HERITAGE COUNCIL OF WESTERN AUSTRALIA

REGISTER OF HERITAGE PLACES – ASSESSMENT DOCUMENTATION

11. ASSESSMENT OF CULTURAL HERITAGE SIGNIFICANCE

The criteria adopted by the Heritage Council in November 1996 have been used to determine the cultural heritage significance of the place.

PRINCIPAL AUSTRALIAN HISTORIC THEME(S)

- 4.2 Supplying Urban Services
- 4.6 Remembering significant phases in the development o settlements , towns and cities

HERITAGE COUNCIL OF WESTERN AUSTRALIA THEME(S)

- 309 Technology & technological change
- 404 Community services & utilities
- 507 Water, power, major transport routes
- 604 Innovators

11. 1 AESTHETIC VALUE*

Lincoln Street Ventilation Stack is a landmark monumental structure in the Inter-War Art Deco style. (Criterion 1.1)

Lincoln Street Ventilation Stack displays innovation and high standard of design of applying the Inter-War Art Deco style for a simple utilitarian building of this type. (Criterion 1.2)

Lincoln Street Ventilation Stack is important for its distinctive contribution to the predominantly flat geography of Highgate, and is a highly visible reminder of an otherwise unseen, but vital, urban infrastructure. (Criterion 1.3)

11. 2. HISTORIC VALUE

Lincoln Street Ventilation Stack was built to ventilate the newly introduced reticulated sewerage system in Perth and was an important step in the development and expansion of Perth's metropolitan sewerage system during the 1930s and 1940s. (Criterion 2.1)

Lincoln Street Ventilation Stack was built by workers in receipt of sustenance payments during the Great Depression. (Criterion 2.2)

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* For consistency, all references to architectural style are taken from Apperly, R., Irving, R., Reynolds, P. *A Pictorial Guide to Identifying Australian Architecture. Styles and Terms from 1788 to the Present,* Angus and Robertson, North Ryde, 1989.

Lincoln Street Ventilation Stack played a major role in the Defence communication services during the World War II and the Western Australian Police Service communications since this time. (Criterion 2.2)

Lincoln Street Ventilation Stack is associated with Russell Dumas, a notable West Australian engineer and later director of the Public Works Department, who contributed greatly to the development of Perth's infrastructure between 1925 and 1953. It is a testament to his illustrious career that this, his only notable failure, did not damage his professional reputation. (Criterion 2.3)

Lincoln Street Ventilation Stack was recognised as having landmark value at the time of its construction. (Criterion 2.4)

Lincoln Street Ventilation Stack closed after four weeks of operation when the hydrogen sulphide, which turns to sulphuric acid on contact with water, corroded the extractor fans so quickly as to make the operation of the tower financially unfeasible. Furthermore, the hydrogen sulphide, which is heavier than air, on exiting the tower dispersed to the surrounding area causing complaints from residents about the unpleasant odours. (Criterion 2.2)

11. 3. SCIENTIFIC VALUE

Lincoln Street Ventilation Stack, as a technical failure in its own right, prompted further study into the viable management of hydrogen sulphide gas. It was thus an important step in the development of a new sewerage system, which replaced the concrete pipes with plastic lined pipes and ceased use of ventilation altogether. (Criterion 3.3)

11. 4. SOCIAL VALUE

Lincoln Street Ventilation Stack is highly valued for social reasons, having provided a much-needed source of employment for the economically disadvantaged during the Great Depression, in return for sustenance payments. It was also later used by the Police Road Safety Unit for education. (Criterion 4.1)

The Town of Vincent has included *Lincoln Street Ventilation Stack* on its Municipal Inventory evidencing the value attached to it by the local community. The National Trust of Australia (WA) has also classified *Lincoln Street Ventilation Stack*. The Art Deco Society of WA has recognised the building as a significant example of the contemporary Inter-War Art Deco style. (Criterion 4.1)

Lincoln Street Ventilation Stack contributes to the community's sense of place as a well-known landmark in the Town of Vincent. (Criterion 4.2)

12. DEGREE OF SIGNIFICANCE

12. 1. RARITY

Lincoln Street Ventilation Stack is rare as being the only existing sewer ventilation stack in Western Australia of its particular engineering design. (Criterion 5.1)

Lincoln Street Ventilation Stack is rare for its distinctive architectural style, as being the only known ventilation stack to be designed in the Inter-War Art Deco style. (Criterion 5.1)

Lincoln Street Ventilation Stack demonstrates the style and processes of sewer management of that era, no longer used in modern sewerage systems (Criterion 5.2)

12. 2 REPRESENTATIVENESS

Lincoln Street Ventilation Stack is a good representative example of experimental engineering in the area of sewer works for that era, and of the innovative designs and ideas of prominent West Australian engineer, Russell Dumas. (Criterion 6.1)

Lincoln Street Ventilation Stack is a good example of the architectural style used during principal PWD architect A.E. (Paddy) Clare's time. The PWD projects during this period favoured bold vertical lines and decorative detail, and compares to similar style buildings built around Perth in during the 1930s for example King Edward Memorial Hospital. (Criterion 6.1)

12. 3 CONDITION

The overall condition of *Lincoln Street Ventilation Stack* is good. The interior of the tower and chamber room are in good condition. There is some deterioration to the exterior of the building including crazing and cracking of the render and minor vandalism in the form of graffiti.

12. 4 INTEGRITY

Lincoln Street Ventilation Stack served its intended function for four weeks and since then it has been used for different purposes. Machinery and supporting structure have been removed but its former use is evident by its tower. Current uses have been compatible because only minor adaptations were required to convert the chamber room.

Lincoln Street Ventilation Stack has high to moderate integrity.

12. 5 AUTHENTICITY

Despite interior modifications to the chamber room, due to the removal of machinery and conversion of the chamber room to a laboratory, the tower, chamber room and external form of *Lincoln Street Ventilation Stack* are intact. Minor additions and replacement of original fabric are readily identifiable and are reversible. *Lincoln Street Ventilation Stack* retains a high degree of authenticity.

13. SUPPORTING EVIDENCE

The documentation for this place is based on the heritage assessment by post graduate students in the cultural heritage program at Curtin University of Technology, Naomi Deegan, Sarah Mason, Alex Nichols, Mary-Ann Goodlich and Thomas van der Linden, with amendments and/or additions by HCWA staff and the Register Committee.

Supporting evidence has been taken from Pickering, G. 'The Lincoln Street Ventilation Stack: A Draft Conservation and Management Plan', 2004, October.

13. 1 DOCUMENTARY EVIDENCE

Lincoln Street Ventilation Stack comprises a 38 metre high, brick and render sewer vent, surrounded by a low wall with a chamber room attached. The sewer ventilation stack was constructed for the Metropolitan Water Supply, Sewerage and Drainage Department and was completed in 1941 with modifications in 1951 when the chamber room was converted into a laboratory.[1] The ventilation stack is of brick construction with concrete render and it is a prominent local landmark. Built in the Inter-War Art Deco style it was designed during A.E. (Paddy) Clare's term of office as Principal Architect of the Public Works Department of Western Australia and Chief Engineer Russell Dumas oversaw its construction.

In 1827 when Lieutenant Governor Captain James Stirling surveyed the Swan River he noted a number of lagoons in the vicinity of the future Perth townsite that could provide a viable source of fresh water for the colonists.[2] These were part of a system of lakes and swamps that stretched from Claisebrook, through Perth and on to Lake Monger and Lake Herdsmen. The Highgate area was bounded by seasonal wetlands, which included Stone's Lake (in the area of Loton Park and Perth Oval), Lake Poullet (now Birdwood Square), Lake Thompson (between Lake, Brisbane and Beaufort Streets), and Third Swamp (now known as Hyde Park).[3] The importance of freshwater swamps as a food source for Aboriginal people means that this was an area of high activity for the Aboriginal inhabitants of the Perth region prior to colonisation.[4] The Department of Indigenous Affairs has heritage site listings for Hyde Park, a known seasonal campsite, Highgate Hill, situated on the eastern edge of Hyde Park, and Stone's Lake, which takes in the block on which *Lincoln Street Ventilation Stack* now stands.[5] As late as 1889 a corroboree on Highgate Hill is reported in the *West Australian*.[6] This supports the notion that the site had important ceremonial functions. The people who inhabited the whole area immediately north of the city were the Mooro tribe of the Nyungar, headed in 1829 by Yellagonga.[7]

After the foundation of Perth on 12 August 1829 the townsite was laid out between Mount Eliza and Heirisson Island, facing the Swan River on the south. The area to the north of the city, with its wetlands, was left vacant in anticipation of the new colony's expansion. Drainage works undertaken in the 1840s allowed some of the land to be used for small farms and market gardens. In 1858 the first town lots began to appear around Stone's Lake. It has been suggested that

1 Commemorative plaque on Lincoln Street Sewer Vent; renovations to building, PWD drawing set 29246.

2 Hunt, Su-Jane, *Water the abiding challenge,* 1980, p. ix

3 Town of Vincent, *History of Highgate*, www.vincentheritage.com.au, retrieved 4 April 2006

4 Hallam, Sylvia, 'Aboriginal Women as Providers: The 1830s on the Swan' in *AboriginalHistory* 15, Issue 1-2, 1991, p. 46

5 Department of Indigenous Affairs website. www.dia.gov.au

6 'News and Notes', *The West Australian*, 16 December 1889, p. 21

7 Hallam, op. cit., p. 41

Lincoln Street was named after the American president, Abraham Lincoln.[8] In 1865 suburban lots 140 to 149, bordered by Beaufort, Walcott, Lord and Lincoln Streets were added. Settlement at this time was sparse. It is not until the 1880s that the new suburb of Highgate Hill began to grow. While some large blocks were bought up by wealthy owners, there was also a small group of workers cottages to the east of Beaufort Street that were to form the congregation of the new Anglican Church of St. Alban's, which opened in 1889.[9] The sudden increase in the population of Perth brought about by the gold rushes of the 1890s prompted increased subdivision and land sales in the Highgate area. The Highgate Hill State primary school was opened in 1895 and the tramline to Highgate commenced operation in 1899.[10] In 1897 the Highgate Hill Police Station was built on a lot located on the corner of Smith and Lincoln Streets, the north-west corner of which became the site of *Lincoln Street Ventilation Stack*.

It was also in the 1890s that discussion of a sewerage system for the new city commenced. Drainage and water supply works, as more pressing requirements, had both been undertaken earlier in Perth and Fremantle. The earliest sewerage system consisted of drains dug alongside town streets that carried off all refuse and wastewater to the Swan River. The structure, though not the function, of these was upgraded in 1877. The substantial wetlands north of Perth which were subject to seasonal flooding, and acted as breeding grounds for mosquitoes and the source of water born bacterial diseases were progressively drained and filled in between the 1850s and 1870s. The city's first major water supply scheme, which piped water from Victoria dam and also utilised a reservoir at Mt Eliza, was opened in 1891. However, the summer of 1897 showed the water supply to be inadequate to the needs of a growing population, as residents of Highgate complained to *The West Australian*.[11]

The State Government recognised the need for improved infrastructure to service a massively expanded urban population. In the same year, after reports of over two thousand typhoid cases, C. Napier Bell was commissioned to advise the State Government on a sewerage scheme for Perth and Fremantle. In 1901, while Bell's proposals were still under investigation, advice on the latest technology was received from England and an experimental installation of septic tanks and filter beds was set up at Government House in St. George's Terrace. In 1903 the results being favourable, the design of a reticulated sewerage scheme for Perth was commenced. Construction began in 1906. In the meantime refuse from the city's drains and collections by the sewerage carts continued to be discharged untreated into the Swan River. In 1912 septic tanks were built at Claisebrook, with an underground pipe transporting the contents to filter beds on Burswood Island. The treated waste then flowed into the river. Only 700 houses were connected at this time. By 1920 a third of Perth's houses were connected, the rest continued to rely on the manual cart system.

The next major development in the management of Perth's sewerage came in 1927 with the construction of the Subiaco Treatment Plant, comprising two septic tanks, to service the expanding Subiaco area. The mass unemployment resulting from the Depression provided the Western Australian Government with a workforce for an expanded public works programme. Those in receipt of

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8 'Origin of Nomenclature, recorded by the Perth City Council' *The Sunday Times*, 4 August 1928, p. 24. However the Town of Vincent has suggested that the street is named after St Alban's organist.

9 Burton, A: *The Early Days of St. Alban's Church*, c. 1939. p. 6

10 *Western Mail*, 29 August 1903. p. 30

11 'The water supply question' *The West Australian*, 13 January 1897. p. 5

sustenance payments were recruited for an ambitious scheme for the much-needed upgrade of urban infrastructure, including water supply, roads and sewerage. Work on the present sewerage disposal system began in 1935.[12] The Subiaco works were expanded to accommodate the flow of the whole city region. This followed complaints of algae blooms in the Swan River around Burswood, produced by the concentration of nitrogen nutrients in the water that resulted from effluent discharge. The mainline sewer, running through Perth and Leederville, with its highpoint at Highgate, was connected to the Subiaco sewerage system. Pumping Stations in East Perth facilitated the uphill flow of the sewerage from the low-lying eastern regions. Reticulation was extended to several new suburbs, including Claremont, Maylands, South Perth, Bassendean and Guildford. In 1936 the Claisebrook and Burswood Plants were finally closed and all sewerage was diverted to Subiaco, and after treatment, pumped out to sea. Work on the scheme continued into the early 1940s.

As part of the new system, ventilation towers were to be built along the central mainline sewer at three mile (4.8km) intervals. Ventilation was by that time a standard practice in sewer system management, its use recognised since the late 19th century.[13] Airflow was important in keeping sewerage fresh, as it both removed malodorous gases and exposed the waste to oxygen, preventing the build up of anaerobic bacteria, which produces noxious and corrosive sulphides. Due to a number of factors, hydrogen sulphide was present in high concentration in the expanded Perth sewerage system.[14] The greatly increased size of the system, which extended from Bassendean to Cottesloe, meant that waste was contained in the pipes for a much longer period of time before finally reaching the Treatment Plant at Subiaco. This allowed for a greater degree of decomposition. Further, the use of pumps to transport the sewerage uphill created an anaerobic environment, as the gap of air that sits above the level of liquid waste in a pipe that flows by gravity was eliminated.[15] Perth's relatively warm climate was also favourable to the increased production of hydrogen sulphide gas.

The replacement of original earthenware pipes with cement pipes during the late 1930s revealed the damaging effects of hydrogen sulphide on cement. It was therefore decided to remove the gas from the system using ventilation towers. These were to be fitted with motorised extractor fans, to pump the gas, which is heavier than air, up the height of the tower and out into the atmosphere, clear of the sewer and the surrounding residential areas. While most sewer ventilation relies on natural airflow, the use of extractor fans was not uncommon at the time.

The Melbourne system was similar in its use of ventilation with motorised extractors to limit the hydrogen sulphide damage to cement pipes.[16]

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12 *The Local Government Journal of WA,* June Quarter, 1975

13 Brown, William., *The sanitary problem from the sewer gas point of view: sewer ventilation: the high shaft fallacy: protection of water supply*, (London: Eyre and Spottiswoode, East Harding Street), 1898, Scholars Microform University of Western Australia.

14 Pers. Comm. With Barry Sanders, former Water Corporation General Manager Bulkwater and Wastewater, 3 May 2006. Mr. Sanders outlined the factors that resulted in a particularly high concentration of hydrogen sulphide gas in the Perth system.

15 Ibid., due to Perth's sandy soils as well as financial limitations at the time of construction, most of the city's sewer pipes have been laid in shallow trenches. The use of deeper trenches allows for the construction of a system based on gravitational flow, such as the one in Melbourne, and thus limits the production of hydrogen sulphide gas by keeping the sewerage well oxidated within the pipes.

16 Ibid. This system is still in use today. It is still viable in Melbourne due to the much lower production of hydrogen sulphide, compared with Perth. Melbourne is cooler, and also makes greater use of gravitational flow, which aids in keeping the sewerage fresh. The concrete pipes still corrode however, and require constant maintenance.

The first tower, a basic steel shaft, was built on the hill behind Subiaco Treatment Plant, near the corner of Selby and Hay Streets. The second, known as *Lincoln Street Ventilation Stack*, was constructed in 1941 in Highgate on the corner of Smith and Lincoln Streets.[17] *Lincoln Street Ventilation Stack* became located on its own title on reserve no. 45158, designated as Perth lot 1089 and was vested in the Metropolitan Water Supply Sewerage and Drainage Department.[18] From this point on it became considered separate from the police structures located on the adjoining site. The low room attached to the south side of the tower housed the extractor fans, ducts and connection to the mainline sewer.

Lincoln Street Ventilation Stack was designed during A.E. (Paddy) Clare's time as Principal Architect of the Public Works Department, while the engineering was overseen by the Department's Chief Engineer Russell Dumas. Dumas had an outstanding reputation as one of Western Australia's most notable engineers. He began as Resident Engineer at Churchman's Brook Dam in 1925, moving on to become Chief Engineer of the Water Supply Department, and finally becoming Director of Works and Buildings in the Public Works Department from 1941-53.[19] During his career he oversaw the construction of most of the dams of the South West of the State, a large portion of the rural water supply schemes and the expansion and upgrade of the Perth sewerage system.

Lincoln Street Ventilation Stack opened in late 1941 and ran for only four weeks before being shut down.[20] There are two explanations for the failure of the stack. The first is that the hydrogen sulphide, which turns to sulphuric acid on contact with water, corroded the extractor fans so quickly as to make the operation of the tower financially unfeasible. The second is that the hydrogen sulphide, which is heavier than air, on exiting the tower dispersed to the surrounding area causing complaints from residents.[21] The ventilation operation was closed. As a spectacular failure in an otherwise illustrious career, the tower became known colloquially, among Water Corporation employees, as 'Dumas' Folly'.

In 1949 a collapse of pipes near *Lincoln Street Ventilation Stack* was attributed to the acceleration of corrosion promoted by the ventilation function of the stack.[22] As part of the intersection caved in, the main line sewer pipes were re-laid, and the stack has been disconnected from the sewer since at least that time. The extractor fans were also removed. Due to lack of verifiable historical record it is uncertain exactly when and why *Lincoln Street Ventilation Stack* was decommissioned. This was the first of a series of pipe collapses that alerted the Metropolitan Water Supply, Sewerage and Drainage Department to the severity of the hydrogen sulphide problem.

After 1949, the low room attached to the tower was converted for use as a laboratory. It functioned as a research facility into wastewater, including crude gas analysis, and the effects of oxygen content, alkaline levels and temperature on hydrogen sulphide gas until it was moved to the upgraded Subiaco Treatment Plant in 1961. It was the first laboratory for the chemical analysis of sewerage to be used by the Metropolitan Water Supply, Sewerage and Drainage Department. The aim was to provide a better management strategy for hydrogen sulphide

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18 Ibid. The exact cost of *Lincoln Street Ventilation Stack* is unknown, as records are incomplete.

18 Heritage Council

19 Beor, P., Flowing Back, in *Flowing Forward*, p. 3, Water Corporation, 24 May 2004

20 *Voice News,* 30 July 1999

21 Beor, P., Flowing Back, in *Flowing Forward*, p. 3, Water Corporation, 24 May 2004

22 Pickering, G., *Lincoln Street Ventilation Stack: Draft Conservation Management Plan*, 2004, p. 6, citing Pers.Comm with Barry Sanders, former Water Corporation General Manager Bulkwater and Wastewater.

within the Perth sewerage system, to control odours and prevent widespread and costly corrosion to pipes. This pioneering research contributed to a publication that was to become the worldwide reference volume for hydrogen sulphide management.[23]

After much research the final solution to the hydrogen sulphide problem was implemented from the late 1960s through 1970s. All pipes were lined with plastic and all ventilation shafts were closed. The Perth system is now notable for being a totally sealed system. Artificial injections of oxygen aid in maintaining the freshness of the sewerage, pumping stations are still in use, and all sewerage is comprehensively treated at the many treatment plants throughout the metropolitan area. The final section of the main line sewer in Leederville is currently undergoing upgrade. *Lincoln Street Ventilation Stack* is the most spectacular feature of a story that has determined how the sewerage system operates in Perth today.

The centrality of its location and the generally negative public response to sewer vents in a suburban area may have prompted *Lincoln Street Ventilation Stack's* singular Inter-War Art Deco design. Certainly there are a number of examples of smaller sewer vents in the Perth metropolitan area that were executed in a decorative style in order to mask their function.[24] These smaller vents, erected in the 1920s around the older parts of Perth, were metal constructions designed to resemble lampposts.[25] By the time *Lincoln Street Ventilation Stack* was commissioned in the early 1940s, a new architectural style was being adopted around Perth. The Inter-War Art Deco style or Moderne style as it was known during the Interwar years, reflected modernity and a growing sense of internationalism that was occurring throughout the world. The strong vertical lines on the ventilation stack were designed to visually increase the apparent height of the structure, while the tapering of the tower structure towards the top further emphasises this illusion.[26] The stack, in this way, was reminiscent of New York skyscrapers. Although *Lincoln Street Ventilation Stack* did not fulfil its intended use, its landmark quality, which was recognised by contemporary commentators even during its construction,[27] did ensure its continued existence.

In 1942, *Lincoln Street Ventilation Stack* attained a new function as an antenna mast for the WA Police Department's wireless facility (call code 'VKI' – License No. 1258). The entry of Japan into World War II prompted the transfer of the wireless facility from the prominent and therefore vulnerable Central Police Station in Roe Street to the former Highgate Hill Police Station premises. The police station had been out of operation since its closure on 2 December 1940 primarily due to the opening of the newly built Inglewood station. However, the recently built and decommissioned sewer vent adjacent to the property provided an excellent anchorage point for the antennae and anchored VKI to its location even when the Highgate Hill Police Station buildings were no longer considered

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23 Thistlethwayte, D.K.B, *The control of sulphides in sewerage systems*, (Sydney:Butterworths, 1974). Other publications include: Muller, W. *Control of Odours from Hydrogen Sulphide in Sewage Works*, (Perth: Metropolitan Water Supply,Sewerage and Drainage Department, 1956); and, Pomeroy, Johnson and Bailey, *Process Design Manual for Sulfide Control in Sanitary Sewerage Systems*, (Washington D.C.: Environmental Protection Agency, 1974).

24 Beor, P., 'Flowing Back', in *Flowing Forward* p. 3, Water Corporation 21 June 2004

25 It is important to note that these smaller vents operated without the use of motorised extractor fans, instead facilitating natural airflow. All have since been cut off from the main line sewer system.

26 Facius, R, 'Identifying Art Deco' in *Trust News: The National Trust of Australia (W.A)*, 183rd Edition, September 1993

27 'Ventilating Stack: Tall Structure at Highgate Hill' *The West Australian,* 3 April 1941, p.6.

adequate.[28] It both obviated the need to build a new and costly mast, and as an apparently innocuous monument, built to hide its own original function, supplied a ready made camouflage for a covert police operation.

Lincoln Street Ventilation Stack is built on land designated as a reserve for sewerage. It is currently (2006) on its own title, Perth Lot 1089 on Certificate of Title Vol. 3109 Folio Reserve 45158. On the same corner next to the ventilation stack is located the former Police Station, Lockup and Police Residential Quarters, Perth Lot 1088 on Certificate of Title Vol. 3109/928 Folio Reserve 6245. The site with the Police Residential Quarters across the road in Lincoln Street represents a significant contribution of the Police in the area.[29]

The *Highgate Police Station, Lockup & Quarters (fmr)* (04282) buildings on the adjacent lot to *Lincoln Street Ventilation Stack* are single-storey, of red brick and have encircling verandahs. Built between 1897 and 1916 in the Federation Bungalow Style, *Highgate Police Station, Lockup & Quarters (fmr)* has been modified and adapted both internally and externally and important details and fittings have been removed or altered. It does not form part of this assessment as it is entered in the State Register of Heritage Places on a permanent basis.[30]

In 1961 the West Australian Police Service began renting the room from the Metropolitan Water Supply, Sewerage and Drainage. From 12 November 1971, the whole property was rented for $9.60 per month.[31] In 1975, the Wireless Branch – then called 'Radio Section' and subsequently renamed 'Communications Section' – was transferred to the new Police Headquarters in East Perth near the Causeway and transmissions utilising the stack antennae ceased. The antennae were not fully removed and can still be seen.

Presently (2006), *Lincoln Street Ventilation Stack* and adjoining room are still being rented by the West Australian Police Service from the Water Corporation on a monthly basis. The room has been used by the Police Road Safety Unit as a space for education.[32] It is also used as a meeting place for the Police Historical Society of Western Australia.

In 2006, *Lincoln Street Ventilation Stack* remains a unique industrial structure with exceptional landmark qualities to Perth. It has been adopted as part of the Municipal Inventory by the Town of Vincent, classified by the National Trust of Australia (WA) and recommended to the State Register by the Art Deco Society of Western Australia as a significant example of this architectural style. It has also been the subject of letters from local residents remarking on its landmark value to the community.[33] It is a testament to the advancements in waste management techniques in the early 20th century and played a major role in the development of radio and communication technology in Australia. The striking

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28 *Police Wireless Service – General File*, Vol 5, p.22 – report from Sergeant S.C. 'Jimmy' Austin to CIB dated 21 February 1952. Sgt. Austin comments on the cost of erecting a new mast if the Wireless Section were to be relocated. He says that although the building was inadequate, the antenna fixed to the top of the 120 foot sewer vent at the current location was certainly adequate, even if the Wireless Station were switched to FM. Acc 430 no. 4038/1951, Public Records Office

29 Ibid.

30 Hocking Planning and Architecture: 'Heritage Assessment of WA Police Services Property, Reserve 6245 H Highgate', 1998, June.

31 Pickering, op. cit., p. 7, citing Pers. Comm with Sean O'Loughlin, Education Support Officer, Water Corporation, 26 August 2004

32 Pickering, op. cit., p. 4 citing Pers. Comm with Sgt. Jack McGillivray, Highgate Police, 6 August 2004

33 National Trust letters: one in particular received 2 July 1976 from a resident of Guildford. The author of the letter called it 'an essential part of our town-scape'.

Inter-War Art Deco design is a testament to the sense of progress and modernity that pervaded Australian architecture at the end of World War I.

13. 2 PHYSICAL EVIDENCE

Lincoln Street Ventilation Stack comprises of a 38 metre high, brick and render sewer vent, surrounded by a low wall with a chamber room attached. The sewer ventilation stack was constructed for the Metropolitan Water Supply, Sewerage and Drainage Department and was completed in 1941 with modifications in 1951 when the chamber room was converted into a laboratory.[34] The ventilation stack is of brick construction with concrete render and it is a prominent local landmark. Built in the Inter-War Art Deco style it was designed during A.E. (Paddy) Clare's term of office as Principal Architect of the Public Works Department of Western Australia and its construction was overseen by Chief Engineer Russell Dumas.

Lincoln Street Ventilation Stack is located on the south corner of Lincoln and Smith Streets in Highgate. The main elevation on Lincoln Street faces north with the long axis of the building, parallel to Smith Street. It stands isolated from other buildings, but on the same lot as the former Highgate police station. Security fencing runs down each of the street boundaries making the south and east side of the building inaccessible to the public.

Lincoln Street Ventilation Stack towers over the predominantly single-storey residential neighbourhood and is the dominating structure in the street. The surrounding cottages are predominantly single-storey and date from the 1890s. Seven cottages, opposite the sewer vent on Lincoln Street, were formerly residential quarters for the police from 1899 to 1914.[35]

The area around *Lincoln Street Ventilation Stack* is grassed along the street verges and bushes grow on the south-east side. The area around the entrance is bare. The area between the buildings has very little vegetation located on it and the surface has been bituminised for practical reasons related to the Police activities on the site.

Lincoln Street Ventilation Stack is of the Inter-War Art Deco style which was frequently used for industrial buildings at that time. The tower tapers gradually to give the illusion of even greater height. The corners of the tower have been chamfered. This serves to reduce the visual mass of the column. Recessed vertical banding going down the length of the shaft on each side further emphasises the verticality and height. The vertical banding is terminated at the top of the stack in a pressed cement decorative panel with an interwoven pattern seen in similar Inter-War Art Deco Buildings of the time. The Inter-War Art Deco style was adopted in industrial buildings because it expressed the new technologies associated with an international modernism. Embellishment was often incorporated into the designs simply to mix modernity with the 'gravitas of useless ornament'.[36]

The tower is surrounded by a wall, one metre in height and octagonal in plan giving the tower a monumental appearance as if it was on a plinth. The tower has the tripartite features of a classical fluted column: the capital, shaft and base on a pedestal similar to Adolf Loos' competition entry for the Chicago Tribune

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34 Commemorative plaque on Lincoln Street Sewer Vent; renovations to building, PWD drawing set 29246.

35 Hocking Planning and Architecture: op. cit.

36 Ferson, M., Nilsson, M. *Art Deco in Australia: Sunrise Over the Pacific*, 2001, Fine Art Publishing, Sydney

Tower, Chicago in 1922, a skyscraper in the form of an abstracted Doric column.[37]

In a prominent centralised position on the front elevation of the tower, a commemorative plaque has been fixed to the wall giving the completion date and the name of the authority, engraved in Roman style lettering: 'Metropolitan Water Supply, Sewerage and Drainage Dept. 1941'.

An enclosed timber portico defines the entrance to the chamber room. It has a simple architrave on the top edge and is painted white. A single door with a flyscreen opens to an antechamber. This was a modification to the building when it was converted to a laboratory. Above the door the words 'lecture room' are painted in capital letters. The same message appears on a sign on the east wall of the chamber room. Iron downpipes are reticulated on the external face of the building with modern zinc rain collector heads.

The chamber room is covered by a low pitched hipped roof that is surrounded by a single storey parapet wall to give the appearance of a flat roof externally. Two sash windows are placed centrally on the long east and west elevation of the room. The original windows appear to be made of steel and were paned but have been removed and replaced with aluminium double hung sash windows. Externally a cement rendered moulding frames the window with a sill, at the same height as the exterior low wall.

The external structure is made of brick with an applied concrete render and in a sandstone colour. The top edge of the parapet wall is profiled and continues around the top edge of the pedestal of the tower.

The antechamber is on the longitudinal axis and is located in front of the former entrance to the chamber room. Double timber, ledged and braced, tongue and grooved doors which have been painted white, open outwards. Above the doors is a paned fanlight. The chamber room is designed to a rectangular floor plan. The internal brick walls have also been painted white. The ceiling is a new addition and consists of modular ceiling tiles made of plasterboard. Ceiling lining is not indicated on the original drawings. The lights are fluorescent tubes. The original floor level has been raised and currently consists of a timber floor covered in carpet. Air conditioning has also been installed.

Alterations to the building were undertaken in 1951 when the chamber room was converted into a laboratory. Additional changes have been made to make the room acceptable for general use including paint to the internal walls, carpet on the floor and air conditioning installed. The windows have been boarded up on the west side.

Originally the chamber housed the ducts, mechanical fans and motors (Two No. 3 1/2 Richardson Buffalo Limit Load Fans and two 5HP AGE AKT Motors).[38] These were removed when the sewer vent was decommissioned. It is believed that the sewerage connection was cemented over and the floor filled with sand. The removed machinery no longer exists.[39]

A low opening allows access to the tower and an inspection door is at the entrance to the stack. Internally the vent is constructed of base brick. There is a

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37 Frampton, K., *Labour, Work and Architecture: Collected Essays on Architecture and design*, 2002, Phaidon Press Inc., New York, p. 216.

38 Drawing No. 2, MSS & DD drawing set no. 6552, May 1941.

39 Perry Beor of Water Corporation, Superintendent's Representative, site visit on 16 March 2006 and interview 5 April 2006.

diagonal subdividing wall up which a ladder is fixed. A system of counter weights still remains. These were connected to ropes and a pulley for the warning light mounting that was located at the top of the stack. Footholds lead up the inside of the ventilation stack. These are made of steel and are in good condition. The brickwork on the interior is in excellent condition. Reinforced concrete platforms are spaced at regular intervals in the partitioned section of the vent.

Externally the building shows significant deterioration to its concrete render. In places the concrete render is crazing and parts have fallen off, revealing underlying layers of render and brick. There is evidence of crazing down the length of the walls and water staining. White rims on the crazing indicate dissolution and precipitation processes going on. Rising damp is indicated to the left of the front door to the lecture room. White ant activity is also apparent in the floor of the chamber room.[40]

In the exterior low wall, wide and deep cracks are visible. This is probably due to rusting of the reinforcement.

Graffiti is present on some sections of the exterior walls. It has been painted over in a colour resembling the original render to cover it. Some vent covers are missing. Windows have been boarded up from the inside and original window frames have been removed and replaced with aluminium framed windows.

13. 3 COMPARATIVE INFORMATION

Lincoln Street Ventilation Stack is the only structure of its type and design remaining in Perth. Water Corporation records indicate a second tower was built in Subiaco on the site of the Water Treatment Plant, which has since been demolished. Other sewer vents do exist in the Perth metropolitan area, but are significantly smaller, constructed of iron, more similar to a lamppost in design, and did not use exhaust fans or mechanical equipment to circulate air.

Numerous ventilation towers exist elsewhere in Australia. Those ventilation towers identified on the NSW Heritage Register are similar to *Lincoln Street Ventilation Stack* in design but slightly different in function. *Lincoln Street Ventilation Stack* was designed purely to pump gas build up and sulphides out of the sewer system, while the Sydney tower vents are thought to have functioned as both exhaust and air intake vents. Such types of vents were built across Sydney from as early as 1857, but are not operational today. An example is the Premier Street Vent in Marrickville, built 1898-1900 in Queen Anne Revival style, and includes workers cottages similar to those built alongside *Lincoln Street Ventilation Stack*. The vent is constructed of moulded brick in a cylindrical shape. Another similar example is the Corunna Road Vent in Stanmore, which is a cylindrical brick tower featuring Federation style, and was built in 1900. Other examples listing on the NSW State Register of Heritage Places exist in: Railway Pde, Burwood; Paisley Rd, Croyden; The Boulevarde, Lewisham; Falcon St, North Sydney; Elizabeth St, Sydney; and Military Rd, Bondi.

The architectural style of *Lincoln Street Ventilation Stack* is unique. There is no other known tower built in the distinctive Inter-War Art Deco style involving the Public Works Department (PWD) during the time of the Principal Architect A.E. (Paddy) Clare. Clare was an advocate of the use of Inter-War Art Deco style and many of the buildings designed during the 1930s and early 1940s by the PWD were in this style. Other prominent buildings attributed to PWD during Clare's time are entered in the on the State Register of Heritage Places and include

40 Pickering, op. cit., p. 5.

former 02173 *Perth Girls School* (now Traffic Police Headquarters), corner of Plain and Wellington streets, East Perth, and 02424 *Royal WA Institute for the Blind,* on Whatley Crescent, Maylands. These two buildings in particular are representative of the type of decorative styling similar to *Lincoln Street Ventilation Stack*, and are part of a series of buildings built around Perth at that time

There were numerous other government and commercial buildings built in Perth around that time in the Inter-War Art Deco style, although none in the form of a monument or obelisk. For example, the 02132 *St John's Ambulance Building* (1940) on Wellington Street, Perth, is a three-storey rendered masonry structure, designed by Olchitree & Hargrave Architects. The 11595 *First Church of Christ, Scientist* (1939), also designed by Olchitree & Hargrave, is an ashlar ruled stucco finished masonry church building with a geometric monumental style. Both buildings feature the rendered brick/concrete exterior wall surface, bold vertical lines and intricate Inter-War Art Deco detailing that are distinctive of this style, and are entered in the State Register of Heritage Places.

There are 62 places in the Heritage Council of Western Australia Assessment Program classified as Community Utilities, none of which are similar to *Lincoln Street Ventilation Stack.* There are 34 places in the Assessment Program that are classified as Inter-War Art Deco style, none of which are of similar function to *Lincoln Street Ventilation Stack.* No comparative international examples have been sourced to date.

Lincoln Street Ventilation Stack is rare as it is the only structure of its kind in Western Australia. While there are some comparative examples in NSW, *Lincoln Street Ventilation Stack* is unique in its design, style and function in Western Australia.

13. 4 KEY REFERENCES

Pickering, G. 'The Lincoln Street Ventilation Stack: A Draft Conservation and Management Plan', October 2004

Hocking Planning and Architecture: 'Heritage Assessment of WA Police Services Property, Reserve 6245H Highgate', June 1998

13. 5 FURTHER RESEARCH
