PROJECT SUMMARY OUTLINE

NAME OF PROJECT: Research & Development and Plastic Injection Moulding Centre

NAME OF COMPANY: MakPak Inc, Land of Canaan, East Bank Demerara, Guyana
(Subsidiary of QMoulds Inc Brampton, Ontario, Canada)

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PREPARED BY: Robena Kudus **DATE:** November 9, 2023

DESCRIPTION OF SITE

Location: Plot 60 portion of area "KK", Land of Canaan, East Bank Demerara, Guyana
Plot 27 portion of area "KK", Land of Canaan, East Bank Demerara, Guyana
(Adjoining plots)

Land: 30,000 square feet

Layout: 8,000 square concrete building erected on land

Area of influence:
The area of influence for an 8,000 square feet building situated on a 30,000 square feet parcel of land, for a project lasting greater than 20 years, represents both the physical and long-term impact of this development. In spatial terms, the area of influence corresponds to the building's footprint, encompassing 8,000 square feet, where the project's activities are concentrated. This space will play a crucial role in shaping the immediate surroundings and urban fabric. Temporally, the project's influence extends well beyond its construction phase, potentially leaving a lasting imprint for over two decades. It affects property values, local infrastructure, environmental sustainability, and the overall character of the community. Understanding the area of influence of such a long-term development is pivotal for comprehensive land-use planning, zoning regulations, and urban design considerations, as it influences the social, economic, and environmental dynamics of the area for years to come.

Identification of receiving water: Water supplied by Guyana Water Inc

Map: Attached

PROJECT DESIGN

Activities (for all stages of the project):

Our injection plastic moulding project consists of several stages that cover the entire product development and production process. Here are the main stages:

Concept and Design Phase:

- **Conceptualization:** Define the product concept, its purpose, and basic specifications.
- **Design**: Create detailed 3D designs and CAD (Computer-Aided Design) models.
- **Prototyping**: Develop prototype for testing and validation.
- **Material Selection**: Choose the appropriate plastic material based on product requirements.

Tooling and Mould Design:

- **Mould Design**: Develop the mould design that will be used in the injection molding process.
- **Tooling Procurement**: Build or order the moulds, including consideration of cavity and core design.
- **Prototype Tooling**: Create a prototype mould for initial testing and adjustments if necessary.

Material Preparation:

- **Material Acquisition**: Procure the selected plastic material in the required form (pellets, etc.).
- **Material Testing**: Evaluate the material's suitability for the project through material testing.
- **Material Handling and Storage**: Establish proper procedures for handling and storing materials to prevent contamination.

Injection Moulding Production

- **Machine Setup**: Configure the injection moulding machine, including temperature, pressure, and speed settings.
- **Injection Molding**: Execute the actual production process, where molten plastic is injected into the mould.
- **Quality Control**: Implement quality control measures during production to ensure consistency and adherence to product specifications.

Quality Assurance and Testing

- **Visual Inspection**: Inspect the moulded parts visually for any defects.
- **Functional Testing**: Conduct functional tests to verify product performance.
- **Dimensional Inspection**: Use measuring equipment to confirm product dimensions.
- **Defect Resolution**: Address any defects or issues in the moulding process.

Post-Processing and Finishing

- **Trimming and Cutting**: Remove excess material or flash from the moulded parts.
- **Surface Finishing**: Apply any required surface treatments, such as painting, printing, or coatings.
- **Assembly**: Assemble multiple components, if necessary.

Packaging and Shipping

- **Packaging**: Properly package the finished products for protection during transportation and storage.
- **Shipping**: Arrange logistics for the distribution of the moulded products to customers or end-users.

Project Documentation

- **Record Keeping**: Maintain detailed records of the project, including material specifications, production data, and quality control reports.
- **As-Built Documentation**: Create as-built drawings and documentation for the moulded product.

Project Evaluation

- **Performance Review**: Evaluate the project's performance against initial goals and objectives.
- **Lessons Learned**: Identify areas for improvement and lessons learned for future projects.

Project Closure

- **Documentation Archiving**: Archive all project-related documentation for future reference.
- **Final Reporting**: Prepare a final project report summarizing the entire plastic moulding project.
- **Client Acceptance**: Ensure that the client or stakeholders are satisfied with the delivered product

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Each of these stages is critical to the successful completion of the plastic moulding project, and effective communication and collaboration between design, production, and quality control teams are essential throughout the process.

SOURCE OF UTILITY SERVICES

- Water: Guyana Water Inc
- Electricity: Guyana Power and Light

WASTE MANAGEMENT

Waste management details:
Minimal plastic waste is expected with testing of brand new injection moulds, upon start-up of machine i.e. warm up period of machine, or rejected products.

Methods of waste disposal/treatment:

- Develop plastic waste recycling program by turning plastic waste into reusable construction and other products
- Collaborate with local recycling centers to ensure proper disposal and recycling of waste materials as needed

PROJECT SIZE

Capital Investment: $5,000,000 USD

Number of employees: Projected # of employees projected upon initial production phase: 5

Rates of production: Varies depending on the mould(s) in production. Projected annual turnover rate of products (Sales): $1,000,000 USD

PROJECT SUMMARY

Our plastic injection moulding business is a specialized company which manufactures a wide range of plastic products and components using a precise and efficient process. It is a subsidiary company of QMoulds Inc located in Ontario, Canada which has been in operation since 1998 (both owned and managed by current owners). Here is a more detailed explanation:

- Moulding process: Plastic injection molding is a method that involves melting plastic material, often in the form of small pellets, and injecting it into a custom-made mould. This mould is designed to have the exact shape and specifications of the desired product.
- Material Selection: The type of plastic material including biodegradable material used can vary, depending on the product's requirements. The choice of material is critical to achieving the desired properties of the final product.
- Custom Production: The business can create a wide variety of products, from small and intricate components to larger, more complex items. It's a versatile manufacturing process that can be customized to produce specific designs and features.
- High Precision: Plastic injection moulding is known for its precision and repeatability. It is capable of producing very detailed and intricate parts with tight tolerances, which is essential for industries such as electronics and automotive manufacturing.
- Mass Production: It is a cost-effective method for mass production, allowing businesses to create a large quantity of identical products quickly and consistently.

- Quality Control: Quality control is a crucial aspect of this business. Skilled operators and automated systems ensure that each moulded product meets the required standards and specifications.
- Applications: Products made by plastic injection moulding businesses are used in a vast array of industries, including automotive, medical, aerospace, consumer goods, electronics, and more. They can range from tiny components in a smartphone to large plastic parts in a car.

In summary, MakPak Inc is a manufacturing enterprise that specializes in transforming raw plastic and biodegradable materials into various useful products and components through a highly efficient and precise process. It plays a crucial role in the production of many everyday items and complex industrial components.

DURATION OF PROJECT

MakPak Inc is currently in its test run phase i.e. testing its production processes, equipment and machinery, and tooling to ensure that everything is working smoothly before full-scale production. This phase involves:

- **Setup and Calibration:** Ensure that all injection moulding machines and equipment are properly set up and calibrated. This includes configuring the right temperature, pressure, and cycle times for the specific plastic material being used.

- **Tooling and Moulds:** Verify that the moulds and tooling are in good condition and correctly installed. This includes checking for any defects, ensuring proper alignment, and conducting maintenance if necessary.

- **Material Testing:** Test the selected plastic material to ensure it melts, flows, and solidifies as expected. Material quality and consistency are critical in injection moulding.

- **Production Trials:** Run a series of production trials with a limited quantity of parts. This helps identify any issues in the production process and allows for adjustments to be made.

- **Prototype Testing:** A model is subjected to various tests and evaluations to assess its functionality, performance, and suitability.

- **Quality Control:** Implement quality control measures to check the moulded parts for any defects, dimensional accuracy, and overall quality. Reject any substandard parts and make any necessary adjustments.

- **Cycle Optimization:** Continuously monitor and optimize the injection molding cycle to achieve the desired production speed while maintaining quality.

Duration of the project:

Production phase is expected to be greater than 20 years.

ENVIRONMENT IMPACT & PLANS FOR MITIGATION

1. GENERATOR NOISE

Back-up Generator on site: Generac automatic standby generator 150kW, Diesel, Liquid, CARB Compliant, Three Phase. Sound Level dBA 70dBA. Upon present initial set-up/testing of business, Guyana, Power and Light (GPL) with a high voltage transformer hook-up was used as main source of power. However, sensitive components of injection moulding machines suffered significant damage due to low/fluctuating voltage and electrical disruption, incurring very costly repairs. Subsequently, back-up generator will need to be used on a daily basis for production (approximately 8-10 hrs) in place of GPL, not only for reliability for also for cost effectiveness.

Mitigation Strategies:

- Suitable location: Distance of generator increased by locating it as far away from areas populated by homes to allow the wavelength to disperse at a greater distance, which decreases acoustic intensity, reducing the noise significantly.
- Installation of an acoustic enclosure/barrier: Acoustic barrier and insulation to be added i.e. concrete walls with door which will reduce sound level. Sound attenuation roof/canopy to be added i.e sheet metal which will enable large amounts of air to pass through to prevent overheating, while absorbing the sound and reducing the sound wavelengths.
- Exhaust Silencer: Generator is equipped with a chamber type muffler which is more effective than an exhaust muffler.
- Regular maintenance: Generator will be regularly checked and components like air filters, exhaust systems and mufflers replaced when necessary as worn-out or poorly maintained parts can produce more noise.
- Suitable placement: Generator placed on a stable, level 8 inch concrete pad to minimize vibration and noise.
- Time of use: Generator will be run during daytime hours and not during quiet or night time hours.
- Local Regulations and Permits: Adhere to local noise regulations and permit requirements.

Conclusion

Mitigating the noise level of our Generac generator will significantly improve the overall comfort and environmental impact of our operations. We are working closely with GPL and understand that at some point in the near future, high power voltage will be available and reliable through their Development and Expansion Plan 2023-2027. At such time, MakPak Inc will be

able to get back unto the electrical grid and the back-up generator will solely be used for power outages or unforeseen issues.

2. PLASTIC SCRAP AND PRODUCTION WASTE

Injection moulding combined with engineered, hot runner systems delivers the molten material directly to the cavities, thereby producing no or minimal scrap. Only fully optimized injection moulding processes will be used, so only the amount of polymer required to fill the mould will be used. Our electric/hydraulic injection moulding machines are also more energy efficient than the original models, meaning they use less power and have less carbon impact and less waste. However, there may be very minimal plastic waste with testing of brand new injection moulds, upon start- up of machine i.e. warm up period of machine, or rejected products.

Mitigation Strategies:

- Develop plastic waste recycling program by turning plastic waste into reusable construction and other products
- Use of eco-friendly material and adoption of responsible sourcing practices
- Continuously monitor and improve energy efficiency
- Collaborate with local recycling centers to ensure proper disposal and recycling of waste materials only if needed
- Collaborate with local environmental organizations and regulatory bodies for guidance and compliance

Conclusion

By implementing these strategies, our plastic injection moulding business can minimize its environmental impact and contribute to a more sustainable and eco-friendly future for the industry.

Additional Environmental Considerations

- No delivery truck will be on premises, other than occasional pick-up and drop off.
- Moulding machines are automated with computerized controls, therefore, noise level is minimal and cannot be heard outside the premises.

Attachments:

- Agreement of Sale and Purchase, Plot 60 portion of area "KK", Land of Canaan
- Land Transport, Plot 27 portion of area "KK", Land of Canaan
- Land survey and pictures
- Building plan