



Basic Details of the Team and Problem Statement

Ministry/Organization Name/Student Innovation:
Ministry of Housing and Urban Affairs.

PS Code: SIH1514

Problem Statement Title:

Comprehensive inspection and Analysis of Water Supply Distribution Lines.

Team Name: TEAM SIRIUS

Team Leader Name: Jayesh Kriplani

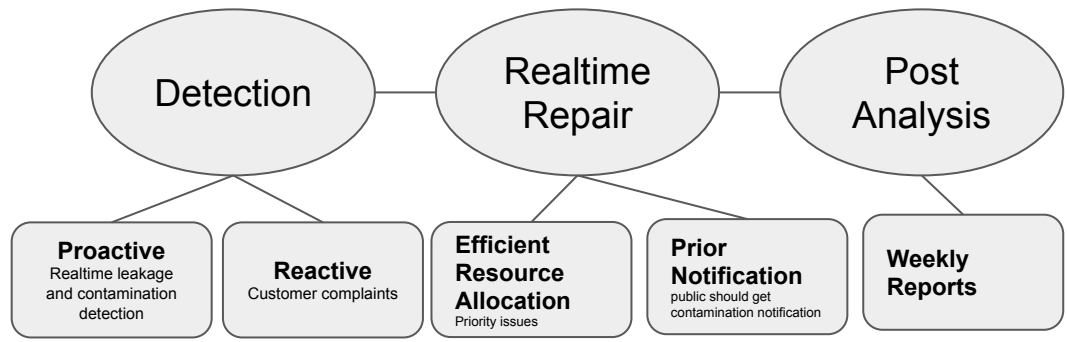
Institute Code (AISHE): C-18886

Institute Name: Shri Ramdeobaba College of Engineering and Management, Nagpur.

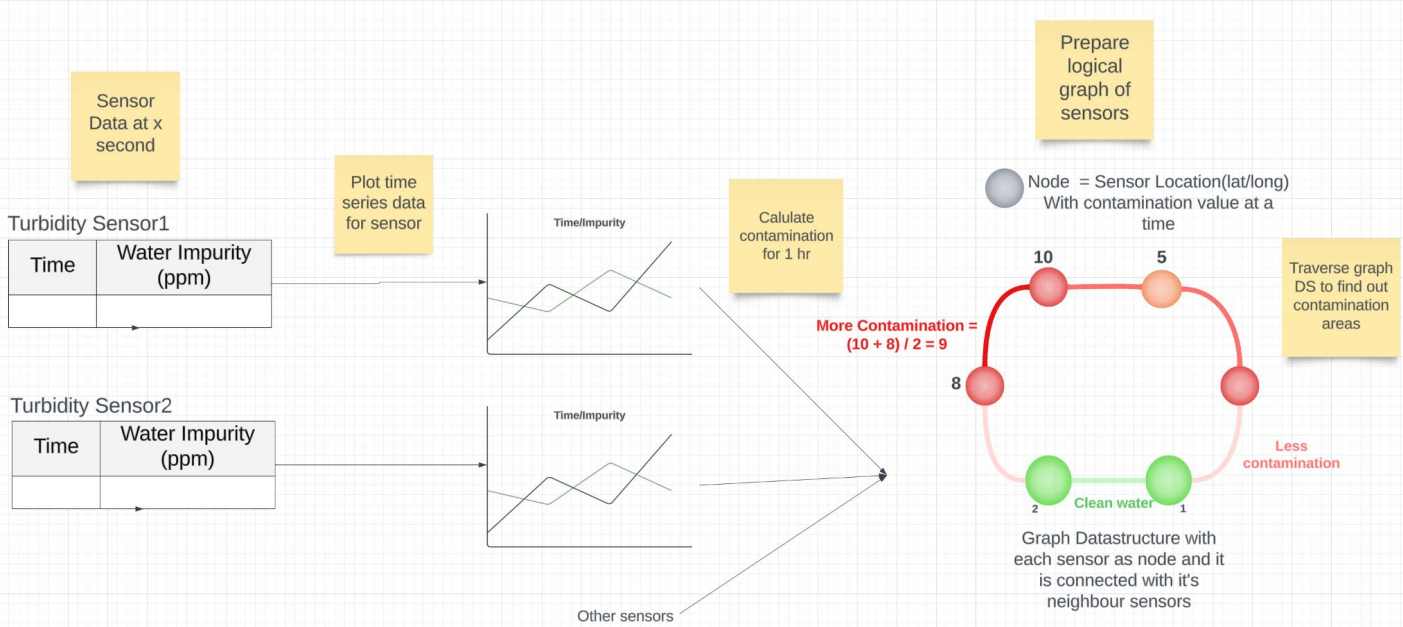
Theme Name: Clean & Green Technology

Problems

- There is no **data driven** way to
- To find the location of leakage.
 - To find the location of contamination.
 - To handle customer complaint.
 - To allocate resources on priority issues.
 - To plan when and where to do pipeline upgrades.
 - To generate weekly reports.



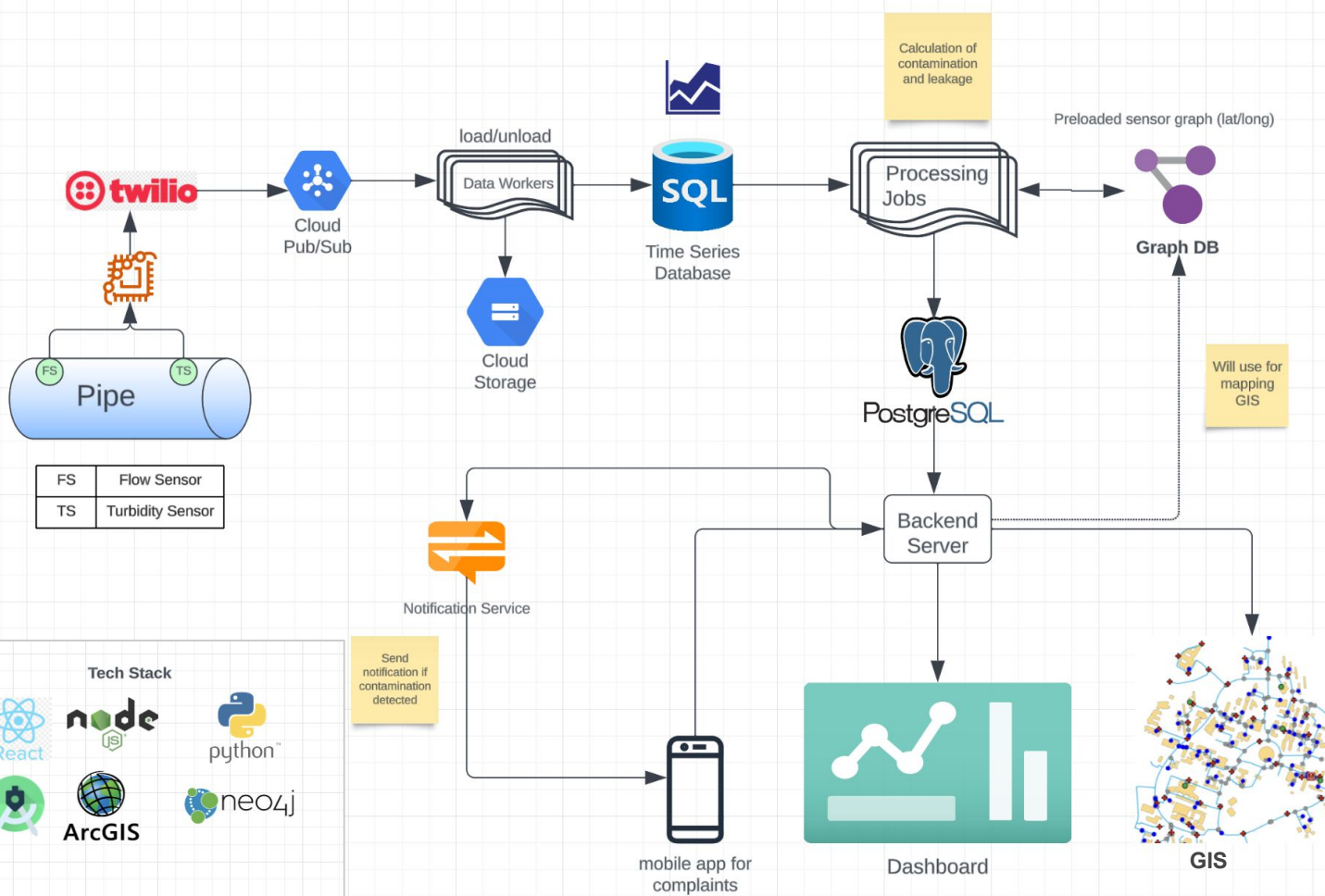
How to calculate location of pipelines with contaminated water?



What about water leakage?

- Same graph will be created.
- **Flow sensors** will be used here
- Each Sensor node in graph will have pressure(psi) value.
- **Possibility of leakage(i,j) = | Pressure at sensor(i) - Pressure at sensor(j) |**
- Difference in pressure is proportional to leakage probability.

Higher Level Architecture



- ## Features
- GIS of pipelines.
 - List of areas having contaminated water with priority.
 - List of areas having leakages with priority.
 - List of areas with highest contamination requests.
 - Weekly report with contamination/leakage analysis rolled up with area/city.
 - Suggestions of areas to upgrade pipeline.
 - Notification to people in area of high contamination.

- ## Dependencies/Show Stopper
- Dependent on sensor data for the solution.
 - Dependent on latitude/longitude of sensor.
 - Dependent on defined relationships between sensors/nodes of graph(neighbour information).
 - Dependent on User Complaints in Sensor-Lacking Areas.
 - Dependent on Real Administrators to Explore Additional Use-Cases

Use cases/Low level flows

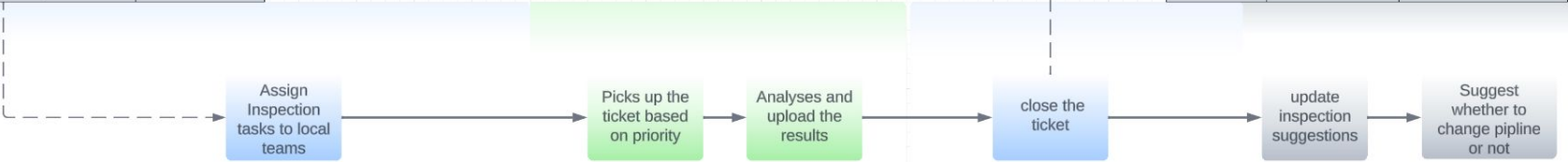
Inspection Suggestions by system

| Area | Priority | Suggested Local Team | Local Office Ph no |
|------------|----------|-------------------------------------|--------------------|
| Shyam Park | P1 | Shyam nagar Water Investiation Team | xxxxxxxxxx |
| Bani Nagar | P3 | Bani Nagar Water Corporation | xxxxxxxxxx |

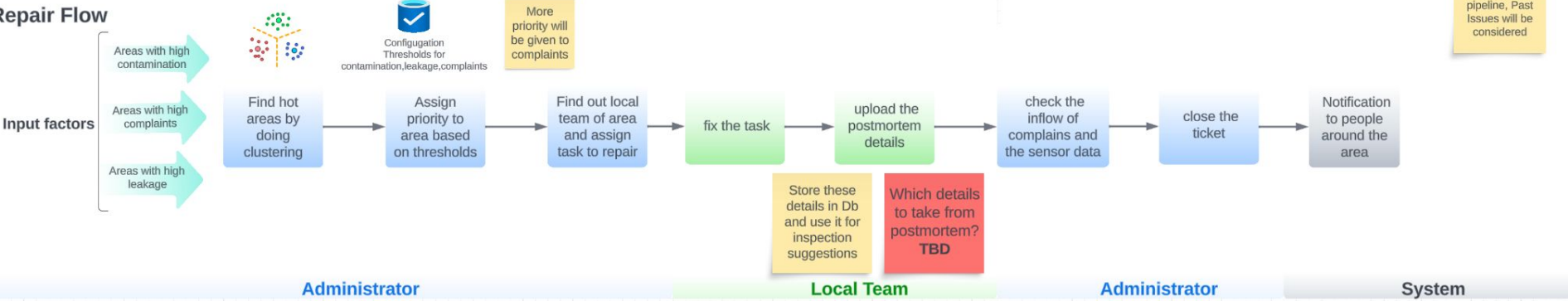
Inspection Checkpoints

| Area | last upgraded | last inspected |
|------------|---------------|----------------|
| Shyam Park | 25 Sept 2000 | 2 Aug 2023 |
| Bani Nagar | 25 Sept 2010 | 1 March 2023 |

Inspection Flow



Repair Flow



Notes

- This is **MVP** of our solution.
- The real solution should be combination of technologies like satellite, imagery,sensor etc.
- Other technologies are scoped out for the sake of current feasibility.
- **Changes in algorithms/system are expected** to achieve high levels of scalability.
- Knowledge of Water industry is required for lower level inputs/outputs like what are the output artifacts of postmortem and pipeline inspection.(**Help from Industry Expert is appreciated**)



Team Member Details

Team Leader Name: Jayesh Kriplani

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|------------------------|-------------------------|---------------------|
| Branch (Btech): | Stream : CSE(DS) | Year (II): |
|------------------------|-------------------------|---------------------|

Team Member 1 Name: Ritesh Kriplani

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| Branch (Btech): | Stream : CSE(DS) | Year (I): |
|------------------------|-------------------------|--------------------|

Team Member 2 Name: Nidhish Parke

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| Branch (Btech): | Stream : CSE(DS) | Year (II): |
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Team Member 3 Name: Om Aryan

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| Branch (Btech): | Stream : CSE(DS) | Year (II): |
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Team Member 4 Name: Mehansh Masih

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| Branch (Btech): | Stream : CSE(DS) | Year (II): |
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Team Member 5 Name: Palak Bang

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|------------------------|-------------------------|---------------------|
| Branch (Btech): | Stream : CSE(DS) | Year (II): |
|------------------------|-------------------------|---------------------|

Team Mentor 1 Name: 'Prof. Aarti Karandikar'

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|----------------------|-----------------------------------|-------------------------------|
| Category (Academic): | Expertise (AI/ML/Blockchain etc): | Domain Experience (in years): |
|----------------------|-----------------------------------|-------------------------------|

Team Mentor 2 Name: 'Vishal Kriplani'

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|----------------------|----------------------------|----------------------------------|
| Category (Industry): | Expertise : Data Pipelines | Domain Experience (in years): 2+ |
|----------------------|----------------------------|----------------------------------|