AMENDMENT TO PRESTIGE BRICKWORKS PROPOSAL TO RE-DEVELOP THE MIDLAND ABATTOIR SITE, MIDLAND

PILSLEY INVESTMENTS PTY LTD

Report and Recommendations
of the
Environmental Protection Authority

Environmental Protection Authority
Perth, Western Australia

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i SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The Environmental Protection Authority (EPA) previously assessed a proposal by Prestige Bricks to establish a brickworks at the former Midland Abattoir site in Midland (Public Environmental Report, BSD Consultants Pty Ltd, May 1987). During its assessment of that proposal, the EPA identified the following general impacts from the project:

fluoride fallout from the plant;

the effect of noise with surrounding neighbourhood;

generation of dust from transport and plant operation; and

the effect on the Helena River floodplain.

After making a detailed analysis, including the consideration of public and Government agency submissions, the Authority concluded, in its Assessment Report (EPA Bulletin 289) that the proposal as described in the Public Environmental Report was environmentally acceptable and recommended that it could proceed subject to the proponent's commitments given in the Public Environmental Report and in the additional information supplied to the Authority, and to the Authority's conclusions and Recommendation in EPA Bulletin 289.

Following the publication of a statement by the Hon Minister for Environment that the project could proceed subject to eleven conditions, the Company subsequently advised the EPA that due to poor foundation conditions on the southern segment of their site, it proposed to relocate the brick plant and kiln to an area that had previously been designated as a clay stockpile area. This required the clay stockpile area to be located on the southern part of the Company's site within the area that had previously been identified for the establishment of the brick plant and kiln. The EPA requested the Company to submit details of these modifications in the form of a Notice of Intent.

The EPA has found that the associated emission stack will translate the previously predicted ground level concentrations of fluoride by about 130 metres. There will be no increases in the overall quantities of fluoride released to the atmosphere compared to the earlier proposal.

In its first Assessment Report on this proposed brickworks the EPA indicated that the potential for damage to vegetation resulting from fluoride emissions from the brickworks was the main environmental issue. The Authority acknowledged that there exists a potential for minor injury to vegetation from fluoride fallout from the brickworks. The same general conclusion on fluoride impacts is relevant to the proposal described in the Notice of Intent.

The relocation of the clay stockpile area has the potential to impact on the Helena River floodplain. The stockpile area is closer to existing and proposed residential development in Hazelmere, but the proposed configuration of the stockpile should ensure that noise levels emanating from the operation of loading equipment will be within acceptable limits.

The conclusions and recommendations in EPA Bulletin 289 have been reiterated for the sake of completeness.

The Environmental Protection Authority has made the following conclusions and recommendations:

RECOMMENDATION 1

The Environmental Protection Authority concludes that the modifications to the original proposal as described in the NOI are environmentally acceptable and recommends that the proposal could proceed subject to:

the proponent's commitments in the PER, the NOI and the additional information supplied to the Environmental Protection Authority; and

the conclusions and recommendations in this Assessment Report.

RECOMMENDATION 2

Based on the information available to the Environmental Protection Authority it recommends that:

the fluoride mass emission rate from the whole plant should never exceed 1.0 gram/second;

these emissions should be released to the environment through a stack with a minimum height of 35 m;

the proponent should monitor the emission rate and supply the results to the Environmental Protection Authority as part of a monitoring and verification programme approved by the Environmental Protection Authority; and

if, in accordance with Recommendation 3 environmental damage occurs as a result of the brickworks operation, this maximum allowable mass emission rate will be reduced to a level such that the objective of the continuing maintenance of current beneficial uses of the locality is met.

RECOMMENDATION 3

The Environmental Protection Authority recommends that the proponent funds an independent study, to be approved by the Environmental Protection Authority, to measure the ground level concentrations of fluoride on areas around the plant, and the associated effects on the environment. For appropriate verification of this study, monitoring will have to commence well before the plant becomes operational. In the event that the Environmental Protection Authority is not satisfied with the assessment of the state of the environment as shown in the results of the study, the Environmental Protection Authority will require the proponent to modify its operations to reduce air emissions to an acceptable level.

RECOMMENDATION 4

The Environmental Protection Authority recommends that the proponent should configure the various parts of the plant so that a scrubber can be retrofitted to Stage 1 should the Environmental Protection Authority consider it necessary.

RECOMMENDATION 5

The Environmental Protection Authority recommends that if the project proceeds to Stage 2 the proponent should maintain the fluoride emissions from the total plant at the mass emission rate set in Recommendation 2.

RECOMMENDATION 6

The Environmental Protection Authority recommends that the noise emissions from the premises will need to be at a level acceptable to the Authority. This will be controlled by appropriate licensing conditions set under the Environmental Protection Act.

RECOMMENDATION 7

The Environmental Protection Authority recommends that prior to the construction of the clay stockpile, the proponent is required to submit its clay stockpile management programme, including details of stormwater runoff and landscaping, to the Swan River Management Authority (or its proposed successor the Swan River Trust) for its approval.

RECOMMENDATION 8

The Environmental Protection Authority recommends that should there be a nuisance from dust associated with the brickworks outside the site boundary then the Swan Shire Council and the nominee of the Minister for Transport should inform the proponent to take appropriate action to stop the nuisance occurring.

RECOMMENDATION 9

The Environmental Protection Authority recommends that in the event of the requirement to fill part of the floodplain, the proponent should landscape the filled area which is not required directly for the clay stockpile in a manner which recreates the indigenous floodplain vegetation of that area.

1. INTRODUCTION

Pilsley Investments Pty Ltd trading as Prestige Brick propose to establish a high technology brickworks on 25.9 hectares of land that comprised of the former Midland abattoir site.

In the first stage of the project 50 million bricks a year will be manufactured for the local brick market. The later second stage of the project will involve expansion of the plant to produce 100 million bricks a year.

A Public Environmental Report (PER) was prepared by the proponents and released in May 1987 for public review for a period of eight weeks. A total of 26 submissions were received from the public and Government agencies. The EPA's report and recommendations on the proposal described in the PER was released on 21 July 1987 (EPA Bulletin 289).

The EPA assessment and public submissions raised concerns in the following general issues:

the impact of fluoride emissions on the surrounding areas;

noise effects on the surrounding neighbours;

the potential for dust nuisance from traffic and the brickworks;

the interactions with planning related matters; and

the impact on the Helena River floodplain.

The EPA reported that while there are potential environmental impacts associated with each of the above, it considered that the main issue is the potential for damage to vegetation resulting from fluoride emissions from the brickworks.

The EPA concluded that:

subject to the proponent's commitments given in the PER and in the additional information supplied to the Environmental Protection Authority and the Recommendations made in EPA Bulletin 289 the proposal is environmentally acceptable;

based on the information in the PER there exists a potential for minor injury to vegetation from fluoride fallout from the brickworks. The Environmental Protection Authority considers that this is a realistic assessment. The Environmental Protection Authority emphasises that the fluoride levels which may cause injury to vegetation are considerably lower than those levels which will cause human health affects;

there is insufficient information in the PER on the means by which the noise emissions from the brickworks will be controlled. However, if appropriate control measures are undertaken, noise emissions can be reduced to an acceptable level;

there are aspects of the transport of raw materials and brickworks operation which may result in a dust nuisance. The control of this is the responsibility of the proponent; and

the project may require some minor filling of the Helena River flood plain in the vicinity of the brickworks. It is unlikely that this will have any significant impact on the floodplain or its hydrological characteristics.

With the benefit of the EPA's Assessment Report (EPA Bulletin 289), and taking into account public concerns about this proposal the Hon Minister for Environment on the 1 September 1987 announced that the project, as outlined in the Company's PER, could proceed in accordance with eleven conditions.

Following the setting of conditions for the project, the proponent's further investigations of the site revealed that the area proposed by the location of the brick plant and kiln, had unsuitable geotechnical properties and would be unsatisfactory for foundations for the new plant. The Company advised the EPA of this finding and indicated that it proposed to relocate the brick plant and kiln to an area that had been designated for the clay stockpile. The clay stockpile in turn would be shifted to the site that had initially been identified for the brick plant and kiln.

Taking account of the minor variation to the initial proposal and that the initial proposal had been subject to a public review through the publication of a Public Environmental Report, the Authority determined that the modifications could be adequately assessed through the preparation and submission of a Notice of Intent (NOI).

This document was forwarded to the Waterways Commission, the State Planning Commission, the Western Australia Water Authority and the Shire of Swan for their comments on the modifications. Their comments, together with those made by the public in response to the original PER, have been considered by the EPA and taken into account in this Assessment Report.

2. DESCRIPTION OF AMENDED PROPOSAL

The NOI included a Plan showing the layout of the initial proposal. This Plan has been reproduced in the Report as Figure 1.

The proponents have reported that the foundation capacity of the proposed site of the brick plant and kiln, shown as 'C' in Figure 1, is unsuitable.

It is now proposed to locate the brick plant and kiln within the area that had previously been proposed for the clay stock pile area. This involves a shift of the emission stack by about 130 metres to the north.

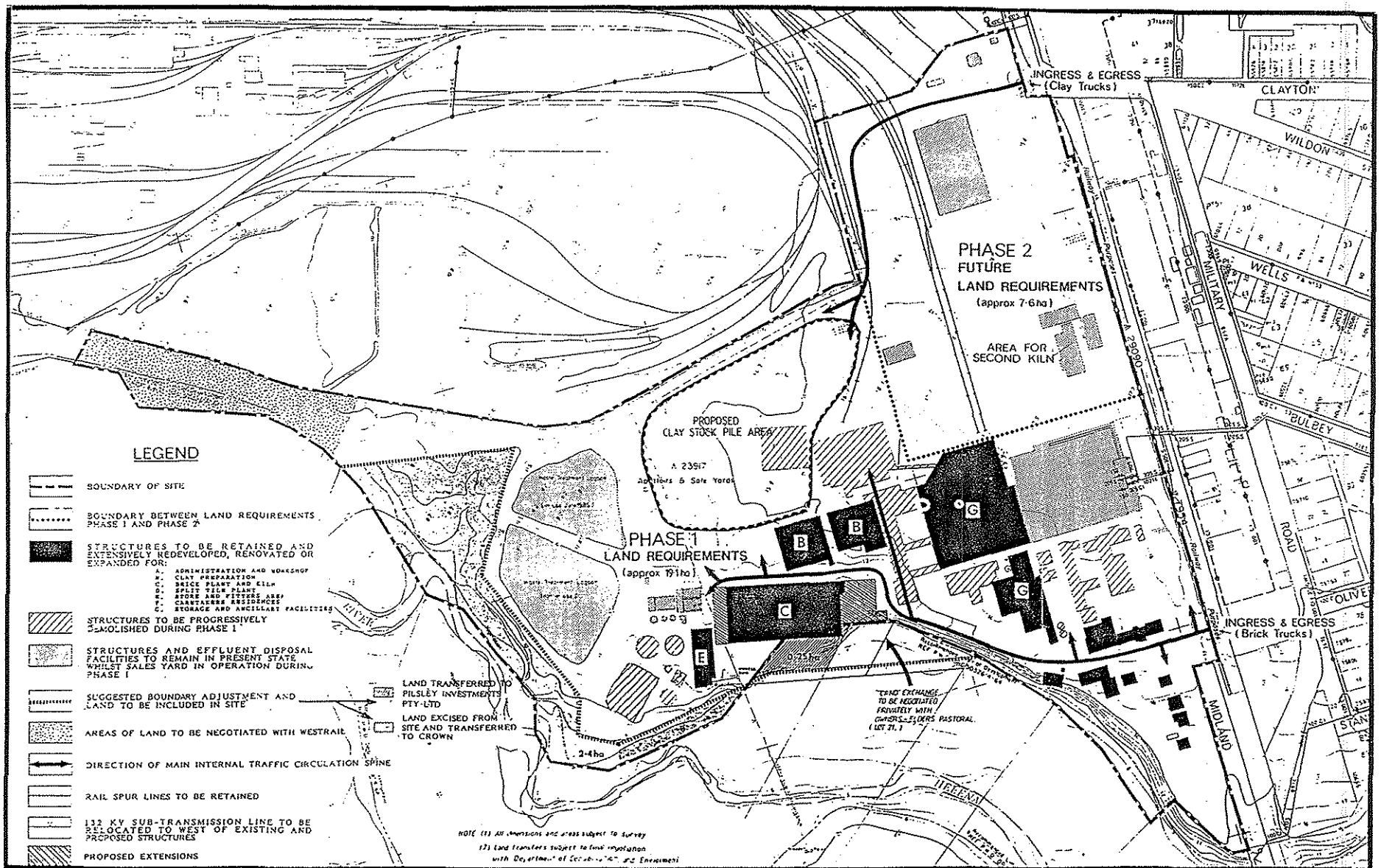
The clay stockpile would be sited on the southern boundary in the area that had previously been identified for the brickworks and kiln.

The amended layout is shown in Figure 2. With these modifications there is no longer a need for a 10 metre by 210 metre long strip that intruded into the Helena River Flood plain. The Company has offered to make this ten metre wide strip available to the Crown at no cost to assist with the provision of the proposed Helena River linear park.

3. ENVIRONMENTAL IMPACTS AND MANAGEMENT

3.1 FLUORIDE

The PER included predictions of ground level concentrations of fluorides for two different emission stack heights - one case for a 17.5 metre stack, the other for a 35 metre stack. The air dispersion modelling calculations showed



LAND REQUIREMENTS & DEVELOPMENT STRATEGY MIDLAND ABATTOIR SITE

for PRESTIGE BRICK

LAYOUT AS APPROVED FOLLOWING PUBLIC ENVIROMENTAL REPORT SEPTEMBER 1987.

N W E S

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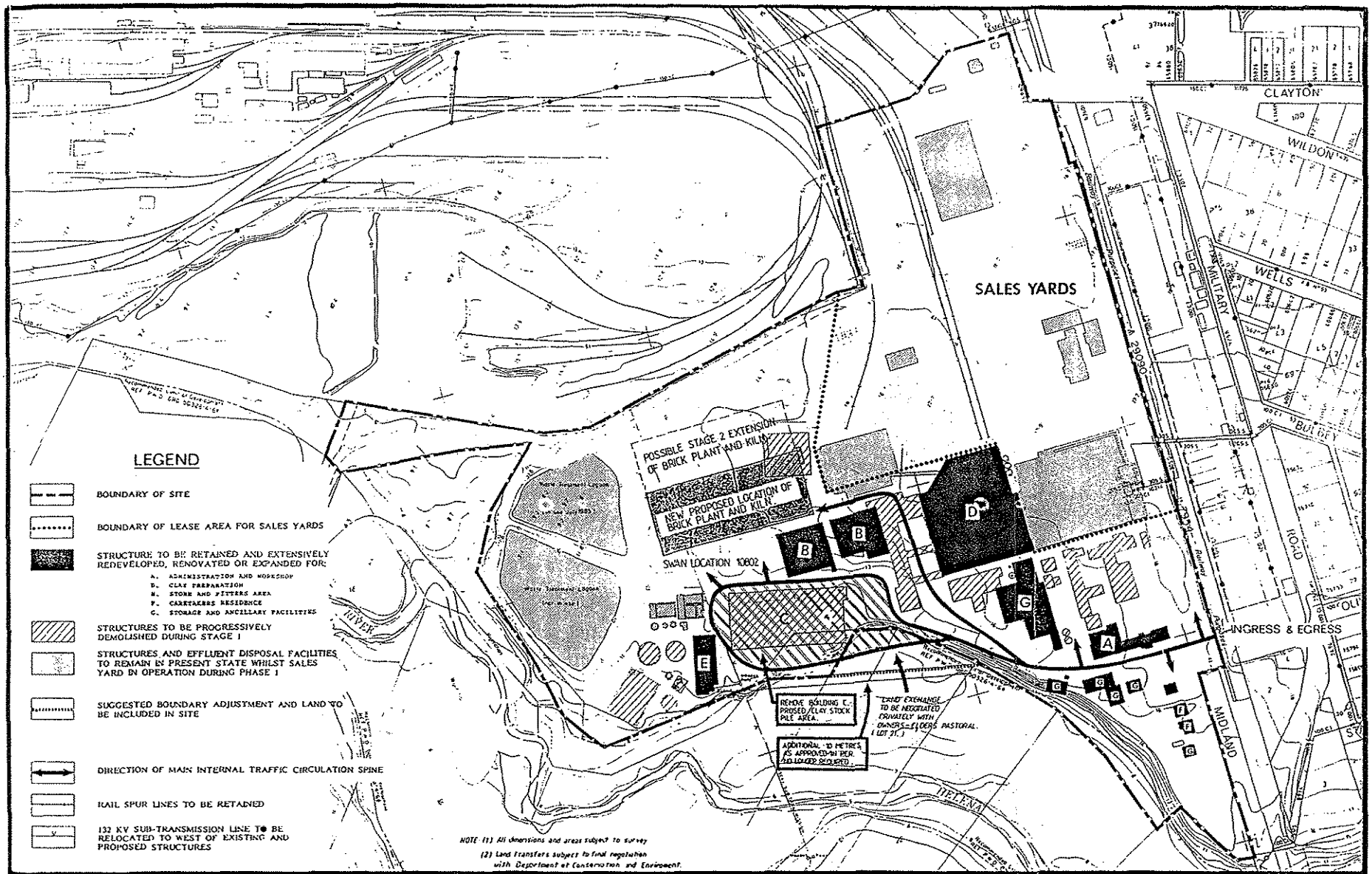
TELEPHONE 474 1366

SCALE 1:2000
SHEET OF
DRAWING NUMBER
P 8581-MK 1
Fig 1.



LAND REQUIREMENTS & DEVELOPMENT STRATEGY MIDLAND ABATTOIR SITE

for PRESTIGE BRICK

AMENDED LAYOUT – RELOCATION OF BRICK PLANT AND KILN BUILDING.

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OCTOBER 1987

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SCALE 1:2000

SHEET 2 OF 2

DRAWING NUMBER

P 8581-MK 2

Fig 2.

that the higher stack resulted in a more effective dispersion of fluorides and generated lower ground level concentrations of fluorides. In its assessment report (EPA Bulletin 289) the Authority recommended that the brickworks should have a stack height of 35 metres.

The EPA in its earlier report included a comprehensive section on the environmental impacts of fluoride.

The proposal described in the NOI has adopted a 35 metre stack and the predicted ground level concentrations of fluoride for the new location of the kiln compared to these for the kiln located on the southern boundary of the site are shown in Figure 3.

The Authority agrees that these predictions of ground level concentrations of fluoride are a very good representation of the expected fluoride levels.

In its earlier report the EPA acknowledged that in certain areas, particularly in the area surrounded by Bushmead Road, Stirling Crescent, Central Avenue, Wingate Avenue and Eric Street in Hazelmere and around Ferguson Street and Moore Ave in Midland there may be, on rare occasions, some leaf damage such as yellowing, the edges of leaves dying or some spotting of fruit which may be attributable to fluoride fallout from the brickworks. These effects should be only noticeable in the most sensitive species and are not expected to impact most species.

The relocation of the kiln with the emission stack to be sited approximately 130 metres further north of the site described in the PER, will mean on average that the ground level concentrations will be translated by a similar distance. The area of greatest impact west of the brickworks, with a predicted ground level concentrations of 0.3 micrograms a cubic metre, will in essence still be the same general area in Hazelmere as that mentioned above. The 0.2 microgram a cubic metre impact zone to the north east of the new kiln location will now encompass the southern portions of Wellaton and Ewart Streets, as well as Ferguson Street, but will now exclude Moore Avenue.

One of the issues that has been raised by several community groups and individuals of the EPA's first assessment report is the validity of the proponent's dispersion modelling work, and in particular whether the model accurately took account of appropriate inversion conditions.

The Authority is satisfied with the assumptions and scope of the air dispersion modelling work. However, because of the high interest in these aspects the EPA has recently published a short report on this particular subject matter. This is included as Appendix A.

The Authority considers that the air dispersion modelling has adopted conservative parameters such as the fluoride content of clays and the "worst three months" meteorological data from five years of records.

Notwithstanding the conservative approach adopted by the dispersion modelling, it means that there are only two relatively small areas where the ground level concentrations are expected to reach or exceed 0.2 micrograms a cubic metre.

For most of the surrounding area the average three month concentrations are at the 0.1 microgram a cubic metre level or less.

NOTICE OF INTENT

AMENDMENT TO PRESTIGE BRICK WORKS.
PROPOSAL TO RE-DEVELOP THE MIDLAND ABATTOIR
FOR A HIGH TECHNOLOGY BRICK WORKS.

Isopleths for Ground Level Concentrations of Flourides
Stack Height 35 m.

LEGEND
0·3 •ISOPLETH, CONCENTRATION IN $\mu g/m^3$. OF NEW STACK LOCATION.
•ISOPLETH, CONCENTRATION IN $\mu g/m^3$. OF PREVIOUS STACK LOCATION.

N W E S

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DATE OCT. 87
SCALE 1:25 000

Most native vegetation can withstand continuous exposure at levels of 0.5 microgram a cubic metre for three months without any appreciable adverse impact.

Because of the expressed widespread community concern about the impact of the fluoride emissions on the health of the Midland community, the Authority points out that the expected levels of fluoride at ground level are very much lower than the levels adopted as the standard for the protection of worker health. The occupational health standard for fluorides for a five day a week, 8 hours a day, a 12 months a year exposure is 2 500 micro gram a cubic metre. This means that for the vast majority of the land surrounding the stack, the fluoride levels are about 25 000 times lower than those which have been specifically established to protect the health of a workforce.

The Authority agrees with the proponent's conclusion that the relocation of the 35 metre high emission stack to a position approximately 130 metres north of the original location will have negligible effects on humans, grazing animals and no effect on commercial horticulture or viticulture in the region.

There could be minor plant damage to sensitive plants in the area impacted by the 0.3 microgram a cubic metre ground level concentration zone. This particular area is presently largely cleared and undeveloped.

The Authority reiterates its earlier position that there should be no unacceptable effect on the beneficial uses of the area surrounding the brickworks. The Authority's approach towards protection of beneficial uses was outlined in its earlier report.

The Authority restates its earlier recommendations that are relevant to the control of management of fluoride emissions:

RECOMMENDATION 2

Based on the information available to the Environmental Protection Authority it recommends that:

the fluoride mass emission rate from the whole plant should never exceed 1.0 gram/second;

these emissions should be released to the environment through a stack with a minimum height of 35 m;

the proponent should monitor the emission rate and supply the results to the Environmental Protection Authority as part of a monitoring and verification programme approved by the Environmental Protection Authority; and

if, in accordance with Recommendation 3 environmental damage occurs as a result of the brickworks operation, this maximum allowable mass emission rate will be reduced to a level such that the objective of the continuing maintenance of current beneficial uses of the locality is met.

RECOMMENDATION 3

The Environmental Protection Authority recommends that the proponent funds an independent study, to be approved by the Environmental Protection Authority, to measure the ground level concentrations of fluoride on areas around the plant, and the associated effects on the environment. For

appropriate verification of this study, monitoring will have to commence well before the plant becomes operational. In the event that the Environmental Protection Authority is not satisfied with the assessment of the state of the environment as shown in the results of the study, the Environmental Protection Authority will require the proponent to modify its operations to reduce air emissions to an acceptable level.

RECOMMENDATION 4

The Environmental Protection Authority recommends that the proponent should configure the various parts of the plant so that a scrubber can be retrofitted to Stage 1 should the Environmental Protection Authority consider it necessary.

RECOMMENDATION 5

The Environmental Protection Authority recommends that if the project proceeds to Stage 2 the proponent should maintain the fluoride emissions from the total plant at the mass emission rate set in Recommendation 2.

3.2 NOISE

The NOI discusses the impact of the modifications on noise levels as two discrete components - one relating to the relocation of the brick plant and kiln and the other pertaining to the relocation of the clay stockpiles.

The proponent claims that the shift of the brick plant and kiln will not have an adverse affect on environmental noise levels.

In addition to monitoring undertaken for the PER the proponents undertook further calculations of expected noise levels at two locations. One location was at the nearest residential area in Eric Street, Hazelmere and the other at the nearest point of a proposed development in Hazelmere for residential subdivision.

Information given in the PER indicated that satisfactory noise levels at the nearest proposed residential area could be achieved by special design of the clay stockpile and by strict limits on day to day operations.

The Authority considers that the configuration of the stockpile layout is an important factor in limiting noise impacts in the Hazelmere area.

The proponent has acknowledged that the assigned noise levels for stated times for the nearest existing residential boundary approximately 1 400 metres away at Hazelmere would not be achieved when using a basic piece of loading equipment. However, the proponent is confident that the equipment could be modified to achieve satisfactory noise levels.

The Authority reiterates its earlier position with respect to noise that it does not consider that the potential noise emissions from the site will be of such a level that the project should not be allowed to proceed.

RECOMMENDATION 6

The Environmental Protection Authority recommends that the noise emissions from the premises will need to be at a level acceptable to the Authority. This will be controlled by appropriate licensing conditions set under the Environmental Protection Act.

3.3 DRAINAGE AND CLAY STOCKPILE MANAGEMENT

The proposal described in the NOI does not generate any additional runoff. However, the proponent now proposes to control stormwater runoff to the Helena River floodplain by the installation of standard oil and silt traps. It is proposed that this system will be installed to the satisfaction of the Western Australian Water Authority and the Shire of Swan.

Stormwater from the clay stockpile area will be discharged into the nearby existing waste water settlement and treatment lagoons.

There will be some stormwater runoff from the outside face of the clay stockpile bund on the southern boundary. The proponent proposes that this be discharged down the boundary embankment onto the floodplain. Although the NOI states that because of small amounts of stormwater runoff from the bund that this will have no detrimental effect on the floodplain, the Authority considers that stormwater runoff from the stockpile needs to be carefully managed and to the satisfaction of the relevant management agencies.

The Company also proposes to landscape the embankment and land adjacent to the clay bund.

RECOMMENDATION 7

The Environmental Protection Authority recommends that prior to the construction of the clay stockpile, the proponent is required to submit its clay stockpile management programme, including details of stormwater runoff and landscaping, to the Swan River Management Authority (or its proposed successor the Swan River Trust) for its approval.

3.4 DUST

The proponent acknowledges the need for dust management of the clay stockpile area and proposes to use water as a dust suppression method.

The EPA will require the proponent to outline their dust suppression system when it makes an application for a Works Approval.

Satisfactory on-site dust control measures would be one of the conditions that would be attached to a licence that would be issued to the proponent if this proposal proceeds.

For dust associated with the brickworks outside the site boundary the EPA reiterates it previous recommendation.

RECOMMENDATION 8

The Environmental Protection Authority recommends that should there be a nuisance from dust associated with the brickworks outside the site boundary then the Swan Shire Council and the nominee of the Minister for Transport should inform the proponent to take appropriate action to stop the nuisance occurring.

3.5 PLANNING MATTERS, THE HELENA RIVER AND FLOODPLAIN

Issues pertaining to the Helena River and floodplain were discussed by the EPA in its July 1987 Report.

Subject to final survey approximately 0.63 hectares of river floodplain was included within the land requirements of the proponent's proposal outlined in the May 1987 Public Environmental Report. This proposal now no longer requires the 210 metre strip (identified in Figure 2) and this means that approximately 0.19 hectares less floodplain will now be required for the development.

The Authority commends the Company for its offer to make this ten metre strip available to the Crown at no cost to assist in the provision of the proposed Helena River linear park. The State Planning Commission has acknowledged that a benefit of the proposed relocation of the brick plant and kiln building is that it results in less floodplain land being used.

The PER states that the proponent proposes to landscape the embankment and land adjacent to the clay bund for a distance of approximately 15 metres from the site boundary. The Authority considers it important to landscape the floodplain area with indigenous vegetation of the area.

RECOMMENDATION 9

The Environmental Protection Authority recommends that in the event of the requirement to fill part of the floodplain, the proponent should landscape the filled area which is not required directly for the clay stockpile in a manner which recreates the indigenous floodplain vegetation of that area.

4. CONCLUSION

The Environmental Protection Authority has considered the NOI and the submission from relevant Government agencies. The proposal to relocate the brick plant and kiln to an area that was previously set aside for the clay stockpile area and the relocation of the clay stockpile on the southern boundary of the property is considered to be a minor variation to the proposal previously evaluated by the Authority.

The Environmental Protection Authority concludes that the modifications to the original proposal as described in the NOI are environmentally acceptable and recommends that the proposal could proceed subject to:

the proponent's commitments in the PER, the NOI and the additional information supplied to the Environmental Protection Authority; and

the conclusions and recommendations in this Assessment Report.

5. REFERENCES

BSD Consultants Pty Ltd. Public Environmental Report for Prestige Brick (Pilsley Investments Pty Ltd). A Proposal to Redevelop the Midland Abattoir for a High Technology Brickworks. May 1987.

Environmental Protection Authority Prestige Brick Proposal Brickworks, Midland Abattoir Site Midland, Pilsley Investments Pty Ltd. Report and Recommendations of the Environmental Protection Authority. Bulletin 289, July 1987.

APPENDICES

APPENDIX A

EPA REPORT ON THE TREATMENT OF TEMPERATURE INVERSIONS IN THE AIR DISPERSION MODELLING STUDIES UNDERTAKEN BY THE PROPONENT

Since the publication of the EPA's Assessment Report on the Company's PER (EPA Bulletin 289) there have been a number of queries about the use of Perth Airport meteorological data and, in particular, the treatment of temperature inversions in the fluoride dispersion modelling calculations for the Midland site. Reference was made in these queries to an unpublished report from the Bureau of Meteorology (1978) which indicated the presesnce of temperature inversions in the lowest 100 m of the atmosphere on many mornings throughout a year. This information was taken as being contrary to the values of mixing depth employed within the model, as described in the PER. The purpose of this report is to explain the reasons for the apparent disparity and to explain why the EPA considers the mixing heights used in the PER to be acceptable.

The Bureau of Meteorology provided the following explanation of how the data in the 1978 report was derived:

> The analysis of 0700 radiosonde data was performed to provide a somewhat arbitrary morning average "mixing depth", derived by:
>
> setting the surface air temperature to the Perth Met Office minimum plus 3°C; and
>
> using this temperature in the dry adiabat intersection method to determine the mixing height from the radiosonde profile.
>
> For cases where this analysis revealed that a surface inversion existed (even with the addition of 3°C) the mixing height was assumed to be in the 0-100 m range.

The large number of cases in the 0-100 m band reflects the large number of surface inversions, especially during the colder months. However, the use of the term "mixing depth" to describe a surface inversion or any situation where a gravitationally stable layer extends upwards from the ground may be quite misleading, and appears to be the cause of misunderstanding of the issue.

During the daytime, thermal turbulence causes the growth of a well-mixed layer upwards from the earth's surface. This layer is capped aloft by a stable layer (often a sharp temperature inversion) which acts like a lid. The depth of the layer is called the "mixing depth".

The situation at night and early morning prior to the onset of thermal mixing is generally very different. If there is wind at the surface then a weakly turbulent nocturnal boundary layer will develop. However, the nocturnal boundary layer is not well mixed over its depth; the mechanical turbulence energy level approaches zero at the upper boundary and the stable temperature gradient throughout the layer and above it acts to damp out turbulent mixing. Unlike the daytime situation, pollutants are not well mixed over the nocturnal boundary layer. Pollutants within buoyant plumes which rise high in the nocturnal boundary layer will disperse very slowly, with the uppermost portions of the plume not mixing to ground level. Plumes which rise about the boundary layer will be trapped and not disperse to

EPA REPORT ON THE TREATMENT OF TEMPERATURE INVERSIONS IN THE AIR DISPERSION MODELLING STUDIES UNDERTAKEN BY THE PROPONENT (contd)

ground at all; a commonly observed phenomenon around dawn. Trapped plumes may subsequently be mixed to ground level sometime after dawn, but this is a transient process which is not a significant consideration in the modelling study which was aimed at predicting long-term concentrations.

Consequently, for the purpose of modelling dispersion, the most accurate simple means of representing the nocturnal (stable) situation is to assume slow dispersion with unlimited vertical mixing, ie no "reflection" of plume material from an elevated "lid" (as is assumed for the daytime mixed layer). The selection of an arbitrary large "mixing depth", 999 m, achieves this effect. The model employed by BSD Consultants includes the effect of plume rise being limited in stable conditions and employs widely accepted vertical and horizontal dispersion rates.

The consultant's choice of average mixing depths for unstable and neutral conditions (ie stability categories A - D) are arbitrary but are considered reasonable estimates of the long-term average values. A sensitivity test was performed by setting all average mixing depths to 200 m (an ultra-conservative assumption) and running the model on the same data as used previously. The increase in ground level concentrations at the point of maximum impact was only about 10%. In other words, average mixing depth is not a critical parameter in the simulation of long-term average concentrations.

Contrary to statements made in submissions on the PER, the exit temperature of the gas is not "low". The combination of temperature and large volume flux provides an appreciable buoyancy flux which in turn causes the plume to rise to altitudes greater than 80 metres. At these altitudes the plume is very susceptible to being trapped within nocturnal temperature inversions with very slow or no subsequent mixing of plume material to ground level. The plume is also likely to be isolated from the surface by the cold katabatic flows from the Darling Scarp. The modelling performed by BSD Consultants is conservative in the sense that it ignores plume trapping by allowing dispersion to ground level at all times.

In summary, the influence of atmospheric inversions have not been ignored, but rather have been treated in a simplified, scientifically justifiable manner.

APPENDIX B

CONSOLIDATED LIST OF COMMITMENTS BY THE PROPONENT CONTAINED IN THE PER, THE NOI AND IN SUPPLEMENTARY INFORMATION PROVIDED TO THE ENVIRONMENTAL PROTECTION AUTHORITY

Redevelopment strategy plan indicates that the entire original 29 ha site will be used to accommodate the brickworks in two distinctive phases of redevelopment, except for:

approximately 0.6 ha of land to be transferred to Westrail; and

approximately 2.4 ha of floodplain to be vested as part of the future Helena River linear park concept.

Use existing railway spur lines into the site.

All raw materials will be transported mainly by truck to the site. Possibility of rail transport at some future date.

Waste bricks will be recycled by recrushing with virgin clay and used in the manufacture of new bricks.

To overcome potential dust problems a 'wet process' will be used which involves the addition of water to the raw materials at each stage of the crushing process.

Clay stockpiles will be continuously watered to eliminate any dust problems created by dumping and truck movement.

All gaseous waste, including water vapours, will be discharged from three individual stacks. 'Two of these stacks will be from the (brick) dryer and will only discharge water vapour. The third will be the kiln exhaust stack, discharging other gases including fluorides'. The only visible emission will be a water vapour cloud.

A stack of 35 m height from ground level, with allowance made in the ducting for rapid installation of a scrubber if it becomes necessary, is to be built to disperse the kiln exhaust gases.

An access point for measurement of fluorides in the gas stream will be included.

During the first year of operation of the plant it is envisaged that regular inspection of the surrounding areas and potential vegetation damage be instigated at any substantiated complaint from the surrounding residents or landusers. If a substantial likelihood (or reasonable suspicion of such) exists that damage is being caused by fluorides from the stack then analysis of foliar content of a representative sample of damaged plants shall be arranged.

In the event that a series of reports indicate a recurring problem the area affected will be monitored for ambient ground level concentrations using a high volume sampler or other approved method of monitoring, (as 2628.2 - 1984 Ambient Air-Determination of Gaseous Fluorides and Acid-soluable Particulate Fluorides (0.1 gm/m or greater) - Manual, Double Filter Paper Sampling). Monitoring will take place over a 30 or 90 day period.

CONSOLIDATED LIST OF COMMITMENTS BY THE PROPONENT CONTAINED IN THE PER, THE NOI AND IN SUPPLEMENTARY INFORMATION PROVIDED TO THE ENVIRONMENTAL PROTECTION AUTHORITY (contd)

After testing and modelling, should it eventuate that a scrubber is required for any future kilns then Prestige Brick will comply with the requirements of the EPA.

Demolition and follow up landscaping programme will be instituted to ensure that the appearance of the site is considerably improved.

Prestige Brick will acknowledge its specific responsibilities under the following Acts and Regulations:

State Planning Commission Act (1985)
Environmental Protection Act (1986)
Metropolitan Region Town Planning Scheme Act (1959)
Metropolitan Region Scheme (1963)
Local Government Act (1960-1982)
Shire of Swan Town Planning Scheme No 9 (1985)
Shire of Swan Extractive Industry By Laws (1982)
Noise Abatement Act (1972-1981)

Effluent/wash water from the Saleyards operated by the WA Meat Commission will continue to be treated as it is at present. In the event that part of the treatment system as used at present is interfered with by Prestige Brick, it will be either relocated or re-installed at Prestige Brick's cost.

The WA Meat Commission will be responsible for the operation and maintenance of the treatment/settlement system. Prestige Brick will allow access for such maintenance.

The noise level emanating from the site will comply with the Noise Abatement (Neighbourhood Annoyance) Regulations 1979.

The current stormwater drainage system will be utilized.

A strip of land 10 metres by approximately 210 metres within the floodplain of the Helena River will be ceded to the Crown free of cost in order to assist the creation of the Helena River linear park as promoted in the System 6 Report (see Plan A in Notice of Intent), subject to satisfactorily negotiations being concluded with the present owners of the land.

Standard oil and silt trapped manholes to the specifications of the Shire of Swan and the Water Authority of WA will be installed in the existing drainage system discharging to the Helena River floodplain.

Stormwater from the proposed clay stockpile area will be collected and discharged into the existing wastewater settlement and treatment lagoons.

The land embankment and land adjacent to the clay bund for a distance of 15 metres from the site boundary will be landscaped with indigenous floodplain vegetation.

CONSOLIDATED LIST OF COMMITMENTS BY THE PROPONENT
CONTAINED IN THE PER, THE NOI AND IN SUPPLEMENTARY
INFORMATION PROVIDED TO THE ENVIRONMENTAL PROTECTION AUTHORITY (contd)

Only one ingress and egress point will be used at the south-east section of the site, whilst the sale yards remain in operation.

The specification of plant, equipment and building construction will ensure that adequate attenuation of noise is achieved. This is possible within current technology for the type of plant envisaged.