

**Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine**

**Beta Project Documentation**

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**1. What is the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine?**

This is a Geospatial Data web app that uses geospatial data, global positioning systems (GPS), satellites and satellite imagery as well as custom based research databases in order to properly allocate land developments. It is a very powerful tool that can be applied for a variety of purposes in The Built Environment such as policy making and zonation of towns, cities as well as communal lands (by local planning authorities) and to clearly identify hotspot areas that are prime locations for profitable land development and real estate based projects.

The web app will also inhibit a Rental and Digital Marketing platform that will display all the available properties for purchase(for your asset market) or for rental purposes(for your space market). This web app will be specically dedicated to display properties as well as their about (database information) that also displays the agent who has the mandate to dispose of or lease out the property as well as the agents contact details just to promote professional practice as well as the same time mitigating unethical practices while the beta project is running.

The main goal of creating this engine is to be able to create more accurate and more detailed mapping systems using geospatial data for the Built Environment in Bulawayo, Zimbabwe. With that being said, the mapping tool will be designed in accordance to the abilities of internationally compared softwares such as ArcGIS Pro, Maps Made Easy etc with more user friendlty features and easy manouvability throughout the app and an easy to navigate Graphic User Interface (GUI).

Bulawayo, the second largest city in Zimbabwe, has experienced a decline in economic activity and living standards in recent years. This has led to social inequality and marginalization, particularly in the citys western suburbs. In response, the concept of mixed-use land development has emerged as a potential solution to revitalize these areas and improve quality of life. This beta project aims to investigate the role of geospatial data in promoting social inclusion and equitable development, with a specific focus on Bulawayo. The beta project will utilize geospatial data to assess the current conditions in Bulawayo, identify areas for potential development, and evaluate the potential impact of mixed-use development on social inclusion and equity.

By analyzing the current situation and potential outcomes of mixed-use development, the beta project will provide recommendations for policy makers and developers in Bulawayo. The findings of this project will contribute to the understanding of how geospatial data can be used to promote sustainable development and improve quality of life for all residents of Bulawayo as well as improve the quality of choices made by construction and real estate as well as other affiliated firms in the use of geospatial data in urban planning is a relatively new concept. The mapping and survey engine has the potential to revolutionize the way we approach development. By mapping out the physical and social characteristics of a city, we can gain a deeper understanding of how urban areas function and where there is room for improvement. This information can be used to make informed decisions about where to invest in new developments and how to structure them in a way that benefits the entire community.

**2. How does it work and how to use it.**

This mapping engine is built using python programming and a plethora of other python API’s and libraries to make it fully functional and interactive. The source code of the engine is developed from scratch by Mthoe Saps Construction Technologies meaning each and every aspect of the engine is completely alterable to the desired outcome of the Developer thus we have full control of how the engine functions, how it is optimised and all capabilities and features are monitored by us. In order to use the engine, one needs to fill in the beta project application form and then they will receive an email link to access the engine online from Mthoe Saps Construction Technologies as soon as all affiliation and payments are made. The engine does not have any external plug-ins since the project is in beta testing, all upgrades and maintanaces will be handled only by Mthoe Saps Construction Technologies. The engine is built in a simple to use manner and it already has aleady managed to map over 120 low, medium and high density suburbs of Bulawayo. Beta project companies will get access to the original database (in excel format) so they can extend database information that they would like displayed on their own mapping softwares. After their databases have been filled, they will submit the databases to the developers email for upload on their mapping softwares thus the affilited parties can then use their own database based information to view and analyse geospatial data using their own custom made GIS and Remote sensing software.

**3. What API’s does the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine use?**

The software is built ontop of a number of high level programming libraries. To mention but a few of the most important ones are the use of Plotly, Streamlit, Pandas as well as Numpy and scikit-learn library. These libraries enables the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine algorithm to perform a number of high level activities and abilities such as the ability to combine GIS and Remote Sensing as well as being able to add Machine Learning (ML) and Artificial Intelligence (AI) in order to form more accurate and precise plots using this robust engine.

As much as the libraries used to build the tool are as good as they get in the technovative industry, this does not mean our engine is completely going to dependant on its current libraries and API’s for it functionality but we will continue to update the Mapping Engine and add more features to it as well by exploring other libraries that will definitely improve the functionality and usability of the engine.

This system enables superuseful information for example we will provide the most robust mapping system that enables affiliate companies to build super accurate land developments for precise use and allocations. It renders database based information that the affiliated companies send to the developer in order to create robust mapping systems for their preffered land use.

**3(a) Gaps filled by the Mthoe Saps Construction Technologies Mapping Survery Engine that competitors have not fulfilled in the Bulawayo Market:**

(i) Performing drone sensor fusion for land surveys.

(ii) Developing custom software that can interpret and visualize excel, csv, and other type datasets to graphically usable data.

(iii) Developing custom software that meets the exact needs of the client and can be tailored anytime depending on the job requirements meaning software is able to handle large and robust databases and datasets.

(iv) Breaking the barriers of land survey in Zimbabwe, this system is less labor intensive, and less time consuming. The main aim of our project is to be able to accurately draw new maps of Bulawayo (and Zimbabwe over if the project exceeds beta testing) in a short amount of time and to be able to complete property surveys in less than 72 hours including documentation and a full report of the survey.

(v) Create learning based employment for drone programming enthusiasts: the project looks to adopt people who have a similar passion for drone programming and building custom softwares, this would help Bulawayo keep up with the latest technological trends in the world to solve complex problems in the Built Environment and help bridge the gap in the use of technology by the world reat estate and land survey companies as well as Bulawayo real estate and land developemt companies.

**4. Timeline for beta project software releases**

The Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine beta project will have a timeline schedule that will clearly state the times and dates for the release of softawares and software updates. The timeline documentation will be released on its own and it will be attached to this documentation.

**5. Sign up process for beta project**

The Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine beta project sign up process is fairly easy, these are the sign ups steps to the programme:

(i) Fill out beta project affiliate form that come with this documentation (find affiliation form within documentation package).

(ii) After filling out the affiliation form, submit the form to Mthokozisi Thabiso Sapuwa (the Developer), contact the Developer to come and collect affiliation form.

(iii) Upon submission of affiliation forms, a once off premium fee of USD$500.00 has to be paid to fully complete the affiliate process. Payment details will be available on the affiliation form.

(iv) After payment has been made, the affiliated party will receive an email from the Developer (mthoesaps06@gmail.com) that will contain the login details for the affiliated company and it will also contain a link that will enable the affiliated party to access the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine and within 72 hours of the payment, the affiliated party will also receive a second email that will have the same configuration for their own personal company GIS and Remote Sensing software i.e the company will receive 2 emails from the developer that will both contain their access to beta project and a second one will be access to their own personal mapping engine/ software.

(v) Congratulations you have succesfully affiliated to the beta project in those 4 easy steps.

N.B: This sign up method is only limited to the first beta project companies, after beta project has launched, a web app will be created that will be dedicated for communiction and project updates and new project plug-ins and download news.

**6. Release of New Software and Software Updates**

Mthoe Saps Construction Technologies will be constatly hands on with the maintanace of the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine and all affiliated party’s softwares. The engines will be carefully optimized and regularly maintained and debugged to always ensure a smooth user experience for our affiliated clients/ partners. We will also be heavily invested in developing new and exciting software for the benefit of all affiliated beta project companies so you can rest assured you are in for a new and exciting technological journey as we are already exploring into the unchartered territories of 3D Drone Mapping and Surveying. Beta project companies have the advantage of getting and experiencing first hand technological developments from Mthoe Saps Construction Technologies as a dedicated web app will be designed for this communication as mentioned above.

**7. Software packages for beta signed companies**

Companies that sign up for the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine beta project will get the following softwares:

(i) Access to a Private web app by Mthoe Saps Construction Technologies

(ii) Geographic Information Systems (GIS) and Remote Sensing Mapping and Surveying software from Mthoe Saps Construction Technologies

(iii) A Property Management Systems Software that manages properties and real estate

(iv) A Real Time Property Surveillance Software to view properties in real time

(v) Three free 3D drone Mapping and Survey projects each affiliate member

**8. Beta project pricing scheme**

The pricing scheme to sign up for the Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine beta project is as follows:

(a) The beta project has an initial joining premium fee of USD $500.00 that the affiliated organisation/ company agrees to pay the Developer for the enrollment to the beta programme. This premium fee includes deployment costs, a mapbox token for custom map databases and also as stated for the enrolment to the beta programme. The payment has to be made before the web app is deployed for the use of the organization or company in order to settle payments for the affiliates API key userbility.

The affiliated party will be granted full access to the to use of the web app 72 hours after the payment has been made.

(b) A montly payment of USD $75.00 in order to host, maintain, run and debug the code for the first year (12 months) of running the beta programme.

(c) After first year of beta project and the project goes live on global launch, the affiliation fee will be terminated and the montly payment fee charges will be stacked at USD $25.00 for the orginal beta project organisatins and companies.

N.B: Beta project members are to receive lifetime loyalty rewards for actively supporting this project as it needs alot of participants and willingly engaging personel in order to accomplish and fulfil this project.

**9. About Developer**

The Engine is designed by Mthokozisi Thabis Sapuwa a final year student at the National University of Science and Technology undertaking a undergraduate Bachelor of Science Honors Degree in Property Development and Estate Management. I am a big enthusiast and also an aspiring land developer thus I have invested my time and skill into creating a special tool for the Built Environment that can simulate geospatial data into graphically visible charts, diagrams as well as two dimensional(2D) and three Dimensional (3D) real time maps. The Beta Programme also introduces drone surveying which is one of the most accurate and most reliable drone mapping and surveying in the technological market.

**10. Community forums page**

This beta project will have have one update dedicated social media account on Instagram that will be the go to social media page for the project updates. The social media link will be provided on the informatics website that the beta project comes with.

**11. Licencing and Services**

The Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine beta project licencing and services as well as terms of use of the web app are highlighted on the contact, read through the contract clearly to understand the terms of use and licencing.

**11.a. Software Specs**

Current Software size = 338MB (354 504 231 bytes)

Size on disk = 390MB (409 686 016 bytes)

Contains = 33 651 files and 3 978 Folders

**11.b Computer Specs requirements to run Mthoe Saps Construction Technologies Bulawayo Mapping Survey Engine**

1. Atleast Quadcore processor machine

2. 4 gig ram and upwards

3. Operating system: Fully optimized to work on Linux, Windows, Apple devices, Android devices

4. Windows version: Microsoft Windows 10 Home (recommended) but can also work on older Microsoft Windows Versions at most Windows 7

5. System model: optimized for x64-based PC

6. Processor: Intel(R) Celeron(R) CPU N3050 @1.60GHz, 1601 Mhz, 2 Cores, 2 logical processors or better

7. Stable WiFi connection

**12. Trademarks**

The following organizations are accredited for the creation of this tool:

1. Plotly

2. Pandas

3. Numpy

4. Scikit-learn

5. Streamlit

6. Pillow

7. Python

8. GeoPandas

9. Mthoe Saps Construction Technologies

10. Nortveil Incorporated (Pvt) Ltd