WUNDOWIE GARDEN TOWN

CONSERVATION PLAN

1.0 INTRODUCTION

1.1 STUDY OBJECTIVES

This conservation plan is a significant component of the Wundowie Community Strategic Plan 2003 and is intended to identify not only formal heritage values of the place and its significance but also to be the foundation of community initiatives in their revitalisation strategy as set out in the 2003 plan.

The Wundowie Community Strategic Plan 2003 recommended that the town should seek National Trust of Australia (WA) Historic Town status. The Wundowie Progress Association subsequently successfully sought a grant from Lotterywest to this end. The grant required a conservation plan based on the Heritage Council of Western Australia standard format that, while not initially sought by the strategic plan, will substantially respond to the need to set all heritage endeavour in Wundowie on a sound understanding of the heritage values and significance of the place.

However, the original objective of the Wundowie Progress Association of achieving National Trust of Australia (WA) Historic Town status will require further work by volunteers of the Trust beyond this conservation plan. Notwithstanding this, the conservation plan will be of substantial value in preparing the assessment for Historic Town status.

It is emphasized that the heritage significance of the town is deemed as the public domain as it is this that holds the heritage value of Wundowie. The street pattern, the subdivision layout, the location of land uses, the open space and the civic core are the fundamental components that make up the Garden City approach to town planning.

1.2 STUDY AREA

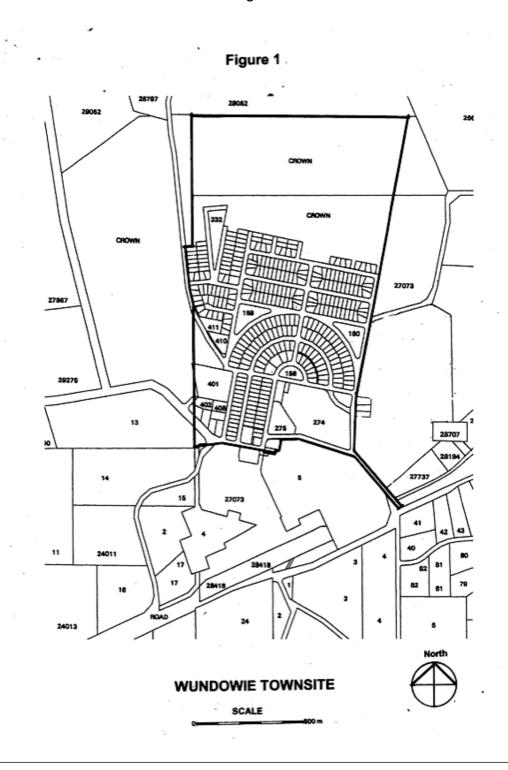
The area for this conservation plan is the townsite of Wundowie as identified in the Shire of Northam Town Planning Scheme No.3 gazetted in 2005.

It is recognised that the adjoining lands for townsite expansion to the north and west are Unallocated Crown Land while the land to the south and east is privately owned. The land to the east is adversely affected as potential residential land by the presence of the sewerage treatment facility that requires a 500 metre setback and thus prevents a substantial area of landform being developed (this is discussed in a later section).

While not considered in detail, the town borrows the natural and modified landscape of the town's environs. The setting of the town in this secluded valley surrounded by natural bushland to the north and west with substantial remnant bushland to the east conveys an attractive and peaceful ambience. It's appeal as an historic place in such a setting is substantial.

It should be noted that the Wundowie townsite as defined on the Shire of Northam Town Planning Scheme No.3 does not include the foundry industrial land or the land containing the sewerage treatment facility.

The extent of the townsite is indicated in figure 1.



1.3 **BACKGROUND**

In 2003 the Wundowie Progress Association commissioned Relix to prepare a Community Strategic Plan in order to address local issues and set out a strategy of revitalisation for the community of Wundowie. One of the recommendations of the strategic plan was to seek formal recognition of the town's historic foundations. This study is part of that process as the Wundowie Conservation Plan will not only identify the heritage significance of the place but will form a sound basis of future development of the town.

One often overlooked contribution of a conservation plan is the value of informing the community in regard to the historical context of the place and raising its awareness and understanding of their town's heritage significance. In Wundowie, the community having embraced the strategic planning process are now sensitive to developing the physical aspects of the town in the general knowledge of its historic nature. This conservation plan will act as the fundamental guide for all the Wundowie Progress Association initiatives in enhancing the town. The town entry statements are testament to this understanding with the public artwork expressing the historical storyline of the town.

The resources available inevitably limit conservation plans and the Wundowie Conservation Plan is no exception. The fact that Wundowie was established in the mid 20^{th} Century does not mean that the information was easily accessible if indeed it was recorded at all. The consultant team were most fortunate to have access to considerable and comprehensive archival resources in the Wundowie Foundry as well as the Wundowie Progress Association. Other archival material, especially in the area of town planning, was surprisingly difficult to research due mainly to the fact that wartime planning was somewhat secretive and that the formal town planning of Western Australian towns had only been established 14 years before. The limited town planning activity was strongly influenced initially the by the onset of the Depression era followed by wartime constraints.

1.4 ACKNOWLEDGEMENTS

The assistance and contributions from the following people has been substantial and is greatly appreciated in the preparation of the Wundowie Conservation Plan.

- The Wundowie Progress Association
- Steering Group members
- Benjamin Seabrook
- Bill Pearce
- Joan Renton Spencer
- Harry Ball
- John Treloar
- Douglas Collins

The Conservation Plan has been researched and prepared by Relix in association with Fiona Bush Heritage and Archaeology with the following responsibilities: -

- Michael Jefferson BSc., Dip Ed Management, editing and community liaison
- Donald Newman A(Arch)PTC, DipTP, MPhil. Physical evidence, research and preparation of drafts
- Fiona Bush BA(Hons), MBEnv History, research and preparation of drafts

2.0 DOCUMENTARY EVIDENCE

Information for this section of the report was obtained from primary and secondary materials. The Wundowie Foundry has retained a number of original documents and a large percentage of the information about the establishment of the Industry, the foundry, the townsite and the manufacturing processes were obtained from this information source. Additional primary material was also obtained from the State

Records Office of Western Australia and Battye Library. Historical and technical information was also provided by Bill Pearce, the Managing Director of the Wundowie Foundry, with additional information obtained from Joan Renton Spencer, Harry Ball, Benjamin Seabrook, John Treloar retired town planner and Douglas Collins formerly Deputy Town Planning Commissioner.

2.1 Chronological Summary

1941 March: State government convenes technical panel to investigate feasibility of establishing iron and steel industry in Western Australia.

Decision made to concentrate on charcoal iron.

1942 BHP approached to develop blast furnace plans for a small pilot plant.

Preliminary plans developed and Wundowie chosen due to closeness to iron ore deposits and wood supplies.

Negotiations commence with United States firm for refinery design and retorts.

1943 Committee recommendations accepted by government.

October: Wood Distillation and Charcoal Iron and Steel Industry Act passed by government. Formation of Charcoal Iron and Wood Distillation Industry Board of Management to oversee project.

Tenders called for construction work: power house, blast furnace, staff housing and administration buildings.

Town Planning Commissioner visits site.

Talks commence with Railways Department regarding construction of railway siding at Wundowie.

1944 Construction work commences. Difficulties experienced in obtaining supplies and labour.

Federal government commits £30,000 towards project.

Staff housing completed.

Lands and Survey Department carry out survey for town of Wundowie.

Town Planning Commission starts on plans for town.

Railway siding completed.

Decision made to erect sawmill and pre-drier on site.

1945 Work starts on blast furnace foundations.

Tenders to be called for Boiler House, Power House, and assorted mobile equipment.

1946 Mess Hall and first houses completed.

Quarters at Boya Quarry moved to Wundowie to provide accommodation.

Managerial positions advertised.

1947 Alterations required to townsite layout due to low lying land in the north.

35 houses now completed.

Hall erected on Lot 158 – originally workshop at Melville Camp, moved to Wundowie.

School commences in Hall.

School quarters erected by State Housing Commission (Lot 35?).

June: Timber mill starts operating.

Second sawmill nears completion.

Extensions made to Wundowie Station platform.

Tents provided due to shortage of housing.

Mr A.W. Jahn takes on management of store at Wundowie.

August: Formation of Wundowie Progress Association.

1948 January Blast furnace comes on line and production of pig iron commences.

Construction of butcher and baker's shops.

Town lots set aside for Anglican and Methodist churches.

Education Department approves construction of a three room school.

First mention of P & C association – need to check when actually formed.

Wundowie gazetted as townsite (check exact date).

Land set aside for ambulance.

Movies shown regularly in Hall.

Population of Wundowie 300.

Formation of Wundowie Club, leases Industry building.

Application by Industry for Gallon license to be operated by Wundowie Club.

Pig iron production 771 tons.

1949 Construction of Wundowie Primary School.

Housing shortage continues - 'Tent Town' constructed to east of blast furnace.

Insufficient power for foundry.

Application by Presbyterian Church for land.

Decision made to construct bookmaker's shop.

February: New General Store completed, under management of Mr. Jahn.

November: Plans prepared for new administration office.

Pig iron production 5,669 tons.

1950 January: Refinery comes on line.

500hp diesel engine transferred to Wundowie to assist with power shortage.

Trials start on Koolyanobbing ore.

Permission given to workers to purchase their own homes.

Decision made to install sawdust burning equipment for boilers.

Railway station moved further east.

Tennis courts constructed on oval.

Movies also shown in garden area at side of Hall.

Mr Sardelich constructs a grocery shop (Lot 44).

July: Control of townsite passes to Shire of Northam.

Pig iron production 6,691 tons.

1951 Decision made to change to Koolyanobbing ore (due to higher iron content).

Permission given for construction of 4 more retorts.

Preparations for installation of pig making machine.

Townsite extended.

Shopping precinct extended and church groups asked to pick new sites.

Sardelich constructs larger grocery store on southern side of General Store. Original grocery used by boot maker/drycleaner.

Pig iron production 8,997 tons.

1952 Pig iron making machine starts operating.

Housing shortage continues – 20 families living in tents.

School expanded by erection of prefabricated building containing 2 classrooms.

Pig iron production 10,815 tons.

1953 Mr Jahn given obtains licence to sell petrol outside the General Store.

Pig iron production 10,280 tons.

1954 Lots 41 – 43 vested with Wundowie Club.

Sardelich sells lease of grocery store to Peter Falipari and Pasquale Battista.

Pig iron production 10,518 tons.

1955 Approval given to expand plant; correspondence with Lambiotte regarding vertical retorts.

Grocery store lease purchased by Frederick and R.J. Hug.

Pig iron production 11,229 tons.

1956 Difficulty filling orders – Board decides to seek Minister's permission to: construct additional furnace (No. 2); purchase license and design for Lambiotte retorts and enlarge existing furnace. Approved by Cabinet.

Board approves granting Lot 179 for Methodist Church.

Board approves construction children's playground at rear Lot 156.

September: screening of film: Forest for Foundry – production story of Wundowie.

Pig iron production 12,324 tons.

1957 Wundowie Progress Assoc. requests extensions to Hall – refused, building too old. Advised to approach Northam Roads Board.

Mr A.J. Hyde given permission to construct garage (Ampol) Station on Industry land.

Board gives permission for construction of swimming pool.

Construction of workers' houses continues.

Tenders go out for construction of 2 Lambiotte retorts. Awarded to Vickers Hoskins

R & I Savings Bank Agency established in town.

August: Opening of new Wundowie Club by Premier.

Pig iron production 14,083 tons.

1958 Plans made to establish telephone exchange.

Approval given to construct library next to tennis courts.

Kenneth Hunter takes over lease of General Store.

2 additional classrooms added onto original 1949 building.

Pig iron production 16,305 tons.

1959 January: No.2 Blast furnace blown in and engineer from Lambiotttes overseas commissioning of retorts.

Pig iron production 24,330 tons.

1960 4 additional rooms added to original 1949 school building, together with new cloak rooms and store room.

Three staff cottages on Industry land moved to Kingea Road, Wundowie.

Wundowie Soccer Club develops soccer field.

Wundowie Swimming Pool officially opened.

Pig iron production 47,534 tons.

- 1961 Pig iron production 52,262 tons.
- 1962 Rooms added in 1960 defined as the Junior High School. New room added onto 1960 classrooms.

Installation of a log docker at eastern end of plant.

Pig iron production 49,786 tons.

1963 Progress Assoc. still trying to get funding for new hall.

Lawrence and Marlene Curnack take over lease on grocery store – becomes known as Pool Shop (later Swimming Pool Kiosk). Managers of shop also responsible for management of pool (pool constructed next door to shop.)

Mr and Mrs Hyde able to purchase land on which Ampol Garage sits.

Shaking ladle installed.

Pig iron production 45,095 tons.

1964 New classroom block added to Wundowie School.

Vanadium deposits found at Coates, reserved for the Industry.

Board discusses ways to expand Industry – discussion re installation of foundry equipment.

Pig iron production 46,769 tons.

1965 Hunter officially opens his new supermarket – old store used for display purposes.

Pig iron production 47,355 tons.

1966 Quotes obtained from Birlec-Major for installation of induction furnace.

William and Violet Garbutt take over lease of Pool shop.

April: Talks between state government and ANI for sale of Industry.

July: ANI takes over management of Industry.

October: 2 new bills presented to parliament: Wood Distillation and Charcoal Iron and Steel Industry Amendment Bill and Wundowie Works Manufacturing and Foundry Amendment Bill. Both passed. Industry now called Wundowie Charcoal Iron. Note: Bill not proclaimed.

Pig iron production 45,864 tons.

1967 Mrs Piera Bani and her son Giovanni purchase old General Store, operate continental delicatessen.

Wundowie Club takes over lease and management of pool and shop.

May: Termination of management agreement with ANI, Industry returns to state control.

August: Induction furnace comes into operation.

Approval given to construct drive-in theatre.

Shops: General Store and Post Office, Chemist, Bakery, Butcher's shop and quarters sold to existing tenants.

1968 Spotmill converted to a fettle (pattern making) shop.

Mr Fernie resigned from the Board, Mr Harris appointed chairman in his place.

1971 Wundowie had population of 1,042.

Agnew finds significant vanadium deposits at Coates.

- 1973 Decision made to increase foundry operation by installation second induction furnace.
- 1974 Agnew Clough purchases Wundowie Charcoal Iron and Steel Industry for \$395,00.

2nd induction furnace commissioned.

Hall condemned as unsound.

- 1975 Exporting pig iron to United States where it was used in manufacture of ductile steel.
- 1976 Shire of Northam obtains grant \$15,00 to put towards cost of new hall.
- 1977 Refinery closed.
- 1978 Discussions about establishment vanadium refinery at Wundowie (use of existing facilities).
- 1979 Sawmill closed down, except docker mill where wood processed for retorts.
 - Work on vanadium plant commences.
- 1980 Vanadium plant commences operations.
- 1981 Blast furnaces shut down.

Crushing plant at Koolyanobbing sold.

- 1987 Sir Garrick Agnew dies.
- 1989 Agnew Clough ceases to exist, Wundowie Foundry becomes part of Clough Engineering.
- 2004 Clough Engineering sell Wundowie Foundry Pty Ltd to partnership.
- 2005 Wundowie Foundry Pty Ltd continues to operate.

2.2 Origins of West Australia's Iron and Steel Industry

In 1941, the state government decided to investigate the possibility of establishing an iron and steel industry in Western Australia. During the war years, Western Australia had found itself relatively isolated and supplies of iron and steel were hard to obtain from both intra-state and overseas suppliers. A technical panel was convened and charged with investigating iron ore and limestone deposits and the possibility of producing iron ore from forest waste. The members on this panel were: Mr. N. Fernie (Director Department of Industrial Development), Mr R.C. Wilson (state mining engineer), Prof. Bayliss (Professor of Chemical Engineering at the University of Western Australia), Mr. H. Bowley (government mineralogist, analyst and chemist), Mr. F.G. Foreman (government geologist), Mr. E.W. Tomlinson (Managing Director of Tomlinson & Co.), Mr. F. Mills (chief mechanical engineer Western Australian Government Railways) and Mr. F. Gregson (utilisation officer for the Forests Department). Programment Pro

The outcome of the panel's first meeting, on 3 March 1941, was the decision to concentrate attention on the development of a charcoal iron plant with a refinery. The panel chose charcoal iron as the iron produced in this process was of a higher quality than that produced using coke. The addition of a refinery meant that useful byproducts, such as acetic acid, methanol and wood tar, which were produced during the carbonisation process, could be collected and sold. The panel noted that useful deposits of iron ore could be mined from Koolan Island and also Koolyanobbing. Limestone, which was also required in the production of iron ore, was readily available. The group considered that Bunbury would be an ideal location for an iron ore plant. However, the committee realised that due to war-time conditions both man-power and materials would be in short supply and they thought that it best to concentrate efforts on a small pilot plant. In January 1942, the panel asked BHP to develop plans and cost estimates for a blast furnace capable of producing 10,000 tons of charcoal iron per year. Jarrah was to be used in the blast furnace.³

In October 1942, following correspondence from BHP, the panel reported that the pilot operation could be profitable and they requested £2,000 from the government to develop preliminary drawings. BHP developed plans for the blast furnace, while enquiries were made to companies in the United States for refinery designs. Preparatory work on the site and the ordering of materials began in August 1943.⁴

Constantine, A., 'The wood distillation, charcoal, iron and steel industry, Wundowie, Western Australia', a paper presented to the Bureau of Steel Manufacturers' Annual meeting, Perth 20 September 1955, Vol. No. 27.

Report on Wundowie project, Consignment 961, Item 2366, 1947, State Records Office of Western Australia (SRO).

Report on Wundowie project, SRO Report on Wundowie project, SRO.

Following the recommendations of the panel, *The Wood Distillation and Charcoal Iron and Steel Industry Act of 1943*, was passed on 25 October 1943.⁵ The act allowed for the formation of a board of management to oversee the operations of the new industry. The inaugural meeting of the Iron and Steel Industry Board of Management was held on the 13 August 1943. Members appointed to the board included: Mr. N. Fernie (Chairman), Mr A.J. Reid (a representative from the Treasury), Mr. H. Bowley and Mr R.C. Wilson. Mr Child was appointed Secretary to the Board.⁶

At the Board's first meeting, preliminary plans were developed, a site chosen and managerial staff appointed. Wundowie was considered to be an ideal site as it was close to iron ore deposits at Wundowie, basic infrastructure was available, such as rail and water, and jarrah wood forests, which would be used to make charcoal, surrounded it.⁷

2.3 The Wood Distillation Charcoal Iron and Steel Industry, Wundowie

Once the Board settled in, a number of tasks were commenced to start the development of the Industry. Mr Butterworth (an engineer) was appointed to supervise the fabrication and erection of the blast furnace and its accessories and Mr F.J. McMullan was appointed as the accountant. By October 1943, most of the factory site had been cleared, tenders had been gazetted for the construction of the blast furnace and the laboratory, two worker's cottages had been completed and a contract let for the construction of three staff houses at £3,027. During this early phase, and indeed for many years afterwards, there was an ongoing problem with finding sufficient labourers and supplies for the project. Many items, such as trucks and buildings, were acquired second-hand from other government departments and essentials were often pared down to the barest minimum to ensure that costs did not become excessive. In the case of the staff houses, no garages, drains, soak wells, cross walls, doors to laundries or cloak cupboards were provided; the cost to include these items was considered just too high.⁸

By the end of 1944, the Town Planning Commissioner had completed his design of Wundowie townsite, the staff housing had been completed and the Federal Government had promised to contribute £30,000 towards the project. It was during this early phase of development that a proposal was brought to the Board that a sawmill and pre-drier could save the Industry thousands of dollars as sleepers, and other marketable timber, could be recovered during the milling process. Further costs could also be made by stacking and drying the cut timber in the bush. The Board considered that the proposal had merit and plans for the sawmill and drier were developed during November 1944. Mr Anthony Constantine, a recent engineering graduate, was employed at Wundowie to work on the designs of the various items required by the plant. Mr Constantine went on to become a long term employee and eventually Manager of the Industry.

Research notes held by Wundowie Foundry Pty Ltd.

July 1942, Report on Wundowie project, SROWA

Wundowie Charcoal Iron Minute Book, 1 and 24 November 1944.

Minute Book Charcoal Iron and Wood Distillation Industry Board of Management, held by Wundowie Foundry Pty Ltd. The name used in the minutes changes slightly at times. However, the Board generally refers to the operation as 'The Industry' or gives its longer title: The Charcoal Iron and Steel Industry,

Minute Book of Charcoal Iron and Wood Distillation Industry Board of Management, held by Wundowie Foundry Pty Ltd.

Due to the various 'historical threads' which make up the history of Wundowie, the construction and development of the factory site will be dealt with first, followed by the development of the townsite (including accommodation and businesses) and the various community groups.

2.3.1 Construction and early development of the Factory Site

Whilst work was proceeding with the blast furnace, Mr Hanley continued his investigations for the refinery plant. The Board eventually chose the Vulcan Copper and Supply Company, Cincinnati, Ohio to design the refinery plant, although refinements to the design were later made in Western Australia as the wood distillation plant was originally designed for US hardwood distillation practises.

The horizontal batch retorts, which burnt the wood to create charcoal, were based on a design produced by Crossett Chemical Company in Arkansas. Once the timber had been burnt in the retorts the charcoal had to be cooled. The coolers were built by Scarfe & Sandovers and then erected on site by Saunders & Stuart.

During 1943, plans for the railway siding at Wundowie were finalised by the Railways Department. The Department estimated that the siding would cost £6,000, and due to labour shortages, they were unsure when the work would be completed. The siding was completed in August 1944 however; it was not until January 1948 that rails for the spur line into the factory site arrived. The Industry had to pay the Department an annual rental of £26 for the facilities.¹⁰

While work on the site continued through 1944 and 1945, the project was continuously held up with both labour and supply shortages. Towards the end of 1945, it became increasingly difficult to obtain supplies of concrete as the Department of Materials and Supply would not release the necessary amounts to the Industry. In the end the Industry imported 35 tons from Tasmania, although this supply was still insufficient for their needs. ¹¹

Work on the townsite also progressed during 1944 and surveyors marked out the housing blocks. The Board decided to excise a small portion from forest reserve 14275 and vest it in the Board of Management. This area, which was located to the north west of the present office, appears to have been the site of the earliest housing erected at Wundowie. Housing at Wundowie will be discussed later in Section 2.3.2.

While work on the various components at the factory site began to take shape, key personnel were appointed in December 1946: Mr Rourke was appointed Manager, Mr Hanley the Assistant Manger and Mr Gartland the Chemist. 13

By June 1947, the timber mill and dryer were completed and had commenced operating. The Industry required 60,000 tons of green timber per year. The large sawmill was capable of producing 45,000 tons of block, which was used in the retorts, 10,000 tons of boiler wood and approximately £25,000 worth of sawn timber per year. The slightly smaller spotmill was not completed until December 1947. At this time, all the milled timber produced by the mill was used in the construction of the plant and housing.

File H31: Wundowie Rail Siding, Wundowie Foundry Pty Ltd.

Wundowie Charcoal Iron Minute Book, 11 October 1945 and 11 April 1946.

Board Minute Book, 10/8/1945.

Board Minute Book.

Wundowie Housing: Cons.961, Item 2366/1947, State Records Office of Western Australia; Wundowie Charcoal Iron Minute Book, 10 June and 3 December 1947.

During 1947, when many of the buildings on the factory site were nearing completion, staff conferences were held weekly by Mr Rourke as a means of disseminating information to the various departmental heads. A rectangular hut, 118' by 19', together with an ablutions block, was purchased from a government disposal sale to be used as the new amenities block as the original amenities building built on site had been requisitioned as the office.¹⁵

Work also commenced on extracting iron ore from the Wundowie Mine. This was an open cut mine located to the east of the present office. While one of the main reasons for the location of the Industry at Wundowie was due to the presence of iron ore, by 1947 only limited work had been done to investigate the quality of the ore. The larger quantities, which were now being extracted from the mine, permitted a more detailed analysis of the ore, which, during this early period, appeared to be satisfactory.¹⁶

By September 1947, the staff conferences began discussing start up dates for the blast furnace. Before the blast furnace could be brought on line, management had to ensure that there was enough charcoal on hand to start the furnace, and that this supply could be replenished regularly. While a start up date of November was initially chosen, it was decided that it would be best to commence operations on 15 January 1948 as by then the ore crushing plant would have gone through its trial operations, limestone, which was used in the blast furnace, would have been delivered and a sufficient supply of charcoal would have been stock piled. On 22 January 1948, the Wundowie blast furnace produced its first iron ore ingot.¹⁷

The smelting works were officially opened on 15 April 1948 by Mr A. Hawke, Minister of Industrial Development. The Refinery did not commence operating until January 1950.¹⁸

While the smelting works had commenced operating, some buildings on site, including the all important refinery, had not been completed. During 1948, a large four bay garage was completed and additions were made to the spotmill. All construction work on the plant had been completed by September 1949.¹⁹

<u>Timber Processing</u>

The Wundowie works were specifically designed to produce a high quality pig iron in a state that had previously had no smelting works. The designers increased the economic viability of the project by firstly utilising the waste gases produced during the production of the charcoal and also by ensuring that all of the timber cut was used by the Industry. The timber was felled using mobile circular power-saws, which were leased out to various contractors, many of whom were Italian migrants. Those logs, which were suitable for milling, were collected and transported to the sawmill for processing. The waste flitches from this process went to the retorts. The remaining boles and branches were left in the bush to dry out before being cut into short lengths by mobile saws. The resulting cord wood was mainly used in the boilers, although some also went into the retorts. Nothing was wasted. This method of extraction allowed contractors to cut low grade timber in an area, which had previously been cut

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Staff Conference File, 25 June and 17 July 1947.

Wundowie Charcoal Iron Minute Book, 19 May 1947.

Avon Valley Advocate 5 November 2003, p. 8.

Wundowie Charcoal Iron Minute Book, 17 July 1950.

Wundowie Charcoal Iron Minute Book, 5 September 1949.

over and left as uneconomic. Once the wood had been cleared the area was used for grazing.²⁰

Charcoal Production

By 1953, six batch retorts (horizontal) were operating at Wundowie. Block wood from the sawmill was placed in steel buggies, which were then rolled into pre-drying kilns for forty-eight hours. Once the wood had dried out, it went into the airtight steel retorts, which were heated by gas from the blast furnace. It took twenty-four hours before the carbonisation process was completed. The buggies were then placed into coolers for forty-eight hours prior to being loaded into bins, which were discharged into the furnace. During the carbonisation process gases were given off. These gases were collected and allowed to condense producing a variety of wood distillation (commonly referred to as pyroligneous), products such as acetic acid, methanol, combustible gas and wood tar. The acetic acid, methanol and wood tar were collected and sold to various markets, while the combustible gas was re-used in the retorts.²¹

Ore

The iron ore was originally mined from an open cut mine at Wundowie. This ore was an unusual deposit of limonite iron with a similar vein found slightly to the east of Wundowie at Coates. The outcrop at Wundowie proved to be less extensive and consistent in quality than originally thought and, during the early years production output proved to be lower than originally anticipated due, in part, to the low iron content of the ore.²² Further research would be required on ore crushing equipment and how it was delivered to the furnace to more fully explain this aspect of operations.

Blast Furnace

As stated previously, the furnace design was supplied by BHP. Minor amendments were made to the design whilst the blast furnace was under construction. The furnace consisted of a steel shell, lined internally with high alumina refractory bricks, that was 36 feet (10.97 metres) high between the tuyeres²³ and the stockline. In the beginning, two blowers provided blast air to the furnace. The furnace was charged alternately with skips or charcoal and iron ore, together with the addition of fluxes such as limestone and magnesium. Once the furnace was 'fired' it operated continuously and was tapped every four hours. The resultant molten ore was originally fed into sand moulds in the casting house. These moulds were later upgraded.²⁴

Refinery

The pyroligneous gases or vapours produced in the retorts were condensed in gas tube condensers, two per retort. The resulting condensate, known as pyroligneous acid, was processed in the refinery. The volatile components in this acid included: methanol, acetone, methyl acetate, wood tars and allyl alcohol. The wood tars were separated into settling tanks, while methanol and acetone, aldehydes and methyl acetate were separated from the settled liquors by further distillation. The methanol

Harris, A.C., 'The Charcoal-Iron Industry at Wundowie, Western Australia', in 5th Empire Mining and Metallurgical Congress Australia and New Zealand, 1953. Extract from Extractive Metallurgy in Australian Ferrous Metallurgy, Vol. IVa, p196.

Harris, A.C., pp 197; Constantine, A.

Harris, A.C., pp 196 – 97; Constantine, A., 'The wood distillation, charcoal, iron and steel industry Wundowie, Western Australia.' Paper presented to Bureau of Steel Manufacturers' Annual Meeting Perth, 20 Sept. 1955, Vol. No. 27.

A tuyere is a nozzle through which a blast of air is delivered to the interior of the furnace. Harris, A.C., Constantine, A.; Information supplied by W. Pearce to F. Bush 11 July 2005.

was then further refined to produce pure methanol, methyl acetone and wood naptha. Acetic acid was recovered separately using a different process.²⁵

Power

While the Industry had originally hoped to be supplied with electricity off the main grid, supply difficulties experienced by the State Electricity Commission meant that the Industry had to commence operating without the connection to the main grid. This was to cause extensive power shortages until the grid became operation in October 1950. The Industry used two forms of power generation: steam and diesel. Two Babcock and Wilcox boilers were installed, capable of using four different kinds of fuel: blast furnace gas, wood, sawdust and tar. These different materials could be used separately or together. The steam generated by the boilers operated a 250 kW turbogenerator. Once the state grid supplied power, this generator supplied power to all the 'continuous' processes on the site, such as the retorts, the blast furnace and the townsite. The state supply grid operated the sawmills and the ore crushing equipment. Two diesel generators were available on stand-by.

2.3.2 Early Difficulties and Expansion

As mentioned previously, one of the early difficulties experienced by the project was a shortage of power and the poor quality of the ore. Reports presented to the Board during the latter part of 1949 mention that power shortages caused problems at the plant. The power shortage was directly related to an insufficient supply getting through to the sawmills prior to October 1950. As the sawmill was unable to operate continuously, the Industry had a shortage block wood to place in the retorts. Cordwood was used instead however, the amount of charcoal produced by the cordwood was proportionally lower than that produced by the block wood. The power shortage was resolved temporarily by the installation of a 500hp engine from Chandler, another state government industrial site that processed alunite.²⁶

Mr A. Harris, who was appointed Manager at Wundowie in September 1949, recommended in February 1950, that the quality of the pig iron could be considerably improved by the purchase of a pig casting machine. This machine would eliminate the impurities in the 'pigs' produced by the sand casting method and would also produce 'pigs' of a more uniform size, weight and silicon content. The Board recommended the purchase of a single stand machine that was produced by Sheppard & Sons (England). The machine was installed during October 1951 and operating by July 1952.²⁷

During 1950, Mr Harris further recommended that the addition of more retorts, the addition of a turbo blower for the furnace and the use of a higher quality grade of ore could only improve production levels. Trials were undertaken with ore brought from Koolyanobbing, about 48 kilometres to the north east of Southern Cross, which showed improved results. As the ore deposit at Koolyanobbing was quite extensive, and the ore had a much higher iron content than that found at either Wundowie or Coates, the Board decided in June 1950 to commence using Koolyanobbing ore in combination with Wundowie and Coates ore. By April 1951, the Board had decided to

Wundowie Charcoal Iron Minute Book, 14 November 1949, 27 February, 24 April, 27 June, 17 July 1950.

WUNDOWIE CONSERVATION PLAN

²⁵ Constantine, A.

Wundowie Charcoal Iron Minute Book, 27 February 1950; Charcoal Iron and Steel Industry, AN 183/9, Acc No 961, Item 25/1950: Reports and General Correspondence, State Records Office of Western Australia (SRO).

use Koolyanobbing ore exclusively and plant to process the ore was built at Koolyanobbing, which trucked, to Southern Cross where it was loaded onto trains.²⁸

Mr Harris further suggested that savings could be made by using sawdust in the boilers and recommended the purchase of sawdust burning equipment for the boilers. It was estimated that the installation of this equipment would save the Industry about £4,000 a year. The Board gave permission to install the equipment. A second hand turbo blower was also installed during October 1950 while a new blower was ordered. 29

Despite these problems, iron ore production at Wundowie climbed steadily from 1948 through to 1952. Production levels in 1948 were 771 tons and by 1952 they had reached 10815 tons. Sales of sawn timber had also progressed well although sales of refinery products were not as advanced as hoped. This was due to a combination of factors. The acetic acid had to be transported in specially designed steel drums, which were exported to the Eastern States either by rail or by boat. Problems were initially experienced in finding suitable vessels to transport the acid and Western Australia's isolated location also made it difficult to find suitable markets for the refinery's products.³⁰

In October 1953, Mr Harris was appointed Conservator of Forests and Mr A. Constantine became manager at Wundowie. Mr Harris was appointed to the Board in October 1953 due to a vacancy.³¹

Additions to the plant continued through 1952 and production levels of iron ore also began to rise. By 1954, the Board noted that 'overseas orders had now reached embarrassing proportions.... with production booked until April 1955, a total of 4,295 tons'.³²

During 1955, as iron ore orders continued to rise, the Board discussed expanding the plant with the Premier. Cabinet approved the expansion of the Industry in May 1956 and £300,000 was allocated for the expansion. It comprised: two Lambiotte Retorts (upright style, as opposed to the horizontal batch style), a second furnace and plant associated with this new equipment. It was recommended that the new furnace be capable of handling 100 tons per day. Although permission to expand the plant had been given, matters proceeded slowly and by 1956 the Industry was having difficulty meeting its overseas orders. By February 1957, tendering for the blast furnace had been finalised: the firm of Saunders & Stuart were the successful bidders. Tenders for the retorts were somewhat slower to be gazetted, as the plans were not finalised with the Belgian company until April 1957. Tenders for the construction of the retorts were finally advertised in October 1957, with a closing date initially given as the 5 December (it was later extended to the 12 December). The local firm Vickers Hoskins Ptv Ltd won the tender for the construction of the retorts, which were required to be completed by August 1958. The firm of Stewart & Lloyd (Australia) Pty Ltd manufactured all the pipe fittings for the retorts.³³

Construction on No. 2 blast furnace was completed by the end of 1957 and was 'blown in' in January 1958. The first retort was completed midway through December 1958,

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Wundowie Charcoal Iron Minute Book, 27 June 1950.

Wundowie Charcoal Iron Minute Book, 27 June and 7 November 1950.

Constantine, A., p. 4; Information supplied by Mr A. Constantine to F.Bush, 16 August 2005.

Wundowie Charcoal Iron Minute Book, 12 October 1953.

³² AN 183/9, Acc No 961, Item 25/1950, November 1954, SRO.

File L10: Lambiotte Retort Installation (1957 – 59), held by Wundowie Foundry Pty Ltd; Wundowie Charcoal Iron Minute Book, 31 May 1957, 11 February, 29 April 1957.

with the second retort ready by the end of January. Lambiotte sent an engineer out to Australia in February 1959 to supervise the firing of the retorts. They were both operational by April 1959.³⁴

While the smelting side of the Industry was proceeding well, the refinery component had not performed as satisfactorily. In August 1958, Mr Constantine was asked to compile a report indicating the possible savings to the Industry if the refinery were closed. The findings indicated that while the refinery was not as successful as the smelting works, there would have been a drop in profit of over £3,000 if the refinery had not been operating. The decision was made to keep the refinery running. As indicated earlier, a large percentage of the refinery's problems were due to the lack of finding suitable markets in Western Australia and the cost of transporting it out of the state. ³⁵

Mr Constantine was instrumental during the 1960s in trying to increase the productivity levels of the Industry, which included investigating new product lines and mechanizing areas, which had become inefficient. During 1960, Ferrolegeringar (a European client) asked if it would be possible for Wundowie to produce 'white iron'. The production of this type of iron required the installation of a mixer to desiliconize and desulphurize the iron once it passed out of the smelter. Constantine travelled to Sweden to investigate the after ladle treatment equipment manufactured by Ob Kalling. Their ladle was found to be satisfactory and permission was given by the Minister for Industrial Development (Mr C.W. Court), to proceed with the project in June 1961.³⁶

A month later in July 1961, approval was also given to purchase new log splitting equipment, which would mechanize the process of splitting logs for the retorts. Trials had proceeded during 1960 and were found to be satisfactory. It is interesting that while these new expenditures were being discussed and approved, there was also some discussion on whether to shut down No. 2 blast furnace.³⁷

The log docker, which was installed on the eastern side of the blast furnaces, was operating by March 1963. The shaking ladle equipment and building were ready for operations in October 1963.³⁸

2.3.3 Foundry Operations and Sale of Industry

The Industry's production levels increased markedly once the new retorts and blast furnace were settled in. The production level for 1958/59 was 24,330 tons. The following year production levels had risen to 47,534 tons. Production reached a record 52,262 tons in 1960/61 and then production began to decline. This was due to static iron prices and escalating production costs. ³⁹

By the end of the 1963/64 financial year, the Industry had incurred a loss of £13,809 (this did not include loan money owed on the plant). After receiving the annual statement, the Board decided to consult with the Minister on how to proceed if the Industry were to be sold. 40

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File L5: Lambiotte Retorts Correspondence with Lambiotte (1957 – 59), held by Wundowie Foundry Pty Ltd.

Wundowie Charcoal Iron Minute Book, 20 August and 17 September 1958.

Wundowie Charcoal Iron Minute Book, 28 April and 9 June 1961.

Wundowie Charcoal Iron Minute Book, 25 July 1961 and 27 March 1963.

Wundowie Charcoal Iron Minute Book, 27 March and 23 July 1963.

Tonks, A.E., *The wood distillation, charcoal, iron and steel industry*, Perth Audit, July 1967, pp 3 – 4.

Wundowie Charcoal Iron Minute Book, 25 August 1964.

The minutes, from the 1960s onwards, rely heavily on the monthly reports provided by Mr Constantine. As these reports were not attached to the minutes, it is difficult at times to determine what proposals were discussed and accepted by the Board until a passing comment is made some months later about an item that has been finalised or in the process of further research.

In September 1963, Mr Constantine tabled a report, which outlined ways in which the Industry could be expanded. While the report was well received by the Board, it elicited no response from the Minister. Items listed in the report included:

- 1. Uses for the pig iron: foundry products; scrap production, steel balls, cast iron bar, iron powder, titanium and vanadium oxides.
- 2. Sawn Timber
- 3. Charcoal briquettes
- 4. Activated charcoal
- 5. Chemical products⁴¹

Sometime during the first quarter of 1964, Mr Constantine met with various companies in the eastern states, the Minister and local firms on the establishment of a metal casting foundry at Wundowie. The Board gave approval on the purchase of equipment to produce casting samples.⁴²

However, Cabinet refused to authorise the necessary funds to establish a foundry at Wundowie and suggested that it might be possible to raise the funds through a public source.⁴³ Although the foundry was knocked back, loan funds were approved to rebuild and reline the No. 1 blast furnace, the construction of a briquetting plant and funding for sawmill improvements for the financial year 1965/66.⁴⁴

While the state government was reluctant to approve funding to establish a foundry, they sent out feelers to eastern states' companies who might be interested in purchasing the Wundowie plant with a view to establishing a foundry. Australian National Industries Ltd (ANI), were receptive and a lengthy correspondence on the conditions of the sale of Wundowie ensured through 1965 – 1967. At this time, when the government was considering the sale of Wundowie, it had to weigh up the heavy investment it held in the plant at Wundowie. The expansion of the plant in 1959 had temporarily improved productivity but the economies of scale meant that the Industry was becoming less competitive leaving the government with continual losses. Additionally, the government was also aware that they had a responsibility to preserve an established town. They considered that the best way to achieve this was to find an outlet for the pig iron, which would not involve further government expenditure.⁴⁵ At the time discussions began with ANI, the government was trying to decide whether they should keep the Industry running at a loss, or close it down. It is interesting to note that while these discussions were going on between the government and ANI, work continued as usual at Wundowie - the Board held discussions with the Federal Immigration Department on whether they could expedite migrants from Yugoslavia as

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Wundowie Charcoal Iron Minute Book, 29 September 1963 and 14 January 1964.

Wundowie Charcoal Iron Minute Book, 4 June 1964.

Wundowie Charcoal Iron Minute Book, 23 March 1965. It is not clear whether equipment was purchased to produce sample castings.

Wundowie Charcoal Iron Minute Book, 27 July 1965.

Cons. 6540, Item 247 Vol 1, 1966: Proposed sale, SRO.

they had a labour shortage and quotes were sought from Birlec-Major for the cost of an induction furnace.⁴⁶

On the 24 June 1966, the Premier signed the agreement of the conditions of the sale of Wundowie Charcoal Iron and Steel to ANI. Under the terms, ANI entered into a ten year agreement, which saw establishment a modern foundry at Wundowie, by ANI while the government continued to operate the Industry. However, ANI would manage The government hoped that ANI's specialist the Industry for the government. knowledge of metallurgical practise would lead to general productivity improvements at Wundowie. The government expected that some expenditure would still be required by them, but hoped that costs would be minimal and that the Industry would be able to sustain itself. The government also ensured that if the Industry continued to make large losses they would be able to close the system down. If it were forced to close the government would pay for the cost of the foundry. It was also necessary to constitute a new board, which include representative from the Ministry of Industrial Development and the Treasury as well as representatives from ANI.⁴⁷ While the sale was being finalised, the new rail link between Perth and the eastern states was finalised. The new line did not passed to the north of Wundowie so a decision was made to retain the line between Northam and Wundowie as the rail link was required to bring ore from Koolyanobbing.⁴⁸

To finalise the sale, it was necessary to make amendments to the Wood Distillation and Charcoal, Iron and Steel Act. New bills were drawn up in October 1966 and a board was appointed. ANI representatives were John Debenham (managing director of ANI and represented on the board by Anthony Constantine), and Edward Adams (represented by Barton Perkins). The government representative was John Ewing (deputy under treasurer). The Industry was renamed Wundowie Charcoal Iron.⁴⁹ Mr Constantine continued as the Manager at Wundowie. The minutes book records that ANI took over the management of the Industry on 1 July 1966.⁵⁰

Constantine reported to the Director of the Department of Industrial Development (Mr T.J. Lewis) in January 1967, that it was anticipated that work on the foundry would soon be proceeding. At this stage the new Act had still to be proclaimed however, Treasury was concerned that losses at Wundowie were running higher than expected. Further, ANI had been unable to secure approval for an overdraft from the Commonwealth Bank for \$720,000. Approval was given for only \$526,00 leaving ANI with a shortfall, which Treasury was concerned, would lead to liquidity problems. At this stage, ANI was trying to lift output from 50,000 tons to 60,000 tons of pig iron per year. The Minister suggested to ANI that it might be wise to review the management situation at Wundowie before the company committed themselves further.⁵¹

In the end the agreement proved to be a failure due to ANI's inability to secure sufficient funding, problems providing sufficient housing for the workers, the fluidity of the iron ore market and the government's unwillingness to commit further funding to the project. Mr Lewis recommended to the Minister in April of that year that the agreement between the government and ANI should be annulled and one of the blast furnaces closed down. The government announced the termination of the agreement

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Wundowie Charcoal Iron Minute Book, 22 March 1966; File D3/4, held by Wundowie Foundry Pty Ltd.

Cons. 6540, Item 247 Vol 1, 1966, SRO.

⁴⁸ Cons. 6540, Item 247 Vol 1, 1966, SRO.

⁴⁹ Cons. 6540, Item 247 Vols 1 & 2, 1966, SRO.

The last minutes were recorded on 27 September 1966. The book was lodged with the secretary for safe keeping.

Cons. 6540, Item 247 Vol 2, 1966, SRO.

on the 30 April 1967 and that from the 1 May 1967 the Industry would again be under government control. The new act was never gazetted.⁵²

The original board was reconvened and matters continued on although the Industry now owed ANI \$168,680.73. This was for the foundry equipment and other sundry items. A Birlec Super-heating furnace, which had been purchased under ministerial approval by ANI, was under going final installation and the Board decided to proceed with the installation. The furnace was expected to be functioning by early August. The expansion into casting saw several changes at the foundry site; these included the conversion of the spotmill to a fettleshop in 1967 and extensions to the foundry building in 1969.⁵³

At the end of 1968, Mr Fernie resigned as the Chairman of the Board. He had served the Industry since its inception and had also been on the committee, which investigated establishing a charcoal iron industry in Western Australia. Mr Harris took his place.⁵⁴

The foundry continued to be the mainstay of the Industry and further expansions were made to the foundry in 1973 when a second induction furnace was purchased. The furnace was delivered to Wundowie in October 1974 and commissioned shortly afterwards.⁵⁵

2.3.4 Agnew Clough Ltd

During 1971, significant vanadium deposits were found at Coates by Garrick Agnew Pty Ltd. Money was spent on developing a pilot project, which would produce 10,000,000 pounds of vanadium pentoxide per year. Wundowie was chosen as the site for the pilot vanadium plant due to the existing infra-structure. The government approved the development of the project in 1973, however work did not commence until 1973 due to the poor demand for vanadium pentoxide.

During 1974, the government negotiated the sale of the Industry to Agnew Clough Ltd. The sale price was set at \$395,000 with Agnew Clough Ltd agreeing to take on the Industries' liabilities. However, it was not until June 1975, that control of Wundowie Charcoal Iron passed to Agnew Clough Ltd. The Industry changed its name once again and became known as 'Wundowie Iron and Steel' a division of Agnew Clough Ltd. ⁵⁶

Smelting continued at Wundowie and during 1975 supplies of Wundowie iron were exported to the United States where it was used to produce ductile iron. In April 1977, the refinery was closed down as it had become uneconomic.⁵⁷

During February 1978, meetings were held at Wundowie to discuss the option of establishing a vanadium plant at Wundowie. Extensive consultation was made between the company, the township and residents of the surrounding district. The decision was made to proceed with the project and by May 1979, most of the designs had been completed and over half the contracts let. Site works began in July 1979 and by the following year, 1980, the plant had commenced operations. ⁵⁸

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⁵² Cons. 6540, Item 247 Vol 2, 1966, SRO.

Wundowie Charcoal Iron Minute Book, 26 May and 19 June 1967, 22 July 1968; File D3/4.

Wundowie Charcoal Iron Minute Book, 25 November 1968.

³⁵ File D3/4

File H5: Vanadium Project 1975 – 1980, file held by Wundowie Foundry Pty Ltd; File H3: Closure of Pig Iron Operation – 1981, file held by Wundowie Foundry Pty Ltd.

⁵⁷ Pearce, 11 July 2005.

File H5.

Sometime during 1979, while the Vanadium Project was under construction, the sawmill operations were closed down. This did not affect the wood supplies for the retorts.⁵⁹

While the Vanadium Project was under construction, there had been considerable unease amongst the workers concerning the possible closure of the foundry. The management called a meeting in November 1979 to allay the workers' fears. During this meeting, the management commented that since taking over the Industry, they had incurred losses of over \$2.5 million. However, it was noted that these losses were due to a recession currently being experienced in the world markets and they had high hopes that improvements would soon lead to bringing the second blast furnace back on line. ⁶⁰

On Saturday 10 January 1981, Agnew Clough Ltd. announced that the smelting works would close in 30 days due to the depressed state of the marked. Due to high interest rates, stock piling was not considered a viable option. The Company hoped to retain as many workers as possible by transferring them to work at the Vanadium plant. The closure of the smelting works also affected the iron ore works at Koolyanobbing. Mining would be halted and the plant mothballed. While the smelting works had ceased operations, the foundry section of the plant continued operating although it was noted that the Birlec Furnaces would need to be converted to run on LPG. It was expected to cost \$9,650 to convert the furnaces to run on gas. In February 1981, the crushing plant at Koolyanobbing was offered for sale. ⁶¹

In March 1981, the management issued a circular defending the closure of the smelting works. The circular noted that Agnew Clough Ltd had taken on an industry which had become increasingly unprofitable and which faced competition from technologies, which were able to produce pig iron more profitably, without charcoal and at a lower cost. Since the sale, the Company had made considerable losses, which could no longer be absorbed. The management further reiterated that when the government had sold the plant it had hoped that the smelting works would be able to continue until the Vanadium Plant came on line, thus providing Wundowie residents with alternative and continuing employment. In closing the circular stated that while the charcoal iron works had given Wundowie its identity, it was hoped that the Vanadium Plant would sustain the town in the future. However, by March 1982 the Vanadium Plant had closed due to a down-turn in the market and technical problems at the plant. The plant was eventually auctioned off in 2003.

During March 1982, a new market for foundry products was discussed and implemented. The management of Wundowie Iron and Steel were able to persuade a local firm, which imported wood stoves to buy a similar product, which could be produced at Wundowie. Thus was born the 'Wundowie Stove', which was designed in the foundry's planning office and proved to be one of the mainstays of the foundry for many years until production of this item ceased in 2004.⁶⁴

During 1986, plans were made by Agnew Clough to construct a silicon plant at the former smelting works. Plans were developed and forward planning had been completed when Garrick Agnew died in 1987.⁶⁵ After Agnew's death, Harold Clough

⁶⁰ File H5.

WUNDOWIE CONSERVATION PLAN

⁵⁹ File H3.

⁶¹ File H3.

⁶² File H3.

W. Pearce, 3/8/05.

Information supplied by W. Pearce, 11 July 2005.

³⁵ A. Constantine 16/8/05; *Western Mail Weekend*, 10 – 11 January, 1987, p.14.

decided to move the silicon plant to the south coast near Bunbury. By 1989, the company Agnew Clough had ceased trading and was replaced by Clough Engineering Ltd. The foundry named was changed to 'Wundowie Foundry Pty Ltd.⁶⁶. In 2005, Wundowie Foundry Pty Ltd is privately owned and continues to function as a specialist foundry.⁶⁷

2.4 Wundowie Townsite and Housing

While planning for the townsite did not commence until late 1944, the construction of housing for both the workers and staff commenced in 1943. The shortage of accommodation, both in the early years of the Industry and later on, would plague the Board for its entire operating life. Accommodation at Wundowie was initially supplied by the Industry, with houses built on Industry land. A 1944 contour site plan shows 17 two roomed cottages located on Avon Loc. 24010 (to the north-west of the factory site) and a further 9 cottages (probably single men's cottages) to the east of these. Three staff cottages are shown to the north of the retorts and blast furnace. Directly to the north of the staff houses were various single men's dormitories, a club house, ablutions block, mess hall and 10 small huts. These buildings appear to have been constructed between 1943 and 1949. By 1946, the State Housing Commission (SHC) had commenced building houses in the townsite. 68

As mentioned previously, the contract for the erection of three staff houses was let in October 1943. While it is not stated in the minutes when work on these houses commenced it took until November 1944 before the houses were completed, the delay no doubt due to labour shortages.⁶⁹ The Manager, Assistant Manager and Plant Engineer initially occupied the houses.⁷⁰

At the August Board meeting (1944), members agreed that the Worker's Home Board would be financially responsible for the erection of houses at Wundowie.⁷¹ A year later the Board were still debating whether to construct two or three bedroom houses in the township. The Board for the construction of houses in Wundowie had received two quotes above £800, however this sum was considered too high. Although the lack of housing had become urgent by this time, the matter was referred onto the Workers' Homes Board for their advice.⁷²

By March 1946, a mess building and Boarding house were under construction and the first house, in the town, had been completed. The Boarding house contained a dining room, sleeping quarters together with an ablution block. The house was constructed by Mr G.W. Sanders for a cost of £820. Sanders indicated that he was willing to construct further 3 to 6 houses and by the beginning of November three houses had been completed with a fourth nearing completion.⁷³ The acute shortage of housing at Wundowie at this time is demonstrated by the suggestion that the single men's

W. Pearce, 11 July 2005; www.igfa.org/hall.asp#ga.

⁶⁷ W. Pearce, 11/7/2005.

Contoured Layout plan of plant and town, Wundowie, 31 August 1944, Plan No. C – 1166, held by Wundowie Foundry Pty Ltd.

Minute Book Charcoal Iron and Wood Distillation Industry Board of Management, held by Wundowie Foundry Pty Ltd. The houses cost £3,027. These houses have since been removed.

Minutes Book: 21/1/48.

⁷¹ Minute Book: 7/8/1944.

⁷² Minute Book: 10/8/45.

Minute Book Charcoal Iron and Wood Distillation Industry Board of Management, held by Wundowie Foundry Pty Ltd.

Wundowie c1948



quarters at the old state quarry at Boya be moved from that site to Wundowie. Removal fees were estimated at £700. At this stage it is not known whether the building was removed from Boya to Wundowie. At the Board's November meeting, the members noted that at least 50 houses would be required by May 1947 when it was hoped production would commence. However, by May 1947 only 35 houses had been completed and the SHC indicated that they would be unable to complete the remaining 15 houses by the end of the year. To cater for this shortfall, the Industry erected temporary cottages for married men, feature number 55 on the 1944 contour map. These cottages had two rooms covered with a skillion roof with a verandah and bathroom. A community wash house was also provided. Workers were also temporarily accommodated in tents. To

During 1948 the housing shortage at Wundowie continued to be a problem. The Board felt it was imperative to supply housing for the work force, as this would attract the competent workers. By November 1949, the Board noted that workers moved on once the lack of housing became apparent. Tents were still being used to accommodate workers and their families in September 1952.⁷⁶ During this period, the SHC continued to construct houses, which were occupied as soon as they were completed. Families lived in the two roomed cottages to the west of the single men's

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F. Bush prepared an assessment of the former government quarries for the Heritage Council of WA and it was noted that the single men's quarters are no longer at the quarry. However, this is not proof that it was actually moved to Wundowie.

⁷⁵ Minute Book: 10/5/47; 25/6/47; 3/12/47.

⁶ Minute Book: 14/11/49; 1/9/52.

quarters, and were moved up to the town as soon as a house became available; another family would move into the vacated cottage. Houses were first erected along the southern sections of Leschenaultia Road, Hovea Crescent and Boronia Avenue before moving north to the circular sections of Wattle and Hovea Crescents. These streets were within the original boundary of the town. The blocks of land fronting Lobelia Avenue and Crowea Terrace, to the north of Orchid and Bulga Terraces, represent the 1951 extension to the town. ⁷⁷

Water for the town came from the Goldfields Water Supply Scheme and electricity was initially supplied by the Industry. Wundowie was connected to the State Electricity Commission's supply lines in 1954.⁷⁸

The feasibility of workers' purchasing their house was also discussed by the Board during 1950. The Board moved that workers should be able to purchase their homes although the sale would be subject to approval by the Industry. However, the SHC were not happy with this arrangement and it was not until 1969 that residents were able to finally purchase their home if they wished.⁷⁹

During the 1960s the minutes of the Board continued to note the addition of houses by the SHC and the urgent need for more houses. In 1967, the Board was concerned that houses in the township were occupied by persons no longer employed by the Industry. It is not clear whether the people involved had retired or resigned but both the SHC and the Industry were concerned that these people would not vacate the houses, particularly when there were 7 employees who were waiting for accommodation.

During 1969, the single men's quarters were renovated: new linoleum was put down, and the rooms were painted and fitted with new tables and chairs.⁸⁰ In 1970, approval was given to erect six huts for single men. In the same year, labour shortages were again blamed on the shortage of housing.⁸¹

In 1985, when both the smelting works and the vanadium plant had closed down, much of the public housing was occupied by welfare recipients. An article in the Western Mail noted that of the 175 houses in the town, 153 were owned by the SHC and occupied by welfare recipients, many of whom felt that they had been dumped in what was a beautiful valley but out of reach of social services. Hopes were raised in the town during 1987 when a proposal to build a silicon plant at the smelting works was raised. Once again the shortage of housing was raised, but for different reasons. This time it was the Homeswest⁸³ residents who were worried that they would be evicted to make way for workers who would be employed at the silicon plant.⁸⁴

The advent of a commitment for continuing the foundry operation was largely responsible for a more stable workforce and resident population.

This continued when in 2004/5 a consortium of managers bought the foundry and reassured the community the operation was secure from economic threat.

Minutes Book: 9/2/1970; 28/7/1970.

Benjamin Seabrook, 8/11/05; Minutes Book: 30/10/51.

Clayden, B.J., 'A short history of the wood distillation charcoal iron and steel industry, Wundowie. The plant and the town.', Unpublished, Graylands Teacher's College Thesis, 1958. p. 24.

⁷⁹ Minutes Book: 24/5/50; 27/6/50; 1/6/69.

Minutes Book: 31/3/69.

Western Mail Weekend June 1 – 2, 1985, p. 15.

The State Housing Commission was renamed Homeswest Western Mail Weekend, January 10 – 11, 1987, p. 15.

2.5 Development of Businesses in Wundowie

As early as April 1946, the Industry's Board had been approached by various individuals interested in setting up businesses in Wundowie. By October 1946, the Board had decided to vest a business area with the Industry and Reserve 1427 was set aside for this purpose in February 1947 (check this). 85 The Board would be responsible for the construction of any buildings, which would then be leased by interested parties. In April 1947, the Board appointed Mr Jahn as manager of the Wundowie general store, which was to be known as the 'Wundowie Trading and Agency Company'86, at £9 per week. The store was to stock general groceries, household hardware, bread, drapery, small goods, greengroceries, patent medicines and fancy goods, newsagency with provision made for a hair dresser. Tenders were called for the erection of the shop in September 1947 with plans provided by the Public Works Department. The Department initially supplied two plans. Plan A was a simpler, with a standard awning, while Plan B was Art Deco in style with a cantilevered awning. As Plan A was the cheaper of the two, that design was picked. The store was completed by 17 February 1949.87 The building was timber framed and clad with weatherboards to the lower portion and asbestos cement sheets to the upper section of the wall. The hipped roof with awning verandah was covered with corrugated galvanised iron. It was located on the south east corner of Wandoo Parade and Boronia Avenue.

At the same time that permission was given to construct the store, applications were also received to open a butcher's shop and bakery. Mr Tomlinson opened a butcher's shop, while Mr E. Campbell operated the bakery. Both shops were completed by 1949.⁸⁸ In 1949, Mr G. Hookway applied to the Industry to run a boot maker's shop.⁸⁹

Peter Sardelich, who ran a vineyard near Wundowie, offered to open a shop selling fresh fruit and vegetables, in March 1950. He was willing to construct the shop, provided that the Industry provided the materials. The Industry agreed with the terms set to a five year lease. At the end of this time the shop would become the property of the Industry or the lease could be renewed. The shop, which was located on Lot 44 and fronted Wandoo Parade, was opened on the 27 April 1951. 90

Business must have been brisk as Mr Sardelich was given approval to construct a larger store, just to the east of his original shop in February 1952. The new shop was 23' x 39' with a skillion verandah at the front. The Industry decided to use the old store for either a boot maker's shop or drycleaner. Sardelich sold the lease of his shop to Peter Falipari and Pasquale Battista in October 1954. Sardelich sold the lease of his shop to Peter Falipari and Pasquale Battista in October 1954.

Other shops and facilities were gradually added to town. The General Store gained a petrol pump license in 1953 and also operated as a Post Office. Mr L.W. Smith was given permission to run a betting shop in March 1956 and the Industry built the shop. The R and I Bank opened an agency in the bakery in 1957. In 1957, Mr A.J. Hyde was given permission to construct a garage and workshop on the corner of Boronia and Hawke Avenues. This became the Ampol Service Station and Messrs Hyde and

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Minute Book of Wundowie Charcoal Iron and Steel Industry, 11/4/1946, 8/10/1946 & 6/2/1947

lt will be referred to in this report as the General Store.

Minutes Book: 21/8/48; 17/2/49; File H4: General Store, Lease, etc, held by Wundowie Foundry Pty Ltd.

Minutes Book: 22/1/48; 14/5/1948; File H4: 26/7/1949.

⁸⁹ Minutes Book: 4/7/1949.

⁹⁰ File H12: Swimming Pool Shop, 9/3/1950; Minutes Book: 17/7/1950.

⁹¹ File H12: 4/10/51.

⁹² File

Hall operated it until 1960. Mr Hyde and his wife took over the lease after Mr Hall retired ⁹³

In 1965, Mr K. Hunter, who had taken over the lease of the General Store from Mr Jahn, in 1958, was given permission to construct a new supermarket. This opened in October 1965. Hunter used the old store to display various goods until the lease passed to Mrs Piera Bani and Mr Govanni Bani who opened a continental delicatessen from the store. ⁹⁴

By 1963, the Board had a number of shops under its jurisdiction and decided that the Industry needed to divest itself of the responsibility. There had also been indications from the various tenants that they would be interested in purchasing the shops. Approval was given by the Minister and new lot numbers for the various stores were issued. Due to technical difficulties the sale of the shops did not actually proceed until December 1967. 95

Once these sites had been sold to their existing lessees, the Industry ceased to be involved with any commercial enterprises within the township.

2.6 Community Development in Wundowie

Community Hall

The commencement of the Industry's involvement with community activities started with the purchase of a second hand building for use as a hall in 1947. The building was originally located at the Melville Military Camp where it was known as the No. 2 Workshop (101' x 25'), plus annexe (15' x 12'). The buildings cost the Industry £220. It was placed on Lot 158, opposite what would become the oval and in the centre of the township. The timber framed building was clad with corrugated galvanised iron (walls and roof) and it had four rooms. After it was placed on Lot 158 an extension was made to the eastern end to create room for a bio box.⁹⁶

Tenders were called for showing pictures in the building in March 1947. Picture gardens were added sometime before 1950 for in August 1950; the Commissioner for Health notified the Board that it had not given permission for the showing of pictures in either the hall or the adjacent gardens. The garden area had a seating capacity of 200. The building was inspected in January 1951 and a number of problems were identified although not fixed until January 1952.⁹⁷

In August 1957, the Wundowie Progress Associated wrote to the Board looking for support to enlarge the Hall. The Board was not in favour stating that it considered the building to be too dilapidated and structurally unsound for additions. They recommended that the Association approach the Shire of Northam for support for a new building. The matter of a new hall had still not been resolved by 1963, when the local minister, Mr A.J. Hawke asked the Minister for Industrial Development whether any steps had been made to construct a new building. The Minister responded that the matter had been left in the hands of the Shire of Northam. 99

File H25: Business Sites: 5/9/1963; File H4: 17/2/1965; 1/10/1965; 13/2/1967.

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⁹³ File H4: 30/7/1953; File H22: Garage & Workshop Site: 7/6/1957; Minutes Book: 11/3/1957; 10/6/1960.

⁹⁴ File H4: 17/3/1958;

File H30: Wundowie Public Hall, Wundowie Foundry Pty Ltd, 25/2/1947.

File H30: 18/5/1950.

⁹⁸ File H30: 23/8/1957.

⁹⁹ File H30: 15/10/1963.

The Board approved funding for superficial repairs to the Hall, painting, in February 1964. No further progress towards a new hall had been made when Lot 158 was vested with the Shire of Northam (Reserve 24259) in June 1968. 101

By 1974, the old Hall was still in use and the Shire of Northam suggested that if the Board was provide a new hall, the Shire would put \$1,000 towards the cost and provide transport for carting sand and other materials. The Board pointed out to the Shire that as the State Housing Commission was largely responsible for the allocation of housing in the town, many of the houses were no longer occupied by people employed by the Industry. They didn't have sufficient funds to construct houses for their own people and certainly had no funds to spare for a hall. 102

By March the Treasury promised a grant of \$15,000 to the Industry to upgrade the Hall. However, an architectural report stated that the building was in poor condition and the building was condemned by the Shire in November 1974. Treasury took back their grant and recommended to the Shire that they apply for a grant. In November 1976, he Shire received a grant of \$15,000 to put towards the cost of building a new hall, which was estimated to cost \$106,000.103

Wundowie Progress Association

Various members of the Wundowie community met on 6 August 1947, in the Wundowie Hall, to form a progress association. The association used the Hall regularly for their meetings.

The Progress Association was responsible for the development of many community amenities. These included: the development of Wundowie oval, the creation of a children's playground and assisting in the purchase of an ambulance.

- 1 Wundowie Oval - work began on the oval in 1947 and by May 1948, the Association were trying to complete the works however they had difficulty loaning Industry equipment as it was often required elsewhere. Basic ground work had been completed by August 1950 when the Tennis Club obtained permission to construct tennis courts on the oval. It is unclear exactly when the oval was completed but it must have been completed by September 1954. when the Under Secretary for lands asked the Board whether they wanted vest the oval with Northam Roads Board as an A class reserve. The Board consulted the Progress Association who was keen to see control of the oval retained by the Industry. It was not until June 1968 that the oval and various community services on Lot 274 were vested with the Shire of Northam. 104
- Ambulance the Association approached the Board for assistance with the 2. purchase of an ambulance in May 1948. It was also hoped that grants from the Lotteries Commission, St John's Ambulance Association and the Northam Road Board would help pay for the vehicle. The Board decided to lend the Association £300 on the proviso that the vehicle was housed at the Industry. The Board set aside land for the ambulance on land facing Wandoo Parade in February 1949. A building was constructed on the site and then extended in September 1952. 105

¹⁰⁰ Minutes Board: 28/2/1964.

¹⁰¹ Minutes Board: 24/6/1968. 102

File H30: 8/2/1974; 27/2/1974. 103

File H30: 28/3/1974; 18/6/1974; 5/11/1974; 23/12/1974; 12/11/1976. 104 Minutes Book: 14/5/1948; 18/8/1950; 9/4/1951; 6/9/1954; 12/10/1954.

Minutes Book: 14/5/1948; 11/8/1948; 9/2/1949; 1/9/1952.

- 3. Children's Play Centre approval to construct a children's playground at the rear of Lot 156 was given to the Association in December 1956. The final plans for the play centre were approved by the Board in June 1957, provided that the Industry was not financially responsible for the building.¹⁰⁶
- Swimming Pool efforts to provide the community with a pool began as early 4. as 1951 when the local member for Parliament, Mr A.G. Hawke, wrote to the Board stressing the need for a pool. However, at this stage the Board noted that there was a shortage of cement and therefore it would not be possible to construct a pool. 107 By 1957, the Association was again progressing plans for a pool and in February the Board agreed to supply the Association with £1,000 worth of materials to assist with the construction of the pool provided that the water could be used in an emergency. Land opposite the Wundowie Club, on Wandoo Parade, was set aside for the pool. It was noted that three cottages would have to be moved to make way for the pool. To assist with the development of the pool a Swimming Pool Fund was established in 1960. Although the Board had been slow to approve construction of a pool, it nonethe-less considered that a pool was an essential amenity for the employees and their families. The swimming pool was officially opened on the 17 December 1960.¹⁰⁸
- 5. Library in May 1958, the Board gave the Association permission to build a library on the eastern side of the tennis courts on the recreation reserve (Lot 274). The library was erected using volunteer labour. 109

Wundowie Club

In July 1947, employees of the Industry met in the local Hall to hold an inaugural meeting of the Wundowie Club. A provisional committee was formed and by April, the group notified the Board that at a meeting held on 1 March 1948, it had decided to form a licensed club, which would be known as the 'Wundowie Club'. The object of the Club was to provide fellowship, add to the social life of the community, provide refreshments and by donating to the Progress Association and the Parents and Citizens Association, provide amenities for the townspeople. The Board approved of the Club and it was decided that the Industry would obtain a Gallon License on behalf of the Club until they had their own premises. All proceeds raised during this interim period would be put aside for the Club.¹¹⁰ During September, the Club requested the Board to set aside Lots 41 and 42 for Club premises. No response was recorded in the file however, a later entry in October 1954, noted that the Club was interested in these lots (and included Lot 43).¹¹¹

The Club appears to have operated quite successfully and were initially given as their premises what had been on old army hut (building 32 in the 1944 contour plan). In May 1950, the Board thanked the Club for their contributions to the town. New club rooms were built on town lots 41 – 43 and were officially opened by the Premier, Mr A.J. Hawke on Saturday 31 August 1957. The building was constructed from natural stone, obtained from a local quarry and constructed by Italian stone masons. Provision was made for a separate room for the ladies (at that time associate

¹⁰⁶ Minutes Book: 6//12/1956; 10/1/1957; 18/6/1957.

¹⁰⁷ Minutes Book: 5/7/1951.

Minutes Book: 11/2/1957; 23/2/1960; 29/11/1960. Minutes Book: 20/5/1958; B. Seabrook 8/11/2005.

File H9: Wundowie Club Inc., Wundowie Foundry Pty Ltd, 15/4/1948; 2/7/1948.

File H9: 6/12/1948; 12/10/1954.

members). The opening of the new Club rooms was celebrated as a gala event with the Northam Advertiser producing a special souvenir supplement in their 28 August 1957 issue. 113 In 1967, the Wundowie Club were put in charge of organising lessees for the pool shop. They continued to hold the lease for many years.

2.7 Wundowie School

By July 1947, there were twenty school age children living at Wundowie. The Industry wrote to the Education Department stating that a school would commence in the Hall on Monday 4 August. 114 The Board charged the Education Department 25/- per week for the use of the Hall, which the Education Department objected to.

School guarters were constructed by the Worker's Home Board at 7 Boronia Avenue shortly after the school opened in the Hall. The house had 3 bedrooms with a lounge. kitchen, bathroom and verandahs front and back. It was a timber framed building clad with asbestos cement sheeting and lined on the inside with plasterboard. 115

By May 1948, the Minister had approved the construction of a 3 room school. The school was constructed to the south west on the oval and what was to become Lot 275. The building was timber framed clad with weatherboards to dado height with asbestos cement sheeting above. The roof was covered with clay tiles. The 'L' shaped building had 3 classrooms and staff room (on the long leg of the 'I') with the ablutions block on the shorter leg. 116

The school was enlarged in 1952 with the addition of a prefabricated building to the north of the original classroom block. This building was timber framed and clad with asbestos cement sheeting and had an aluminium roof. It contained 2 classrooms, which were divided from each other by a central hall. 117

School enrolments continued to increase leading to the addition of 2 more classrooms onto the eastern side of the building in 1958. A new classroom block was built to the east of the original block in 1960. It was linked to the original block by a verandah. The new block contained a science room, class room, prep room and general purposes room store room, cloak and wash rooms. 118

Further additions were made to the school in 1962 when the school was expanded to cater for junior high school students. The 1960 classrooms were used for the junior high school and a new room was added onto the eastern end of the 1960 classroom block. 119

In 1964 a new classroom block was added to the side, on the southern side of the 1960 classroom block. This block contained an additional classroom, home science centre and a manual training centre. As with the previous rooms the building had a verandah on the northern side. 120

File H9: 16/8/1957. 114

¹¹² Clayden, B.J., p. 25. 113

Staff conference minutes: 3/7/1947; 31/7/1947.

¹¹⁵ Wundowie Building Schedule (School), Cons. 5373 item SB637/1953 - 63, State Records Office Western Australia, 1947.

¹¹⁶ Wundowie Building Schedule (School), 1949. 117

Wundowie Building Schedule (School), 1952. 118

Wundowie Building Schedule (School), 1960. 119 Wundowie Building Schedule (School), 1962.

Wundowie Building Schedule (School), 1964.

The junior high school closed in c.1985 due to falling student numbers. Many of the students had begun attending high schools in Northam or the Catholic high schools. In 2005, Wundowie operates as a Primary School. 121

2.8 Churches

After residents began moving into the Wundowie townsite in 1948/47, the Board began receiving requests from the various church groups for sites to be allocated to them in the township. The two applications were received in January 1948, from the Anglican Church and the Methodist Church. The Anglicans were allocated half and acre, Lot 157 that front onto the circular section of Boronia Avenue. The Methodists were initially allocated half an acre on Lot 285, but this was changed in 1956 to Lot 179, the western side of Lobelia Street. The Methodists regularly used the Hall for their services and did not construct a building on their site. 12

The Presbyterian Church was also granted a block of land in 1949. 123

3.0 PHYSICAL EVIDENCE

3.1 INTRODUCTION

The town has been visited several times to inspect and photograph the town setting. streetscapes and the individual buildings. All steering group meetings were held either in the town or at the Wundowie Foundry offices. In photographing the streetscapes several residents expressed interest in the activity, not always initially positive but after discussion, generally supportive.

3.2 **METHODOLOGY**

The objective of site inspection was to determine the consistency of streetscape (the public domain) in order to subsequently place individual properties in the context of the established urban form.

In particular, the site investigations were aimed at identifying the physical manifestations of the Garden City approach to town planning. This town planning philosophy possesses innovative street patterns sensitive to the landform, open space provision of at least 10% of the town area, separation of land uses, local employment, a civic core and affordable and 'decent' housing.

Town plans were examined in a sense of isolation, for due to wartime restrictions, there were no contemporary examples. However, the design principles of Carl Klem's curvelinear style provided some context as his last designs included Menora-Coolbinia (c.1934). Town Planning Commissioner D L Davidson was a keen advocate for this design approach and the civic core of the town has the hemispherical road pattern that now defines the first stage of the town development. The second stage of expansion could be compared to post-war town planning approaches, as the pattern was a more traditional grid style but utilised the corner subdivision technique of Carl Klem in that

¹²¹ B. Seabrook, 8/11/2005.

¹²² Minutes Board: 21/1/1948; 5/10/1956.

Minutes Board: 10/10/1949.

the houses "turned the corner" and no house side elevations were presented to the public domain.

In a similar methodology, the housing style and urban form was inspected and photographed for comparison with contemporary post-war housing initially by the Workers Homes Board and followed by the State Housing Commission.

This work was intended to enable a view to be formed as to the relative significance of the town and its component parts. Once this position was reached, statements of significance could be formulated and provide a basis for any conservation policies that could be appropriately applied to the town.

3.3 THE TOWN

The objective of this plan is to examine the town as a whole and in particular the town plan. That is, the public domain shapes the town plan and it is this area that is the focus of this examination. The plan is not concerned with the conservation of the private properties although it is acknowledged that the urban form of development on private land contributes to the perception of the town. The Garden City town planning philosophy possesses a number of component parts that can be seen on inspection by an observer. The first impressions are of the street pattern and the built form. The original built form of (subsequent) private land is not always readily recognised as it is altered over time in responding to occupier's requirements. However, street pattern is rarely so modified that it becomes concealed. An example in Perth where this has been concealed is the Hope and Klem Ascot Estate of the 1930's and now reconfigured and renamed as Flemington Chase. A case of where the street pattern has been unaffected by redevelopment is Hope and Klem's Menora-Coolbinia.

Wundowie has retained both its original and the second stage of town expansion street pattern, parks and reserves. The expansion has generally been sympathetic to the contours of the townsite as the original curvilinear pattern established an inner core that occupied a shallow bowl-like depression and the northern expansion was located on a more even slope allowing a traditional grid pattern to be developed.

The open space was distributed around the town with the playing fields in the south east quarter and two triangular parks marking the transition from curved to grid pattern street form. To the west and north are Crown reserves that have substantial stands of natural bushland. These open spaces represent more than 10% of the townsite and fulfil the criteria for a Garden City design.

It should be noted that the 10% open space requirement articulated in the Garden City philosophy did not become official in Western Australia until the Metropolitan Region Town Planning Scheme Act 1963, well after the preparation of the Wundowie design. It can be argued that Davidson was visionary in his design.

The separation of land uses that was an integral part of the Garden City design approach is evident in Wundowie. The industrial zone is on the south and east side of the town where it had direct access to the Eastern Railway and the Great Eastern Highway. It could also connect to the Goldfields Water Supply Scheme and the electric power and telegraph lines. The civic core that separated the housing from the industrial land was in the physical centre of the town and included the Shire Hall, shops, school, Anglican Church, Police Station, Wundowie Club, swimming pool and the library.

The residential area extension after 1951 to the north up the slopes of the surrounding hills allowed views over the valley.

From the outset, the nomenclature of the town was aimed at celebrating native flora and streets are all named after flowers (some do have exotic names such as Clematis Drive - unconstructed). The one exception is the main road entry, which acknowledges the Premier of the day, E G Hawke.

3.4 THE HOUSING

The housing component of the town was state housing initially through the Workers Homes Board and later the State Housing Commission thus ensuring that the housing of the workers was affordable and to an appropriate standard. This complies with Garden City principles. The early difficulties of labour and materials shortage after the war meant that progress on construction was spread over a longer period. The result was that the urban form that emerged was of a consistent style and standard. Few towns in Western Australia possess such a homogenous make up.

THE CIVIC CORE 3.5

Wundowie has a civic core that contains retail and administrative services as well as schooling, health services, social and sporting facilities. They are contained predominantly in the inner hemisphere of the core with the exception of the fire and emergency services, the store and the Wundowie Club. This arrangement is consistent with Garden City design principles.

3.6 **INDUSTRY**

The establishment of the town was to provide a Charcoal and Iron industry for Western Australia. In site inspections it is evident that although the original function of the industrial complex has changed to a foundry, it retains the employment relationship for the town. Although outside the townsite boundary, the Shire of Northam Town Planning Scheme No.3 zones the land as industrial for the reason that it sustains the employment of many residents of the town and district.

3.7 **SETTING**

Wundowie is surrounded by Crown Reserves on the West and North that provide a natural setting for the town. To the east is industrial land with a substantial tree canopy on its western and southern edges. To the south is the industrial complex on the lowest part of the area that links the small dead end valley of the townsite to the valley formation of the Woorooloo Brook system.

3.8 **AUTHENTICITY AND INTEGRITY**

The urban form of Wundowie has retained the original fabric to a substantial degree. The original 128 housing lots and the subsequent town expansions of 136 (northern extension) and 71 (western extension) have generally respected the street pattern and housing form. Only now, under the pressure for affordable housing in the Metropolitan Area and arguably the residents of the city seeking a change of lifestyle, is there a subtle change emerging. On less than a dozen lots there are battleaxe subdivisions being developed with new housing to both the created lots. (Battleaxe subdivisions are where a single lot is subdivided into two lots one behind the other and with a 'battleaxe handle' style access leg to the rear lot from the street frontage)

This form of subdivision, with the original dwelling retained on the front lot, does not alter the basic lot layout as it *subdivides* the existing lot and with a dwelling on the front lot and an access drive to one side. It has little visual impact on the established streetscape and retains the evidence of the original lot. It is a technique of urban consolidation that minimises change to streetscapes while allowing twice the existing density of housing.

The expansion north and west provide a counterpoint to the original curvelinear layout and enable the civic core and the original street pattern to assume dominance in the design of the town plan. In these circumstances, the urban form has retained its authenticity and integrity as the town continues as the residential and civic function of serving the local industry as well as clearly defining the expanded urban form of the two subsequent development stages.

The physical evidence demonstrates the Garden City principles as applied to Wundowie and it remains as a largely intact purpose built industrial town and the first twentieth century model in Western Australia In addition it is the only wartime town planning initiative of the government demonstrating, in the darkest days of World War II, a forward thinking post war mindset.

3.9 OTHER EVIDENCE

The townsite takes advantage of its strategic location as it is on the route to the Eastern Goldfields and the Wheatbelt. The history of this route has road and railway, water supply, power and telegraph themes and the National Trust of Australia (WA) heritage project, the Golden Pipeline, is closely linked by location to the site.

3.10 CONCLUSION

The physical evidence of the Wundowie Townsite substantiates the documentary material in terms of town design, relationship to the state's first charcoal and iron industry and first twentieth century purpose built industrial town and an initiative of wartime forward planning. The material identified will assist in the future development of the town through awareness of the cultural significance of the urban form and its industrial base.

4.0 ANALYSIS OF DOCUMENTARY, ORAL AND PHYSICAL EVIDENCE

The townsite can be viewed almost in its entirety from the northern high ground. When coupled to the documentary material, the comprehension of its cultural significance can be appreciated. Further research is always needed and Wundowie has many aspects yet to be revealed through its social history. However, it can be compared with later industrial towns such as the Kwinana area and the Pilbara towns. In so doing, the

story of the development of the states mineral resources can be more fully understood. From the beginnings of mining and processing at the Geraldine lead mine in 1848 through the Goldrush era, the Collie coal industry and then to wartime initiatives up to the present Pilbara, Wundowie sits as a major component of the state's industrial history.

The town has retained its urban form and even when subject to recent gentrification of urban infill, the adopted technique of battleaxe subdivision and redevelopment has not only minimised the adverse visual impacts on the streetscape but also provided modern housing in a style that does not conflict with the existing housing stock.

Future expansion of the townsite will need to be mindful of the heritage significance of the urban form and although the Crown reserves exist on the west and north of the town, the industrial zoned land to the east offers opportunity for future growth once the land is rezoned to residential and incorporated into the townsite. The land to the north and west is Crown Land and would need government involvement to open the land up for residential development. The expansion of residential land to the south is questionable. Environment conditions are unknown and a former industrial site such as this would require a thorough examination before it was considered for residential development.

Wundowie's future appears secure as the industrial beginnings have been altered to a viable foundry process and the increasing interest in rural lifestyle by city based residents indicate growth and development. That such growth and development will occur in Wundowie places importance on the need for town planning controls that will protect and conserve the heritage significance of the place. Gentrification of its urban form is unlikely to threaten the integrity of the Garden City planform and the Shire of Northam needs to prepare strong controls in its town planning scheme to ensure retention of the town's heritage values.

5.0 ASSESSMENT OF SIGNIFICANCE

5.1 INTRODUCTION

In assessing the cultural significance of Wundowie, the Heritage Council of Western Australia criteria is used and it can be found in Appendix 1. The criteria identify six components and they are Aesthetic Value, Historic Value, Scientific Value, Social Value, Rarity and Representativeness. The following sections follow this set of components.

5.2 **AESTHETIC VALUE**

The Garden City form of Wundowie and the setting make the town unique in Western Australia. It is one of the few country towns based on Garden City design principles and when sited in a naturally attractive valley surrounded by rural farmland and remnant forest it assumes a high aesthetic value. As it has retained its urban form and

can be experienced from the high ground on the northern end of the town (mainly along Crowea Terrace) and that the rather unsightly industrial complex is screened by a grove of trees, Wundowie possesses landmark significance (criteria 1.1, 1.2, 1.3 and 1.4).

The industrial complex although outside the townsite, is relatively mild in visual pollution as it retains some of the original timber frame buildings of the first development phase and they contribute a low scale pleasant precinct on the higher ground of the complex site. Although the works buildings are typical industrial large structures, the redundant retorts have a dominant vertical aesthetic that despite the patina of rust and dust, give some vertical counterpoint beauty to an otherwise long rambling industrial set of unremarkable buildings. There are some remnant buildings in poor condition that are redundant and may be demolished in the future. Overall, the aesthetic value of the industrial site is not a strongly negative presence and landscaping the site could improve its attraction substantially.

The civic core possesses unremarkable buildings with some new and renovated buildings of single storey, some civic buildings retain the sense of temporary presence due to their original function such as the library but the later Shire Hall marked the growing confidence by being a substantial construction.

The residential component as an urban form has substantial landmark value in that the predominant housing style remains State Housing Commission standards of post-war housing that reflected a government aesthetic approach, with mature front gardens. Where newer buildings have been interposed, they fortunately have retained a similar aesthetic of medium pitch roofs, light coloured walls with porches/verandahs. (Criterion 1.4)

The street pattern and open space remains unchanged from the initial layout for the town. No roads have been neither closed nor new ones introduced to break up the original pattern. Today the town operates as it was originally intended. (Criterion 1.4)

HISTORIC VALUE 5.3

As a Garden City design for an industrial purpose, Wundowie has landmark status as the first twentieth century town in Western Australia and further, that it has retained not only its industrial character and industrial purpose but also its town plan design. (Criterion 2.1)

Arising from a far-sighted Government when assailed by the vicissitudes of wartime priorities, the Wundowie townsite represents a manifestation of its importance in relation to a phase of history when Western Australia was subject to the threat of invasion. The decision to create the town and it's industry was taken not long after the Japanese attack on Pearl Harbour and thus demonstrated a collective mindset of a lasting peace in the future. The planners were visionary in spite of the circumstances they were working in. This phase of World War II brought a very real threat of direct action through naval and air attacks such as happened in Broome, Derby and Wyndham in early 1942. (Criterion 2.2)

The Wundowie industrial operation was one of excellence and high achievement utilising high quality ores from Koolyanobbing and the rare earth minerals for specialist industrial components. It attained a high reputation for the high quality products it produced over a long period up to and including the present. (Criterion 2.4)

5.4 SCIENTIFIC VALUE

As the Wundowie industrial complex varied its operation over the time since it's commissioning, it has the potential to articulate mining and production practices from the mid twentieth century to the present. (Criterion 3.1)

The current owner of the complex has expressed interest in establishing a visitor centre to inform visitors of the significance of the complex and its history. This represents a manifestation of the potential for such an initiative. (Criterion 3.2)

5.5 SOCIAL VALUE

The town possesses considerable social value through the number of long term residents and more recent arrivals who hold a strong affection for the town. The former Managing Director of the Wundowie Foundry was not only a long term staff member but has recently retired and retains a strong commitment to the future of the town. Under his initiative substantial archival material has been made available for the research into this conservation plan.

The very active Wundowie Progress Association has carried out a strategic community plan in 2003 and have created and installed town entry statements at the town entry plus on Great Eastern Highway as public artworks, all on their initiative. The community and the Wundowie Foundry management have demonstrated a strong social value for the town (Criterion 4.1)

5.6 RARITY

The town demonstrates a rare urban form for a country industrial town, that of the Garden City style. It is a rare purpose built industrial town still operating close to its original purpose and on the same but moderately expanded site. (Criterion 5.2)

Due to the attraction of its setting, stable employment opportunities and a metropolitan residential interest, the town does face the threat of greater urbanisation and without strong town planning scheme controls, could lose it's rare aesthetic significance through inappropriate gentrification of its urban form. (Criterion 5.1)

5.7 REPRESENTATIVENESS

Wundowie demonstrates the Garden City design principles in a rural setting of considerable aesthetic value. It has retained its urban form that emanates from Britain at the turn of the century and transferred to Western Australia by advocates W E Bold, Harold Boas, William Saw and Carl Klem. The Garden City movement in its advocacy for better living and working conditions for the common man was responsible for guiding the development of modern town planning. Wundowie is directly comparable with Floreat-City Beach, Daglish, Bicton, Como, Dalkeith, Redcliffe, Menora-Coolbinia and many other metropolitan suburbs where the Garden City design principles were applied. (Criterion 6.1)

The industrial town model that it represents has subsequent similar examples such as the Pilbara mining towns of Shay Gap, Newman, Tom Price etc, which are towns dedicated to servicing a single industry and part of the established iron ore industry. Wundowie was the first example. (Criterion 6.2)

6.0 STATEMENT OF SIGNIFICANCE

Through the research and analysis of the heritage attributes and values of cultural significance of Wundowie, the town was found to possess cultural significance for the following reasons:

- The place has aesthetic significance arising from its Garden City design.
- The town has high landscape aesthetic significance and the design sits appropriately in a shallow valley.
- The residential development within the town is of a consistent collective vernacular architectural style and is of high aesthetic significance.
- The community of residents and workers have initiated public artworks based on town design themes of aesthetic significance.
- The success of its design and viability of its economic foundation is a model of achievement and aesthetic significance.
- The town has aesthetic significance through its intact streetscape values of the original design approach.
- The town has historic significance as a wartime initiative to address post war industrial development.
- The transfer of Garden City design principles from Britain and the metropolitan area to a rural industrial site is of historic significance.
- Wundowie has historical significance through being the first twentieth century purposely dedicated industrial town.
- Through the high standard of products and techniques, Wundowie has historical significance.
- The town has scientific value due to its potential to demonstrate the history of iron and rare earth materials plus the development of industrial technology in Western Australia.
- The town demonstrates social significance through the vitality of its community organisation.
- Wundowie is rare as it retains a cohesive urban form demonstrating life in a Garden City designed rural industrial town.
- The town and the industry demonstrate representativeness as a beginning of the iron industry in Western Australia.
- Wundowie is a town specifically designed for the iron industry and set the pattern for the later industrial towns in the Pilbara Region and thus demonstrates representativeness.

7.0 CONSERVATION POLICY

7.1 INTRODUCTION

No sites in Wundowie are on the State Register of Heritage Places. At this point it is difficult to forecast any future registration proposals. However, the town and its

industry is an important component in the Shire of Northam and through the heritage provisions of its town planning scheme, recommendations can be made to protect and conserve the heritage significance of the town.

7.2 CONSTRAINTS ARISING OUT OF THE STATEMENT OF SIGNIFICANCE

The following policies are appropriate actions to conserve the heritage significance of Wundowie. They arise out of the discussion of the Assessment of Significance (Section 5.0) and the items raised in the Statement of Significance (Section 6).

- Land uses should remain as existing within the townsite unless there is no adverse impact on the cultural significance of the town.
- The Garden City street pattern of the original stage of town development should not change.
- Any redevelopment of the public domain should be under the direction of a recognised heritage consultant with planning qualifications.
- Future town expansion beyond the townsite should be in consultation with a recognised heritage consultant with planning qualifications.

7.3 PHYSICAL AND PROCEDURAL CONSTRAINTS ARISING OUT OF THE PHYSICAL AND DOCUMENTARY EVIDENCE

7.3.1 Registration

Without further research, there are no individual places revealed in the research that warrant closer research for entry onto the State Register of Heritage Places. This conservation plan deals with the townsite and does not include the residential or commercial properties privately owned.

Should the Wundowie townsite be placed on the Register of Heritage Places or be declared an Historic Town by the National Trust of Australia (WA), it is the public domain that will be subject to the Trust and Heritage Council interest. As it is unlikely that there will be any substantial changes to the town's urban form (the public domain), this should not be seen as a constraint of negative import. Rather it will open up wider opportunities to the Shire of Northam for heritage funding for maintenance and heritage conservation and interpretation.

Private property will not be affected.

7.3.2 Physical Constraints

There are no major perceived physical constraints to the heritage significance of the town. However, if the town is to expand its residential base, the location of the sewer treatment facility does place a constraint on the private land east of the townsite. The industrial operations are monitored by strict regulations and these have ensured that the Wundowie Foundry remains a good corporate citizen.

7.3.3 Procedural Constraints

There are no perceived procedural constraints as the process of registration would be referred to the Shire of Northam as custodian for the townsite and discussions would identify any problems well before they became a negative issue.

7.4 CLIENTS REQUIREMENTS AND CONSTRAINTS THAT ARISE OUT OF OWNERSHIP OF THE PLACE

The client is the Wundowie Progress Association and the landowner is the Shire of Northam. As noted previously, the Shire of Northam will have participated in the final preparation of this Conservation Plan and the Association will be party to that future consultation. Therefore it is not expected that ownership will raise any issues.

7.5 HERITAGE LISTINGS

7.5.1 Heritage Council of Western Australia

There are no listings from Wundowie

7.5.2 National Trust of Australia (WA)

There are no Classified places In Wundowie

7.5.3 Australian Heritage Commission

There are no listings from Wundowie

7.5.4 Shire of Northam

The Municipal Inventory is yet to be researched.

7.6 RECOMMENDATIONS

The Wundowie Progress Association and the Shire of Northam will establish a liaison procedure with which to implement the outcomes of this conservation plan and provide advice to the National Trust of Australia (WA) in the subsequent submission for seeking Historic Town Status. Achieving Historic Town status will complete the objective of this conservation plan and the recommendation from the 2003 Wundowie Community Strategic Plan. The Shire of Northam as the responsible local government authority will manage the public domain of the town and, through its planning and development controls of its town planning scheme, control new development in the town.

There is likely to be further research required once the Historic Town status is achieved in order to interpret the place. This could be carried out with the Wundowie Progress Association acting as a steering committee.

8.0 POLICY IMPLEMENTATION

To be completed in consultation with the Shire of Northam and the Wundowie Progress Association; The Shire of Northam resolved at its January meeting 2008 to adopt in principle the draft plan.

8.1 MANAGEMENT STRUCTURE

The Shire of Northam is the responsible local authority. In managing the public domain it raises issues, assesses problems and develops solutions to resolve the problem. Where natural environment, planning, transport, power and service infrastructure is concerned, the Shire cooperates with the relevant government agencies.

Should the Heritage Council of WA register the town on the State Register, the Heritage Council would join the referral bodies in managing aspects of the town's development.

Should the National Trust of Australia (WA) declare Wundowie a Historic Town then its resources would be available for advice and policy development on request. If this were the case, Wundowie would be the first twentieth century historic town identified and recognised by the National Trust and Wundowie would join an elite group of historic towns of Australia.

8.2 PROGRAMME OF IMPLEMENTATION

Now that this conservation plan has been prepared, a programme of implementation based on the heritage values identified can be developed in consultation with the shire of Northam and the Wundowie Progress Association.

As the public domain is all in the control of the Shire of Northam and that the draft conservation plan adopted early 2008, it is expected this implementation process will be undertaken later in 2008 or early 2009.

Issues raised and already discussed are noted below.

8.2.1 Generally

- i) New residential development should complement building style of existing housing with similar roof pitch (with overhang) and window styles and front verandahs/porches. Where brick or masonry walls are used, the colour should reflect the colour palette of the existing housing in the original townsite.
- ii) Nomenclature should continue the floral thematic names of streets but other components such as parks could be named with Aboriginal words or European Pioneers and events.
- 8.2.2 <u>Heritage Guidelines for future town development</u> (see Figures 2 & 3) In regard to town residential expansion on the east side of the townsite: -
- i) Respect the pattern of access ways between the stacks of timber by

expressing them as new streets or rear laneways.

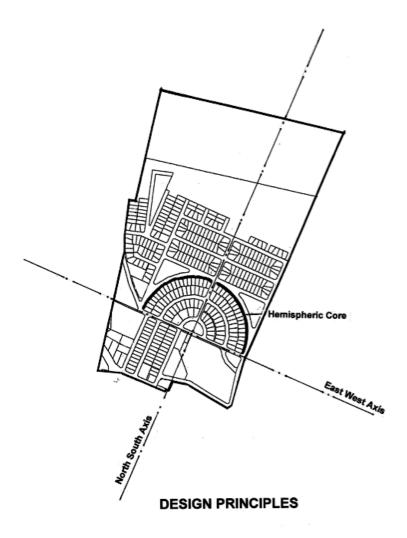
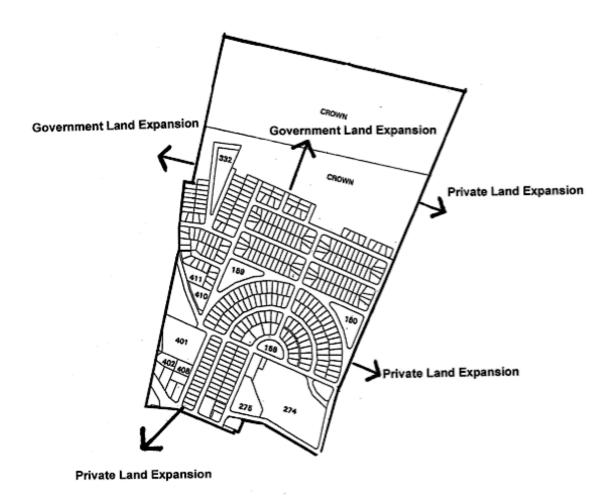


Figure 2

- ii) Ensure there is a clear demarcation between the historic town and new residential areas (e.g. by retaining the stand of trees along Kingia Road).
- iii) 10% open space to be focussed on retaining best tree canopy not degraded areas.
- iv) Ensure there is a direct car and pedestrian link to the town centre via an 'avenue' style major urban street on the traditional east-west axis.
- v) Consider utilising new residential areas to quarantine town from district road traffic by bypassing the established urban street pattern and directing new district roads to link in with the traditional axis avenues.
- vi) Should amelioration or removal of the adverse impacts of the sewer treatment facility be achieved, the southern portion of Lot 27073 could continue the residential subdivision pattern recommended for the northern portion noted in 1 above. Although costly, it may be a future option to relocate the treatment facility

to an area within the Industrial land located more than 500 metres (or whatever environmental requirements are current at the time) from existing residential land.

vii) Provide a new roundabout on Kingia Avenue at Banksia Avenue to make a statement of the junction of new subdivision roads on private land east of Kingia Road.



TOWN EXPANSION POSSIBILITIES

Figure 3

In regard to residential expansion to the west and north: -

The land to the west and north is Crown Land and is under the control of the State. No initiative for rezoning and residential subdivision can therefore be undertaken without the participation of the State.

i) The street pattern should be rectilinear so as to not compete with the town core circular road pattern. This will reinforce the original town layout and allow interpretation of later town expansion such as the 1960's northern extension.

- ii) Retain best quality tree canopy for the 10% open space component.
- iii) Ensure there is connectivity to the town centre.
- iv) Take the opportunity to make linkages to district roads and reduce adverse impacts on the new residential lots.
- vii) Enhance the north-south and east-west axes avenues.

In regard to residential expansion south into the industrial land, there are major issues of health and safety as well as environmental problems arising out of the use of the land over time. It is unlikely these can be fully addressed without prohibitive costs. For the purpose of this study residential expansion to the south is not considered a practical option.

These aspects of heritage planning can be specifically scheduled and codified as below.

Wundowie Policy Guidelines for Future Town Development

In regard to town expansion on the west, east and north sides of the townsite: -

Eastern expansion

- 1.Respect the pattern of access ways between the stacks of timber by expressing them as new streets or rear laneways
- 2. Ensure there is a clear demarcation between the historic town and new residential areas (e.g. by retaining the stand of trees along east road)
- 3, 10% open space to be focused on retaining best tree canopy not degraded areas such as south east of the townsite.
- 4. Ensure there is a direct car and pedestrian link to the town centre via an 'avenue' style street.
- 5. Consider utilising new residential areas to quarantine town from district road traffic by bypassing the established street pattern.

Westward expansion

- 1. The street pattern should be rectilinear so as to not compete with the town core semicircular road pattern. This will reinforce the original town layout and allow interpretation of later town expansion such as the northern extension of 1960's.
- 2. Retain best quality tree canopy for the 10% open space component.
- 3. Ensure there is connectivity to the town centre.

Northern expansion

- 1. Respect the original phases of town expansion and retain the rectilinear cadastral/street format that exists in the earlier stages.
- 2. Ensure the centrality of Zamia Terrace is reinforced by locating a new park north of Crowea Terrace.

Generally: -

1. New residential development should complement building style of existing housing with similar roof pitch (with overhang), window styles and front

verandahs/porches. Where brick or masonry walls are used, the colour should reflect the colour palette of the existing housing in the original townsite.

- 2. Nomenclature should continue the floral thematic names of streets but other components such as parks could be named with Aboriginal words or European Pioneers and events significant to the town's history.
- 3. Where opportune, revise existing road reserves to fit new expansion such as the linking of Jarrah Road to Burma Road.
- 4. Emphasize the historic north-south and east-west axes by avenue plantings and extending them into the expansion areas.

For a collation of heritage guidelines for residential town expansion in diagram format see Figure 4 below.

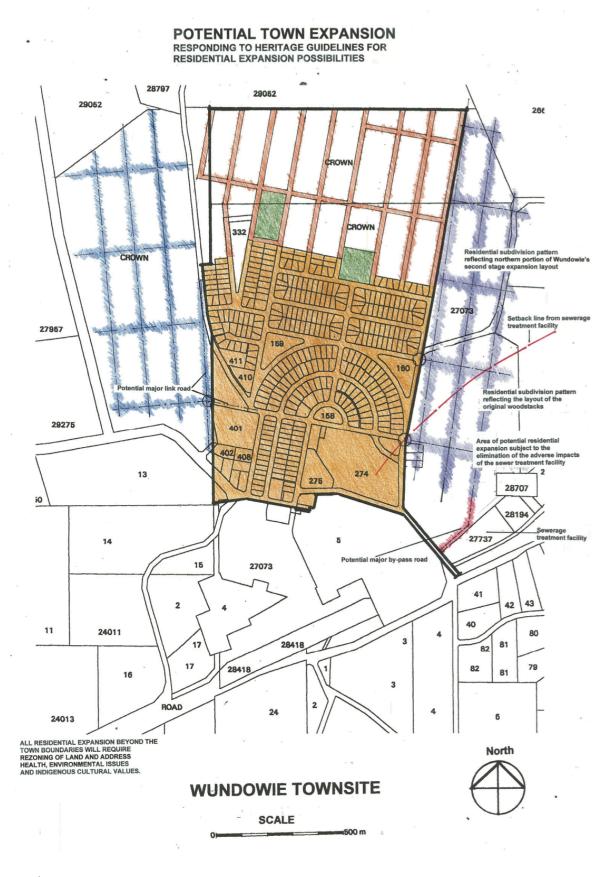


Figure 4

APPENDIX 1- IRON ORE DEPOSITS

Limonitic iron ores located at Clackline, Ravensthorpe, Koolyanobbing, Mt Jackson, MT Laurence and Mt Caudan. Lateritic Ores found: Tenindewa, Baker's Hill (Coates Siding) – on both sides of railway line extensive deposits which in places unusually rich in iron; also Greenbushes, Mahogany Creek, Werribee, Coolgardie, Kalgoorlie. In report from Government Mineralogist – notes (28/8/41) that Mr D Ryan from Fremantle Smelting Works considers Coates ore to be very patchy and siliceous.¹²⁴

Wundowie chosen because of the limonite deposits. Percentage of iron in Wundowie deposits was 45-50%. Koolyanobbing ore, which was a high grade hematite iron, had higher percentage of iron, 60-65%. This replaced the local ore, which was then used mainly as a slag former.

At plant site several small limonitic iron ore deposits with others at Coates Siding and Clackline. Recovery of ore cheap – open cut.

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File H28: Iron Ore Deposits – General, Wundowie Foundry Pty Ltd.

Harris, A.C., "The charcoal iron industry at Wundowie, Western Australia", in *Extractive metallurgy in Australia Ferrous Metallurgy, Vol. IVa*, pp 195 – 1999, 5th Empire Mining and Metallurgical Congress Australia and New Zealand, 1953.