Cowman Stoddart Pty Ltd
ABN 29 057 616 896

STEPHEN RICHARDSON, M.Appl.Sc.,BTP, Grad.Dip.Env. Mgt,CPP, MPIA
STUART DIXON, B. Urb. & Reg. Plan., CPP, MPIA

Associates:
PETER COWMAN, B.Sc.Agr., MAIAST
COLIN STODDART, Cert. TCP (NSW), Ass. Dip. TCP, MPIA

Email: info@cowmanstoddart.com.au
Website: www.cowmanstoddart.com.au

Phone: (02) 4423 6198
(02) 4423 6199
Fax: (02) 4423 1569

The Holt Centre
31 Kinghorne St
Nowra NSW 2541

Postal Address:
PO Box 738
Nowra NSW 2541

18 August, 2011

Our ref: 07/31

Your ref: MP06_0228

The Director-General
Department of Planning & Infrastructure
GPO BOX 39
SYDNEY NSW 2001

Attention: David Mooney

Dear Sir

RE: SHOALHAVEN STARCHES EXPANSION PROJECT MP06_0228
MINOR MODIFICATION TO ETHANOL PLANT
BOLONG ROAD, BOMADERRY

I refer to the meeting attended by Ado Zanella, Felicity Greenway, David Mooney from the Department of Planning and Brian Hanley, Tom Geczy and myself on the 15th August 2011 in connection with the above matter.

At the meeting it was indicated by Departmental staff that the above project was considered a minor modification to the Project Approval for the Shoalhaven Starches Expansion Project (MP06_0228). As a result a modification application made pursuant to Section 75W of the Environmental Planning & Assessment Act would need to be submitted.

To initiate this process it was requested that a submission be made detailing the proposed modification to enable the Department to issue the Director-General's requirements (DGRs) for the proposed modification pursuant to Section 75W(3) of the EP & A Act. This submission has therefore been prepared on behalf of Shoalhaven Starches to provide some background information to this proposed modification and to seek the DGRs for this proposed minor modification.

Background

On the 28th January 2009 the Minister for Planning issued Project Approval MP06_0228 that enables Shoalhaven Starches to increase its ethanol production capacity to meet the expected increase in demand for ethanol arising from both Federal and Stage Government initiatives to encourage the increase use of ethanol as a fuel additive. The Project Approval will subject to certain conditions enable Shoalhaven Starches to increase its ethanol production in a staged

manner at its Bomaderry plant from the current approved 126 million litres per year to 300 million litres per year.

Following the Minister's determination Shoalhaven Starches have been implementing and commissioning works in accordance with this approval. Following commissioning of components of the approved development the Company has had an opportunity to review and identify several operational efficiency and process improvements.

As a result Shoalhaven Starches have identified two areas to better refine operational processes and improve energy efficiency with the sites operations. Essentially the proposed modification relates to the following areas of the process:

- Fermentation; and
- Distillation.

The modifications involving these processes will not result in an increase in the capacity of the plant or production capability. The modifications to the Fermentation process are required for operational reasons while the Distillery modifications are required to improve energy efficiency.

The Proposed Modification

Modification to the Fermentation Process

The Ethanol Plant utilises waste from the starch, gluten and syrups sections of the plant to feed fermentation and distillation, which produces ethanol. In effect the ethanol production process comprises an integral component of the Company's waste water treatment process. An essential difference therefore between ethanol produced by Shoalhaven Starches and ethanol produced by other producers, is the ethanol produced at Shoalhaven Starches is a value added product from the Company's waste stream from the production of gluten and starch. The ethanol produced from waste starch does not involve the diversion of grain from other markets (such as livestock feed). Indeed a further value added product from the waste stream from the production processes at the Plant is dried DDGS which provides an alternative stock feed product.

The starch from the starch plant and grain crushed from the grain plant are mixed in the fermentation plant and the starch in this feedstock is converted to sugars, which are then fermented to produce ethanol. The fermentation process is a natural process where yeast converts the incoming sugars to ethanol. This process requires a residence time of approximately 50 hours, which necessitates the use of large holding tanks called fermenters, which allow time for the process to take place producing a "beer" to feed the distillery.

The distillery separates the ethanol from the "beer" in the "beer" column then purifies the ethanol by passing it through rectification columns and molecular sieves which remove remaining water, which is not removed by the "beer" column. The ethanol is then ready for sale.

To increase production to the rates envisaged by Project Approval MP06_0228 it is necessary to install:

- an additional 3 fermentation tanks;
- additional cooling towers;
- additional molecular sieves and associated additional cooling towers.

The three new fermentation tanks (each with a capacity of 3 ML) and associated cooling towers have been constructed to the eastern extremity of the factory site, within the vicinity of existing approved fermenter tanks.

Additional molecular sieves with associated heat exchangers, pumps and cooling towers will be installed within the existing ethanol distillation plant structure, adjacent to existing molecular sieves. Molecular sieves receive industrial grade ethanol from the storage tanks, process it to fuel grade ethanol and then pump it back to storage. The molecular sieves essentially remove water content from the industrial grade ethanol. The new molecular sieves will operate in parallel with the existing molecular sieves.

Following a review of operations since the commissioning of plant associated with the Shoalhaven Starches Expansion Project it has been ascertained that two (2) additional fermenter tanks (similar in size to the approved fermenters) are required to be installed on the site.

One new fermenter tank is required to replace an existing fermenter which has been taken out of the fermentation process and is now used as a buffer tank for the stillage generated from the distillery process and which is processed further in the Dried Distillers Grain Syrup (DDGS) Plant.

Stillage comprises the suspended and soluble solids that are removed from waste water flow from the Distillery by the DDGS Plant. This process includes the use of decanters, evaporators and DDGS dryers.

At present the cleaning program for the evaporators and other equipment in the DDGS Plant results in disruption and a reduction in the to the Distillery process operations. Once this equipment is cleaned the Distillery process is the required to be intensified to meet normal process operation requirements. This results in peaks and troughs in production within both the Distillery and DDGS Plants.

The allocation of an existing fermenter as a buffer tank will even out the flows and will reduce the peaks which are now occurring. This will result in better control of the Distillery and the DDGS Plants.

The buffer tank evens out the flows between the Distillery and the DDGS Plant by filling when sections of the DDGS Plant are off-line for cleaning thus allowing the Distillery to run at its normal rate. When the DDGS Plant is cleaned and the buffer tank is filled, the DDGS Plant will draw from the buffer tank at a greater rate than the flow from the Distillery thus emptying the buffer tank.

The second additional fermenter is required to enable fermenters which are currently in operation in the Fermentation Plant to be taken out of service for cleaning.

The existing fermentation process was originally designed and implemented as a continuous process. A continuous fermentation process is one where the feed from the Starch Plant continually flows through each of the fermenters in turn before going to the Distillery. The time the volume takes to flow through the total fermenters is sufficient for the conversion of the starch by yeast into alcohol.

It is difficult to take fermenters out of service for a thorough clean on a continuous basis and still maintain the time required for conversion. As a consequence the system was changed to a batch process which enables fermenters to be taken out of service individually for thorough cleaning.

It is very difficult to clean the fermenters when they are all part of the continuous process. Cleanliness is extremely critical to the fermentation process because the bacteria compete against the yeast and consume part of the carbohydrate (starch) thus reducing the yield.

When fermenters are being cleaned on a continuous basis there is not sufficient time to enable a thorough cleaning to take place and consequently any remaining bacteria will flow through all downstream fermenters and infect the fermenters in the process.

By converting to a batch process individual fermenters are taken out of service and thoroughly cleaned if there is any remaining bacteria it will not infect other fermenters in the plant because each fermenter directly feeds into the distillery rather than feed into other fermenters and causing infections.

Cleanliness is paramount because the unwanted bacteria competes with the yeast and results in production of lactic acid. As a consequence the yeast will not be able to convert all of the starch to alcohol because some of the starch will have been consumed by the bacteria.

The consequence of the bacterial infection consuming some of the starch reduces the amount of alcohol that is produced per tonne of starch namely reducing the overall plant yield.

The continuous process has been changed to a batch system. As mentioned previously a continuous fermentation process is one where the liquid starch flows through each fermenter in turn. Starch is being converted to alcohol by the yeast prior to entering the distillery whereas batch fermentation means that conversion from starch to alcohol occurs in individual fermenters prior to transfer to the distillery. The batch process enables better cleaning of individual fermenters and eliminates the risk of infections from one fermenter to another.

The batch system approach has the advantage that it enables individual fermenters to be taken out of service for cleaning. To provide the necessary fermentation time and to prevent disruption to production whenever fermenters are taken out of service for cleaning there is a need for additional fermenters to make provision for redundancy and to enable continued ethanol production.

In summary therefore the proposed modification involves:

- An additional fermenter is required to replace an existing fermenter which is being converted to a buffer tank between the Distillery and DDGS Plants.; and

- Another fermenter is required to provide scope for redundancy when fermentation tanks are taken out of service for cleaning.

Modification to the Ethanol Distillery

Energy is a significant cost within the Ethanol Distillery operations. Following investigations there is an opportunity to undertake some modifications to the Ethanol Distillery that will result in better energy efficiency outcomes and thereby reduce overall costs for the operations.

The distillery uses two sources of energy. Electricity for the motors on the transfer pumps, and steam which is produced by the Natural Gas and coal fired boilers on site.

All forms of energy are expensive and the energy costs on the Shoalhaven Starches site runs into the 10's of millions of dollars per year. The Ethanol Distillery is the biggest individual user of energy in the form of steam and there is an opportunity to reconfigure the distillery by removing one of the older columns and associated equipment and replacing them with newer improved design columns and associated equipment.

The newer columns will run at a lower steam pressure than the equipment that will be taken out of service.

Other forms of efficiency improvements include the replacement of the use of live steam injection by heat exchangers so that steam condensate is recovered and reused.

It is proposed to install an evaporator adjacent to the existing distillery. The role of the evaporator will be to increase the solids in the feed thus reducing the amount of liquid that needs to be heated up to evaporate the ethanol in the distillery.

In addition, it is proposed to replace one of the high pressure distillation columns with three low pressure columns to save steam. The design of the three replacement columns will have different types of trays inside them which will improve the separation of the ethanol from the stillage and water by the use of lower pressure steam than in the older designed columns.

None of these distillery modifications will result in an increase in the capacity of the distillery but are designed to improve energy efficiency by reducing the need for steam created from the coal fired boilers. As a result:

- The proposed modification will not increase the amount of emissions from the plant including odours. Indeed the project is likely to reduce the overall greenhouse gas emissions from the plant.
- The proposal will not increase wastewaters that will need to be treated and disposed.
- The proposal will have no additional traffic impacts.
- The noise impacts will be minimal because the equipment is effectively static equipment with transfer pumps. However, if there is any need for noise suppression that will be incorporated in the detailed design.

In summary, the two components of this minor modification application are two additional fermenters to improve operational processes and modifications to the distillery to improve energy efficiency. Plan details of the proposed modification are attached for your information.

I trust the above information is of assistance. On behalf of Shoalhaven Starches we therefore request the DGRs for this proposed minor modification application with respect to MP06_0228 for the Shoalhaven Starches Expansion Project as outlined in this submission.

If you require any further clarification concerning the matters raised in this submission please do not hesitate to contact me.

Yours faithfully

Stephen Richardson.

Stephen Richardson
COWMAN STODDART PTY LTD

Enc.

OVERALL SITE PLAN SHOWING CARPAKING ARRANGEMENTS ASSOCIATED WITH ETHANOL UPGRADE FOR SHOALHAVEN STARCHES P/L JUNE 2008

1 : 1250 (AT A1 SIZE)

AUSTRALIAN HEIGHT DATUM

PM 32610 AT BOLONG RD

allen, price & associates
land and development consultants
75 plunkett street, nowra, nsw. 2541

PLAN SHOWING THE LOCATION OF BUILDINGS AND STRUCTURES IN RELATION TO THE SITE AND EXISTING STRUCTURES AT BOLONG ROAD, BOMADERRY FOR THE SHOALHAVEN STARCHES WITHIN THE CITY OF SHOALHAVEN

23132-06J

Liability limited by a scheme approved under Professional Standards Legislation

0 10 20 30 40 50 100
scale:- 1:1250

SITE PLAN

PROPOSED GAS LINE AND UNDERGROUND ELECTRICITY LINE FROM POND 7

PROPOSED GAS LINE FROM POND 7

Shoalhaven River

Bomaderry Creek

PROPOSED BIOFILTER

PROPOSED EXTENSION TO DDG LOADOUT

PROPOSED ADDITIONAL TOWERS Position)

PROPOSED ADDITIONAL COOLING TOWERS

PROPOSED BIO-SCRUBBER VESSELS

PROPOSED 6 ADDITIONAL DDGS DRYERS AND ASSOCIATED EQUIPMENT

PROPOSED EVAPORATOR

PROPOSED CHEMICAL STORAGE FACILITY

PROPOSED DDG PELLET PLANT

PROPOSED OVERHEAD GANTRY

PROPOSED GAS-FIRED CO-GENERATOR

PROPOSED ADDITIONAL EVAPORATOR

PROPOSED EXTENSION TO DDG LOADOUT

PROPOSED MCC ROOM

PROPOSED GAS FIRED BOILER

PROPOSED MOLECULAR SIEVES

PROPOSED ADDITIONAL COOLING TOWERS

PROPOSED ADDITIONAL FERMENTERS

PT LOT 241 DP1130535

LOT 1 DP838753

OPEN PADDOCK

BOLONG ROAD

FOR CONTINUATION SEE DIAGRAM BELOW

PROPOSED PRODUCT PACKER OVER DRIVEWAY

PROPOSED PEDESTRIAN OVERPASS

BOLONG ROAD

PROPOSED PIPELINE FROM FACTORY TO PACKER

LOCATION OF PROPOSED NEW FERMENTERS

LOCATION OF ETHANOL DISTILLERY

OPEN PADDOCKS

2 DP 538289

PRIVATE ROAD

B DP 371388

PROPOSED PACKAGING PLANT

PROPOSED CONTAINER STORAGE AREA

PROPOSED WEIGHBRIDGE

16 DP 1121337

A DP 371388

RAILWAY STREET

SOUTH COAST RAILWAY

COUNCIL WASTEWATER TREATMENT PLANT

TOTAL CARPARKING SPACES BY AREA

EXISTING ARRANGEMENTS		
MAIN OFFICE	TOTAL	21
PROJECT OFFICE LAND		12
REAR OF PROJECT OFFICE		14
MAINTENANCE WORKSHOP AREA	TOTAL	110
DDG LOADOUT AREA	TOTAL	50
SOUTH WEST (CONTRACTORS)		52
	TOTAL	259
PROPOSED ADDITIONAL SPACES		
MAINTENANCE WORKSHOP AREA		40
PROPOSED PACKING PLANT		51
EAST OF COAL STORAGE (CONTRACTORS)		30
	TOTAL	94
GRAND TOTAL		353

NOTE. FOR APPROVED STRUCTURES NOT YET BUILT – REFER TO SHEET 1

- EXISTING STRUCTURES
- PROPOSED ETHANOL UPGRADE FACILITIES APRIL 2008
- PROPOSED TREATED WASTE WATER PIPELINE FROM PAPER MILL TO MANILDRA FACTORY
- PROPOSED GAS LINE AND UNDERGROUND ELECTRICITY LINE FROM THE PONDS TO THE MANILDRA FACTORY
- ADJOINING LANDS NOT ASSOCIATED WITH THE PROPOSAL
- WATERWAYS

Figure 28

APPROX RAILWAY LINES

Shoalhaven River

SIGN ON SHED

SERVICE ROADWAY

EXISTING COOLING TOWERS

EXISTING - GREEN.
UNDER CONSTRUCTION - RED.
PROPOSED COMP. ROOM - MAGENTA.
PROPOSED FERMENTERS 16,17 - GRAY

BOUNDARY ADJUSTMENT

RECEIVER

PROPOSED COMPRESSOR ROOM

EXISTING AMENITIES

EXISTING DRAINAGE SUMP
19MS/M ex 5M DEEP
VOLUME = 465.5 m³
CAPACITY = 465,500 Litres

EXISTING PUMP HOUSE

FERMENTERS 10,11 & 12 COMPLETED

FM

CS

APPROX POSITION OF PROPOSED DRAINAGE PIT

ELECT. SWITCH/SUB STATION 7

FERMENTER 15 UNDER CONSTRUCTION

FERMENTERS 16 & 17 PROPOSED

15

12

11

10

16

17

13

EXISTING SLAB

PROPOSED NEW FERMENTERS

TEMPORAR... PARK

CIP TANK SLAB

CS

FM

ROADWAY

EXISTING ETHANOL RECOVERY AREA

Power

SERVICE ROADWAY

CONSTRUCTION ACCESS

EXISTING ACCESS

9.04

40.30

BOLONG RD.

S
E M
N

ISS	DATE	ZONE	CHANGE AMENDMENTS	BY	CKD
A	30-09-08	ALL	Now preferred option,notes added	P.C.	K.L.
1	15-08-08	ALL	Draft.	P.C.	G.M.

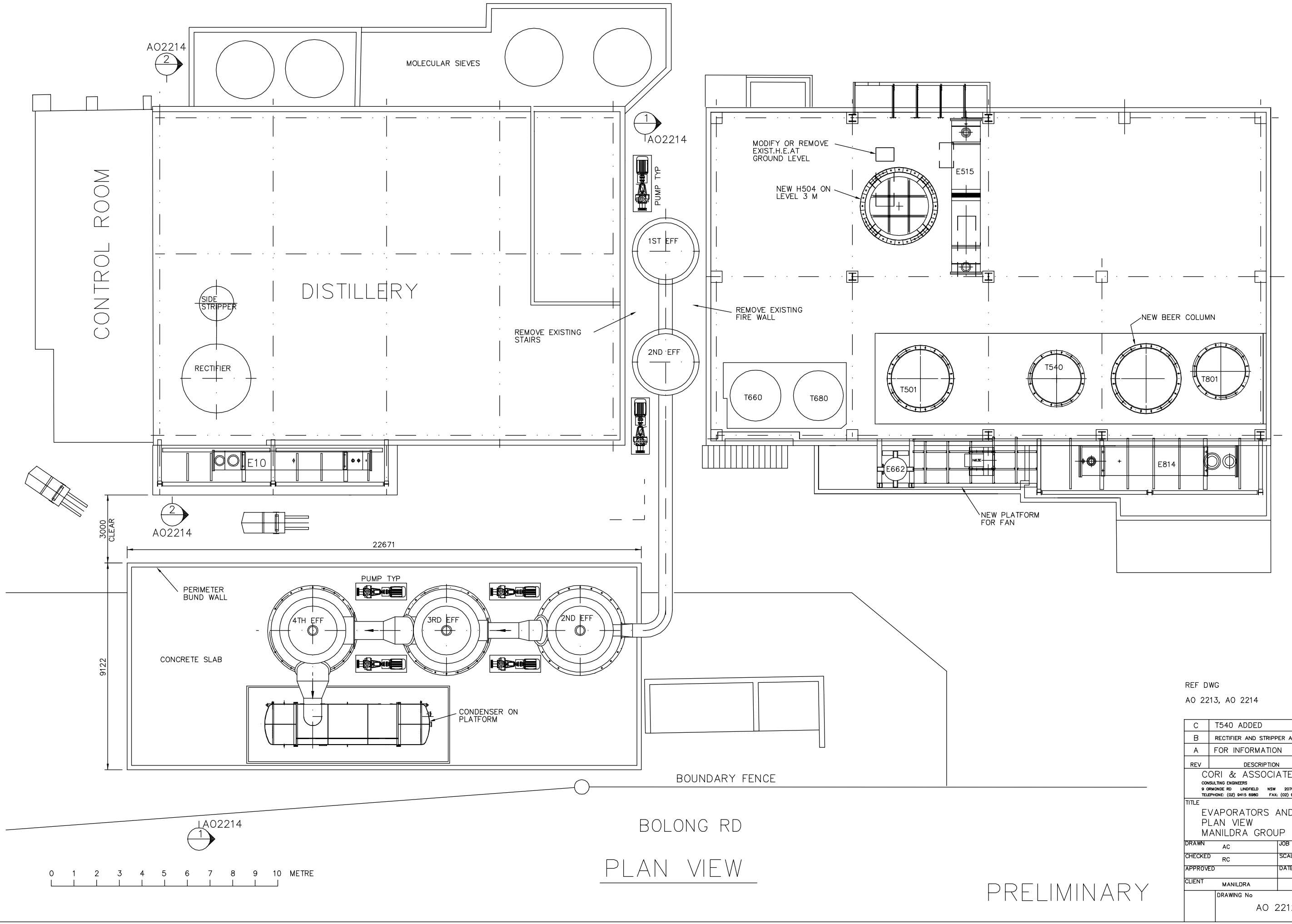
MANILDRA GROUP
100% AUSTRALIAN

DRAWN	P.C.	
TRACED	----	
CHECKED / APPROVED		FINISH N/A
DRG PRACTICE	AS1100	

MATERIAL: N/A

TITLE: MANILDRA GROUP.NOWRA
FERMENTER CONSTRUCTION
COMPRESSOR ROOM PLAN.

SIZE A3 | SCALE: 1:500 | SHT. 1of1
ISSUE 5072
DRG. No. MN-CR-002A



BOLONG RD

PLAN VIEW

PRELIMINARY

REF DWG

AO 2213, AO 2214

REV	DESCRIPTION	BY	DATE
C	T540 ADDED	AC	8.11
B	RECTIFIER AND STRIPPER ADDED	AC	8.11
A	FOR INFORMATION	JG	7.11

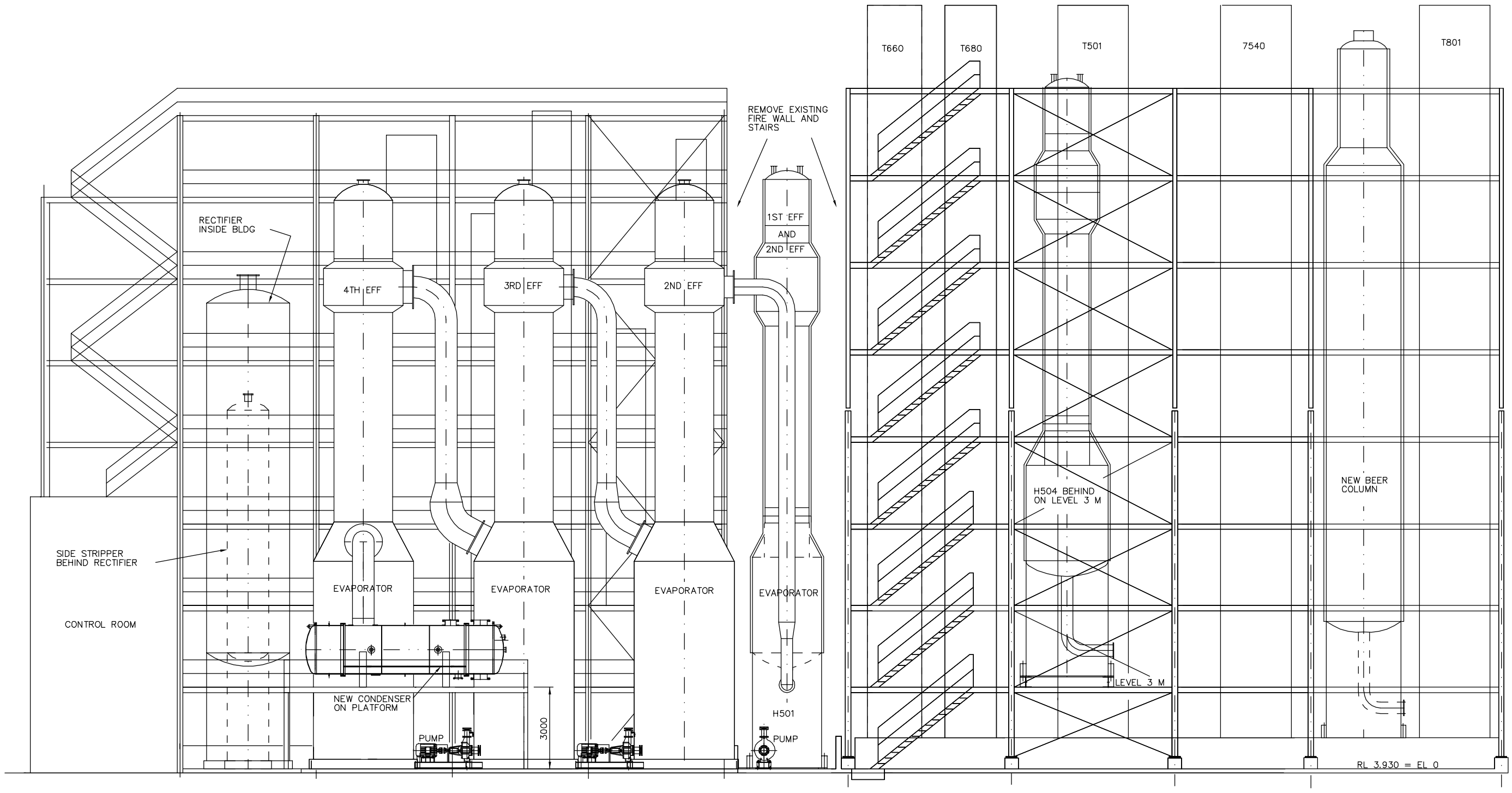
CORI & ASSOCIATES PTY LTD
CONSULTING ENGINEERS
9 ORMONDE RD LINDFIELD NSW 2070
TELEPHONE: (02) 9415 6980 FAX: (02) 9415 6970

TITLE

EVAPORATORS AND COLUMNS
PLAN VIEW
MANILDRA GROUP

DRAWN AC	JOB
CHECKED RC	SCALE NTS
APPROVED	DATE 7.2011
CLIENT MANILDRA	

DRAWING No AO 2212 REV C



ELEVATION LOOKING SOUTH

0 1 2 3 4 5 6 7 8 9 10 METRE

PRELIMINARY

REF DWG

AO 2212, AO 2214

REV	DESCRIPTION	BY	DATE
C	T540 ADDED	AC	8.11
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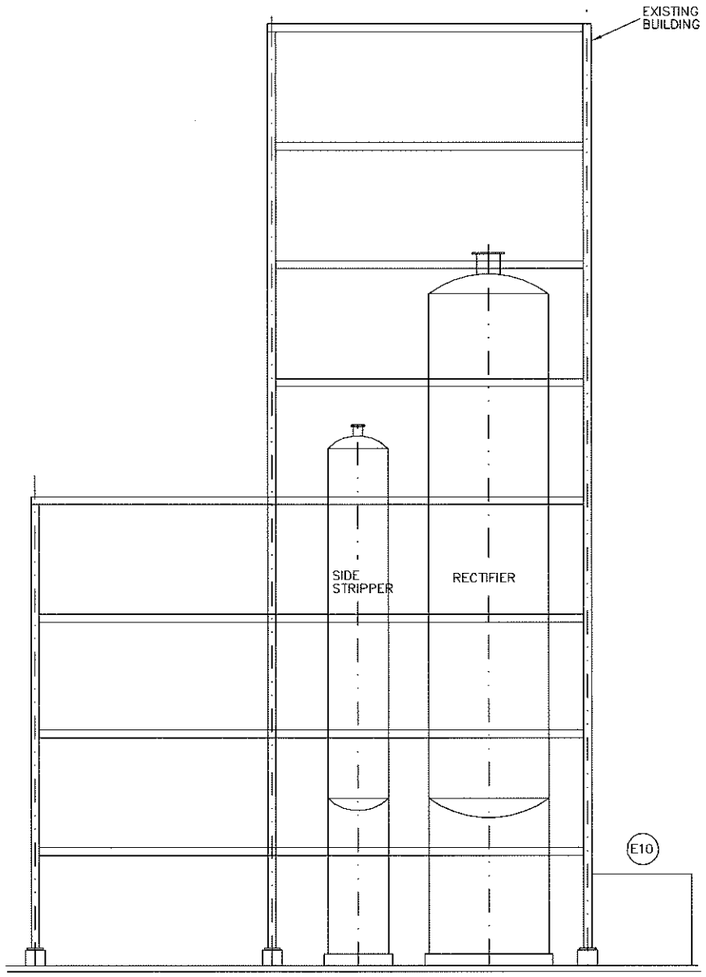
9 ORMONDE RD LINDFIELD NSW 2070
TELEPHONE: (02) 9415 6980 FAX: (02) 9415 6970

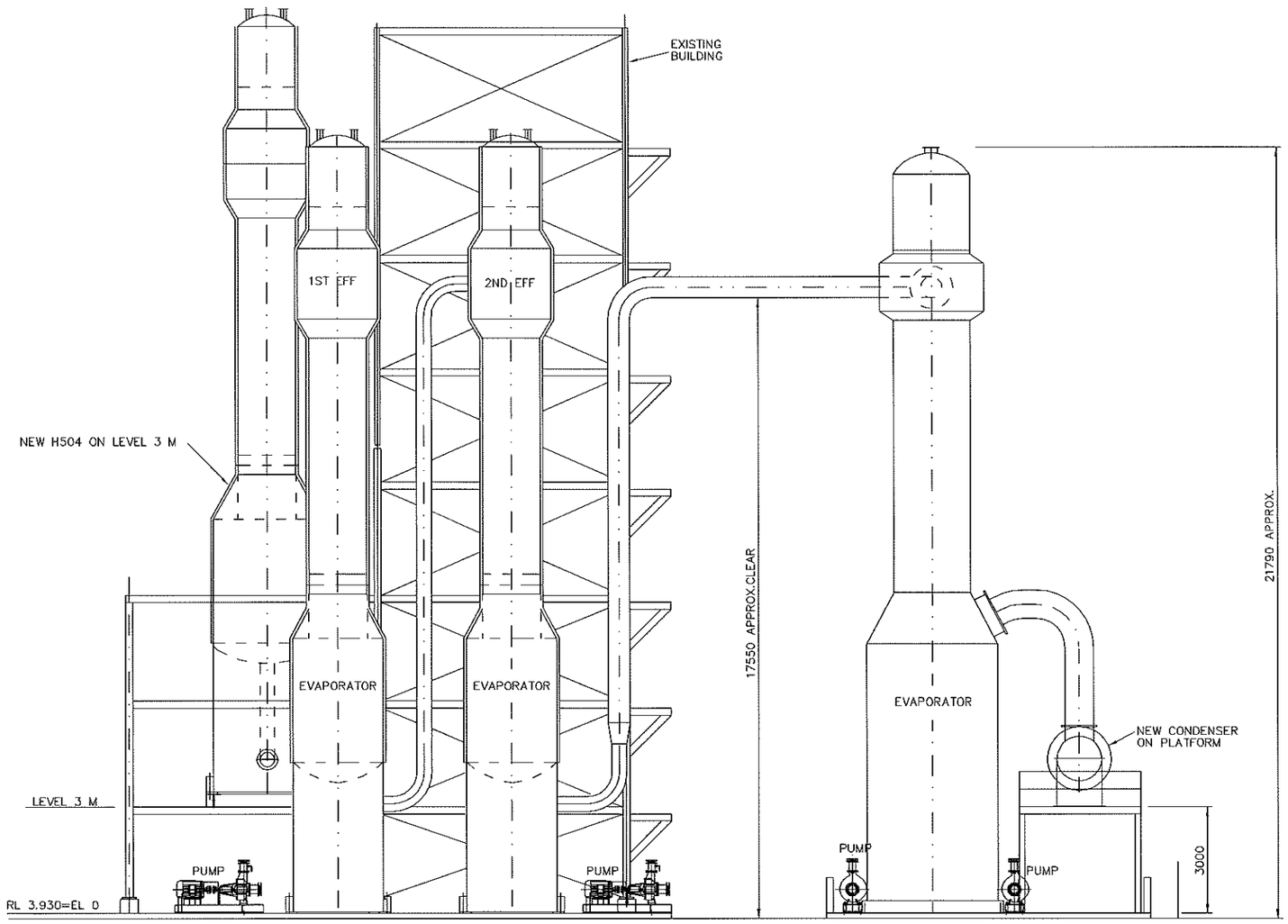
TITLE
EVAPORATORS AND COLUMNS
ELEVATION LOOKING SOUTH
MANILDRA GROUP

DRAWN AC	JOB
CHECKED RC	SCALE NTS
APPROVED	DATE 7.2011
CLIENT MANILDRA	

DRAWING No AO 2213 REV C



2 SECTION
— AO 2212



1 SECTION
— AO 2212

0 1 2 3 4 5 6 7 8 9 10 METRE

PRELIMINARY

REF DWG

AO 2212, AO 2213

REV	DESCRIPTION	BY	DATE
B	RECTIFIER AND STRIPPER ADDED	AC	8.11
A	FOR INFORMATION	JG	7.11

CORI & ASSOCIATES PTY LTD
CONSULTING ENGINEERS
9 ORAKAU RD LINDFIELD NSW 2070
TELEPHONE: (02) 9415 6980 FAX: (02) 9415 6970

TITLE
EVAPORATORS AND COLUMNS
SECTION 1
MANILDRA GROUP

DRAWN	JG	JOB	
CHECKED	RC	SCALE	NTS
APPROVED		DATE	7.2011
CLIENT	MANILDRA		

DRAWING No AO 2214 REV B