

PROJECT NO. 33000.21: LAND FORMALIZATION: SPLUMA PROCESS

WATER SERVICES REPORT

PELLA DEVELOPMENT

Revisions				
No	Date	Compiled	Revised	Description
0	2019/05/15	Mr. P. Jonker	EM Koegelenberg	WATER SERVICES REPORT

SUBMITTED BY:

BVi Consulting Engineers

April 2019



BVi Regional Office
17A Keerom Street
SPRINGBOK 8240
Tel: +27 27-712 9990
Fax: +27 27-712 9991
E-mail: spk@bvinc.co.za



First Issue Date:	5/15/2019	Compiled by:	P Jonker
Date:	5/15/2019	Revised by:	EM Koegelenberg

REVIEWED BY CLIENT (MARK APPROPRIATE BOX WITH AN "X"):

<input type="checkbox"/>	A	REVIEWED AND ACCEPTED.
<input type="checkbox"/>		REVIEWED AND ACCEPTED AS NOTED.
<input type="checkbox"/>	B	WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES AS INDICATED. REVISE & RE-SUBMIT FOR REVIEW.
<input type="checkbox"/>		REVISE AND RE-SUBMIT FOR REVIEW.
<input type="checkbox"/>	C	WORK MAY NOT PROCEED.
<input type="checkbox"/>	D	NO FURTHER REVIEW REQUIRED.

CLIENT APPROVAL:

Name:

Designation:

Signature:

Date:

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	5
4. COMMUNITY PROFILE	5
4.1 POPULATION DATA	5
5. DESIGN GUIDELINES	5
6. PROJECTED WATER DEMAND AND PEAK FLOWS	6
6.1 PROJECTED WATER DEMAND	6
6.2 PROJECTED PEAK FLOW	7
7. EXISTING WATER INFRASTRUCTURE	7
7.1 BULK SUPPLY	7
7.2 RETICULATION NETWORK	7
7.3 STORAGE RESERVOIR	7
8. EVALUATION OF THE EXISTING WATER SUPPLY SYSTEM	8
8.1 EXISTING BULK SUPPLY: SEDIBENG WATER BOARD	8
8.2 EXISTING RETICULATION NETWORK	8
8.3 EXISTING STORAGE CAPACITY	8
9. REQUIRED STORAGE CAPACITY	8
10. PLANNED INFRASTRUCTURE	9
10.1 BULK STORAGE CAPACITY	9
10.2 INTERNAL RETICULATION NETWORK	9
11. RECOMMENDATIONS	9
12. GENERAL	11

1. EXECUTIVE SUMMARY

A report was requested by the Client on the available bulk water capacity for the town Pella. The Client wanted to be informed should limitations exist for the planned developments in order for them to take immediate action to address the limitations.

The existing water infrastructure network requires the following upgrading of works:

- Construction of a 360 kℓ Storage Reservoir

The identified scope of works must be implemented immediately, in order to ensure the new development is possible.

The following upgrade is recommended but not required:

- Installation of an additional pipeline from the reservoir to the area of the new development

2. INTRODUCTION

Vedanta (hereinafter referred to as the “Client”) appointed BVi Consulting Engineers (hereinafter referred to as the “Engineer”) to assist them with their SPLUMA application processes under their land formalizing processes. A Water Services Report is one of the mandatory requirements under the SPLUMA application. This report will only focus on the Water Service for Pella, Northern Cape.

A report was requested by the Client on the available bulk water capacity. The Client wanted to be informed should limitations exist for the planned developments in order for them to take immediate action to address the limitations. This report will only focus on the available bulk supply capacity limited to concept detail.

4. COMMUNITY PROFILE

4.1 POPULATION DATA

According to information from Khâi-Ma Municipality, the resident figures of Pella are shown in Table 1:

Table 1: Population Data of Pella

Description of Items	Current 2019		Additional Development (118 plots)	
	Plots	Population	Plots	Population
1. Total plots	700	2520	818	2945

There are currently 700 households with a population of 2520 persons in Pella. The planned development will consist of 118 additional plots. With the development taken into account the projected population will be approximately 2945 in the near future.

5. DESIGN GUIDELINES

The following design guidelines are adopted to determine the existing and future demands of the town Pella:

- Average persons per dwelling unit 3.6
- Consumption per person per day (Household) 100 l/c/day

- Peak factor in summer peak consumption 1.5
- Water losses in the network 10%
- Industrial water demand 10%
- Minimum required pressure during instantaneous peak 24 m

These guidelines and assumptions are based on the following design codes:

- Technical Guidelines for the Development of Water and Sanitation Infrastructure, Second Edition (2004), Department of Water Affairs and Forestry.
- Guidelines for Human Settlement Planning and Design, Building and Construction Technology, Volume 2, CSIR (The Red Book).

6. PROJECTED WATER DEMAND AND PEAK FLOWS

6.1 PROJECTED WATER DEMAND

Table 2 summarises the projection of the current water demand and the water demand after the new development, using the design parameters as discussed earlier. The projected water demand also takes into account the industrial demand of 10%. The water losses in the network are assumed to be approximately 10%.

Table 2: Projected Water Demand

YEAR	POPULATION	OCCUPIED PLOTS	NORMAL WATER DEMAND (Kℓ)	INDUSTRIAL DEMAND AND CONVEYANCE LOSSES : 20 % (Kℓ)	ANNUAL AVERAGE DAILY DEMAND (Kℓ)	SUMMER PEAK PERIOD: WATER DEMAND (Kℓ)
2019	2 520	700	252	50.4	302	454
After development	2 945	818	294	58.9	353	530

6.2 PROJECTED PEAK FLOW

Table 3 summarises the peak flow factor of 1.5 during peak periods in the summer for the current population and the population after the new development.

Table 3: Projected Peak Flow

Year	Projected Peak Flow (ℓ/s)		
	AADD (kℓ/day)	Average Flow (ℓ/s)	Peak period flow (ℓ/s)
2019	302	3.50	5.25
Future Development	353	4.09	6.14

7. EXISTING WATER INFRASTRUCTURE

7.1 BULK SUPPLY

The water is abstracted from the Orange River, purified and then pumped by Sedibeng Water Board to Aggeneys. A pipeline is connected to the Sedibeng pipe that is connected to a break-pressure reservoir. The water is distributed from the break-pressure reservoir to the existing municipal reservoir, from where it is distributed to the reticulation network in Pella, by means of gravitational flow.

7.2 RETICULATION NETWORK

The existing reticulation network of Pella consists of a combination of uPVC and HDPE pipelines. All existing households are connected to the existing reticulation network in order to be supplied with potable water.

7.3 STORAGE RESERVOIR

Pella water storage capacity consists of one (1) concrete reservoir with a storage capacity of 350kℓ. According to the “Guidelines for Human Settlement Planning and Design”, 48 hours of water storage is prescribed for bulk storage.

8. EVALUATION OF THE EXISTING WATER SUPPLY SYSTEM

8.1 EXISTING BULK SUPPLY: SEDIBENG WATER BOARD

The existing Water Treatment Plant located at Pelladrift was originally designed for a capacity of 12 M³/day. The towns of Pella, Pofadder and Aggeneys are supplied with water from the treatment plant located in Pelladrift. The Client is currently busy expanding the mining activities at Gamsberg Mine which requires additional water and therefore upgraded the Water Treatment Plant located in Pelladrift with an additional capacity of 15M³/day, in order to make provision for the water demand that is caused due to the expansion of the mining activities.

The existing water Treatment Plant located in Pelladrift will be sufficient to provide water for the towns of Pella, Pofadder and Aggeneys.

8.2 EXISTING RETICULATION NETWORK

The existing reticulation network was analysed to determine if any pressure failures are present in the existing water reticulation network of the town Pella. It was determined that certain parts of the high lying areas, especially to the South-West of the town experience low pressures during peak flow periods of less than 20m pressure.

8.3 EXISTING STORAGE CAPACITY

The existing Municipal reservoir located in Pella has a capacity of 350kℓ. This capacity is insufficient to supply the town of Pella with water for 24 hours during peak demand periods and also to provide the required 48 hours AADD storage capacity.

9. REQUIRED STORAGE CAPACITY

The required storage capacity for the current demand and the demand after the new development is shown in Table 4.

Table 4: Required Storage Capacity

Year	AADD (kℓ/day)	Storage Capacity (kℓ) (48 Hours Period of AADD)
2019	302	605
Future Development	353	707

As mentioned in section 8.3, the current storage capacity is already insufficient for peak demand periods, e.g. during Summer times. In addition, the current storage capacity is also insufficient to provide storage for 48 hours of AADD. Fortunately, the feed from Sedibeng is relatively reliable and the flow from the Sedibeng pipeline could refill the reservoir during the day in high demand periods.

However, the Guidelines from Human Settlement Planning and design, states that towns must have at least 48 hours AADD storage capacity. Therefore, an additional storage reservoir of at least 360kℓ will be required to provide sufficient storage for the current demands and accommodate the new development of 118 plots.

10. PLANNED INFRASTRUCTURE

The following scope of works needs to be executed, in order to address the existing shortfalls experienced within the existing bulk supply system of the town Pella and also to make provision for the new 118 plots development.

10.1 BULK STORAGE CAPACITY

For the bulk storage capacity to be able to accommodate the new development, the construction of a 360kℓ storage reservoir is required.

10.2 INTERNAL RETICULATION NETWORK

As discussed earlier, there are certain areas in the South-West of the town where the pressures drop below 20 m during peak periods. This is also the area where the new development is planned. In an attempt to prevent the pressures dropping below 20 m, it is recommended that a pipeline with a diameter of at least 110mm be provided directly from the reservoir to the new development area. Refer to Figure 1.

11. RECOMMENDATIONS

The findings and conclusion in this report are based on a preliminary desktop study, as well as site visits. The following are required/recommend in order to ensure the new development is possible without providing undue strain on the water network of the town Pella:

- Required: Construction of a proposed 360kl storage reservoir.
- Recommended: The construction of an additional section of 110mm dia. from the reservoir directly to the area where the new development will be. Refer to Figure 1.

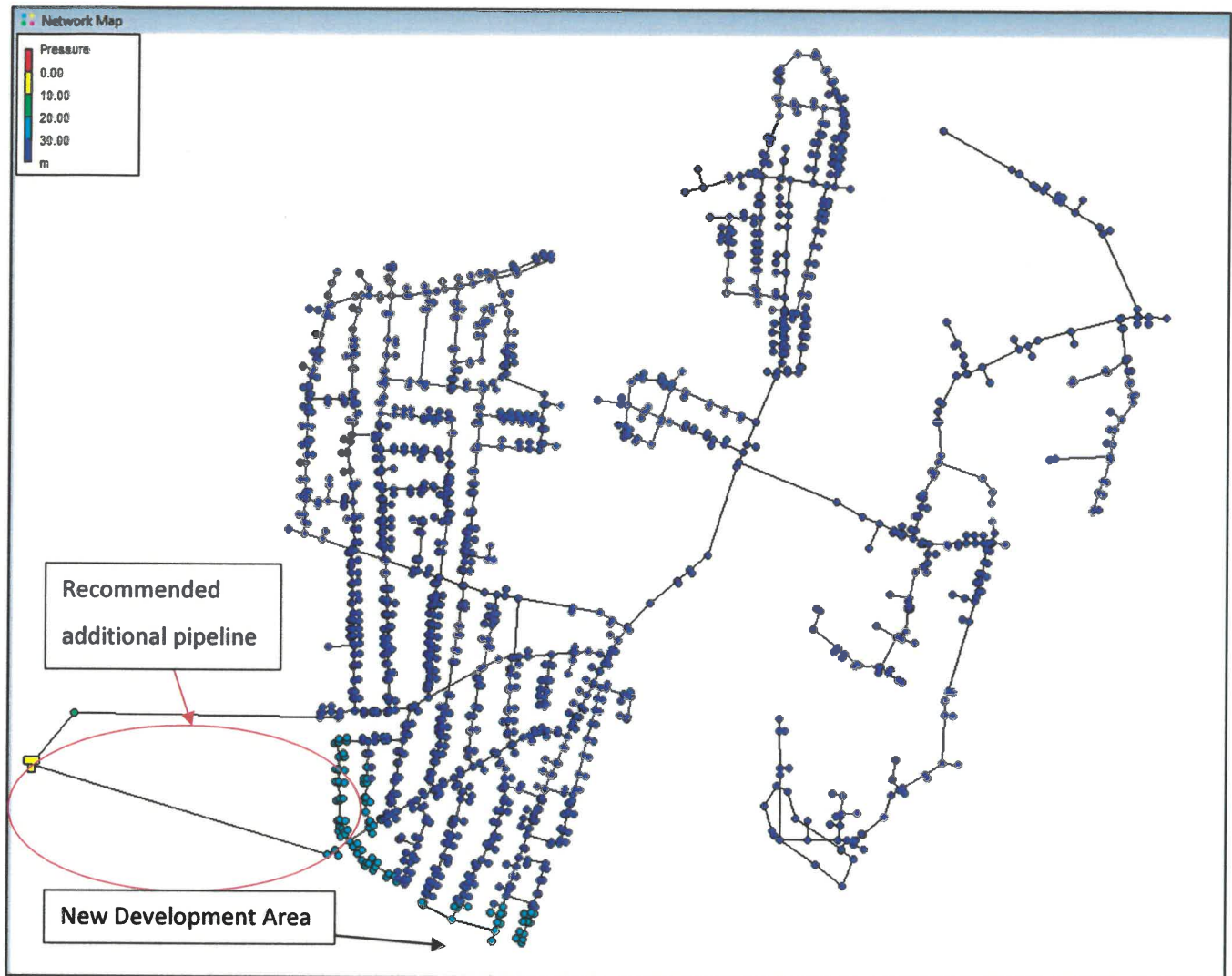


Figure 1: Pella Water Network

12. GENERAL

This report was compiled by BVi Consulting Engineers at the request of Vedanta Resources. Please contact us at this office if any enquiries arise.

Signed by:



.....
EM Koegelenberg Pr. Eng.

.....15/05/2019.....

Date

PROJECT NO. 33000.21: LAND FORMALIZATION: SPLUMA PROCESS
WATER SERVICES REPORT
PELLA DEVELOPMENT

Revisions				
No	Date	Compiled	Revised	Description
0	2019/05/15	Mr. P. Jonker	EM Koegelenberg	WATER SERVICES REPORT

SUBMITTED BY:

BVi Consulting Engineers

April 2019



BVi Regional Office
17A Keerom Street
SPRINGBOK 8240
Tel: +27 27-712 9990
Fax: +27 27-712 9991
E-mail: spk@bvinc.co.za



First Issue Date:	5/15/2019	Compiled by:	P Jonker
Date:	5/15/2019	Revised by:	EM Koegelenberg

REVIEWED BY CLIENT (MARK APPROPRIATE BOX WITH AN "X"):

<input type="checkbox"/>	A	REVIEWED AND ACCEPTED.
<input type="checkbox"/>		REVIEWED AND ACCEPTED AS NOTED.
<input type="checkbox"/>	B	WORK MAY PROCEED SUBJECT TO INCORPORATION OF CHANGES AS INDICATED. REVISE & RE-SUBMIT FOR REVIEW.
<input type="checkbox"/>		REVISE AND RE-SUBMIT FOR REVIEW.
<input type="checkbox"/>	C	WORK MAY NOT PROCEED.
<input type="checkbox"/>	D	NO FURTHER REVIEW REQUIRED.

CLIENT APPROVAL:

Name:

Designation:

Signature:

Date:

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY	4
2. INTRODUCTION	5
4. COMMUNITY PROFILE	5
4.1 POPULATION DATA	5
5. DESIGN GUIDELINES	5
6. PROJECTED WATER DEMAND AND PEAK FLOWS	6
6.1 PROJECTED WATER DEMAND	6
6.2 PROJECTED PEAK FLOW	7
7. EXISTING WATER INFRASTRUCTURE	7
7.1 BULK SUPPLY	7
7.2 RETICULATION NETWORK	7
7.3 STORAGE RESERVOIR	7
8. EVALUATION OF THE EXISTING WATER SUPPLY SYSTEM	8
8.1 EXISTING BULK SUPPLY: SEDIBENG WATER BOARD	8
8.2 EXISTING RETICULATION NETWORK	8
8.3 EXISTING STORAGE CAPACITY	8
9. REQUIRED STORAGE CAPACITY	8
10. PLANNED INFRASTRUCTURE	9
10.1 BULK STORAGE CAPACITY	9
10.2 INTERNAL RETICULATION NETWORK	9
11. RECOMMENDATIONS	9
12. GENERAL	11

1. EXECUTIVE SUMMARY

A report was requested by the Client on the available bulk water capacity for the town Pella. The Client wanted to be informed should limitations exist for the planned developments in order for them to take immediate action to address the limitations.

The existing water infrastructure network requires the following upgrading of works:

- Construction of a 360 kl Storage Reservoir

The identified scope of works must be implemented immediately, in order to ensure the new development is possible.

The following upgrade is recommended but not required:

- Installation of an additional pipeline from the reservoir to the area of the new development

2. INTRODUCTION

Vedanta (hereinafter referred to as the “Client”) appointed BVi Consulting Engineers (hereinafter referred to as the “Engineer”) to assist them with their SPLUMA application processes under their land formalizing processes. A Water Services Report is one of the mandatory requirements under the SPLUMA application. This report will only focus on the Water Service for Pella, Northern Cape.

A report was requested by the Client on the available bulk water capacity. The Client wanted to be informed should limitations exist for the planned developments in order for them to take immediate action to address the limitations. This report will only focus on the available bulk supply capacity limited to concept detail.

4. COMMUNITY PROFILE

4.1 POPULATION DATA

According to information from Khâi-Ma Municipality, the resident figures of Pella are shown in Table 1:

Table 1: Population Data of Pella

Description of Items	Current 2019		Additional Development (118 plots)	
	Plots	Population	Plots	Population
1. Total plots	700	2520	818	2945

There are currently 700 households with a population of 2520 persons in Pella. The planned development will consist of 118 additional plots. With the development taken into account the projected population will be approximately 2945 in the near future.

5. DESIGN GUIDELINES

The following design guidelines are adopted to determine the existing and future demands of the town Pella:

- Average persons per dwelling unit 3.6
- Consumption per person per day (Household) 100 l/c/day

- Peak factor in summer peak consumption 1.5
- Water losses in the network 10%
- Industrial water demand 10%
- Minimum required pressure during instantaneous peak 24 m

These guidelines and assumptions are based on the following design codes:

- Technical Guidelines for the Development of Water and Sanitation Infrastructure, Second Edition (2004), Department of Water Affairs and Forestry.
- Guidelines for Human Settlement Planning and Design, Building and Construction Technology, Volume 2, CSIR (The Red Book).

6. PROJECTED WATER DEMAND AND PEAK FLOWS

6.1 PROJECTED WATER DEMAND

Table 2 summarises the projection of the current water demand and the water demand after the new development, using the design parameters as discussed earlier. The projected water demand also takes into account the industrial demand of 10%. The water losses in the network are assumed to be approximately 10%.

Table 2: Projected Water Demand

YEAR	POPULATION	OCCUPIED PLOTS	NORMAL WATER DEMAND (Kℓ)	INDUSTRIAL DEMAND AND CONVEYANCE LOSSES : 20 % (Kℓ)	ANNUAL AVERAGE DAILY DEMAND (Kℓ)	SUMMER PEAK PERIOD: WATER DEMAND (Kℓ)
2019	2 520	700	252	50.4	302	454
After development	2 945	818	294	58.9	353	530

6.2 PROJECTED PEAK FLOW

Table 3 summarises the peak flow factor of 1.5 during peak periods in the summer for the current population and the population after the new development.

Table 3: Projected Peak Flow

Year	Projected Peak Flow (ℓ/s)		
	AADD (kℓ/day)	Average Flow (ℓ/s)	Peak period flow (ℓ/s)
2019	302	3.50	5.25
Future Development	353	4.09	6.14

7. EXISTING WATER INFRASTRUCTURE

7.1 BULK SUPPLY

The water is abstracted from the Orange River, purified and then pumped by Sedibeng Water Board to Aggeneys. A pipeline is connected to the Sedibeng pipe that is connected to a break-pressure reservoir. The water is distributed from the break-pressure reservoir to the existing municipal reservoir, from where it is distributed to the reticulation network in Pella, by means of gravitational flow.

7.2 RETICULATION NETWORK

The existing reticulation network of Pella consists of a combination of uPVC and HDPE pipelines. All existing households are connected to the existing reticulation network in order to be supplied with potable water.

7.3 STORAGE RESERVOIR

Pella water storage capacity consists of one (1) concrete reservoir with a storage capacity of 350kℓ. According to the “Guidelines for Human Settlement Planning and Design”, 48 hours of water storage is prescribed for bulk storage.

8. EVALUATION OF THE EXISTING WATER SUPPLY SYSTEM

8.1 EXISTING BULK SUPPLY: SEDIBENG WATER BOARD

The existing Water Treatment Plant located at Pelladrift was originally designed for a capacity of 12 Mℓ/day. The towns of Pella, Pofadder and Aggeneys are supplied with water from the treatment plant located in Pelladrift. The Client is currently busy expanding the mining activities at Gamsberg Mine which requires additional water and therefore upgraded the Water Treatment Plant located in Pelladrift with an additional capacity of 15Mℓ/day, in order to make provision for the water demand that is caused due to the expansion of the mining activities.

The existing water Treatment Plant located in Pelladrift will be sufficient to provide water for the towns of Pella, Pofadder and Aggeneys.

8.2 EXISTING RETICULATION NETWORK

The existing reticulation network was analysed to determine if any pressure failures are present in the existing water reticulation network of the town Pella. It was determined that certain parts of the high lying areas, especially to the South-West of the town experience low pressures during peak flow periods of less than 20m pressure.

8.3 EXISTING STORAGE CAPACITY

The existing Municipal reservoir located in Pella has a capacity of 350kℓ. This capacity is insufficient to supply the town of Pella with water for 24 hours during peak demand periods and also to provide the required 48 hours AADD storage capacity.

9. REQUIRED STORAGE CAPACITY

The required storage capacity for the current demand and the demand after the new development is shown in Table 4.

Table 4: Required Storage Capacity

Year	AADD (kℓ/day)	Storage Capacity (kℓ) (48 Hours Period of AADD)
2019	302	605
Future Development	353	707

As mentioned in section 8.3, the current storage capacity is already insufficient for peak demand periods, e.g. during Summer times. In addition, the current storage capacity is also insufficient to provide storage for 48 hours of AADD. Fortunately, the feed from Sedibeng is relatively reliable and the flow from the Sedibeng pipeline could refill the reservoir during the day in high demand periods.

However, the Guidelines from Human Settlement Planning and design, states that towns must have at least 48 hours AADD storage capacity. Therefore, an additional storage reservoir of at least 360kℓ will be required to provide sufficient storage for the current demands and accommodate the new development of 118 plots.

10. PLANNED INFRASTRUCTURE

The following scope of works needs to be executed, in order to address the existing shortfalls experienced within the existing bulk supply system of the town Pella and also to make provision for the new 118 plots development.

10.1 BULK STORAGE CAPACITY

For the bulk storage capacity to be able to accommodate the new development, the construction of a 360kℓ storage reservoir is required.

10.2 INTERNAL RETICULATION NETWORK

As discussed earlier, there are certain areas in the South-West of the town where the pressures drop below 20 m during peak periods. This is also the area where the new development is planned. In an attempt to prevent the pressures dropping below 20 m, it is recommended that a pipeline with a diameter of at least 110mm be provided directly from the reservoir to the new development area. Refer to Figure 1.

11. RECOMMENDATIONS

The findings and conclusion in this report are based on a preliminary desktop study, as well as site visits. The following are required/recommend in order to ensure the new development is possible without providing undue strain on the water network of the town Pella:

- Required: Construction of a proposed 360kl storage reservoir.
- Recommended: The construction of an additional section of 110mm dia. from the reservoir directly to the area where the new development will be. Refer to Figure 1.

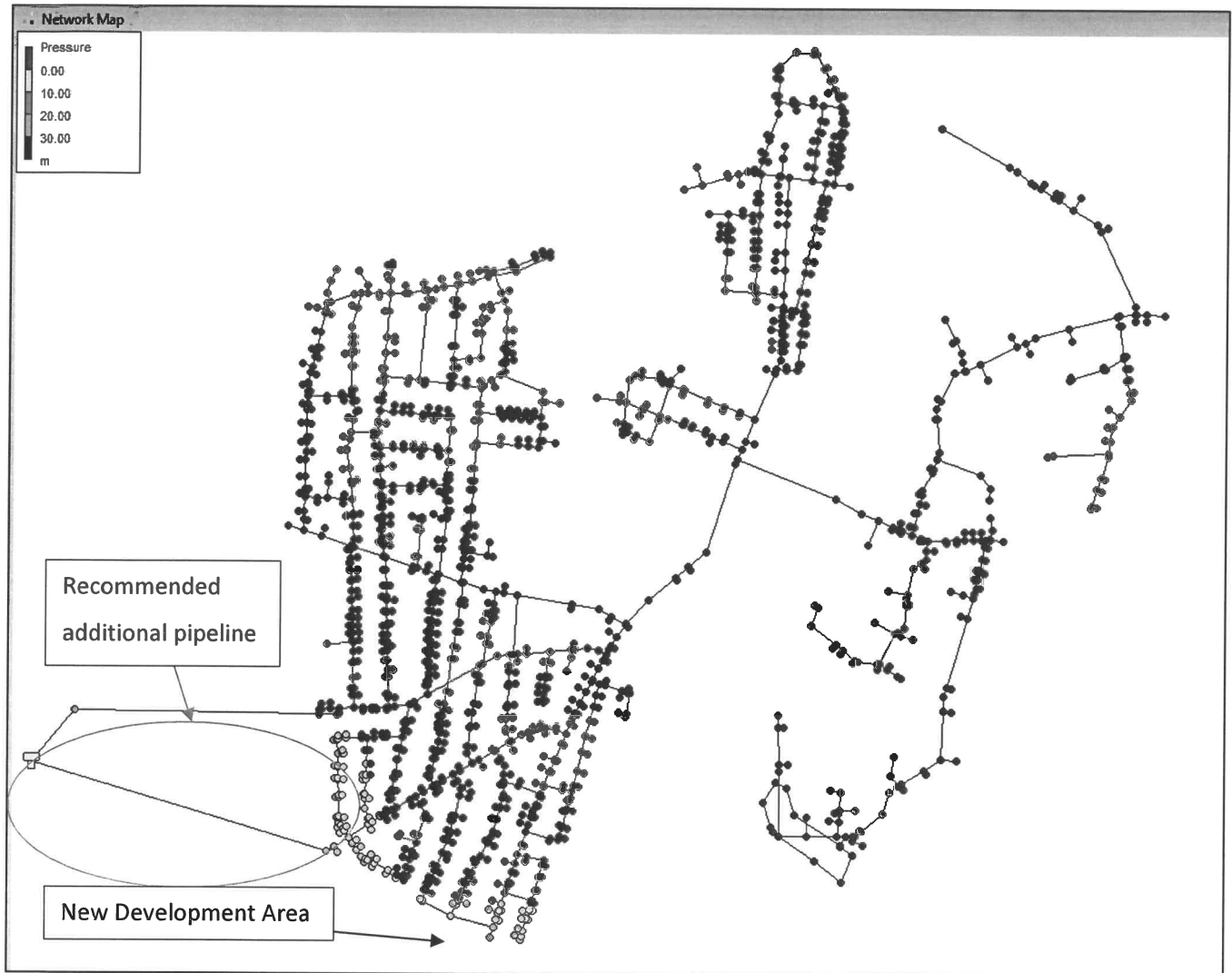
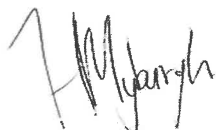


Figure 1: Pella Water Network

12. GENERAL

This report was compiled by BVi Consulting Engineers at the request of Vedanta Resources. Please contact us at this office if any enquiries arise.

Signed by:



.....
EM Koegelenberg Pr. Eng.

.....15/05/2019.....

Date

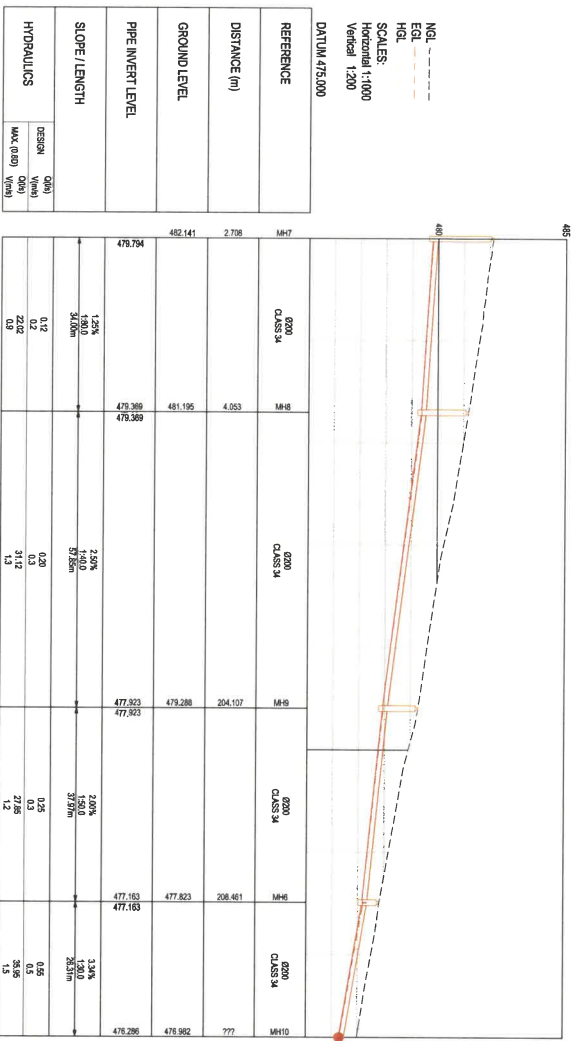
The first part of the paper discusses the importance of the research and the objectives of the study. It then presents a literature review of the existing research on the topic. The methodology section describes the research design and the data collection process. The results section presents the findings of the study, and the conclusion section summarizes the main findings and provides recommendations for future research.

The study was conducted in a laboratory setting, and the data were collected using a series of questionnaires and interviews. The results of the study show that there is a significant relationship between the variables studied, and the findings are consistent with the previous research. The study also identified some limitations and suggested areas for future research.

The study was conducted in a laboratory setting, and the data were collected using a series of questionnaires and interviews. The results of the study show that there is a significant relationship between the variables studied, and the findings are consistent with the previous research. The study also identified some limitations and suggested areas for future research.

[illegible]

NOTES / COMMENTS		APPROVED BY CONSULTANT		DATE		REVISION DESCRIPTION	
DATE	FORMED DATE	REVISION					
1 JAN 2018	A1	A					
CITY ENGINEER / CLIENT		REG. NO.	DATE				
ALLOTMENTS CODE							
A/E / J - APPROVE TENDER							
U.S. / J - TENDER NUMBER							
Z / J - A/E NAME							
AS-BUILT							
INFO ONLY							
PRELIMINARY							
1 JAN 2018							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							
DATE							
DRAWN BY							
CHECKED BY							
DATE							
PROJECT							
DRAWING TITLE							
SHEET NO.							
TOTAL SHEETS							
SCALE							
PROJECT NO.							
SHEET NO.							



NOTES: 1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE STATED. 2. THE CLIENT IS RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS. 3. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE AERIAL PHOTOGRAPHY OR THE EXISTING UTILITIES SHOWN. 4. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE GROUND LEVEL DATA. 5. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PIPE INVERT LEVEL DATA. 6. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE HYDRAULICS DATA. 7. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE DATUM DATA. 8. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE SCALE DATA. 9. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE DRAWING DATA. 10. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 11. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 12. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 13. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 14. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 15. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 16. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 17. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 18. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 19. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 20. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE PROJECT DATA. 21. THE DESIGNER IS NOT RESPONSIBLE FOR THE ACCURACY OF THE CLIENT DATA. 22. THE DESIGNER IS NOT RESPONS

the 'information' and 'communication' fields. The 'information' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'communication' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information studies' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication studies' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication studies' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication studies' field is defined as:

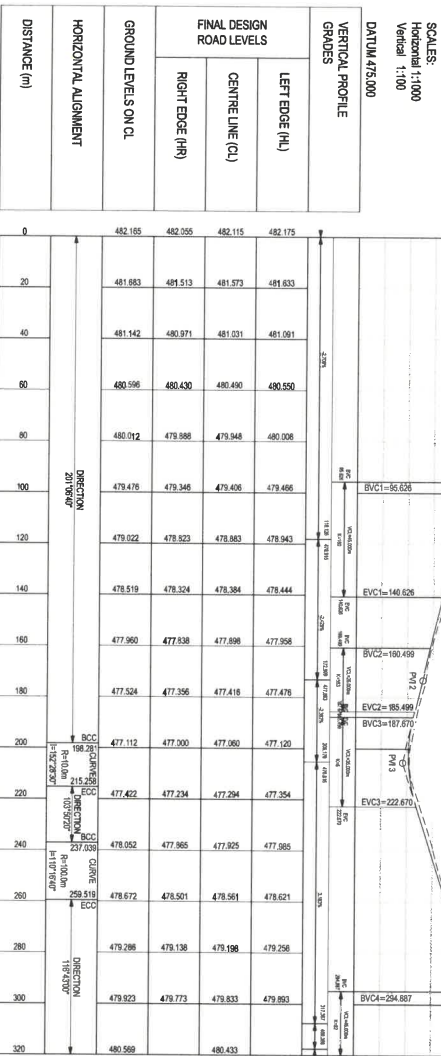
...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication studies' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)

The 'information science and communication studies' field is defined as:

...the study of the nature, creation, organisation, storage, retrieval, dissemination and use of information and communication, and the social, cultural, economic and political contexts in which these activities take place. (p. 1)



DRAWING NOT PRINTED TO SCALE REDUCED FROM A1 TO A3.

DATE: 1 Jun 2018 **SCALE:** A1 **REVISION:** 0

PROJECT: PELLA DEVELOPMENT **STREET 1:** LONG SECTION **33000.12-110-01** **0** **01/06/2018**

APPROVED BY: [Signature] **DATE:** [Date]

CLIENT: vedanta

COMPANY: bvi

CEQA: [Checkboxes]

DESIGNED BY: [Name] **CHECKED BY:** [Name] **DATE:** [Date]

ENGINEER/TECHNOLOGIST: [Name] **REG. NO.:** [Number] **DATE:** [Date]

SCALE: 1:100 **DATE:** [Date]

PROJECT: PELLA DEVELOPMENT **STREET 1:** LONG SECTION **33000.12-110-01** **0** **01/06/2018**