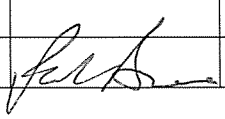
Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
0	Goran Danicic	John Pittock		John Pittock		
1	Goran Danicic	Alan Mansfield		Phil Nicholls		
2	Alan Mansfield	Paul Breame		Phil Nicholls		
3	Elaine Wright	Paul Breame		Phil Nicholls		
4	Elaine Wright	Paul Breame		Paul Breame		
5	Elaine Wright	Paul Breame		Paul Breame		07/04/15