



Inglés I - Skills Integration Project

Inglés I UTN FRP

Skills Integration Project

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Improvements in a Sewage Network: Discussion of the Creation of a Water Waste Pumping Station in María Grande

1. Introduction

At present, María Grande has two sewage treatment pools which are at surface level. However, a neighborhood called Santa Ana is at a lower level than these pools. For this reason, this neighborhood is not connected to the sewage network.

The purpose of the presentation is to describe the problems that the Santa Ana neighborhood has to connect their sewage pipelines to the sewage network of Maria Grande. I will analyze the problems to propose a solution. It is feasible proposal for the city.

Firstly, I am going to describe the context of the city and explain the problem. Next, I am going to present pictures and describe these to later explain the causes of the problem and the consequences this problem produces. After this, I am going to propose a solution to the problem and describe it with its negative and positive aspects. Finally, I am going to refer to the conclusion about the way the solution would help solve the problem.

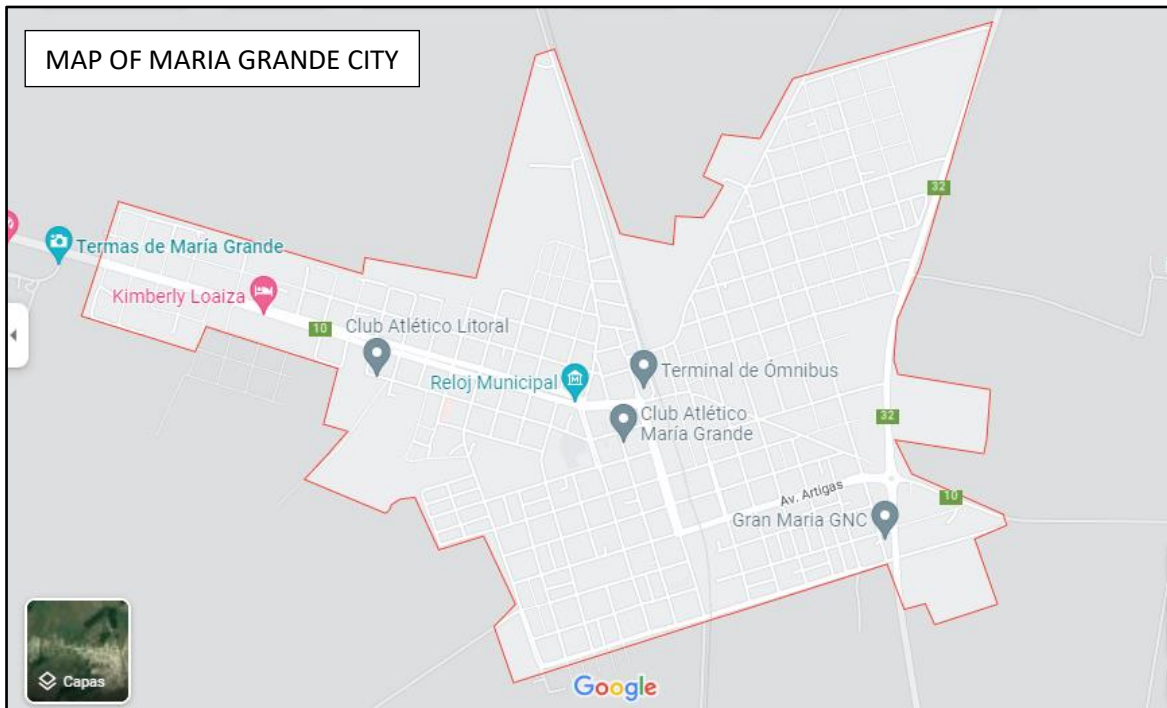
2. Problem Definition and Analysis

2.1. Description of the Context

María Grande is a city in the Entre Rios province and it is located 60 km away from the capital of the province. This proximity is very important because the city is a tourist attraction. There are approximately 10,000 residents but the number increases during peak tourist seasons.



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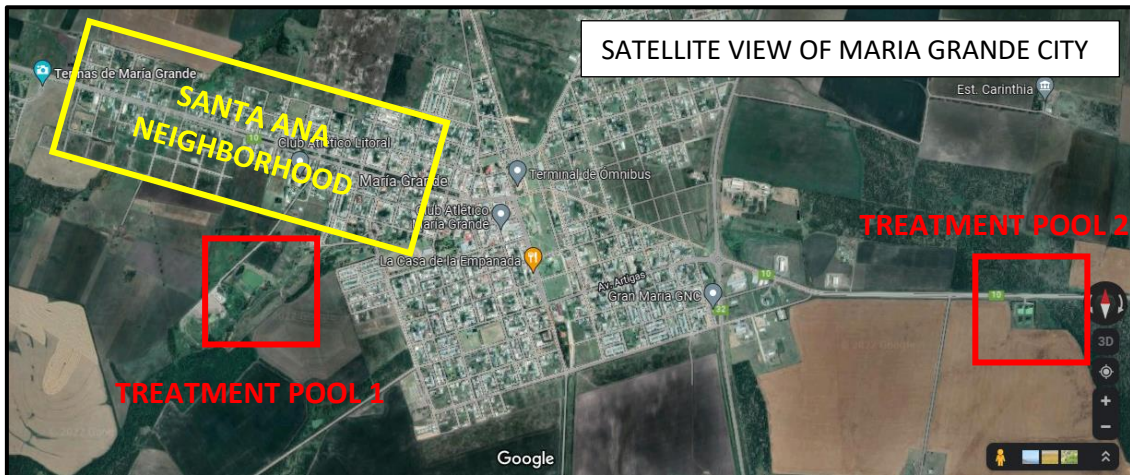
In the center of the city, there is a municipal clock and it is a reference point for everybody. There are many public buildings around it, for example, the Town Hall, the Nación Bank, a police station and the prison. There are many shops too; for example, a pharmacy, an insurance company, among others.





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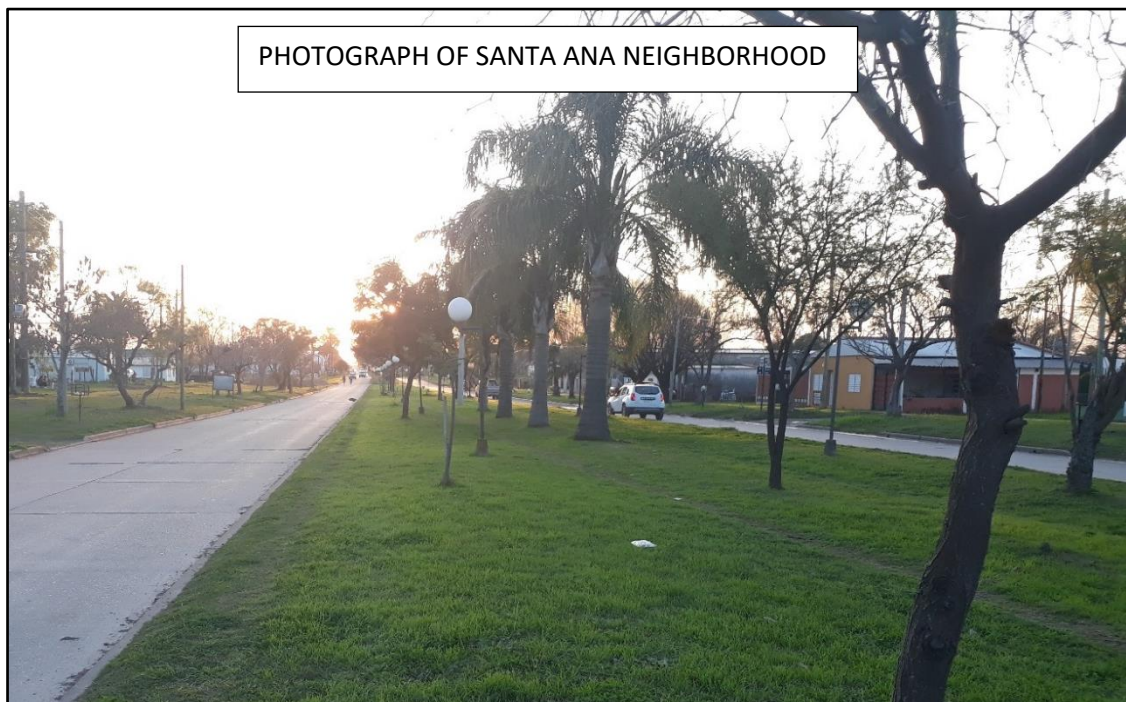
María Grande is approximately at about 90 meters above sea level. However, in the city, there are two treatment pools because there are some variations in ground level. These pools are on the outskirts of the city and the waste of the different neighborhoods goes to the pool that is close to them.



2.2. Problem Statement

Now, I am going to talk about the problem that María Grande has. In the north of the city, there is a neighborhood called Santa Ana. A part of this neighborhood is less than 90 meters above sea level. That is, it is approximately at about 86 meters above sea level. The closest pool it is at a higher level than this level.

In this neighborhood, almost all of the residents have a cesspool for their waste in their properties. When these cesspools are full, the residents have to call the municipal septic truck and it takes away their body waste. A few residents, however, release their waste on public land. For this reason, a new Water waste Pumping Station should be built in María Grande.





Inglés I - Skills Integration Project

2.3. Description of scenes that help picture the problematic situation

This photograph has been taken in a part of the Santa Ana neighborhood. You can see Argentina Avenue, which is a boulevard, so there are a lot of trees and lamp posts. It is usually busy because there is a thermal water park on this way.

On both sides of this avenue there are many houses but this area is not very crowded. The place is one of the parts that is at lower surface level in the city so the value of the land is low if it is compared with other land in the city.



This is another photo of the neighborhood. We cannot see the ground level difference there is in this area. This place also has fill dirt. For these reasons, this place is prone to flooding. We can see that in the center, there is a little puddle because it has been raining.

2.4. Identification and analysis of causes or factors that give rise to the problem

Now, I am going to analyze the causes of this problem. The functioning principle of the sewage network for conducting the waste is gravity. For the correct functioning, it is necessary for the sewage pipeline to have a 2% gradient. This is a minimum slope for the liquid and the solid waste to move and for the plumbing to correctly drain.

This performance is explained by means of the laws of Hydraulics. If the network does not fulfill the requirements, this network works poorly if the slope is lower or higher than the necessary one or it does not work if the initial level is lower than the end level.

The data of surface level previously mentioned is important at this point. These data were extracted from Google Earth and the measuring has an error of 0.5 meters approximately. Still, these measures are sufficiently precise for us because these show the causes of the problem.

The surface level of the treatment pool that is nearer Santa Ana is at about 87 meters above sea level and it makes it impossible for this neighborhood to conduct its waste to such pool. The condition to function by means of gravity is not fulfilled because the places are at the same surface level and they are 1,500 meters away from each other.



2.5. Identification and description of the consequences

It is now necessary to discuss the consequences of this problem. First, this problem means that the life conditions of the Santa Ana residents are affected. They have to spend money on a cesspool and these systems are usually inefficient because they are not built following construction requirements. They should also spend money on maintenance costs.

Secondly, and in close connection to the first consequence, the people of the neighborhood do not have much money and they build their cesspool in relation to this. If a family has no money to build the cesspool or to maintain it, they choose to discard the waste in their patio or the curb of their street.

Third, although the natural waste is not the main problem, the chemical products that the family uses in their house to clean can contaminate if these are not biodegradable. For example, if the family uses detergent that is not biodegradable to clean cutlery or cooking equipment, this can be harmful for the environment.

3. The Way Forward

3.1. Problem approach

The solution that I propose is to build a water waste pumping station for sewage waste. The functioning system of this station consists of many parts that can be built of different forms and dimensions because, before designing it, engineers have to calculate the number of people that live in this neighborhood and estimate the possible number of people that will live in it in the next twenty years. This station should be built in a place that is at a lower surface level than the rest of the neighborhood because the water waste of neighborhood will move to the station due to gravity.

To carry out this project, first, it is necessary to build a pipeline. This is going to collect the residual fluids that come from the buildings of this neighborhood and it will take it to a gravity manhole.



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Secondly, it is necessary to install an electronic control system for the pumps. This system should have sensors in the pipeline because, when the wastewater level rises to a predetermined level, the pumps start to work.

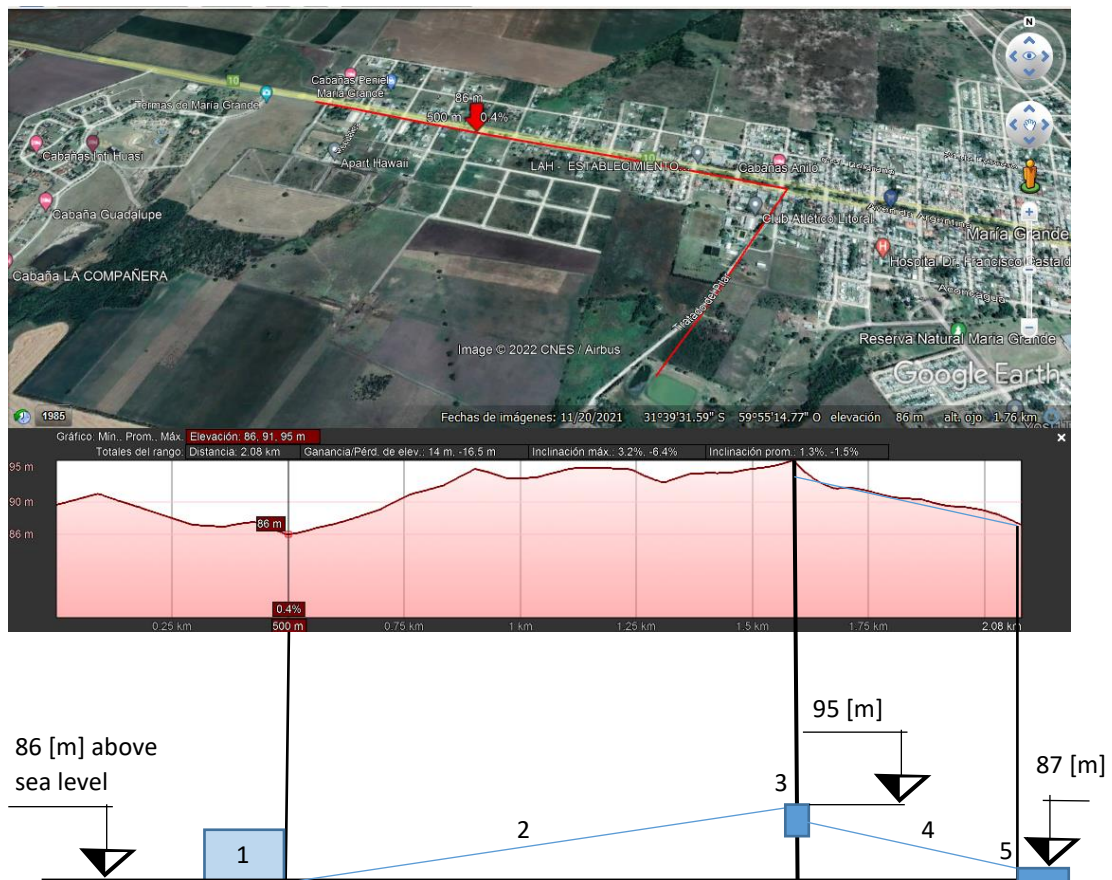
Third, it is necessary to determine the number and type of pumps which will be used. These pumps design depends on the estimate of houses who will connect to the system. The minimum number of pumps that should be installed is two because, if a pump breaks, the other pump will work.

Fourth, it may also be necessary to build an infrastructure that protects these parts. It does not need to have a big dimension and may be built with traditional materials such as brick and sheet but it should comply with the basic security conditions to control this station.

Fifth, it is necessary to build a well called gravity manhole. This well should be built in a place with a higher surface level than the water waste pumping station and this station should be connected with this well with pressurized pipe.

Sixth, it is necessary to connect the gravity manhole with the treatment pipelines. This connection can build with PVC pipes or similar material because this well should be built at higher surface level that these pipelines for the waste to move with gravity.

Outline of the water waste pumping station system:



1- Water waste pumping station



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- 2- Pressure pipe
- 3- Gravity manhole
- 4- Atmosphere pressure pipe
- 5- Treatment pipelines

3.2. Strengths and Weaknesses of the Proposal

Now, I am going to talk about the weaknesses of this proposal. The main negative aspect of this project is its financing. This project is a big building and it requires an investment that the residents of the Santa Ana neighbourhood cannot afford. The municipal government of Maria Grande or provincial government of Entre Rios should finance this project because the sewage network system is public.

Another negative aspect is the building of the sewage network. The municipal government should install the sewage network that connects the houses with the station at the front of each house.

A further weakness is the fact that a well should be built. This well should be built in an accessible place where there is public land. It may give off foul smell because it accumulates water waste.

Now, I am going to talk about the strengths of this proposal. The main strength is that it is not necessary to build other treatment pipelines for the water waste of this neighborhood so building this station is a cost-effective solution.

Another positive aspect is that this system saves energy. This energy saving is possible because the pumps move the waste water from the station pool to the manhole and the energy that is necessary to move the water waste from manhole to treatment pipelines is promoted by gravity.

Finally, the system is easy to expand if the population increases. If many people move to Santa Ana neighbourhood in the next few years, the problem can be solved by adding other pumps and building other connection pipes.

4. Conclusion

4.1. Final statement

In conclusion, this proposal may solve a major problem in the city. It is cost-effective and saves energy. These aspects are important because Maria Grande is a small city so its budget is limited. This project may help save energy, reduce the cost of maintenance, and save the environment.