

A Study of Complaints by Authorities and Public at East Coast Rail Link (ECRL) Project in Section 2 (Pasir Puteh)

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Abstract

The East Coast Rail Link (ECRL) project, managed by Malaysia Rail Link Sdn Bhd (MRLSB), aims to enhance Malaysia's transportation infrastructure and regional strategic objectives along its 665 km span from Kota Bharu to Port Klang. However, Section 2 of the project ECRL faces numerous public complaints and concerns have emerged due to nearest residential areas. This study investigates these issues by analyzing authorities and villagers' complaints from January to December 2022 by focusing on public safety, dust/pollution, and flood/drainage. Through methodical classification and analysis, effective mitigation plans are developed to address these concerns by ensuring project success and community trust. The study emphasizes the importance of proactive measures to prevent further complications and highlights the necessity of comprehensive, regulatory-compliant strategies to optimize project outcomes and minimize negative impacts on affected communities. Through regular inspections, advanced techniques, and close coordination with authorities and villagers', the study identifies strategies such as reinforcing slope protections, ensuring road diversions meet safety standards, controlling construction dust, and maintaining effective irrigation systems. The results highlight the importance of proactive maintenance and comprehensive strategies to prevent further complications and minimize negative impacts on affected communities. Proactive maintenance scheduling is crucial for maintaining infrastructure integrity and community well-being with demonstrating a commitment to continuous improvement. This approach enhances connectivity, stimulates economic growth, and improves the overall quality of life for affected communities. This study contributes to the community relations by addressing and mitigating complaints from authorities and the public regarding the ECRL in Section 2 (Pasir Puteh).

1. Introduction

The first modern rail bridge was built in the 1820s, but since then, railway bridge architecture has seen significant development. Steam locomotives have given way to diesel-electric ones, and the weight of freight The East Coast Rail Link (ECRL) project is managed by Malaysia Rail Link Sdn Bhd (MRLSB), a fully-owned

subsidiary of the Ministry of Incorporated Finance (MOF Inc.). Engaging different stakeholders in ECRL, such as the Malaysian government, state governments, contractors, partners, and the Malaysian people, is a major responsibility of the MRLSB. The Malaysian government's ECRL project, an electric railway that links Kelantan, Terengganu, Pahang, and Selangor, is owned by MRLSB. Government funding, loans, and private investment may all be used to finance the project, which involves constructing railway lines, stations, and other infrastructure. Geopolitically, the ECRL can support Malaysia's larger strategic objectives by influencing regional dynamics [1].

ECRL project has Section A 210 KM (Kota Bharu to Dungun), Section B 251 KM (Dungun to Mentakab), and Section C 204 KM (Mentakab to Port Klang) are the three portions of the ECRL Project. There are 665 km in total between Kota Bharu and Port Klang. The ECRL project alignment is depicted in the Figure 1.1 below. This investigation will be focusing at ECRL Section 2 MRL office at Besut Terengganu.

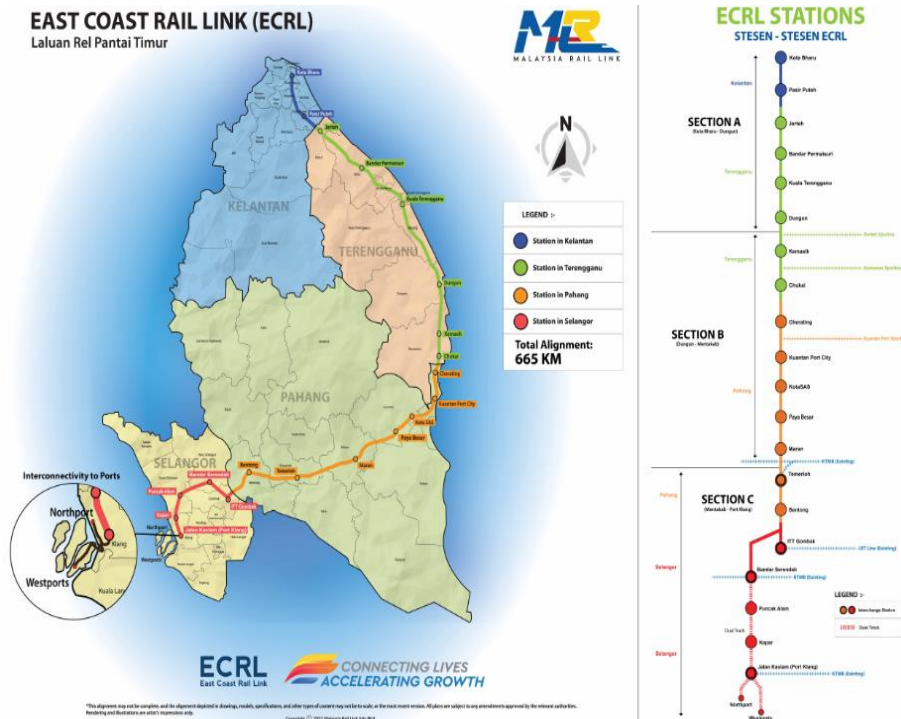


Figure 1.1: Alignment ECRL Project [1]

1.2 Problem Statement

Several concerns about dust pollution, public safety, and interruptions to local infrastructure, particularly in rural regions, are revealed in this study that was created in response to public complaints about the East Coast Rail Link (ECRL) project. The complaints include poor road diversions, damage to road surfaces, irrigation systems because of building activity and badly maintained slope protections that cause landslides. These complaints affect local populations' livelihoods by interfering with vital services like irrigation and transportation, posing immediate hazards to public safety. These issues could have serious consequences, such as further landslides, collisions with vehicles, and interruptions to agricultural operations.

Avoiding these public complaints could have a wide range of negative consequences for the ECRL project as well as the impacted communities. Road damage and recurring landslides are serious threats to public safety that could result in fatalities or serious injury to locals. In addition, disturbances to agricultural practices and irrigation systems may worsen the socioeconomic problems already present in rural regions, impacting the livelihoods and food security of farmers. Ongoing construction-related dust pollution puts locals' health at risk, ruins nearby ecosystems, and impacts efforts to maintain a sustainable environment. In addition, ignoring these complaints damages community confidence and could spark greater opposition to the ECRL project, which could cause delays, legal issues, and harm to the project's company. Ultimately, the lack of timely and effective resolution to these complaints put in danger the project's objectives. Its effect undermines its long-term success and benefits for both the local communities and the broader region.

2. Public Safety

Public safety is the protection and welfare of the general public, ensured through various government and private efforts. It includes law enforcement, which works to prevent crime and maintain order such as fire services focus on fire prevention, response, and safety education and emergency medical services provide urgent medical care. Disaster management and emergency preparedness involve planning and responding to natural and man-made disasters. Public health efforts aim to prevent disease and promote healthy behaviors. Lastly, transportation and environmental safety initiatives ensure safe travel and protect the public from environmental hazards.

2.2.1 Slope Protection using Geotextile

Aside from the conventional wool textiles, numerous new substitute goods have been developed in recent decades. The innovative materials are primarily intended for technical uses where the many special qualities of wool are made good use of. These goods come in a variety of forms, such as geotextiles, oil sorbents, thermal and acoustic insulation materials, and materials that absorb heavy metals [2].

The main objective of the wool geotextiles is to shield grass seeds buried in the earth. The wool mats or blankets help plant growth by establishing the ideal environment for seed germination. In certain locations, such park spaces, riverbanks, and tennis courts, where quick grass growth is necessary, the materials are voluntarily used [3]. Wool geotextiles can also be used in agriculture to preserve soil moisture. In this instance, the geotextiles that are buried in the ground serve as fertilizer and enhance moisture retention. The improvement of the grain yield is a result of this [4].



Figure 2.1: Geotextiles on Slope Surface [4]

2.2.2 Damage for Road

The existence of excessive water held by the underlying soil structures and frequent traffic passing over the afflicted places, which causes the road to collapse owing to the weight of large cars, are some instances of pothole flaws. Increased rainfall brought on by climate change might worsen pothole development by causing pavement degradation and lowering the overall longevity of road components. According to states that report holds represent a serious risk to drivers and have a major factor in the yearly incidence of serious accidents, some of which may result in fatalities. In addition, in order to maintain the efficiency and security of the road, satellites lengthen journey times, disturb traffic patterns, and raise the expense of operating a car. Regular maintenance should be conducted to address potholes and maintain the road [5].



Figure 2.2: Damage Road [6]

2.3 Dust/Pollution

Dust consists of fine particles like soil, pollen, and plant matter suspended in the air, often originating from natural sources or human activities. Pollution refers to harmful substances in air, water, soil, including gases, particulate matter, chemicals, and biological agents. Air pollution comes from sources like vehicle emissions and industrial processes, while water pollution arises from contaminants like chemicals and sewage. Soil pollution results from industrial activity and improper waste disposal, impacting plant growth and groundwater. Both dust and pollution can harm human health, causing respiratory and cardiovascular issues, and negatively affect the environment.

2.3.1 Hazards Exposed to Construction Dust

The World Health Organization's Global Air Quality Guidelines identify air pollution as the most significant environmental hazard to human health [7]. The studied research emphasizes the serious health concerns associated with construction dust exposure, especially with respirable silica. Exposure to construction dust has been linked in numerous studies to a range of respiratory conditions, such as silicosis, chronic obstructive pulmonary disease (COPD), lung cancer, and other systemic ailments. Construction dust's nature, which primarily consists of silica, exacerbates these health risks, particularly in settings with inadequate ventilation. Studies have repeatedly demonstrated higher than ambient particulate matter concentrations of silica in construction dust, highlighting the increased risk to construction workers and surrounding communities. Furthermore, research has shown that exposure to respirable silica at levels above suggested criteria can have serious health effects, including irreversible lung damage and systemic disorders. Although efforts to reduce exposure, problems still exist, especially in developing nations where ignorance and poverty encourage people to work in hazardous conditions. As a result, comprehensive preventive measures and regulatory actions are desperately needed to protect the health of construction workers everywhere [8].

2.4 Flood/Drainage

A flood is an overflow of water onto normally dry land, caused by heavy rain, storm surges, overflowing rivers, or dam failures. It can cause extensive damage to property, infrastructure, and pose risks to human life. Drainage refers to systems designed to remove excess water from an area, including natural waterways and man-made structures like sewers and drains. Effective drainage is crucial to manage water flow, prevent waterlogging, and reduce flood risk. Both flood and drainage management are essential for protecting communities and maintaining healthy ecosystems.

2.4.1 Irrigation Drainage

The research report emphasizes how important it is to accurately estimate components of the water balance and evapotranspiration in order to optimize water management techniques, especially in places that cultivate rice under irrigation, such as Malaysia's Besut irrigation network. Since irrigation is used for most rice farming in Malaysia, it is crucial to comprehend the complex dynamics of evapotranspiration in order to ensure water sustainability and maximize agricultural productivity. In the absence of direct measurements, mathematical models like the Pan evaporation method and the Penman-Monteith evapotranspiration model provide an alternate way for estimating evapotranspiration. These models make it easier to quantify the elements of the water balance, such as runoff, water loss, evapotranspiration, and percolation. This allows for more efficient use of the water resources that are available and more land that can be farmed. This research attempts to provide quantitative insights into water management techniques and determine effective rainfall for stable double cropping of rice in the Besut irrigation scheme, thereby contributing valuable knowledge to sustainable agriculture in Malaysia. It will do this by comparing simulated reference evapotranspiration with observed pan evaporation and estimating seepage and percolation rates [9].

3. Methodology

The construction of the simulation model and the formulation of the problem should follow the same path as the research flow. For project managers in particular, the research flowchart provides an illustration of the required steps. Figure 3.1 shows the flowchart that details the steps involved during writing this thesis.

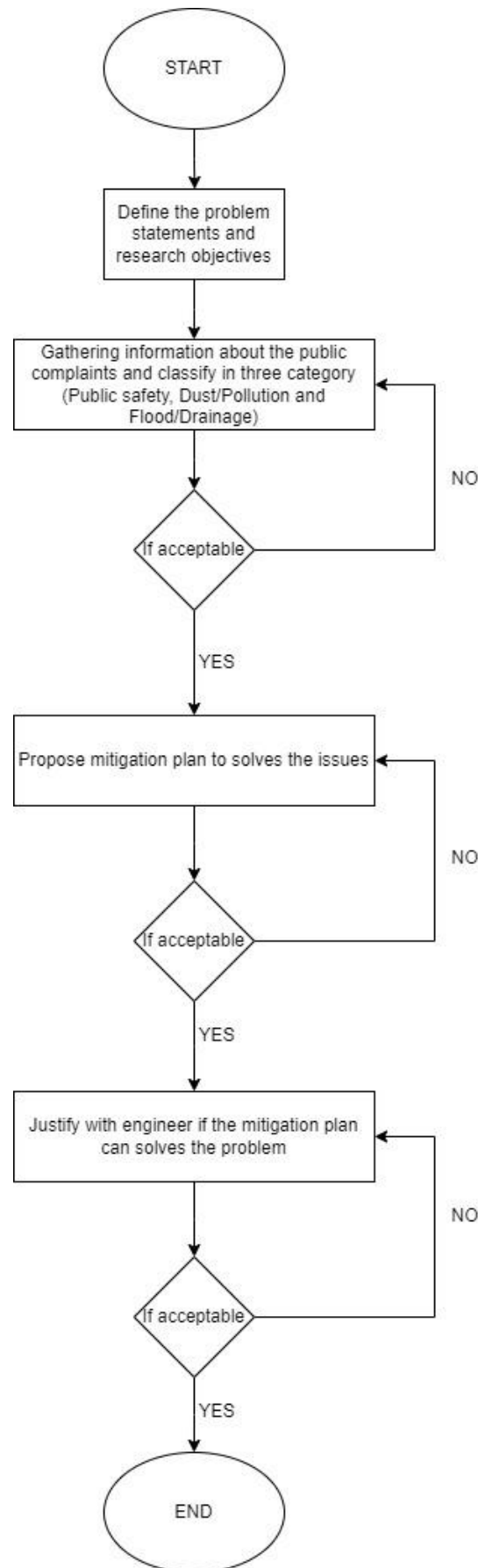


Figure 3.1: Project Flowchart

3.1 Gathering Data from Public Complaints

The Malaysia Rail Link (MRL) website provided the data for this study, which was accessed using their SharePoint platform. For a range of documents and data from various MRL divisions, SharePoint acts as a centralized repository. Researchers had access to and could get the data they needed for their investigation through SharePoint. This platform made it easy and well-organized to gather relevant information, guaranteeing precision and dependability throughout the study procedure.

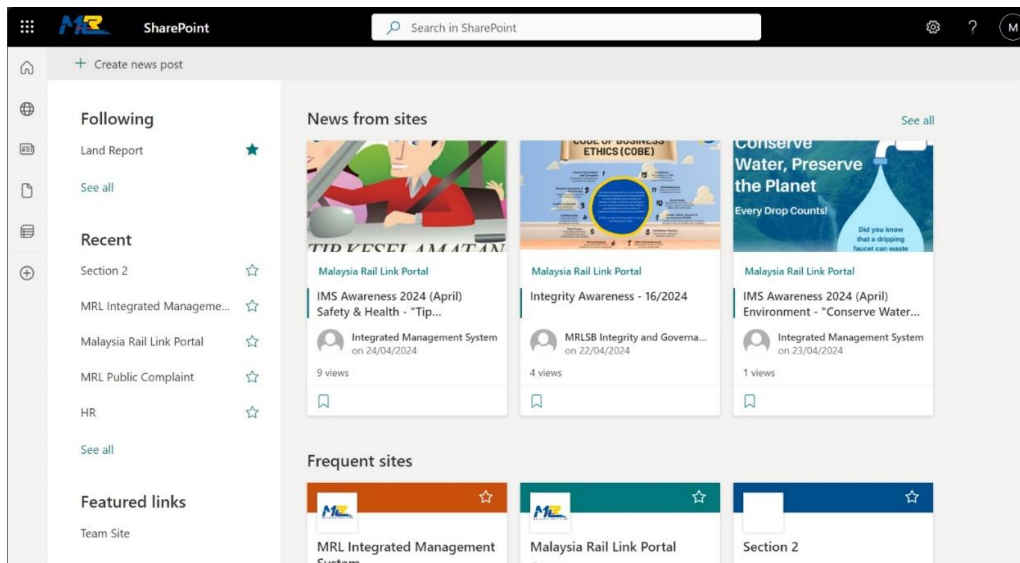


Figure 3.2: SharePoint Interface [10]

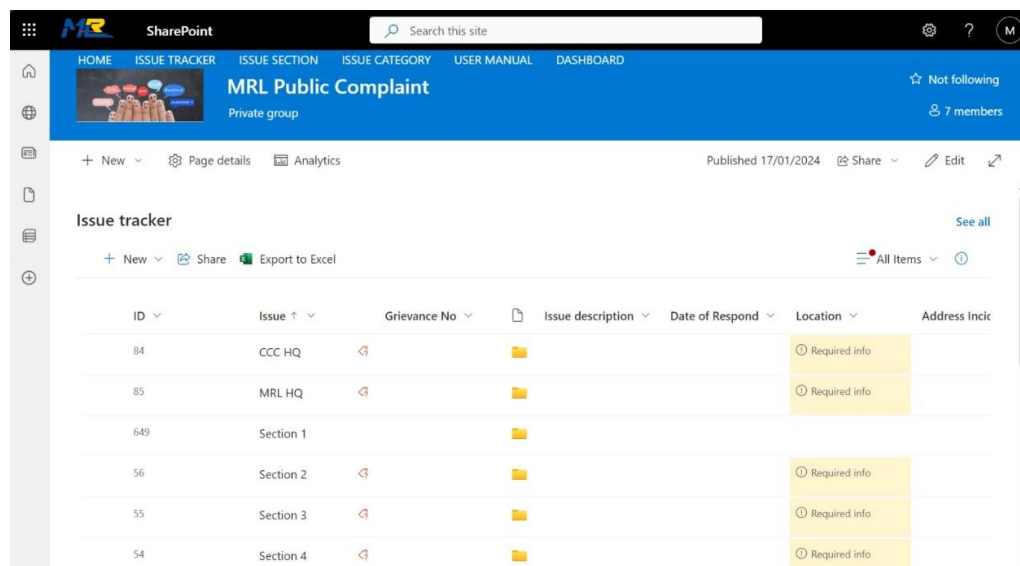


Figure 3.3: MRL Public Complaint Department Interface [10]

The MRL SharePoint website provided researchers access to public complaints about various MRL operations. These complaints were categorized into three main groups: Public Safety, Dust/Pollution, and Flood/Drainage. Public Safety complaints included issues like landslides and potholes, Dust/Pollution complaints involved air quality concerns from construction dust; and Flood/Drainage complaints focused on irrigation and flooding problems. Each complaint type was addressed with specific actions to mitigate risks and improve conditions. This classification helped MRL prioritize and respond effectively to community concerns.

3.2 Propose Mitigation Plan

To create a mitigation plan, first identify and categorize issues like public safety concerns, dust/pollution problems, and flood/drainage disruptions. Assign responsible teams, such as CCC S2, to handle each specific issue with detailed maintenance tasks, ensuring they understand their roles. Establish a maintenance frequency for each task, whether daily, weekly, monthly, or quarterly, to ensure timely intervention. Regularly monitor the effectiveness of the efforts and adjust the plan as needed to address emerging problems or inefficiencies.

A thorough mitigation strategy should address public concerns about dust/pollution, flood/drainage, and public safety. Regular inspections and repairs of slope protections, road surfaces,

and other vital infrastructure are necessary to ensure public safety. This includes fixing structural defects, restoring damaged slope safeguards, and improving road diversions, with enhanced collaboration with local government and communities. To mitigate flood and drainage issues, proactive measures like constructing temporary diversion canals, maintaining irrigation systems, and enhancing drainage infrastructure should be implemented.

To maintain efficient water management and support agricultural operations, collaboration with irrigation authorities and nearby farmers is essential. Dust suppression techniques, such as using water bowsers, covering exposed soil, and implementing dust control measures during construction, should be used to address dust and pollution concerns. Enforcing environmental standards and conducting routine monitoring can help reduce the negative effects of pollutants on nearby ecosystems and communities. Overall, ECRL projects can mitigate risks and promote sustainable development by implementing proactive maintenance plans tailored to public complaints.

3.3 Justify with Experts

For selecting two experts in infrastructure for the mitigation plan, a structured interview approach is used to ensure consistency and thorough evaluation. Each expert is asked the same set of six questions focused on their qualifications, experience with infrastructure projects, specific techniques for addressing slope protection and road safety, strategies for mitigating dust and pollution, approaches to managing flood and drainage issues, and their familiarity with relevant standards and regulations. This structured format allows for direct comparison of their responses, ensuring that the selected experts have the necessary skills and knowledge to effectively contribute to the mitigation plan. The consistent questioning also ensures that all critical aspects are covered, providing a comprehensive assessment of each candidate's suitability for the role.

A thorough mitigation approach is required since public concerns like dust/pollution, flood/drainage, and public safety keep coming up in construction projects like the ECRL. It is essential to put in place a proactive maintenance scheduling strategy in order to handle these issues. In order to maintain public safety and prevent structural flaws, this requires carrying out routine inspections and repairs of crucial infrastructure, such as road surfaces and slope safeguards. It can help to quickly detect safety hazards if local government agencies and communities work closely together. In order to reduce flooding and drainage issues, proactive steps like constructing makeshift diversion canals and improving drainage infrastructure are also necessary. These actions necessitate cooperation with pertinent organizations like irrigation authorities and surrounding farmers.

Furthermore, limiting dust and pollution issues during building activities can be achieved by implementing dust suppression measures such as water bowsers and geotextile covers. Reducing adverse effects on ecosystems and communities also involves routine monitoring and enforcement of environmental regulations. In the end, it takes proactive and periodic maintenance plans that are evaluated by engineer interviews to advance sustainable development and improve public safety in impacted areas.

3.3.1 Question for Experts

The effective management and maintenance of infrastructure projects, such as the East Coast Rail Link (ECRL), are critical to addressing public complaints and ensuring the safety and well-being of the community. Public complaints typically fall into three main categories: public safety, dust/pollution, and flood/drainage. These issues are of paramount concern as they directly impact the daily lives of the residents in affected areas.

To systematically address these concerns, six targeted questions have been formulated. These questions aim to evaluate and enhance the current strategies employed for slope protection, road safety compliance, dust control, irrigation coordination and the effectiveness of temporary measures such as temporary culvert. This structured approach ensures that all critical areas are covered and allows for a comprehensive evaluation of the measures in place.

By focusing on these six questions, the aim is to develop a detailed understanding of the measures in place and identify areas for improvement. This targeted approach ensures that the concerns related to public safety, dust/pollution, and flood/drainage are comprehensively addressed, ultimately leading to enhanced public satisfaction and reduced complaints.

1. What specific measures will be implemented to ensure that slope protection is reinforced effectively, especially in erosion-prone areas during quarterly inspection?
2. How will the team ensure that road diversions comply with safety standards during monthly inspections and repairs?
3. What daily dust control measures will be implemented during deep soil mixing work to minimize dust pollution, and how will the effectiveness of these measures be monitored?
4. What specific steps will be taken during bi-monthly inspections to coordinate with farmers and maintain the irrigation systems disrupted by ECRL works?
5. How will the team ensure the effectiveness of temporary diversion canals built to manage damage to irrigation canals, and what criteria will be used to assess their performance?
6. In your opinion as engineer experts, what do you think about the maintenance scheduling that has been

produce, which can help to solve the problems from happen again?

4 Results and Discussion

4.1 Data Public Complaints

Table 4.1: Data Public Complaints 2022

No.	Complaint	Issues	Action	Category
1	Villager	Poor maintained slope protection causing landslide.	Using geotextile to cover the slope area.	Public Safety
2	Villager	Complain improper and sub-standard road diversion.	CCC will do maintenance and repair to improve the condition of the road.	Public Safety
3	JKR Pasir Puteh	Damage on road surface on JKR road at Kg Bukit, Pasir Puteh.	CCC repair the road by using specification JKR.	Public Safety
4	Villager	Muddy and dirty road which is dangerous and not suitable for public use.	CCC has been carried out the regular road cleaning.	Public Safety
5	JKR Terangganu	JKR road shoulder and potholes which is dangerous to users.	CCC taken action by fixing the road damage.	Public Safety
6	Penghulu	Deep soil mixing work caused the dust pollution.	They will put the cement pipe into a pail of water. The dust will dissolve in water and there will be less dust surrounding.	Dust/Pollutions
7	JKR	JKR road dirty due to construction activities.	CCC has cleaned the road with water bowser and will make sure it is clean.	Dust/Pollutions
8	IADA Ketara	Farmers complaining that ECRL works has caused disturbance and disruption to irrigation system.	CCC has repair and improve the irrigation system.	Flood/Drainage
9	IADA Ketara	Complain about the damage irrigation canal caused by construction activities.	It will build the temporary diversion canal to farmers.	Flood/Drainage
10	Villager	Due to design of structure, villager house has been flooding.	CCC discuss with landowner to explain it not matter of structure but it matters of drainage system.	Flood/Drainage

11	KADA	Collapsed temporary access road and irrigation drain at Kg Permatang Rambai.	CCC carried out repair works at the location and the irrigation drainage and temporary access road has been restored.	Flood/Drainage
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Table 4.1 show the data public complaints from SharePoint MRL has carefully processed and filtered the data, making sure that every entry is arranged systematically for easy access and evaluation. The department has effectively classified and filtered complaints by utilizing SharePoint's powerful features, which has enabled streamlined procedures for handling public complaints. This systematic strategy demonstrates a dedication to providing high-quality service and ongoing development in the management of public feedback. It also improves openness and accountability and allows for faster response times and more efficient responses.

4.3 Discussion for Public Safety

Based on SharePoint registered public complaint, on February 1, 2022 a villager has raised a complaint about a poorly maintained slope protection that has led to a landslide. In response to this issue, CCC S2 are taking action by using geotextile to cover the affected slope area. This measure aims to stabilize the slope and prevent further erosion or landslides.

By July 7, 2022 a villager has complained about an improper and sub-standard road diversion. In response to this complaint, the CCC S2 has committed to conducting maintenance and repair work to improve the road's condition. These efforts aim to ensure the road meets safety and quality standards for all users.

On October 16, 2022, JKR Pasir Puteh has reported damage to the road surface on a JKR road in Kg Bukit, Pasir Puteh. In response, the CCC S2 will carry out repairs using JKR specifications to ensure the road is restored to its proper condition. This repair work aims to enhance road safety and durability for local residents and commuters.

By October 18, 2022, a villager has complained about a muddy and dirty road, highlighting its danger and unsuitability for public use. In response to this issue, the CCC S2 has been conducting regular road cleaning to address the problem. These efforts aim to improve road safety and ensure it is suitable for all users.

On December 11, 2022, JKR Terengganu has reported that the road shoulder and potholes on a JKR road pose a danger to users. In response, the CCC S2 has taken action by repairing the road damage. These repairs are intended to enhance safety and ensure a smoother driving experience for all road users.

4.4 Discussion for Dust/Pollution

On March 21, 2022, the Penghulu has reported that deep soil mixing work is causing dust pollution. To mitigate this issue, workers will place the cement pipe into a pail of water. This method will help the dust dissolve in the water, reducing the amount of dust in the surrounding area.

By October 20, 2022, JKR has reported that a JKR road has become dirty due to ongoing construction activities. In response, the CCC S2 has used a water bowser to clean the road. They will continue to ensure the road remains clean throughout the construction period.

4.5 Discussion for Flood/Drainage

On August 8, 2022, IADA Ketara has received complaints from farmers that the ECRL construction works have caused disturbances and disruptions to the irrigation system. In response, the CCC S2 has undertaken repairs and improvements to the irrigation infrastructure. These actions aim to restore proper irrigation for the farmers, ensuring minimal disruption to their agricultural activities.

By May 31, 2022, IADA Ketara has received complaints about damage to the irrigation canal caused by construction activities. To address this issue, the responsible authorities will build a temporary diversion canal for the farmers. This solution aims to ensure uninterrupted water supply for irrigation while repairs are being made to the damaged canal.

On December 18, 2022 a villager has reported that their house has been flooding due to the design of a nearby structure. In response, the CCC S2 has discussed the issue with the landowner, explaining that the flooding is not caused by the structure itself but by the drainage system. They emphasized the need to address drainage improvements to prevent future flooding.

By December 28, 2022, KADA has reported a collapsed temporary access road and irrigation drain at Kg Permatang Rambai. In response, the CCC S2 has carried out repair works at the location. The irrigation drainage and temporary access road have now been fully restored.

4.6 Mitigation Plan

Table 4.2: Proactive Maintenance Scheduling

Issue Type	Specific Issue	Maintenance Task	Responsible Team	Frequency	Notes
Public Safety	Poorly maintained slope protection	Inspect and reinforce slope protection with geotextile	CCC S2	Quarterly	Focus on erosion-prone areas
Public Safety	Improper and sub-standard road diversion	Inspect and repair road diversions	CCC S2	Monthly	Ensure compliance with safety standards
Public Safety	Damaged road surface (JKR road in Kg Bukit)	Inspect and repair road surface	CCC S2	Bi-monthly	Use JKR specifications for repairs
Public Safety	Muddy and dirty road	Regular road cleaning	CCC S2	Weekly	Increase frequency during rainy season
Public Safety	Dangerous road shoulder and potholes (JKR Terengganu)	Inspect and repair road shoulder and potholes	CCC S2	Monthly	Prioritize high-traffic areas
Dust/Pollution	Dust pollution from deep soil mixing work	Implement dust control measures	CCC S2	Daily during work	Use water suppression methods
Dust/Pollution	Dirty roads due to construction activities	Road cleaning with water bowser	CCC S2	Weekly	Monitor cleanliness after each project
Flood/Drainage	Disruption to irrigation system from ECRL works	Inspect and maintain irrigation systems	CCC S2	Bi-monthly	Coordinate with farmers for scheduling
Flood/Drainage	Damage to irrigation canal	Build and maintain temporary diversion canals	CCC S2	As needed	Ensure temporary canals are effective
Flood/Drainage	Flooding due to drainage system issues	Regular drainage system inspections	CCC S2	Quarterly	Address potential blockages promptly
Flood/Drainage	Collapsed temporary access road and irrigation drain	Inspect and repair access roads and drains	CCC S2	Quarterly	Ensure robustness during construction

Table 4.2 show the proactive maintenance schedule created from MRL SharePoint's public complaint data. Maintenance tasks are organized by frequency: daily, weekly, monthly, bi-monthly, and quarterly. This scheduling ensures regular attention to issues, allowing for timely interventions and ongoing vigilance. By adhering to this plan, MRL can effectively address and prevent public safety, dust/pollution, and flood/drainage problems.

4.6.1 Task Details

4.6.1.1 Public Safety

Regular inspections are essential for maintaining slope stability and preventing erosion. Inspecting slopes involves checking for signs of erosion like soil displacement, cracks, and weakened vegetation.

Vulnerable slopes can be stabilized by applying geotextile fabric, which reduces surface runoff and soil loss. Additional measures, such as installing retaining walls, planting vegetation, or using erosion control blankets, are also implemented to further stabilize the slopes and prevent future erosion.

Ensuring road diversions' safety and functionality begins with reviewing their designs to meet standards and site conditions. Engineers then conduct on-site inspections to identify any deviations or signs of wear. If any issues are found, immediate repairs are made to correct alignment, signage, or structural weaknesses. High-quality materials and techniques are used to ensure the diversions are safe and durable for all road users.

Maintaining road surfaces starts with regular inspections to identify potholes, cracks, and uneven areas. Repairs are then scheduled and carried out according to JKR specifications to ensure high quality and safety. These standards dictate the materials and methods for durable repairs. Follow-up inspections verify the success of the repairs, helping to maintain road safety and extend the road's lifespan.

Regular road cleaning is essential for safe and clean roadways. Using equipment like street sweepers and water bowsers, dirt, debris, and mud are effectively removed. Techniques like high-pressure washing ensure thorough cleaning without damaging the road. Increased cleaning during rainy seasons prevents slippery conditions, minimizing hazards and prolonging the road's lifespan.

Regular inspections of road shoulders are crucial for spotting hazards like erosion, debris, and structural weaknesses. Any potholes or damages found are promptly repaired using durable materials and effective techniques. Proper signage and safety measures are implemented during repairs to alert drivers and ensure their safety. These efforts maintain the integrity and safety of road shoulders, providing a secure driving environment for all road users.

4.6.1.2 Dust Pollution

To control construction dust, water is applied to cement pipes to prevent dust from becoming airborne. Regular monitoring of dust levels ensures air quality remains safe for workers and residents. Dust meters measure particulate levels, allowing adjustments to the amount and frequency of water application. These practices minimize health risks and environmental impact, ensuring a safer environment.

Regular cleaning with water bowsers is crucial for maintaining clean roads, especially near construction sites. Water bowsers spray roads to remove dust, dirt, and debris, followed by inspections to ensure thorough cleaning. Coordination with construction teams helps address the most affected areas and minimize dirt spread. These practices maintain road cleanliness and safety, reducing hazards for drivers and pedestrians.

4.6.1.3 Flood/Drainage

Inspecting irrigation systems involves checking canals and infrastructure for wear, leaks, or blockages. Identified damage is promptly repaired to restore functionality, with improvements made to enhance efficiency. Adjustments and maintenance ensure uniform water delivery, supporting agricultural productivity by preventing shortages and maximizing yields.

Prompt construction of temporary diversion canals is crucial during disruptions to primary irrigation canals. These canals redirect water to ensure continuous supply to affected areas. Regular inspections check for leaks, blockages, or weaknesses, with ongoing maintenance to optimize water supply. This proactive approach safeguards farmers' crops and livelihoods by ensuring uninterrupted irrigation.

Comprehensive inspections of the drainage system assess drains, culverts, and outlets for functionality issues. Blockages are promptly cleared to prevent flooding during these inspections. Improvements like enlarging drains or installing culverts enhance drainage capacity. Regular maintenance minimizes wear, debris accumulation, and ensures optimal performance, managing stormwater runoff effectively and reducing flood risk.

Inspecting temporary access roads and drainage systems identifies signs of damage, erosion, or weaknesses. Immediate repairs are crucial to prevent further deterioration and ensure safe passage for vehicles. Repairs may involve filling potholes, fixing eroded areas, or unclogging drainage channels. Reinforcing structures like culverts or retaining walls is important to maintain infrastructure integrity and prevent collapses. Regular inspections and proactive maintenance ensure continued functionality and safety.

4.7 Consultation with Experts

An interview was held on Tuesday, April 30, 2024 to consult with experts who are Mr. Sulaiman and Mr. Najhie as infrastructure engineer as per their Curriculum Vitae (CV) that are shown in **APPENDIX A** and **APPENDIX B**. Based on the questions that have been stated in the methodology section, the interview more focused on proactive maintenance schedule that has been propose.

4.7.1 Ensuring Effective Slope Protection

During the quarterly inspections, the team will implement several measures to reinforce slope protection effectively, especially in erosion-prone areas. These measures will include the application of geotextile fabric, which acts as a barrier to reduce surface runoff and soil loss. Additionally, the team will install

retaining walls, plant vegetation, and use erosion control blankets to provide further stabilization. Each inspection will involve a thorough examination of the terrain to identify any signs of erosion, such as soil displacement, cracks, and weakened vegetation. By promptly addressing these issues, the team can ensure that the slopes remain stable and secure. Moreover, the inspection process will be documented meticulously to track the effectiveness of the reinforcement measures and make necessary adjustments in future inspections.

4.7.2 Compliance of Road Diversions

To ensure that road diversions comply with safety standards during monthly inspections and repairs, the team will start with a detailed review of the engineering designs for the diversions. This review will confirm that the plans meet all relevant standards and are suitable for the specific site conditions. On-site inspections will then be conducted to identify any deviations from the design or signs of wear and tear. If any sub-standard conditions are found, immediate repair work will be undertaken using high-quality materials and techniques. The team will also implement proper signage and safety measures during the repair process to alert drivers and ensure their safety. By maintaining rigorous inspection and repair protocols, the team can ensure that road diversions remain safe and functional for all road users.

4.7.3 Dust Control Measures

Daily dust control measures during deep soil mixing work will include the application of water to the work areas to suppress dust particles and prevent them from becoming airborne. The effectiveness of these measures will be monitored through regular use of dust meters or similar equipment to measure particulate levels in the air. Based on these readings, the amount and frequency of water application can be adjusted as needed. Additionally, the team will ensure that construction activities are coordinated to minimize dust generation and implement best practices for dust suppression. By maintaining vigilant monitoring and adjusting control measures accordingly, the team can effectively minimize dust pollution and protect the health and safety of workers and nearby residents.

4.7.4 Coordinating with Farmers for Irrigation Maintenance

During bi-monthly inspections to maintain irrigation systems disrupted by ECRL works, the team will coordinate closely with local farmers to schedule maintenance activities at times that minimize disruption to agricultural operations. This coordination will involve regular communication with farmers to understand their irrigation needs and any issues they may be facing. The team will then inspect and repair irrigation infrastructure, such as channels and pipes, to ensure proper water flow and distribution. By addressing any damage promptly and implementing necessary improvements, the team can maintain the integrity of the irrigation systems and support agricultural productivity. Additionally, the team will provide farmers with updates on maintenance activities and seek their feedback to continuously improve the coordination process.

4.7.5 Ensuring Effectiveness of Temporary Diversion Canals

To ensure the effectiveness of temporary diversion canals built to manage damage to irrigation canals, the team will conduct regular inspections to check for any leaks, blockages, or structural weaknesses. The performance of these canals will be assessed based on criteria such as water flow consistency, absence of leaks, and structural stability. Any issues identified during inspections will be addressed promptly through necessary repairs and reinforcement measures. Additionally, the team will monitor the water supply to ensure that it meets the irrigation needs of the affected areas. By maintaining proactive inspection and maintenance practices, the team can ensure that temporary diversion canals function effectively and provide a reliable water supply for agricultural use.

4.7.6 Assessment of Maintenance Scheduling

As engineering experts, the maintenance scheduling produced appears comprehensive and well-structured to address the various public safety, dust/pollution, and flood/drainage issues. The frequency of inspections and maintenance tasks is appropriate for the specific issues identified, ensuring that potential problems are addressed promptly and effectively. Quarterly, bi-monthly, monthly, weekly, and daily schedules provide a balanced approach to maintenance, allowing for both regular monitoring and immediate response to urgent issues. By implementing detailed inspection protocols and coordinating closely with stakeholders such as farmers, the team can maintain infrastructure integrity and safety. This proactive maintenance strategy not only prevents problems from recurring but also extends the lifespan of the infrastructure and supports the well-being of the community.

5 Conclusion

Effective complaint identification and classification, coupled with systematic categorization into Public Safety, Dust/Pollution, and Flood/Drainage concerns, have been achieved. Assigning specific maintenance tasks to responsible teams enables precise responses to each issue. A comprehensive mitigation plan, featuring measures like geotextile use for slope protection and dust suppression methods, has been tailored to efficiently address identified issues. Validation from infrastructure experts, Mr. Sulaiman and Mr. Najhie, validates the suitability and effectiveness of the proposed measures, endorsing the plan's acceptability and ensuring infrastructure integrity and safety.

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Conflict of Interest

Authors declare that there is no conflict of interests regarding the publication of the paper.

Author Contribution

The authors confirm contribution to the paper as follows: A Study of Complaints by Authorities and Public at East Coast Rail Link (ECRL) Project in Section 2 (Pasir Puteh): Muhammad Ikmal Roaini, Supervisor: Ir. Muhamad Faiz Abd Latif and Ts. Muhamad Sulaiman Al Yaakubi Suhaimi. All authors reviewed the results and approved the final version of the manuscript.

References

1. MRL - Enriching Lives, Prospering The Nation. (2016). Retrieved December 16, 2023, from Mrl.com.my website: <https://www.mrl.com.my/en/ecrl/alignment/>
2. Zach, J., Azra Korjenic, Vít Petránek, Jitka Hroudová, & Bednar, T. (2012). Performance evaluation and research of alternative thermal insulations based on sheep wool. *Energy and Buildings*, 49, 246–253. <https://doi.org/10.1016/j.enbuild.2012.02.014>
3. Wool as a Technical Fibre. (2024). Retrieved April 30, 2024, from Journal of the Textile Institute website: <https://www.tandfonline.com/doi/abs/10.1080/00405000308630626>
4. Broda, J., Grzybowska-Pietras, J., Andrzej Gawłowski, Rom, M., Przybyło, S., & Ryszard Laszczak. (2017). Application of Wool Geotextiles for the Protection of Steep Slopes. *Procedia Engineering*, 200, 112–119. <https://doi.org/10.1016/j.proeng.2017.07.017>
5. Kanchi Anantharaman Vinodhini, & Ramachandran, K. (2022, December 28). Automatic crack detection in the pavement with lion optimization algorithm using deep learning techniques. Website: https://www.researchgate.net/publication/366644697_Automatic_crack_detection_in_the_pavement_with_lion_optimization_algorithm_using_deep_learning_techniques
6. Akhmar, S. I. N., & Doh, S. I. (2019). Factors Influencing Road Damage in Developing Countries. ISSN: 2349-2058, Volume-06, Issue-02, February 2019. <http://umpir.ump.edu.my/id/eprint/24253/>
7. WHO global air quality guidelines. (2021). May 2, 2024, from Google Books website: https://books.google.com.my/books?hl=en&lr=&id=s5pREAAAQBAJ&oi=fnd&pg=PR5&ots=qAOGarKkqs&sig=5vYIyqNbzovpt0swmtHJr4K41wA&redir_esc=y#v=onepage&q&f=false
8. Sarkar, A., Thakur, B., & Gupta, A. (2023). Particulate pollution at construction sites of Kolkata and associated health burden for exposed construction workers. *Urban Climate*, 52, 101750–101750. <https://doi.org/10.1016/j.uclim.2023.101750>
9. Lee, T. S., M, A. H., & Huang, Y. F. (2006). Modeling water balance components in rice field irrigation. The Institution of Engineers, Malaysia (Vol. 67, No. 4, December 2006). <http://dspace.unimap.edu.my:80/xmlui/handle/123456789/13731>
10. (2024). Retrieved May 5, 2024, from Sharepoint.com website: https://mrlsb.sharepoint.com/_layouts/15/sharepoint.aspx