

# The Purification Works

Architecture as a restitutor of Industrial heritage and Ecology



Submitted in fulfillment of part of the requirements for the degree in Magister in Architecture (Professional) at the Department of Architecture in the Faculty of Engineering, Built Environment and Information Technology

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## Abstract

This dissertation aims to propose an appropriate architectural intervention within a site that requires both ecological restitution and the commemoration of industrial heritage. The Johannesburg Gasworks site serves as a clear example of how the Industrial Revolution and subsequent industrial technologies have both damaged the natural environment and left blighted legacies within ever developing urban conditions.

The project aims to uphold the general significance of Industrial heritage as proposed by charters such as the Nizhny Tagil charter prepared by The International Council for the Commemoration of Industrial Heritage as well as the unique heritage significance of the Gasworks site. An appropriate theoretical framework and precedents are explored that reconcile the two seemingly opposing requirements of post-industrial sites - that of commemoration and ecological restitution. In post-industrial sites scarred by water, soil and air pollution, as well as dangerous or inaccessible places, maintaining an appreciation of heritage whilst employing the various rehabilitative actions required need to be balanced to ensure both.

The project undertaken forms part of four schemes proposed for the site that aim to maintain the iconic identity of the Johannesburg Gasworks by proposing ecologically sensitive industries. These industries and interventions within the site aim to bring about urban resilience, site specific environmental rehabilitation as well as integration with the surrounding urban context. The proposed project for the site draws its program from global ecological issues as well as site specific heritage factors. The aim of scripting a new layer of intervention onto the Gas Works site is to make a legible reading between the site's history and its ecologically resilient future legacy.

## Project Summary

Site description: The Johannesburg Gasworks also known as Egoli Gas

Site location: Corner of Barry Hertzog Street and Annet Road  
Cottesloe, Johannesburg  
26°11'23.34" S 28°01'15.10" E

Programme: Aquaculture & Fish feed production facility

Research Field: Heritage and Cultural Landscapes

Keywords: Aquaculture, Post-industrial, Site remediation

## Special thanks

First and foremost, the living Christ for making me alive.

My mother and father for continuous support

John Mayer, King's Kaleidoscope, Skurwe abrahams rusks and the entire Egoli Gas Works team

# Index

## Preface

Title Page.....	i
Abstract.....	ii
Special thanks.....	iii
List of Figures.....	iv

## Chapter 1 - Introduction

Page no

1.1 Introduction.....	1
1.2 General issues.....	2
1.3 Urban issues.....	3
1.4 Architectural issues.....	4
1.5 Research questions.....	5
1.6 Research methods.....	6

## Chapter 2 - The Site, The Johannesburg Gas Works

2.1 Site location.....	9
2.2 Site morphology.....	11
2.3 History of the Gas Works.....	13
2.3.1 Inception and early days.....	14
2.3.2 Years of growth and eventual shutdown.....	16
2.3.3 The Gas Works and cooking.....	17
2.4 Gas production from coal.....	19
2.5 Present day zoning.....	27
2.6 Present day condition of industrial core.....	29
2.7 Unpacking the immediate site (the identification of order and place).....	32
2.7.1 Identifying zones and place.....	32
2.7.2 Broken coherence.....	33
2.7.3 The spatial logic of industry.....	34
2.8 Understanding the urban condition.....	35
2.8 Responding to the urban condition.....	39

## Chapter 3 - Appropriate theoretical framework

3.1 Introduction.....	43
3.2 TICCIH.....	45
3.3 The Japanese Wabi-Sabi aesthetic.....	46
3.4 Reconstruction and commemoration.....	47
3.5 Genius Loci “the spirit of a place” .....	48
3.6 The site as palimpsest.....	49

## Chapter 4 - Precedents

4.1 Crissy Field, San Francisco Bay.....	53
4.2 Landscape Park Duisburg-Nord, Duisburg, Germany.....	55
4.3 Turbine hotel, Knysna, South Africa.....	56
4.4 Westergasfabriek, Amsterdam, the Netherlands.....	56
4.5 Parc de la Cour du Maroc, Paris.....	57
4.6 Fresh kills park, New York.....	57
4.7 The plant, Chicago.....	58
4.8 Conclusion.....	58

## Chapter 5 - Programme

5.1 Identifying the appropriate programme.....	61
5.1.1 Heritage and legacy.....	61
5.1.2 The restitution of industry with ecology on the Gas Works site.....	61
5.1.3 The presence of water.....	62
5.1.4 Promoting sustainable urbanism.....	63
5.1.5 Connection with established networks.....	63
5.1.6 The Gas Works and cooking.....	64
5.1.7 Conclusion.....	65
5.2 Magmeal - an Innovative solution as precedent.....	68
5.3 Programme areas schedule.....	71
5.4 Programme allocation.....	73

## Chapter 6 - Conceptual development

6.1 Conceptual intention 1: The extension of industry.....	77
6.2 Conceptual intention 2: Responding to the grid.....	79
6.3 Conceptual intention 3: movement along the grid.....	80
6.4 Conceptual intention 4: Water-based recreation.....	81
6.5 Conceptual intention 5: Cohesion through geometric order.....	82
6.6 Conceptual intention 6: Overlaid geometry.....	83
6.7 Synthesis of conceptual intentions.....	84
6.8 Place-specific conceptual approaches.....	85
6.9 The layering of intervention.....	87

## Chapter 7 - Design development

7.1 Intervention layer one - remedial action.....	91
7.2 Intervention layer two - commemorate demolished structures.....	97
7.2.1 The purification plants.....	99
7.2.2 Appropriate commemoration.....	101
7.3 Intervention layer three - formal heritage responses.....	105
7.3.1 Overall intervention area.....	107
7.4 Intervention layer four - programmatic responses.....	109
7.4.1 No 3 gas tank.....	111
7.5 Design explorations.....	113
7.5.1 Design iteration 1.....	115
7.5.2 Design iteration 2.....	117
7.5.3.1 Design iteration 3, building 1.....	119
7.5.3.2 Design iteration 3, building 2.....	121
7.5.4 Design iteration 4. elevations.....	123
7.6 Facade analysis as design informant.....	125
7.7 Iteration five design drivers and resolution.....	127

## Chapter 8 - Technical resolution

8.1 Technological heritage analysis of the Gas Works	
8.1.1 Material palette.....	141
8.1.2 Construction techniques and details.....	143
8.1.3 Translating elements from heritage into design.....	145
8.2 Climatic analysis.....	147
8.3.1 Structural system building 1.....	149
8.3.2 Structural system building 2.....	151
8.4.1 Passive ventilation building 1.....	153
8.4.2 Passive ventilation building 2.....	155
8.4.3 Geothermal piping and ventilation strategy.....	157
8.5 Construction detailing.....	159
8.6 Daylighting iterations.....	165
8.7 Rainwater harvesting calculations.....	167



## List of figures

- figure 1. Site location. Image by Author (2017)
- figure 2. Ecological condition. Image by Author (2017)
- figure 3. Industrial condition. Image by Author (2017)
- figure 4. Post-industrial condition. Image by Author (2017)
- figure 5. Original Plan of Gas Works, 1929. Tsica heritage consultants archives (2017), edited by author
- figure 6. View of Gas Works from Annett road looking east, 1929. Tsica heritage consultants archive (2017)
- figure 7. Holmden's street map of Johannesburg and suburbs. City of Johannesburg map office (1929) edited by author
- figure 8. Gas storage tank of President street Gas Works. Tsica heritage consultants archives (2017)
- figure 9. Purifiers at President Street Gas Works. Tsica heritage consultants archives (2017)
- figure 10. No 1&2 gas tanks of new Cottesloe site. Tsica heritage consultants archives (2017)
- figure 11. Photograph of Purification plant, 1929. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 12. Aerial photograph of Gas Works site, 1960. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 13. Mr Therm, the mascot for Egoli Gas. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 14. The liquid Ammonia collection area. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 15. A cookery demonstration at the showroom of the Gas Works. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 16. Gas stove cooking. istock. 2017. Signature. <http://media.istockphoto.com/photos/man-tossing-fresh-vegetables-in-saucepan-picture-id477000030?k=6&m=477000030&s=612x612&w=0&h=fGHsh7hks-WrBefp5ruuNTNEtpsDf2BfhJlQFCdWYXU=> (Accessed 12 October 2017)
- figure 17. longitudinal section through Retort House 1. Tsica heritage consultants archives (2017)
- figure 18. Retort House 1 with condensers in foreground. Tsica heritage consultants archives (2017)
- figure 19. Plan of structures involved in process and direction of energy flow. Image by Author (2017)
- figure 20. condensers (item 9) in their current state. Photograph by Author (2017)
- figure 21. Livesey and rotary multifilm Washers (item 11) with purifier (item 14 on plan) shown in background. Tsica heritage consultants archives (2017)
- figure 22. Plan of structures involved in process and direction of energy flow. Image by Author (2017)
- figure 23. View towards Retort No.1 & 2. Tsica heritage consultants archives (2017)
- figure 24. View of the No 1,2 and 3 gas storage tanks. Tsica heritage consultants archives (2017)
- figure 25. View towards easternmost purification plant. Tsica heritage consultants archives (2017)
- figure 26. View on tar distillation plant\_1950. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 27. Pollution distribution diagram. Image by Author (2017)



- figure 28. Aerial of the Gas Works site from the 1950s. Tsica heritage consultants archives (2017) edited by author
- figure 29. Aerial of the Gas Works site. Tsica heritage consultants archives (2017) edited by author
- figure 30. Identifying zones and place. Image by Author (2017)
- figure 31. Zones of industry, sequence of industry and demolished structures. Image by Author (2017)
- figure 32. Demolished structures and their role within the sequence of the industrial process. Image by Author (2017)
- figure 33. The linear sequence of the original coal to gas process. Image by Author (2017)
- figure 34 View towards Retort 1 through No 1&2 gas tanks. Tsica heritage consultants archives (2017)
- figure 35. The urban condition in contrast. Image by Author (2017)
- figure 36. Gas Works urban vision plan. Image by Johannesburg Gas Works group (2017)
- figure 37. Noteworthy heritage aspects of the Gas Works site. Image by Author (2017)
- figure 38. Wabi-Sabi application on the Gas Works site. Image by Author (2017)
- figure 39. Noteworthy aspects of demolished structures. Image by Author (2017)
- figure 40. Genius Loci of the Gas Works site. Image by Author (2017)
- figure 41. The layering of the Gas Works site and reading the intervention area as the location of overlap. Image by Author (2017)
- figure 42. Reading a site as a palimpsest. Image by Author (2017)
- figure 43. Layers of intervention at Crissy Field. Sketch by Author (2017)
- figure 44. Crissy Field. Airport2Park. 2014. Crissy Field. <http://airport2park.org/portfolio-item/crissy-field/> (Accessed 12 October 2017)
- figure 45. Park Duisburg Nord, Latz+Partner. Mellado, J.A.C. [Sa]. <https://za.pinterest.com/pin/347832771193086641/> (Accessed 27 July 2017)
- figure 46. layers of intervention at duisburg-Nord. Image by Author (2017)
- figure 47. Turbine hotel in Knysna, South Africa. Baker. 2012. <http://www.stayreview.com/turbine-hotel-in-knysna-south-africa/> (Accessed 16 October 2017)
- figure 48. Cultuurpark Westergasfabriek. Gustafson, Porter + Bowman. 2017. <http://www.gp-b.com/cultuurpark-westergasfabriek> (Accessed 16 October 2017)
- figure 49. Parc de la cour du maroc. Kopinski, J. [Sa]. Les Jardins d'Eole Parc de la Cour du Maroc. <https://za.pinterest.com/pin/159314905545751490/> (Accessed 27 July 2017)
- figure 50. Fresh kills park. Ecowatch. 2017. New York Transforms World's Largest Landfill Into City's Biggest Solar Array. <https://www.ecowatch.com/new-york-transforms-worlds-largest-landfill-into-citys-biggest-solar-a-1881830086.html> (Accessed 16 October 2017)
- figure 51. Garden and mural. Plant Chicago. 2014. <https://www.flickr.com/photos/plantchicago/14400906158/> (Accessed 28 September 2017)
- figure 52. The Gas Works site in relation to the nearby campus and public restaurants. Image by Author (2017)
- figure 53. Program designation showing core, sub- and supporting functions. Image by Author (2017)
- figure 54. Areas schedule. Image by Author (2017)
- figure 55. Area function allocation. Image by Author (2017)
- figure 56. Layout of programme on intervention area. Image by Author (2017)
- figure 57. The link between Industry and Ecology. Image by Author (2017)
- figure 58. Building 1 as extension of heritage narrative. Image by Author (2017)
- figure 59. Building 1 as conceptualized mass on site. Image by Author (2017)
- figure 60. Responding to the grid as conceptual response. Image by Author (2017)
- figure 61. Movement along the grid as conceptual response. Image by Author (2017)
- figure 62. Water-based recreation and conceptual response. Image by Author (2017)
- figure 63. Cohesion through geometric as conceptual response. Image by Author (2017)
- figure 64. Overlaid geometry as conceptual response. Image by Author (2017)
- figure 65. Synthesis of conceptual intentions. Image by Author (2017)
- figure 66. The intervention zones. Image by Author (2017)
- figure 67. The intervention area. Image by Author (2017)

- figure 68. The layers of intervention. Image by Author (2017)
- figure 69. Erosion and pollution location and intensity. Image by Author (2017)
- figure 70. Hole 1 edge condition. Photograph by Author (2017)
- figure 71. Tar pollution within soil. Tsica heritage consultants archives (2017)
- figure 72. Sketch illustrating soil displacement at tank 1's construction, the present condition of hole 1 and the future conditions. (author, 2017)
- figure 73. Hole 1 and 2 sketch. Image by Author (2017)
- figure 74. Photograph of hole 1 edge. Photograph by Author (2017)
- figure 75. Diagram of pollution on site. Image by Author (2017)
- figure 76. Section through hole 2 indicating pollution and remedial actions. Image by Author (2017)
- figure 77. Pre-industrial, mid-industrial and proposed post-industrial conditions. Image by Author (2017)
- figure 78. Possible interventions within gas tank holes. Image by Author (2017)
- figure 79. Demolished structures and their location. Image by Author (2017)
- figure 80. Sketch indicating position of five purification plants. Image by Author (2017)
- figure 81. Dry purification plant\_1929. Tsica heritage consultants archives (2017)
- figure 82. Construction drawings for purification plant. Tsica heritage consultants archives (2017)
- figure 83. Column stubs. Photograph by Author (2017)
- figure 84. Purification box inside plant. Tsica heritage consultants archives (2017)
- figure 85. Gas plant\_Cottesloe\_1950\_dry purification plant. Tsica heritage consultants archives (2017)
- figure 86. Formal heritage responses. Image by Author (2017)
- figure 87. Identifying order. Image by Author (2017)
- figure 88. Design explorations as response. Image by Author (2017)
- figure 89. Programmatic responses. Image by Author (2017)
- figure 90. Model exploration 1: Rebuilt topography as means of commemoration and reflection. Image by Author (2017)
- figure 91. Model exploration 2: Interplay between rectilinear and circular form. Image by Author (2017)
- figure 92. Model exploration 3: Structure, scale, placement and the nature of the stair. Image by Author (2017)
- figure 93. Design iteration one with re-appropriated Gas tank no.3. Image by Author (2017)
- figure 94. Design iteration 2. Image by Author (2017)
- figure 95. Design iteration four, elevations. Image by Author (2017)
- figure 96. Facade analysis of Building 1 and Retort no. 2. Image by Author (2017)
- figure 97. Facade analysis of building 2 and Retort no. 1. Image by Author (2017)
- figure 98. Design drivers. Image by Author (2017)
- figure 99. Scheme plan (Author, 2017)
- figure 100. Building 1 first floor plan (Author, 2017)
- figure 101. Building 1 ground floor plan (Author, 2017)
- figure 102. Building 2 square level plan (Author, 2017)
- figure 103. Building 2 service level plan (Author, 2017)
- figure 104. Building 2 park level plan (Author, 2017)
- figure 105. Southwestern elevation (Author, 2017)
- figure 106. Northeastern elevation (Author, 2017)
- figure 107. Building 2 Southeastern elevation. scale 1:200 (Author, 2017)
- figure 108. Building 1 cross section (Author, 2017)
- figure 109. Building 2 Longitudinal section (Author, 2017)
- figure 110. Northwestern elevation. scale 1:200 (Author, 2017)
- figure 111. Close-up photograph of Livesey scrubber. Photograph by Johannesburg Gas Works group (2017)
- figure 112. Steel structure in Retort 2 interior. Photograph by Johannesburg Gas Works group (2017)
- figure 113. Livesey washer deconstructed envelope and piping exposed. Photograph by Johannesburg Gas Works group (2017)
- figure 114. Western entrance to Retort No. 1. Photograph by Johannesburg Gas Works group (2017)
- figure 115. CWG plant eastern elevation with structure expressed in facade. Photograph by Johannesburg Gas Works group (2017)

- figure 116. Retort no. 1 western facade with brick-ciaa cross bracing expressed. Photograph by Johannesburg Gas Works group (2017)
- figure 117. Opening detail of Retort no. 2 northern facade. Photograph by Johannesburg Gas Works group (2017)
- figure 118. Steel structure of Retort No. 1. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 119. South-eastern facade of Retort No. 1. Tsica heritage consultants archives (2017)
- figure 120. 3D digram illustrating facade detailing of Retort no. 1 & 2. Image by Author (2017)
- figure 121. Steel and concrete junctions of Retort No. 1. In: Lauferts le Roux, M. & Mavunganidze, J. 2015. The Johannesburg Gas Works. 1st ed. Johannesburg: Fourthwall.
- figure 122. Concrete detailing around openings and strucural expression. Photograph by Johannesburg Gas Works group (2017)
- figure 123. Chimney towers, the relationship between openings and structure. Photograph by Johannesburg Gas Works group (2017)
- figure 124. Brick eave detailing. Photograph by Johannesburg Gas Works group (2017)
- figure 125. Chimney flues of Retort 1. Photograph by Johannesburg Gas Works group (2017)
- figure 126. Construction elements of Gas Works site deconstructed. Image by Author (2017)
- figure 127. Wind direction distribution of Johannesburg showing 12 months overlaid. Windfinder. 2017. [https://www.windfinder.com/windstatistics/Johannesburg\\_or\\_tambo\\_airport](https://www.windfinder.com/windstatistics/Johannesburg_or_tambo_airport) (Accessed 26 September 2017) edited by Author
- figure 128. Summer solstice shadow paths. Image by Author (2017)
- figure 129. Winter solstice shadow paths. Image by Author (2017)
- figure 130. Climatic analysis with September solstice shadow paths. Image by Author (2017)
- figure 131. Structural system of Building 1. Image by Author (2017)
- figure 132. Reference plan for Building 1. Image by Author (2017)
- figure 133. Structural system of Building 2. Image by Author (2017)
- figure 134. Reference plan for building 2. Image by Author (2017)
- figure 135. Trombe wall detail at scale 1 to 50. Sketch by Author (2017)
- figure 136. North-eastern elevation showing continuity between Trombe wall and external stair in elevation at scales 1 to 200 and 1 to 100. Sketch by Author (2017)
- figure 137. Building 2 cross-section showing passive ventilation strategy at scale 1 to 100. Sketch by Author (2017)
- figure 138. South-eastern elevation of building 2 showing Trombe wall sytem as implemented in the facade Sketch by Author (2017)
- figure 139. Trombe wall detail at scale 1 to 50 showing possibilities of implementation at either level. Sketch by Author (2017)
- figure 140. The implementation of geothermal earth-tubes (Author, 2017)
- figure 141. The implementation of Corobrik external angle 45 brick into building facade. Image by Author (2017)
- figure 142. Recessed brickwork as a means of solar control. Image by Author (2017)
- figure 143. Recessed brickwork and the effect on building 1's facade. Image by Author (2017)
- figure 144. Building 2 detail section through southern facade (author, 2017)
- figure 145. Building 1 baseline over/under-lit study (Sefaira, 2017 and edited by author)
- figure 146. Building 2 baseline over/under-lit study (Sefaira, 2017 and edited by author)
- figure 147. Rainwater harvesting strategy. Image by Author (2017)

## List of tables

- table 1. Rainwater collection. Table by Author (2017)



# Chapter 1

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## Introduction

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## 1.1 Introduction

Industry and Ecology have mostly had a mutually exclusive relationship for the last 250 years. The development of the steam engine in 1769 served as the trigger for industrialization (Krinke, 2001) and the mechanization of production processes whilst the perception of unobstructed progress was propelled by a willful ignorance of the legacy left on the natural environment. Although planet Earth and its resident ecology has since revealed its own limits on resource provision and pollution tolerance, the decades of unawareness on this issue have caused the “inexhaustible earth” mindset to gain tremendous momentum - a momentum proving difficult to halt and reverse. The need for this reversal is made prevalent by witnessing the legacy of Industrialization whether it is acidified streams, airborne toxins or soil pollution. Of course, industrialization has made major advances possible for society in terms of goods production and many other sectors and therefore it is not suggested that industrialization is inherently bad but rather that a certain callousness towards ecological matters have necessitated steering industry in a more sustainable direction.

However, by the term “Industrialization” much broader associations must be drawn than the extraction and processing of raw natural materials for the mechanized production of products. In fact, since the pre-industrial society was an agricultural society, it follows that the rapid growth in technology has led to the industrialization of agricultural and food systems as well (Millstone, et al., 2003). Although the advantages of mechanizing the agricultural and food systems have appealed to the human desire for convenience, efficiency and replicable standards, these very advantages often necessitate the monopoliza-

tion of the agricultural and food industries.

This separation between the producer and the consumer has never been farther although there has been a recent shift to bridge this divide as people realize the insensitive and domineering approach towards ecology (Crawford, 2012). The legacy also entails physical remains in our built environments that serve as a plethora of earlier built interventions around which, through which and in which design practitioners must work. Polluted natural resources such as water bodies and soil are also tangible remnants that require various remedial actions. Whether the legacy of industrialization is “tangible”, referring to artifacts and blighted landscapes in our cities or “intangible” referring to consumerist mindsets, the relationship between industry and ecology has traditionally been at odds and in need of restitution.

## 1.2 Background

The general issue addressed in this dissertation is the relationship between ecology and the legacy of industry. More specifically, it deals with the necessary restitution on a site where the processing of raw materials into a product has left a damaging legacy on the indigenous ecology. This issue can be witnessed in the old Johannesburg Gas Works site in Cottesloe, Johannesburg. The Gas Works epitomizes dominion over the natural environment and the persuasion that the Earth is limitlessly resilient in handling pollution brought about by industry. Since gas production at the plant had started in 1928, the Gas Work's impact on the natural environment has been pervasive and it's shutdown in 1988 is partly owing to concerns regarding its ecological impact that includes severe tar pollution within the soil (International, 2006).

The shutdown of the Gas Works was also owing to the inherent brevity and contingency of any particular industry. This dissertation investigates and understands ecology in reaches that extend to global issues and not merely to the immediate ecological issues of this site. On a global scale, the issue that pertains to industry and ecology that will be localized to this site is the manner in which the industrialized agriculture and food industry has put enormous pressure on ecology (especially oceanic fish stocks) to supply the demand of the world's growing population.

In terms of water demand, Africa uses more than 80% of its freshwater supply for agricultural purposes, more than the Americas and Asia (Agriculture, 2017). Furthermore, 2016 has been South Africa's driest year ever recorded and the country is yet to recover (Live, 2016). The urbanization rate and population growth rate of 2% per year of Johannesburg (City of Johannesburg 2016) as well as the depletion of freshwater and ecological resources places the pressure on industry in South Africa and the world to progress in a manner that illustrates the possibilities of a restituted mutually beneficial relationship between industry and ecology.

## 1.3 Urban Issue

The placement of the Johannesburg Gas Works may seem arbitrary considering its dense urban surroundings, but in the 1920s the site was chosen for its favourable topography that would render the site invisible from the affluent neighbourhoods of Parktown and Westcliff but visible from the poorer neighbourhoods of Cottesloe and Vrededorp (Lauferts le Roux & Mavunganidze, 2015). The Gasworks ceased gas production in 1988 and because of the rapid growth of Johannesburg to the North, this 14 hectare site sits isolated within the dense urban fabric surrounding it. Since the site is privately owned and hazardous to the public it is completely shut off from its surroundings.

Considering the large open space that the site currently occupies as well as its potential in terms of biodiversity (stemming from its location within the Braamfontein Spruit basin), the Gas Works site has tremendous potential to serve as an open green space within a dense urban environment where open spaces are typically fragmented, privatized or dangerous. However, its scale and location also make it a prime development opportunity and thus there is a tension regarding the site's next stage of development.

The pressure on the Gas Works site to be developed stems from its location within the future regional node of Milpark as part of a East-West business corridor. The potential of the site as a recreational open space stems from its location between Wits University, the University of Johannesburg and John Orr Technical school. Therefore, the urban issue deals with the pressure to meet the demand of development as well as open ecological space in such a way that the Johannesburg Gas Works site serves as a catalytic precedent in showcasing the harmony between these two necessities that are typically at odds in Johannesburg. If this can be done in a way that celebrates the unique heritage of this particular site, the people of Johannesburg can take recognition of the unique industrial inception of their city.



## 1.4

## Architectural Issue

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“Architecture is the instrument for manipulating our perception of the world in this way. It is by means of architecture that an architect mediates between the person and their surroundings...” (Unwin, 2015:108-109). Every work of architecture communicates its attitude towards its natural environment and this is especially the case in the Johannesburg Gas Works. Since the Gas Works employed advanced technology for its day, the architecture is a proud authoritative showcasing of its identity as a pioneer of industry in South Africa.

The proud showcasing of progress and industry makes the architecture Futurist in its inception and rhetoric. The rhetoric of futurism in architecture is to illustrate a vision - a vision of a modernized, industrial future where the innovation of man has conquered his environment. This, of course has been found to be unsustainable. Inevitably, the vision of smoke-filled skies as depicted in Art-Deco futurist reliefs are no longer a desirable vision for the future (Lauferts le Roux & Mavunganidze, 2015). The mono-functional purpose of the Gas Works and the redundancy of the coal to gas process has given the buildings on site the inevitable destiny of becoming historical artifacts.

The architectural issue is thus two-fold. Firstly, these artifacts and remnants of the industrial Revolution in South Africa have to be understood for their heritage significance and appropriately commemorated and secondly, the architecture must communicate a more resilient and responsible industry in line with the illustration of a future vision.

The architectural issue has become a new “futurism” - the new vision for the future. A future vision informed by a much more wholesome view of the planet we build on and the sustainability of mankind's residence here.

## 1.5 Research Questions

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The question that the research will aim to answer is: Can architecture, through both its programmatic and spatial realization, sustain and illustrate the restituted relationship between ecology and industry? The sub-question to this will be: Can this be done in such a way that the architecture becomes didactic - forming a connection in the mind of the public between the heritage of industry and the new industry? Can new architectural interventions assist in binding spaces disrupted by demolition to restore order and meaning to post-industrial places?

The question more specific to this dissertation is site specific. The most ecologically sensitive location on the Gas Works site are the holes where the first two gas tanks were located. These holes symbolize the damaging legacy of industry on the ecology of the site and it therefore has the potential to narrate a restored relationship as a powerful statement of restitution. Can architecture and appropriate programmes make this restitution possible within the location where the holes are located? The sub-question to this is: can this be done in such a way that the industrial heritage of the site as well as the ecological history of the site is overlaid as a palimpsest through which memory of damage and industry is displayed?

## 1.6

## Research Methods

### 1.4.1 ASSUMPTIONS

The scheme will work with two basic assumptions-architectural and operational. The architectural assumption will be that the gas storage tanks on site can be re appropriated and are no longer vital for storing gas. Also, it is assumed that the gas distribution pipeline can be moved to a different location on the site and that the only buildings worth keeping based on a heritage assessment are the two red brick retort buildings, the coal bunkers, Carburetted Water Gas plants and the foundations of the three tanks. The operational assumption is that Egoli Gas can move offices to another location on the site and that the company has made the site available for development.

### 1.4.2 RESEARCH METHODOLOGY

The research will be conducted through visits to the site and documenting the condition of the footprints of the No.1 and No.2 gas tanks. Theory will be sourced that pertains to the ecological restoration of post-industrial landscapes. This will be sourced by desktop research and literature regarding post-industrial natural spaces. Appropriate theories will be sourced that pertain to industrial heritage, restoration and commemoration in architecture and the recall of memory of place in new architectural or landscape interventions. Design research will then subsequently involve architectural model explorations on the site to represent the conclusions found in the theory.

### 1.4.3 DELIMITATIONS & LIMITATIONS

This architectural proposal is delimited to a specific zone within the entire Egoli Gas site. Similar issues in other locations on the site are not addressed since the project in this dissertation is one of four architectural proposals and one landscape architecture proposal that specifically deals with the remediation of a large portion of the site. The chosen site has the potential to communicate the relationship between ecology and the heritage of industry most clearly. Although the scheme incorporates the gas distribution plant as a museum, other buildings of significant heritage value are not addressed since they fall within the territory of other proposals.

Other limitations within this scheme deal with the rehabilitation of the natural environment. Since the site of intervention is affected by tar pollution there are certain areas in which architectural interventions are not possible or where the interventions will be strictly guided by the remediative processes of tar pollution.