TILENGA PROJECT

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT

Volume VI(a)

Submitted to:
National Environment Management Authority

May 2018

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Due to the size of the appendices, for the printed version of the ESIA they have been split into 2 volumes (6a and 6b) as follows:

ESIA VOLUME 6a:

Appendix A: NEMA Approval for Scoping Report and Project Proponents Response

Appendix B: Key Project Component Fact Sheets

Appendix C: Early Works Project Brief (PB) Executive Summary and Enabling Infrastructure Geotechnical surveys PB Executive Summary

Appendix D: A3 copy of key figures

Appendix E: Additional Project Description material

Appendix F: CIA VEC Summary Report

Appendix G: Stakeholder Engagement Plan and supporting information

Appendix H: Air Quality supporting information

Appendix I: Noise and Vibration supporting information

ESIA VOLUME 6b:

Appendix J: Soils and Geology supporting information

Appendix K: Hydrogeology supporting information

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Appendix M: Landscape and Visual supporting information

Appendix N: Terrestrial Vegetation supporting information

Appendix O: Terrestrial Wildlife supporting information

Appendix P: Aquatic Life supporting information

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Appendix R: Archaeology and Cultural Heritage supporting information

Appendix: S: Ecosystem Services supporting information

Appendix T: ESMP Mitigation Checklist

TILENGA PROJECT ESIA - APPENDIX A: Reponse to comments from NEMA on for Scoping Report and ESIA Terms of Reference

May 2018

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1. Annex A – NEMA Response to Scoping Report and ESIA Terms of Reference (TOR)

A Scoping Report for the Tilenga Project which contained a detailed proposed Terms of Reference for the ESIA was submitted to NEMA in December 2015 (at the time of Scoping, the Project name was EA-1/EA-1A and EA-2 North Project). NEMA subsequently provided formal approval of the Scoping Report and Terms of Reference on 21st April 2016. A copy of the approval is contained below.

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RE: REVIEW OF SCOPING REPORT AND TERMS OF REFERENCE FOR THE PROPOSED EA-1/EA-1A AND EA-2 NORTH PROJECT EIA

This is in reference to the Scoping Report and Terms of Reference (ToR) for carrying out an Environmental Impact Assessment for the proposed EA-1/EA-1A and EA-2 North Project in Buliisa and Nwoya Districts that were submitted to this Authority for review and consideration.

The review has been completed and the ToR are generally deemed appropriate to guide the Environment Impact Study. However, in addition to the aspects and the scope of work identified in the ToR, there are a number of issues that have to be addressed during the conduct of the study and preparation of the report as highlighted below:-

1. EIA Team

(i) Ensure that all persons who will participate in the EIA process in-country are duly registered and certified in accordance with the National Environment Act Cap 153 and National Environment Impact Assessment Regulations, 1998. The use of in-country expertise is encouraged where there is sufficient capacity.

(ii) It is recommended that an Environmental Engineer with clear understanding of the local requirements is included on the local team. The engineer will contribute to the review and alignment of the project components, alternatives and waste management options to local requirements so as to guide the development of implementable actions.

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2. Regulatory and Institutional Framework

(i) The EIA should provide a comprehensive and systematic account of how the Strategic Environment Assessment (SEA) for the Albertine Graben is reflected and integrated into the assessment. There should be better indication how results from the SEA are integrated into the EIA for this project. Potential gaps between the SEA concluding advice and the project EIA can be highlighted, and measures that can be taken to fill these gaps within the project proposed.

(ii) The relevance of IFC standards to this project is recognized, however Ugandan laws and regulations should be adhered to while seeking to achieve a '*net gain*' in biodiversity and ecosystem services for the highly sensitive areas in the project area (refer to section 1.3.2 of the scoping report).

3. Stakeholder consultation

(i) The Directorates of Gender, Women and Social Affairs of the Ministry of Gender, Labour and Social Development should be consulted in relation to aspects of Gender, HIV, Vulnerable groups among others (Table 7-1). Similarly, the Office of the Prime Minister, Ministry of Internal Affairs and Ministry of Defence should be consulted on emergency preparedness, security issues, migration and cross-border impacts.

4. EIA Study

(i) The study should not only aim at identifying and assessing adverse impacts, but also identifying and enhancing/strengthening any possible positive impacts of the project. This should be one of the objectives of the study.

(ii) The timing of the FEED and EIA should be synchronized to enable full integration of EIA results into the FEED to allow for assessment of design within the ESIA.

(iii) The study should make reference to previous exploration and appraisal activities undertaken in the project area, drawing on experience from previous drilling operations as well as the geotechnical studies. Information on positive and negative impacts, challenges and successes should be systematized and used to inform the EIA and FEED process. The lessons learnt with regard to management of drilling waste (both on-site and off-site), storm water, chemicals, land resettlement and compensation among others, should be considered during the study.

(iv) All locations and construction activities within highly sensitive areas such as the Nile and Murchison Falls National Park, in particular wildlife and tourism hot spots among others, need to be based on comprehensive analysis to avoid any adverse environmental and social impacts.

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5. Quality of the EIA Report

(i) Illustrations of the different parts of the project should be related to the context of the development area. The use of non-technical illustrations, photographs, charts and tables, photographic visualizations, visibility maps and 3D models in relation to the project environment is encouraged, as they are a useful tool to help communicate the nature of environmental changes, and to foresee potential impacts.

(ii) Ensure that accurate baseline information is provided in the EIA report. The baselines should be accurately documented to inform the assessment of impacts including, whether the development will lead to 'no net loss' or even a 'positive gain' as suggested in the report, future monitoring as well as restoration activities. Also make reference to previous baseline studies undertaken for instance by Wildlife Conservation Society(WCS) particularly in Murchison Falls National Park and its reserves.

6. Project description and alternatives analysis

(i) The project description should provide a clear understanding of the different project components and planned sequencing/phases of implementation. There is need to ensure that all required pipelines are installed at the construction stage to minimize additional activities at a later stage.

(ii) Adequate detail should be provided about the different project components, exact locations, layout and land take for the well pads, pipelines and other linear infrastructure, camps, operational bases and the Central Processing Facility (CPF) including description of all operations and processes at the CPF. The proposed routing of the pipeline should take advantage of road corridors and provision of one trench for pipeline infrastructure to minimize surface disturbance.

(iii) The land take should be computed and compensation measures proposed. Large land take and surface disturbance should be minimized as much as practicable as the project is located in a fragile and sensitive ecosystem with high ecological and biodiversity significance.

(iv) The alternatives analysis should clearly present the project decisions/tradeoffs made to date including justification for the choices made. This includes information from the high level feasibility studies and the optioneering done at pre-scoping that helped inform the initial design of the project in order to avoid adverse impacts and strengthen the positive impacts. The alternatives should be assessed not only in respect to physical layouts, timelines and sequencing of project elements, route selections for linear construction, use of chemicals and technology during the development and production stages, but also options for down-sizing the project as a whole or components of it given that the severe impacts of these also need to be considered. The current description of the '*No project*' alternative is biased and not within EIA standard or planning best-practice when described as inevitable, even if it is not the likely outcome. There should be a clearer description on how the '*No project*' alternative shall be used as a reference alternative describing the likely development of the area without the realization of the proposed development. In order to eliminate or reduce negative impacts arising from the proposed development, realistic alternatives should be provided in the EIA report.

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(v) A comprehensive assessment should be undertaken for the project water needs, the estimated amounts of water to be abstracted from the various sources and the capacity of the available resources to meet these needs without compromising the ecosystem and local and regional demands. This should include detailed hydrological study for the L. Albert and associated systems to inform the design of the project. Options for recycling of water should be assessed and provided in the EIS.

(vi) The project should adopt environmentally friendly technologies that protect human health and wildlife, reduces waste and the overall environmental footprint for all operations within the project area. For instance, there is need for careful selection of materials and additives taking into account technical requirements, concentration, toxicity, bioavailability and bioaccumulation potential. This applies to drilling fluids, cement and completion work over fluids, production chemicals, corrosion inhibitors among others. Selection of pipeline material to minimize the use of pipeline chemicals should also be assessed. An assessment justifying the choice of the proposed technologies over other alternatives as well as the material data safety sheets should be provided in the EIA.

(vii) In regard to the planned use of chemicals to enhance oil recovery, the EIA should contain an evaluation of the potential environmental effects of these chemicals. This should include but not be limited to the expected fate of the chemicals in the reservoir and how water resources will be protected from contamination, how much of the chemicals will be back produced with the produced water and possible methods to remove the chemicals from the produced water, in cases where re-injection is not possible.

(viii) Provided that large volumes of murram (approx. 10,000 tons/well pad) are required for the project, it is prudent that the EIA identifies probable sources of murram and other locally available resources such as sand to meet the project needs (refer to section 3.6.2 of the scoping report). This will involve preliminary identification and general assessment of the availability of these resources locally and in the region. Note that burrowing murram within the national park may be limited.

7. Impact assessment and mitigation

(i) The report should include proposals to comprehensively address the impacts of the project through its full life cycle.

(ii) The mitigation hierarchy should be considered while proposing mitigation actions. Avoidance should be given first consideration while offsets should be a last option.

(iii) The EIA should identify all possible waste streams and develop a comprehensive waste management plan for the project. This should include for the different waste streams; on-site waste handling, storage, transportation, treatment and final disposal or reuse/recycling with waste tracking mechanisms. Explore and propose alternatives for the on-site handling of drilling waste.

(iv) In regard to treatment and disposal of waste drill cuttings and other potentially hazardous waste likely to be generated from the project operations, the treatment

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and disposal methods should be clearly described in the EIA as well as measures to mitigate and monitor environmental impacts. The expected outcome from the treatment process to render the waste suitable for other proposed uses, particularly in regard to residual drilling fluids (particularly Non –aqueous drilling fluids (NADFs)) on the cuttings, should be described. Note that the proposed methods of disposal should be applicable within the local regulatory context. Drilling fluids and cuttings management therefore requires thorough assessment of all possible alternatives and objective justification for the selected options.

(v) Ensure that all waste water generated from the operation of the project is treated to meet the required standards prior to disposal. According to the scoping report there seems to be a mis-match between the project water usage and the capacity of the waste water treatment facility. All waste water needs to be accounted for and the capacity and efficiency (expected quality of effluent) of the treatment facility described. Re-injection facilities including how leakages from the well will be prevented and alternative methods of disposal if water cannot be re-injected should also be clearly described. Environmental effects of discharges from pipeline testing and cleaning should also be assessed and appropriate management measures proposed.

(ix) In regard to the pipeline, a leak detection system should also be described.

(x) Drilling and production facilities should be designed for minimum noise and air emissions. The EIA should adequately assess plans for well testing, alternative methods for well testing and expected emissions and /or discharges related to these.

(xi) Ecosystem services for environmental resources such as water both to communities and in the national park should be evaluated to assess how the provision of these services will be affected.

(xii) The EIA should comprehensively address the socio-economic impacts of the project on the livelihood activities within the project area and its area of influence both during construction and operation phase. This should take into account seasonal variation of activities such as tourism, fisheries, agriculture and wildlife behavior/patterns among others.

(v) Cumulative impact assessment should clearly define the area of influence based on the identified Valued Ecosystem Components (VECs). Regional impacts should be evaluated given that the project is located in an area with international values and, an Integrated Management Plan developed to address the identified impacts.

(vi) In regard to visual impacts (Chapter 8, page 182 of the scoping report), provided that well pads will be located in tourism areas for long periods of time, technology for pumping the oil should be specified and measures to blend these facilities should be identified. The impacts of a high presence of people and more water

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traffic in an otherwise pristine environment should be assessed in the short term, medium and long term and wherever possible in economic terms.

(vii) The two EIA submissions should clearly describe the bridging mechanism indicating how the two Environmental Management Plans for the respective areas of operation will be implemented to guarantee a joint and successful EIA process and effective implementation of the EIA results into construction, operations and decommissioning/abandonment in the project.

The purpose of this letter therefore, is to grant formal **APPROVAL** of the TOR pertaining to Environmental Impact Assessment for the proposed EA-1/EA-1A and EA-2 North Project in Buliisa and Nwoya Districts taking into account the above-mentioned issues.

Any developments outside the scope of this ToR shall be subjected to separate Environment Impact Assessment process.

We look forward to your cooperation and receipt of ten (10) comprehensive copies of the EIA report, for our further action.

(***NOTE: THIS DOES NOT SERVE AS A CERTIFICATE OF APPROVAL***)

Waiswa A. Ayazika
FOR: EXECUTIVE DIRECTOR

c.c The Director
Petroleum Exploration Development and Production Department
Ministry of Energy and Mineral Development
ENTEBBE

" The Director
Directorate of Water Resources Management
Ministry of Water and Environment
ENTEBBE

" The Executive Director
Uganda Wildlife Authority (UWA)
KAMPALA

" The District Environment Officer
Buliisa District Local Government
BULIISA

" The District Environment Officer
Nwoya District Local Government
NWOYA

2. Annex B - Response to comments from NEMA

This section provides a summary table of the comments which also identifies where the comments and recommendations from NEMA have been considered and addressed within the ESIA.

NEMA APPROVED SCOPING REPORT/ TERMS OF REFERENCE – COMMENTS AND RESPONSES			
1. EIA Team			
NEMA Comments		**Project Proponents Response**	**Relevant Chapter of ESIA**
i)	Ensure that all persons who will participate in the EIA process in-country are duly registered and certified in accordance with the National Environment Act Cap 152 and National Environmental Impact Assessment Regulations, 1998. The use of in-country expertise is encouraged where there is sufficient capacity.	*The study was performed by registered environmental assessment practitioners from AECOM Limited and Eco&Partner Consult.*	***Chapter 1: Introduction***
ii)	It is recommended that an Environmental Engineer with clear understanding of the local requirements is included on the local team. The engineer will contribute to the review and alignment of the project components, alternatives and waste management options to local requirements so as to guide the development of implementable actions.	*The local Consultant (Eco & Partner) Team Leader is an Environmental Engineer and provided invaluable guidance in the alignment of the Project with national requirements, including the development of mitigation actions which are in line with Ugandan legislation.* *In addition, the Project Proponents provided a number of environmental engineers (local and international) who worked on the project and as an interface between the ESIA team and the Project Team, including FEED, Enabling Infrastructure (EI) and Drilling.*	***Chapter 2: Policy, Regulatory and Administrative Framework*** ***Chapter 4: Project Description and Alternatives,*** including embedded mitigation measures ***Chapters 6 - 20*** ***Chapter 23: Environmental and Social Management Plan***
2. Regulatory and Institutional Framework			
NEMA Comments		**Response**	**Relevant Chapter of ESIA**
i)	The EIA should provide a comprehensive and systematic account of how the Strategic Environmental Assessment (SEA) for the Albertine Graben is reflected and integrated into the assessment. There should be a better indication how results from the SEA are integrated into the EIA for this project. Potential gaps between the SEA concluding advice and the project EIA can be	*The Albertine Graben SEA was considered throughout the production of the ESIA. Numerous chapters and sections of the ESIA build on the recommendations which were outlined within the SEA, with a clear focus on those items relevant to our own Project.*	***Chapter 2: Policy, Regulatory and Administrative Framework*** ***Chapter 21: Cumulative Impact Assessment***

	highlighted, and measures that can be taken to fill these gaps within the project proposed.		
ii)	The relevance of IFC standards to this project is recognized, however Ugandan laws and regulations should be adhered to while seeking to achieve a 'net gain' in biodiversity and ecosystem services for the highly sensitive areas in the project area (refer to section 1.3.2 of the scoping report)	*Noted. Both Ugandan laws and regulations, and IFC standards have been adhered to.*	***Chapter 2: Policy, Regulatory and Administrative Framework; Chapter 13: Terrestrial Vegetation, Chapter 14: Terrestrial Wildlife; Chapter 15 Aquatic Life, Chapter 16: Social and Chapter 19: Ecosystem Services***
3. Stakeholder Consultation			
NEMA Comments		***Response***	**Relevant Chapter of ESIA**
i)	The Directorates of Gender, Women and Social Affairs of the Ministry of Gender, Labour and Social Development should be consulted in relation to aspects of Gender, HIV, Vulnerable group among others (Table 7-1). Similarly, the Office of the Prime Minister, Ministry of Internal Affairs and Ministry of Defence should be consulted on emergency preparedness, security issues, and migration and cross border impacts.	*Noted. Consultation was undertaken with The Directorates of Gender, Women and Social Affairs of the Ministry of Gender, Labour and Social Development. Additionally, Consultation was undertaken with, the Office of the Prime Minister, Ministry of Internal Affairs and Oil and Gas Police relating to numerous potential issues including emergency preparedness, security issues, and migration and cross border impacts.* *Stakeholder consultation and engagement activities have been considered essential in the development of the ESIA and the views and responses gained have been used to inform the ESIA.*	***Chapter 5: Stakeholder Engagement*** ***Appendix G: Stakeholder Engagement Plan***
4. EIA Study			
NEMA Comments		***Response***	**Relevant Chapter of ESIA**
i)	The study should not only aim at identifying and assessing adverse impacts, but also identifying and enhancing/strengthening any possible positive impacts if the project. This should be one of the objectives of the study.	*This was a key objective and a fundamental part of the development of this ESIA. Although understanding where potential adverse impacts may occur and outlining plans and measures to mitigate against them is vital, a key focus has been on identifying and enhancing any potential beneficial impacts within the ESIA. These have included the significant economic and employment opportunities (e.g. including the training provision of staff that would then have transferable skills for the future) as well as business*	***Chapter 3: ESIA Methodology –*** and throughout a number of the ***technical chapters*** where appropriate.

		opportunities and the opportunities for more efficient and positive management systems to help across the Albertine Graben region.	***Chapter 21: Cumulative Impact Assessment***
ii)	The timing of the FEED and EIA should be synchronized to enable full integration of EIA results into the FEED to allow for assessment of design within the ESIA.	*The ESIA and FEED have taken place at the same time. The ESIA has operated slightly ahead of the FEED process, which has provided the opportunity to positively input into the detailed design to ensure environmental and social factors are considered as part of the design. Some key examples of this include:* • *Design principles identified by the Project Proponents to the EI and FEED engineers have included specific environmental design requirements based on the outcomes of the scoping report (and associated ToR), Uganda national legislative requirements, IFC EHS Guidelines, and Best Available Technology (BAT) reference documentation.* • *Dedicated ESIA workshops were held with EI and FEED engineers to present the environmental and social baseline. This assisted each contractor with the development of the environmental design philosophies and has been an integral part of the FEED development.* • *ENVID studies have been undertaken with each entity (EI, FEED and Drilling) to define the embedded design mitigation measures.* • *Social and ecological avoidance work was undertaken for the ESIA and passed directly to the FEED team to help avoid potential impacts at sensitive receptors.* • *Ongoing dialogue between each entity and the ESIA contractor to ensure that suitable and sufficient additional mitigation measures derived from the EIA process have been incorporated into the design.* • *A Management of Change process to monitor and assess any design changes in terms of potential consequences with respect to environment and social was established.*	***Chapter 4: Project Description and Alternatives***
iii)	The study should make reference to previous exploration and appraisal activities undertaken in the project area, drawing on experience from previous drilling operations as well as the geotechnical studies. Information on positive and negative impacts, challenges and successes should be systematized and used to inform the EIA and FEED process. The lessons learnt with regard to management of drilling water (both on-site and off-site), storm water, chemicals, land resettlement and compensation among others, should be considered during the study.	*The past experiences of the Project Proponents have been fed into the FEED and ESIA process and have helped to inform the development of the design of the Project. For the ESIA, we have drawn upon secondary data contained in other EIAs which have been undertaken in the past as part of the explorations phases. The ESIA therefore builds on the existing information and studies undertaken to date with our own baseline surveys focused specifically on our project footprint/area of influence, where they are required.* *For storm water management, the main principle will be to minimize, control and manage the generation of surface water at source to prevent risk of erosion, flooding and contamination at source i.e. at the facilities in a sustainable manner which is in line with best practice guidance.* *Lessons learned for land resettlement and compensation are summarized in the LARF which is used as a basis for the RAPs.*	***Chapter 4: Project Description and Alternatives*** and contained within each ***Technical Chapter*** as appropriate

iv)	All locations and construction activities within highly sensitive areas such as the Nile and Murchison Falls National Park, in particular wildlife and tourism hot spots among others, need to be based on comprehensive analysis to avoid any adverse environmental and social impacts.	*The evolution of the projects design has taken place with due consideration of the sensitive environment within which it lies. The FEED have taken into consideration baseline information gathered over the last 5+ years (for this ESIA and other studies) to help ensure the design is developed in order to avoid or minimise as many potential adverse impacts as possible. Furthermore, the Project Proponents have developed a robust Environmental and Social Avoidance Protocol which sets out clear guidelines and information which was used to identify sensitive areas of wildlife, tourism and social features that needed to be avoided due to the sensitivities attached to these locations. The results of these avoidance surveys fed directly into the design of the Project. Consequently, this protocol was used to both minimise the size of the development and the individual land take required for each Project component, as well as for the siting of the actual individual Project components to help avoid completely the most sensitive areas.* *HDD technique used for the Nile crossing is considered to be a method with least potential impact among the techniques considered for the river crossing.*	***Chapter 3: ESIA Methodology*** ***Chapter 4: Project Description and Alternatives***
5. Quality of the EIA Report			
NEMA Comments		**Response**	**Relevant Chapter of ESIA**
i)	Illustrations of the different parts of the project should relate to the context of the development area. The use of non-technical illustrations, photographs, charts and tables, photographic visualizations, visibility maps and 3D models in relation to the project environment is encouraged, as they are a useful tool to help communicate the nature of environmental changes, and to foresee potential impacts.	*This is a complex Project with a large ESIA. It has been essential for us to utilise and include non-technical illustrations, photographs, charts and tables, photographic visualizations, maps and models in relation to the project environment. These have been included throughout the ESIA were appropriate.*	***Contained within all Chapters of the ESIA, as necessary***
ii)	Ensure that accurate baseline information is provided in the EIA report. The baselines should be accurately documented to inform the assessment of impacts including, whether the development will lead to 'no net loss' or even a 'positive gain' as suggested in the report, future monitoring as well as restoration activities. Also make reference to previous baseline studies undertaken for instance with Wildlife Conservation Society (WCS) particularly in Murchison Falls National Park and its reserves.	*The ESIA baseline has, in addition to the baseline studies conducted at the various Project locations, utilised the vast array of existing available information across the Albertine Graben to inform the impact assessment, including WCS studies in MFNP and its reserves. Each technical chapter outlines the secondary data and information sources which have been used to help identify the baseline characteristics. Each technical chapter therefore has a detailed baseline section, which is often supplemented with additional data which is presented within the ESIA Appendices.* *The aspect of No Net Loss / Net Gain is covered specifically within Chapters 13: Terrestrial Vegetation and Chapter 14: Terrestrial Wildlife and Chapter 15: Aquatics. Monitoring and restoration are recognized as necessary in the implementation of the Project to ensure potential negative impacts are minimized and potential positive impacts*	Contained within each baseline section of each ***Technical Chapter***

		enhanced. Details of the monitoring and restoration aspects will be further expanded upon in future management Plans which will be prepared for the project as outlined within Chapter 23: ESMP.	
6. Project description and alternatives analysis			
NEMA Comments		**Response**	**Relevant Chapter of ESIA**
i)	The project description should provide a clear understanding of the different project components and planned sequencing/phases of implementation. There is need to ensure that all required pipelines are installed at the construction stage to minimize additional activities at a later stage.	*The Project Description within the ESIA does provide a clear understanding of the different Project components and planned sequencing/phases for implementation of the project. All Pipeline and flowline construction activities are to be undertaken during the Construction and Pre-Commissioning phase of the project. The Project Description includes details on the activities which will occur for each phase of the development (Site Preparation and Enabling Works; Construction and Pre-Commissioning; Commissioning and Operations; and Decommissioning.*	***Chapter 4: Project Description and Alternatives***
ii)	Adequate detail should be provided about the different project components, exact locations, layout and land take for the well pads, pipelines and other linear infrastructure, camps, operational bases and the Central Processing Facility (CPF) including description of all operations and processes at the CPF. The proposed routing of the pipeline should take advantage of road corridors and provision of one trench for pipeline infrastructure to minimize surface disturbance.	*The Project Description of the ESIA contains detailed information about the design of the project. In particular, this includes:* • *Information and description of each Project component;* • *Confirmed locations of key Project components;* • *Example layout and land take for the well pads;* • *Location of pipelines and other linear infrastructure;* • *Location of camps, operational bases and the Central Processing Facility (CPF) including description of all operations and processes at the CPF.* *Where possible, the proposed routing of the pipelines has taken advantage of new road corridors in the North Nile and the construction philosophy ensures that there is only one trench for pipelines and flowlines to minimize surface disturbance.*	***Chapter 4: Project Description and Alternatives***
iii)	The land take should be computed and compensation measures proposed. Large land take and surface disturbance should be minimized as much as practicable as the project is located in a fragile and sensitive ecosystem with high ecological and biodiversity significance.	*The Project has sought to minimise its land take requirements and there was an emphasis during the FEED process to seek solutions to the Projects design which would help reduce the footprint of each and every Project Component. The land take requirements have been calculated and mitigation measures have been developed. This includes the development of specific Resettlement Action Plans covering different components of the Project.* *Assessment of potential losses and gains for biodiversity are undertaken for the optimized footprint, any additional mitigation measures are identified in order to ensure that Project Proponents meet commitment on No Net Loss and Net Gain to biodiversity.*	***Chapter 4: Project Description and Alternatives*** ***Chapter 16: Social*** ***Chapter 13: Terrestrial Vegetation*** ***Chapter 14: Terrestrial Wildlife***

iv)	The alternatives analysis should clearly present the project decisions/trade-offs made to date including justification for the choices made. This includes information from the high level feasibility studies and the optioneering done at the pre-scoping that heled inform the initial design of the project in order to avoid adverse impact and strengthen the positive impacts. The alternatives should be assessed not only in respect to physical layouts, timelines and sequencing of project elements, route selections for linear construction, use of chemicals and technology during the development and production stages, but also options for down-sizing the project as a whole or components of it given that the severe impacts of these also need to be considered. The current description of the 'No project' alternative is biased and not within EIA standard or planning best-practice when described is inevitable even if it is not the likely outcome. There should be a clearer description on how the 'No project' alternative shall be used as a reference alternative describing the likely development of the area without the realization of the proposed development. In order to eliminate or reduce negative impacts arising from the proposed development, relative alternatives should be provided in the EIA report.	*Detailed information has been provided on the Alternative analysis undertaken as part of the evolution of the Project. Further detail and information is also provided on the No Development option.*	***Chapter 4: Project Description and Alternatives***
v)	A comprehensive assessment should be undertaken for the project water needs, the estimated amounts of water to be abstracted from the various sources and the capacity of the available resources to meet these needs without compromising the ecosystem and local and regional demands. This should include detailed hydrological study for the L. Albert and associated systems to inform the design of the project. Options for recycling of water should be assessed and provided in the EIS.	*The Project Proponents have undertaken detailed calculations relating to the water needs for the Project which are compared against anticipated available water resources. Hydrological studies of Lake Albert were conducted by the Project Proponents and the findings used in the selection of the lake as a water source to meet Project needs during the Commissioning and Operations Phase. Further studies to understand the feasibility of using ground water resources for the Site Preparation and Enabling Works, and Construction and Pre-Commissioning phases will be conducted to ensure that all water use for the Project is sustainable, and does not compromise the ecosystem and local and regional demands.* *Options for reducing the amount of water required through re-use and recycling have also been explored and included in the Project design, where feasible, as detailed in the ESIA and further measures are continually being explored.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 9: Hydrogeology; and*** ***Chapter 10: Surface Water.***
vi)	The project should adopt environmentally friendly technologies that protect human health and wildlife reduces waste and overall environmental footprint for	*In all aspects, the FEED has been based on Good International Industry Practice (GIIP) and BAT. The Project has adopted environmentally friendly technologies to help minimise any potential adverse impacts on human health or wildlife and ecosystems. This was a*	***Chapter 2: Policy, Regulatory and***

	all operations within the project area, For instance, there is a need for careful selection of materials and additives taking into account technical requirements, concentration toxicity bioavailability and bioaccumulation potential. This applies to drilling fluids, cement and completion work over fluids, production chemicals, corrosion inhibitors among others. Selection of pipeline material to minimize the choice of the proposed technologies over the alternatives as well as the material data safety sheets should be provided in the EIA.	*key consideration for the FEED teams as they sought to identify a suitable design solution for the Project.* *The design proposed by the Project Proponents does not include discharge of chemicals to environment. Concentration and composition of chemicals shall be defined by operational requirements; however priority will be given to chemicals with least potential impact on health, safety or environment. Chemical composition is identified for drilling and production, however in the light of ongoing contract and procurement activities, specific product names and associated MSDS cannot be provided at this point. Some examples are attached for reference purposes in Appendix E of the ESIA, however actual names of the products can change depending on drilling and operational requirements.* *Internal corrosion management requirements will define selection of pipeline material.*	***Administrative Framework*** ***Chapter 4: Project Description and Alternatives*** ***Appendix E*** ***Chapter 12: Waste***
vii)	In regard to the planned use of chemicals to enhance oil recovery, the EIA should contain an evaluation of the potential environmental effects of these chemicals. This should include but not be limited to the expected fate of the chemicals in the reservoir and how much water resources will be protected from contamination, how much if the chemicals will be back produced with the produced water, in cases where re-injection is not possible.	*A Chemical Management Plan will be developed and implemented, which will provide an assessment of selected chemicals, their risks, and how these will be appropriately managed, including usage, storage, and disposal. Example mitigation measures will also be identified, including undertaking a risk assessment of each chemical and outlining the material data safety sheets, presenting the personal protective equipment required to handle chemicals, and appropriate storage.* *It is proposed to use FLOPAAM 3630S to enhance oil recovery for the Project. It is understood that the polymer may contain traces of acrylamide generated during the enhanced oil recovery process* *Further study work has been undertaken to determine the estimated amount of back produced polymer during the pilot phase although the rate of back produced polymer will be dependent on reservoir characteristics. Back produced polymer will be transported with the production fluids back to CPF where it will be separated with the produced water stream and subsequently re-injected into the reservoir.*	***Chapter 4: Project Description and Alternatives*** ***Chapter 23: Environmental and Social Management Plan***
viii)	Provided that large volumes of murram (approx. 10,000 tons/well pad) are required for the project, it is prudent that the EIA identifies probable sources of murram and other locally available resources such as sand to meet to project needs (refer to section 3.6.2 of the scoping report). This will involve preliminary identification and general assessment of the availability of these resources locally and in the region. Note that burrowing murram within the national park may be limited.	*The EI and FEED teams have identified a number of suitable locations/ borrow pits and quarry sites within the regional area, with due consideration for sites within the MFNP and associated restrictions. These are presented within the ESIA. Further work is on-going in order to identify the most suitable material sourcing locations to be used for the project.* *During Site Preparation and Enabling Works and Construction and Pre-Commissioning, reuse of cut material will be adopted wherever possible in order to minimize material take from borrow pits.*	***Chapter 4: Project Description and Alternatives***
7. Impact assessment and mitigation			

NEMA Comments		Response	Relevant Chapter of ESIA
i)	The report should include proposals to comprehensively address the impacts of the project through its life cycle.	*Noted. The key project phases defined within the ESIA are: Site Preparation and Enabling Works; Construction and Pre-Commissioning; Commissioning and Operations; and Decommissioning. Potential impacts and enhancement and mitigation measures have been identified for each phase of the project, throughout its life cycle. Due to the uncertainties around the exact plans for the project decommissioning at this stage, impact predictions have been largely based on the same as those for the Construction and Pre-Commissioning phase.*	***Chapter 4: Project Description and Alternatives; and*** Contained within each baseline section of each ***Technical Chapter*** ***Chapter 23: ESMP***
ii)	The mitigation hierarchy should be considered while proposing mitigation actions. Avoidance should be given first consideration while offsets should be a last option.	*The mitigation hierarchy of avoid, minimise, restore and offset has been fundamentally used in the development of the ESIA.*	***Chapter 3: ESIA Methodology*** ***Chapter 4: Project Description and Alternatives*** Contained within each baseline section of each ***Technical Chapter***
iii)	The EIA should identify all possible waste streams and develop a comprehensive waste management plan for the project. This should include for the different waste streams; onsite waste handling, storage, transportation, treatment and final disposal or reuse/recycling with waste tracking mechanisms. Explore and propose alternatives for the on-site handling of drilling waste.	*The ESIA provides details on the current Waste Strategy and estimates on waste types and volumes. Additionally, a dedicated Waste Map of all anticipated waste produced as part of the Project has been prepared, a summary of which is contained within the ESIA. A detailed Waste Management Strategy for the whole Project is currently being developed and will be used to develop a detailed Waste Management Plan for the Project.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 12: Waste***
iv)	In regard to treatment and disposal of waste drill cuttings and other potentially hazardous waste likely to be generated from the project operations, the treatment and disposal methods should be clearly described in the EIA as well as measures to mitigate and monitor environmental impacts. The expected outcome from the treatment process to render the waste suitable for other proposed uses, particularly in regard to residual drilling fluids (particularly Non-aqueous drilling fluids (NADFs) on the cuttings, should be described. Note that the proposed methods	*The drilling strategy is planned in line with the waste minimisation strategy, considering that the slim hole architecture reduces drill cuttings (waste) volumes by 30% (compared to standard well dimensions).* *Drill fluids will be reused thus reducing amount of hazardous fluids for disposal.* *A number of options were considered for drilling cuttings management and possible options have been listed in the ESIA. The measures associated with the management of waste including drilling have also been indicated in the report.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 12: Waste***

	of disposal should be applicable within the local regulatory context. Drilling fluids and cuttings management therefore requires thorough assessment of all possible alternatives and objective justification for the selected options.	*A detailed Waste Management Strategy for the whole Project is currently being developed in consideration of regulatory context, existing capacity and capability to manage hazardous waste.*	
v)	Ensure that all waste water generated from the operation of the project is treated to meet the required standards prior to disposal. According to the scoping report there seems to be a mis-match between the project water usage and the capacity of the waste water treatment facility. All waste water needs to be accounted for and the capacity and efficiency (expected quality and effluent) of the treatment facility described. Re-injection facilities including how leakages from the well will be prevented and alternative methods of disposal if water cannot be re-injected should also be clearly described. Environmental effects of discharges from pipeline testing and cleaning should also be assessment and appropriate management measures proposed.	*The majority of the water will be used by the Project during production phase for enhanced oil recovery (water injection). Where feasible, water used for pre-commissioning activities will also be re-injected.* *The Project Proponents will engineer and procure facilities suitable for water treatment at the Industrial area which will be of the sufficient capacity and will ensure that water is treated to meet the national standards. Existing Waste Water Treatment Plants at the camps will be upgraded if required based on further assessment.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 12: Waste*** ***Chapter 10: Surface Water.***
ix)	In regard to the pipeline, a leak detection system should also be described.	*Fibre optic cable (FOC) installed along the full length of the pipeline will have leak detection functionality.*	***Chapter 4: Project Description and Alternatives;***
x)	Drilling and production facilities should be designed for minimum noise and air emissions, The EIA should adequately assess plans for well testing, alternative methods for well testing and expected emissions and/ or discharges relates to these.	*The FEED has been done with due consideration of the acceptable noise and air emissions by the national standards. As such prescribed equipment has been proposed with the aim of meeting these standards, as far as reasonably practicable, particularly with consideration of working in MFNP.* *Main power generation equipment has been selected based on operational requirements and BAT and EHS Guidelines thus minimizing air emissions from main combustion equipment. There will be no routine well testing after wells are completed.* *Modelling for air emissions demonstrates compliance with applicable ELVs and ambient air quality standards.* *For the equipment at CPF a rule of 85 dBA at 1 m from the equipment will be adopted.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 6: Air Quality and Climate; and*** ***Chapter 7: Noise and Vibration;***
xi)	Ecosystem services for environmental resources such as water both to communities and in the national park should be evaluated to assess how the provision of these services will be affected.	*A whole suite of ecosystem services have been studied and analysed within the ESIA, including for water provision. These are discussed in detail within the ESIA.*	***Chapter 19: Ecosystem Services***

xii)	The EIA should comprehensively address the socio-economic impacts of the project on the livelihood activities within the project areas and its area of influence both during the construction and operation phase. This should take into account seasonal variation of activities such as tourism, fisheries, agriculture and wildlife behaviour/patterns amongst others.	*The ESIA has provided a detailed review of wide range of social and socioeconomic factors and topics for each of the phases of the project.*	***Chapter 16: Social;*** ***Chapter 18: Health and*** ***Chapter 19: Ecosystem Services***
v)	Cumulative impact assessment should clearly define the area of influence based on the identified Valued Ecosystem Components (VECs). Regional impacts should be evaluated given that the project is located in an area with international values and, and Integrated Management Plan developed to address the identified impacts.	*The ESIA has a chapter devoted to the Cumulative Impact Assessment. This includes the detailed identification of priority VECs and a review of the possible regional impacts. Measures to work with the government and other developers are included to help manage any potential cumulative impacts.*	***Chapter 21: Cumulative Impact Assessment*** ***Chapter 22: Transboundary Impacts***
vi)	In regard to visual impacts (Chapter 8, page 182 of the scoping report), provided that well pads will be located in tourism areas for long periods of time, technology for pumping the oil should be specified and measures to blend these facilities should be identified. The impacts of a high presence of people and more water traffic in an otherwise pristine environment should be assessed in the short term, medium and long term and wherever possible in economic terms.	*The ESIA includes a dedicated chapter which looks at the potential landscape and visual impacts associated with the Project.* *The development of the Project is based on footprint minimisation and production from normally unmanned well pads. It is estimated that each well pad will be visited once per week for routine inspection and maintenance. The FEED has concentrated on reducing the equipment complexity at the well pads to ensure potential impacts associated with manning and intervention are minimised. All fluids will be sent back to the CPF where the fluid separation and treatment will be undertaken. Every well pad will be remotely monitored (CCTV and leak detection). Production activities will be controlled via the Integrated Control and Safety System (ICSS) from the Central Control Room at CPF.* *Facilities design has also given due consideration of potential visual impact – The vent stacks have been removed with permanent facilities height at the well pads being no more than 5 m. Bund walls will be in place for the well pads situated in the MFNP. Where possible Project components were located below ground level (e.g. flowlines, wellheads) which will help to minimise the potential impact.* *It is anticipated that there will be daily ferry traffic during operations period (estimated 4-6 one way crossings per day) to maintain regular visits to the well pads.* *Mitigation measures to try and help further minimise potential adverse impacts are identified.*	***Chapter 4: Project Description and Alternatives;*** ***Chapter 11: Landscape and Visual***

vii)	The two EIA submissions should clearly describe the bridging mechanisms indicating how the two Environmental Management Plans for the respective areas of operation will be implemented to guarantee a joint and successful EIA process and effective implementation of the EIA results into construction, operations and decommissioning/abandonment in the project.	*After an extensive review, it has been decided to only submit ONE ESIA for the whole Project, rather than 2 separate documents This decision was made based on a change in the shareholding of the project as well as due to the more efficient and clearer approach of having one ESIA for the ONE Project. This approach will prove to be beneficial to NEMA's review process and help cut down on unnecessary repetition. Further information and justification for this approach is provided within the ESIA.*	***Chapter 1: Introduction***

TILENGA PROJECT ESIA - APPENDIX B: Key Project Component Fact Sheets

May 2018

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Introduction

The Factsheets have been produced to provide a concise summary of the main social, biological and physical features of the main components of the Tilenga Development project. The information has been gathered from primary and secondary data sources that were utilized for the in the main Tilenga ESIA report. More detailed information is provided in the relevant chapters of the main report.

This appendix incudes site specific information for the main project components which include:

- Well Pads;
- Industrial Area;
- Water Abstraction Station;
- Victoria Nile HDD Crossing ;
- Victoria Nile Ferry Crossing;
- Bugungu Air Strip
- Masindi Vehicle Check Point;
- Borrow Pits; and
- Flowlines

Access roads are not included as not all of the access roads were surveyed because the locations were not finalized at the time of the surveys. In the north, most access roads will be along the flowlines. In the south, the access roads in many cases also follow the flowlines or are short distances to existing roads. The satellite imagery is of sufficient detail to be able to see the general site conditions. The social, biological and physical features noted for the well pads, borrow pits and the flowlines will be considered and assumed to be present and all mitigation measures adopted as appropriate.

With respect to culturally important flora, where there are English names, e.g. sausage tree, Aloe Vera, tamarind, sisal these are provided. Scientific or English translation names are provided for the reader where we know them for local dialect names that are provided. In some cases all we know is a local name in one of several dialects - if we are not certain of the Latin name, it is not provided as this would be misleading. Most of the time there is no English name, as these plants are rare/nonexistent in countries that were English speaking prior to the colonial period, and/or have no industrial/mass economic use (e.g. sisal) exploited by the colonists so have not been given an English name.

Mapping of the individual components has been provided showing the social, biological and physical features of each of the project components. The purpose of the mapping is to provide an overview of the results of the biodiversity and social surveys to inform the impact assessment and the development of mitigation measures. The Factsheet mapping is aligned with the information contain in the report and show:

- Administrative boundaries – parish and village;
- Social Receptors - settlements, schools, lodges, health care facilities, places of worship and DWRM boreholes;
- Physical Receptors – water course , cattle corridors and roads; and
- Biological features.

For clarity, symbols for numerous specific biological and social features have been replaced by simple dots. Some features are more important than others for different reasons and the details of which are explained in the relevant ESIA Chapters. More detailed mapping is provided in Appendix N (Biodiversity) and Appendix I (Noise) – which use symbols as necessary. The current mapping is sufficient for its intended purpose.

1. JBR-01	**Well pad in MFNP**		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation(m)	653		
Terrain	Sloping		
Slope (degrees) and Aspect	3.739439	West	
Well Pad Area (ha)	3.7	8.3	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	20 November 2016 (Avoidance), 9 April 2017(Detailed), 27 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Site is an area of wooded grassland with general slope to the south-east. Surrounded by denser areas of vegetation potentially along seasonal channels and close to extensive areas of open grassland. Some areas of bare ground. At this point there are a series of linked wallows and ponds showing clear signs of use. The surveyed area is crossed by numerous animal tracks, most of which appear to radiate from/towards the wallows and ponds. The centre of the buffer zone is located within 1,000m of the edge of the Ramsar site.		
Vegetation type(s) (WCS mapping)	Wooded grassland		
Vegetation types recorded (micro-habitats)	Open grassland Open wooded grassland Bushed grassland Thicket Open water		
Main Biological and Social Features	Numerous trees principally: *Acacia sieberiana* *Balanites aegyptiaca* *Crateva adansonii* *Borassus aethiopum* (single example) Numerous termite mounds	Wallows Seasonjally flooded wetlands Numerous animal tracks Signs of elephant (destroyed tree) Burrows Salt lick Shade	
Notable Biological and Social Features	The series of wallows are a significant feature in this landscape and should be avoided. There are a numerous animal tracks radiating in all directions from these wallows and disturbance of these should be minimised. There is a large area of seasonal flooding and a seasonal watercourse leading from it on the western side of the buffer zone and the Ramsar site is located within 1,000m of the site's centre point.		
Dominant Woody Species	*Acacia sieberiana, Balanites aegyptiaca, Cadaba farinosa, Combretum aculeatum, Crateva adansonii, Harrisonia abyssinica*		
Dominant Herbaceous species	*Cyperus dubius-ferrugineus, Chamaecrista kirkii; Cyperus dubius; Cyanotis lanata, Desmodium sp.; Bulbostylis filamentosa; Bulbostylis sp., Hyperthelia dissoluta; Spermacoce ruelliae, Sporobolus stapfianus*		
Phytosociological Description	*Acacia-Hyperthelia* Bushed Grassland *Crateva-Acacia-Hyperthelia* Open Wooded Grassland *Harrisonia-Combretum-Cadaba* Bushed Grassland		

	Hyperthelia-Bulbostylis Grassland *Hyperthelia-Bulbostylis-Chamaecrista* Grassland with sparse trees *Sporobolus-Chamaecrista* Open Grassland *Sporobolus-Chamaecrista-Bulbostylis* Open Grassland					
Alien/Invasive Species	None identified					
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site.					
Priority Species	The area had sizable herds of Uganda Kob, Buffalo, Hartebeest, Oribi and Warthog. Giraffe and Elephant were also present in smaller numbers. Signs of Lion and Hyena were also recorded in this area. Two amphibian and seven reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. Soil Boring Log for DWD28663; Aquifer type is fine sand. Lithology 0-6m Brown Sandy top soil 6-18m Grey clay 18- 24m Fine grey sand 24-27m Grey sand & clay 27-30m Fine greyey sand 30-39m Yellowish brown fine sand 39-45m Sticky grey clay 45-54m Yellowish fine sand 54-57m Grey sticky clay 57-66m Soft Grey clay 66-72m Blackish grey clay & peat 72-75m Dark clay & Light grey claystone				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD28633	331604	251265	Within land acquisition	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		69	27.81	-	5.15-12.92	1.12-2.81
	Water availability	Specific Capacity 4.6 – 6.8 m^2/hr				
	Water Quality	There are no water quality reports at this site.				
Surface Water	**Closest Surface Water**	Not identified, 470m Wetland, 1,088m				
	Distance to Lake/River	Victoria Nile, 2,140m				
Socioeconomic Characteristics						
Social	**Distict**		**Subcounty**	**Parish**	**Village**	

	Nwoya	Purongo	Murchison Falls NP	-

	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**
		Africana Safari Lodge	3,168m
Archaeology and Cultural Heritage	**Survey Date:** 5th December 2016	Archaeological remains Lithic artefacts comprised three LSA single platform and opposed double platform quartz cores and a scatter of quartz lithics. The cores were abandoned prematurely, which may indicate that raw materials were plentiful. All lithic materials were made of readily available local quartz. One roulette-decorated pottery sherd of Late Iron Age or later date was recorded. Medicinal and cultural uses of plants Cultural heritage materials especially medicinal plants such as *combretum* (bush willow) and *kadaali*. The latter is used for the treatment of eyes.	
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** Key local characterisitics: • This LCA is a large scale upland plateau. This location is gently undulating. • This is a largely undisturbed landscape close to local tracks part of the Buligi Circuit. • Landcover within this site is entirely characteristic of the LCA as a whole. • A sense of wilderness prevails heightened by lack of infrastructure or human settlement; • Views are open and panoramic.	

2. JBR-02	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	675		
Terrain	flat		
Slope (degrees) and Aspect	0.46447	West	
Well Pad Area (ha)	3.2	5.8	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	21 November 2016 (Avoidance), 10 April 2017 (Detailed), 23 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Site is an area of wooded grassland with general slope to the south, where woody vegetation cover is denser. The more northerly upslope areas comprise open grassland with occasional trees. A leopard was noted at this site. The surveyed area is crossed by a number of animal tracks, most of which appear to radiate from/towards the wallows and ponds. The centre of the buffer zone is located about 1,500m from the edge of the Ramsar site.		
Vegetation type(s) (WCS mapping)	Wooded grassland		
Vegetation types recorded (micro-habitats)	Mainly open grassland Bushed grassland Grassland with scattered trees and scattered thicket		
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Crateva adansonii* *Trichilia emetic* *Kigelia africana*	Numerous termite mounds Animal tracks Burrows Aardvark activity Small wallows Tree with bat roost potential	
Notable Biological and Social Features	There are some small wallows and these should be avoided. There are some animal tracks crossing the survey area apparently heading towards the Ramsar site.		
Dominant Woody Species	*Acacia senegal; Acacia sieberiana; Balanites aegyptica; Cadaba farinosa, Cadaba longifolia, Combretum aculiatum, Chamaecrista kirkii; Crateva adansonii, Digitaria longiflora. Hyperthelia dissoluta; Harrisonia abyssinica*		
Dominant Herbaceous species	*Bulbostylis sp, Chamaecrista kirkii, Digitaria longiflora, Hyperthelia dissoluta, Murdannia simplex, Vernonia perrottetii*		
Phytosociological Description	*Harrisonia* Bushed Grassland *Harrisonia-Acacia-Combretum* Bushed Grassland *Harrisonia-Acacia-Hyperthelia* Lightly Bushed Grassland *Hyperthelia-Bulbostylis* Grassland with *Harrisonia* Thicket *Hyperthelia-Crateva-Acacia* Grassland with sparse tree cover *Hyperthelia-Digitaria* Open Grassland with sparse trees		
Alien/Invasive Species	None identified		

Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded at this site.					
Priority Species	Area had signs of Elephant, Hartebeest, Uganda Kob, Buffalo, Olive Baboon and Giraffe . Three reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no boreholes in the vicinity of this well pad. In general, superficial deposits including sandy clays with a thickness of 20-30m interbedded with clays with thickness 10-15m are found over much of the area; in some places boreholes have been drilled beyond 100m without encountering bedrock.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): <u>Static Water Level (m.b.g.l)</u> Average – 36 Median –37 Max – 64 Min - 21 <u>Yield m^3/hr</u> Average – 7 Median – 5 Max – 15 Min - 0.5				
	Water Quality	There are no known boreholes within 1 km.				
Surface Water	**Closest Surface Water**	Not identified, 543m Wetland, 617m				
	Distance to Lake/River	Victoria Nile, 2,381m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Nwoya	Purongo	Murchison Falls NP	-		
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		Neul Lodge	3,251m			
Archaeology and Cultural Heritage	**Survey Data** 2014 (Eco & Partner, 2014) & 27th June 2017	<u>Archaeological remains</u> Concentrations of pottery and lithics as well as in situ pottery sherds were recorded in JBR-02, producing coherent, well-preserved and complex assemblages reflecting the lack of ground disturbance in the MFNP over the past century. Identified lithics comprise a possibly Early Stone Age (ESA) hammerstone, LSA cores and quartz flakes, a hammerstone or fishing weight and a rubbing stone. Concentrations of lithics may indicate stone tool manufacturing sites. The pottery included decorated Neolithic Kansyore pottery dated to c. 8000 years ago. These had wavy lines and zig zag decorations that are common across the Upper Nile					

		catchment areas. Late Iron Age pottery with roulette decoration and mamiliations was noted.. Heaps of laterite, a raw material used for iron smelting, were recorded at one site. Daub was noted in two places, which is significant in the MFNP area which was evacuated over 100 years ago, as it may indicate a former settlement area <u>Medicinal and cultural uses of plants</u> The medicinal plants included *lenga*, *uduk* and *kulumbero*. *Lenga* is associated with cultural sites. *Kulumbero* treats eye problems, while *uduk* trees are mainly for construction. <u>Faunal remains</u> Recent materials in the form of faunal remains were also observed especially animal bones. The parts of bones identified were teeth, hippo tibia and long rib bones. Small shells were also common in the site. The faunal remains were from animals killed by other animals or those that died naturally, and are of no archaeological or palaeontological significance.
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** <u>Key local characteristics:</u> • This LCA is a large scale upland plateau. This location is gently undulating. • This is a relatively undisturbed landscape but close to local tracks part of the Buligi Circuit which is a key recreational asset. • Landcover within this site is largely characteristic of the LCA as a whole. • Although adjacent to the existing track, this site is void of infrastructure. • Views are wide angled and occasionally fragmented by trees.

3. JBR-03	Well pad in MFNP	
Location Block	CA1, MFNP	
Field	JobiRii	
Coordinates	-	-
Elevation (m)	681	
Terrain	sloping	
Slope (degrees) and Aspect	1.969845	Southeast
Well Pad Area (ha)	4.0	8.0
District	Nwoya, MFNP	
CHA habitat type	Natural	
Survey date(s) and Type	22 & 23 November 2016(Avoidance), 11 April 2017(Detailed), 28 June 2017 (Detailed)	

BIODIVERSITY		
Site description	For this site a buffer approximately 1000m x 1000m was surveyed. Most of the area within the buffer comprises open grassland with scattered trees. A distinct low lying area comprising wooded grassland with a significant presence of linked wallows and seasonally flooded areas is present within the eastern part of the buffer zone, running north to south. Current design indicates that the access road and flow line would need to cross this feature. The surveyed area is crossed by a number of animal tracks, most of which appear to radiate from/towards the line of wallows and ponds.	
Vegetation type(s) (WCS mapping)	Open grassland Wooded grassland	
Vegetation types recorded (micro-habitats)	Seasonally flooded open wooded grassland Open grassland Wooded grassland Open grassland with scattered trees Open wooded grassland	
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Crateva adansonii* *Borassus aethiopum* *Kigelia africana*	Wallows and wetland Wildlife tracks Burrows Tree with bat roost potential Termite mounds
Notable Biological and Social Features	The band of seasonally flooded (open) wooded grassland contains a significant sequence of connected wallows and seasonally flooded areas. There are significant animal tracks radiating from these. The area is clearly very important for large animal species including buffalo, giraffe, elephant, hyena, kob, hartebeest, etc. The construction and operation of the well pad must not disturb the wallows and wetland here, particularly in terms of disrupting surface and shallow groundwater flow between the linked wallows and flooded area. Notable Biological and Social Features that were that would be directly affected include mature individual trees of *Acacia sieberiana, Balanites aegyptiaca*, and *Crateva adansonii*. There are also azonal micro-habitats such as wallows with habitat-specific (wetland) flora such as *Ipomoea aquatica*, occurring in only very restricted places within the site.	
Dominant woody species	*Balanites aegyptica, Crateva adansonii*	
Dominant Herbaceous	*Boophone disticha; Bulbostylis filamentosa; Bulbostylis sp; Chamaecrista kirkii; Ctenium newtonii; Cyperus dubius; Cyperus dubius-ferrugineus; Eragrostis sp.; Hyperthelia dissoluta; Sporobolus*	

species	*staphianus*					
Phytosociological description (within plot)	*Hyperthelia-Ctenium-Bulbostylis* Open Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland *Hyperthelia-Ctenium-Eragrostis-Sporobolus* Open Grassland *Sporobolus* Open Grassland *Sporobolus-Eragrostis-Ctenium* Open Grassland *Sporobolus-Hyperthelia* Open Grassland					
Alien/Invasive Species	None identified					
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.					
Priority Species	This area presented the least oportunities for small mammals. It had large herds of Uganda Kob, Buffalo, good numbers of Hartebeest, Oribi and Warthogs. The area has great potential for lekking by Kob and for grazing by the ungulates. One amphibian and eight reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. Soil lithology for DWD35655 is provide below; Lake Albert Sediments, no bedrock within the borehole depth; aquifer dark grey sand Lithology 0-6m Red clay sand 6-15m Yellowish clay sand 15- 21m Greenish fine sand and sand 21-45m Grey clay with silt sand 45-57m Greenish clay with silt sand 57-75m Yellowish sand with silt and fine sand 75-78m Light grey fine sand 78-90m Dark grey fine sand				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD35655	332594	253500	517m	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Pumping Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)/Specific Cap (m^3/hr/m) and Transmissivity (m^2/day)**
		90	53.37	60.65	10.0	7.28 1.41 266.4
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): Static Water Level (m.b.g.l) Average – 36 Median –37 Max – 64 Min - 21 Yield (m^3/hr) Average – 7 Median – 5 Max – 22 Min - 0.5				
	Water Quality	There are no current water quality reports available.				
Surface Water	**Closest Surface**	Not identified, 245m Wetland, 1,500m				

	Water				
	Distance to Lake/River	Victoria Nile, 4,699m			
Socioeconomic Characteristics					
Social	**Distict**	**Subcounty**	**Parish**	**Village**	
	Nwoya	Purongo	Murchison Falls NP	-	
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**		
		Pakuba Lodge	4,957m		
Archaeology and Cultural Heritage	Date of survey 2014	Archaeological remains The survey identified archaeological remains comprising a Late Stone Age core and struck stone flakes.			
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** Key local characteristics: • This LCA is a large scale upland plateau. This location is gently sloping. • This is a relatively undisturbed landscape and the belt of trees between the track and the site enhances the sense of wildness that can be experienced in this location. • Landcover within this site is largely open grassland with few trees and typical of the LCA as a whole. • This site is void of infrastructure. • Views are wide angled and panoramic.			

4. JBR-04	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	677		
Terrain	sloping		
Slope (degrees) and Aspect	2.93506	North	
Well Pad Area (ha)	4.1	7.1	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	24 November 2016 (Avoidance), 12 April 2017(Detailed), 29 June 2017 (Detailed)		

BIODIVERSITY

Site description	Most of the area within the buffer comprises open grassland with scattered trees. However, there is a significant proportion of the buffer area to the south/south-east which is wooded grassland. This area of wooded grassland is centred on a lower lying band of seasonal flooding. An adult spotted hyena was observed during the survey at the site. In addition, the surveyed area is crossed by a number of animal tracks, most of which appear to radiate from/towards the low lying seasonally flooded areas.	
Vegetation type(s) (WCS mapping)	Open grassland Wooded grassland	
Vegetation types recorded (micro-habitats)	Open grassland Open bushed grassland Open bushed wooded grassland Lightly bushed grassland Wooded grassland Seasonally flooded open wooded grassland	Seasonally flooded open woodland Open woodland *Acacia Senegal* scrub Eroded gullies Seasonal wetland/wetland with seasonal water presence
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Borassus aethiopum* *Crateva adansonii* *Kigelia africana*	Seasonal stream with wetland Wildlife tracks Burrows and termite mounds Eroded gullies
	Notable biological and social features recorded within the site as mature large trees, particularly of *Acacia sieberiana* and *Balanites aegyptiaca*. In addition, there are seasonally flooded wetland areas (Wetland with seasonal water presence) with habitat-specific flora such as *Nymphaea lotus*, *Caldesia resinosa*, *Cyperus iria*, *Sphenoclea zeylanica* and friable soils with marginal plant species. These are azonal habitats enhancing diversity.	
Notable Biological and Social Features	The area of seasonally flooded (open) wooded grassland and woodland contains a sequence of connected seasonally flooded areas. There are animal tracks radiating from these. The area is clearly very important for large animal species elephant and hyena, etc. The construction and operation of the well pad must not disturb the wallows and wetland here, particularly in terms of disrupting surface and shallow groundwater flow within the seasonal wetland areas.	
Dominant woody species	*Acacia sieberiana,; Combretum aculeatum, Harrisonia abyssinica; Pseudocedrella kotschyi*	
Dominant Herbaceous	*Brachiaria brizantha, Brachiaria decumbens, Ctenium newtonii, Cyperus dubius-ferrugineu, Eragrostis sp., Hyperthelia dissoluta; Setaria sphacelata; Sporobolus pyramidalis*	

species						
Phytosociological description (within plot)	*Acacia seasonally* Flooded Wooded Grassland *Acacia-Harrisonia-Combretum* shrubland *Acacia-Setaria Seasonally* Flooded Wooded Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland *Hyperthelia-Pseudocedrella* Open Grassland					
Alien/Invasive Species	None identified					
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.					
Priority Species	The area had large herds of Uganda Kob, Buffalo, good numbers of Hartebeest, Elephant, Giraffe, Oribi and Warthogs. The area has great potential for lekking by Kob and for grazing by the ungulates .Five reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no boreholes in the vicinity of this well pad. In general, Superficial deposits including sandy clays with a thickness of 20-30m interbedded with clays with thickness 10-15m are found over much of the area; in some places boreholes have been drilled beyond 100m without encountering bedrock.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1km	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l)**	**Pumping Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)/Specific Cap (m3/hr/m) and Transmissivity (m2/day)**
		-	-	-	-	--
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): Static Water Level (m.b.g.l) Average – 36 Median –37 Max – 64 Min - 21 Yield (m^3/hr) Average – 7 Median – 5 Max – 22 Min - 0.5				
	Water Quality	There are no known boreholes withn 1 km.				
Surface Water	**Closest Surface Water**	Not identified, 154m Wetland, 148m				
	Distance to Lake/River	Victoria Nile, 4,530m				
Socioeconomic Characteristics						

<table>
<tr><td rowspan="3">Social</td><td colspan="2">District</td><td>Subcounty</td><td>Parish</td><td>Village</td></tr>
<tr><td colspan="2">Nwoya</td><td>Purongo</td><td>Murchison Falls NP</td><td>-</td></tr>
<tr><td>Closest Receptor</td><td>Receptor Details</td><td colspan="3">Distance to Well Pad (m)</td></tr>
<tr><td>Archaeology and Cultural Heritage</td><td>Date of survey:
2013</td><td>Baker’s Lodge</td><td colspan="3">5,246m</td></tr>
<tr><td colspan="5"><u>Archaeological remains</u>

Chance find sites were verified by the Department of Museums and Monuments. Twelve archaeological sites were identified, including Late Stone Age quartz cores and flakes. Pottery sherds and pottery scatters included Late Stone Age or Neolithic Kansyore pottery and roulette-decorated Late Iron Age pottery.</td></tr>
<tr><td>Landscape and Visual Amenity</td><td>Landscape Character Area
LCA07</td><td colspan="4">MFNP North, Savanna Plateau
<u>Key local characteristics:</u>
• This LCA is a large scale upland plateau. This location is gently sloping.
• This is a relatively undisturbed landscape and the belt of trees between the track and the site enhances the sense of wildness that can be experienced in this location.
• Landcover within this site is largely open grassland with few trees and typical of the LCA as a whole.
• This site is void of infrastructure.
• Views are wide angled and panoramic</td></tr>
</table>

5. JBR-05	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	699		
Terrain	Flat		
Slope (degrees) and Aspect	0.734367	West	
Well Pad Area (ha)	3.8	7.9	
District	Nwoya, MFNP		
CHA habitat type	Natural; open grassland		
Survey date(s) and Type	25 November 2016 (Avoidance), 13 April 2017(Detailed),30 June 2017 (Detailed)		

BIODIVERSITY		
Site description	The area within the buffer comprises open grassland close to Pakuba airstrip.	
Vegetation type(s) (WCS mapping)	Open grassland	
Vegetation types recorded (micro-habitats)	Open grassland with scattered trees	
Main Biological and Social Features	Scattered trees: *Acacia sieberiana* *Crateva adansonii* *Borassus aethiopum* *Kigelia africana*	Wildlife tracks Dust baths Eroded gullies Occasional wallows Termite mounds
Notable Biological and Social Features	The surveyed site is an area of open grassland with occasional scattered trees. Trees present include Acacia, Borassus, Crateva and one Kigelia recorded. There are various animal tracks that cross the site and occasional wallows.	
Dominant woody species	*Crateva adansonii*	
Dominant Herbaceous species	*Bulbostylis filamentosa, Ctenium newtonii; Eragrostis sp., Hyperthelia dissoluta*	
Phytosociological description (within plot)	*Hyperthelia* Open Grassland *Hyperthelia-Ctenium-Bulbostylis* Open Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland	
Invasive Species	None identified	
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.	
Priority Species	Area had large populations of Uganda Kob and Buffalo, Good numbers of Oribi, Warthog, Hartebeest and Giraffe One amphibian and eight reptile species were recorded at this site. Four reptile species were recorded at this site	
Physical Characteristics		
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.	
Closet Air	Wildlife (adjacent)	

Receptor (distance)						
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. There is a boring log for DWD35662. The borehole is also identified as JobiE-5.; aquifer type sand. The soils are identified as Lake Albert Sediments Lithology 0-12m Clay, brown 12-18m Cream sand 18-30m Brown clay and sand 30-48m Cream clayey sand 48-60m Cream clay and fine sand 60-69m Light grey sandy clay 69-75m Cream clayey sand 75-78m Sandy cream clay 78-87m Light grey sand , clayey 87-93m Cream sandy clay 93-102m Light grey sandy clay					
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD35662	332139	256025	683	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l)**	**Pumping Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)/Specific Cap (m3/hr/m) and Transmissivity (m2/day)**
		100	74.13	83.62	4.2	9.49 0.45 25
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): Static Water Level (m.b.g.l) Average – 36 Median –37 Max – 64 Min - 21 Yield m^3/hr Average – 7 Median – 5 Max – 15 Min - 0.5				
	Water Quality	There are no current water quality reports for this well.				
Surface Water	**Closest Surface Water**	Not identified, 605m Wetland, 1,106m				
	Distance to Lake/River	Albert Nile, 4,067m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**		**Parish**	**Village**	
	Nwoya	Purongo		Murchison Falls NP	-	
	Closest	**Receptor Details**		**Distance to Well Pad (m)**		

	Receptor	Pakuba Lodge	3,942m
Archaeology and Cultural Heritage	**Date of survey** 2014	All find spots comprised finds of exposed animal bones. These are likely to be relatively recent and are of no archaeological or palaeontological significance. No archaeological remains were identified.	
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** <u>Key local characteristics:</u> • This LCA is a large scale upland plateau. This location is elevated but largely flat. • This site is largely undisturbed but is adjacent to the Pakubu airstrip is a notable physical influence which reduce the levels of wilderness that is typical of the wider landscape. • Landcover within this site is largely open grassland with very few trees and is typical of the LCA as a whole. • This site is void of infrastructure. • Views are wide angled, panoramic. Views to the west, east and south are iconic of MFNP. • The UWA rangers working within this part of MFNP have strong associations and connections with this landscape and the landscape is highly revered.	

6. JBR-06	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	716		
Terrain	flat		
Slope (degrees) and Aspect	3.025225	Northwest	
Well Pad Area (ha)	4.0	6.4	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	26 November 2016 (Avoidance), 13 April 2017 (Detailed), 1 July 2017 (Detailed)		
BIODIVERSITY			
Site description	The area within the buffer comprises open grassland close to Pakuba airstrip.		
Vegetation type(s) (WCS mapping)	Open grassland		
Vegetation types recorded (micro-habitats)	Open grassland Open wooded grassland Seasonally flooded open wooded grassland		
Main Biological and Social Features	*Acacia sieberiana* *Crateva adansonii* *Borassus aethiopum* *Kigelia africana* *Balanites aegyptiaca* *Phileneptera laxiflora*	Kob lek Wildlife tracks Dust baths Eroded gullies Occasional wallows Termite mounds	
Notable Biological and Social Features	The surveyed site is an area of open grassland with some open wooded grassland. There is an area of seasonally flooded open wooded grassland long the eastern boundary of the buffer zone. Of particular importance were signs of kob lekking within the buffer zone. There are various animal tracks that cross the site and occasional wallows and eroded gullies, as well as the ubiquitous termite mounds. These are seasonal wetland with *Urochloa*, *Ludwigia* and *Cyperus* spp. (wetland areas with habitat-specific flora) and mature trees, particularly of *Crateva adansonii*, *Borassus aethiopum* and *Acacia sieberiana*.		
Dominant woody species	*Acacia sieberiana, Borassus aethiopum, Calotropi, Crateva adansonii ,*		
Dominant Herbaceous species	*Astriopomoea malvacea , Alysicarpus rugosus; Ctenium newtonii;, Cyperus dubius-ferrugineus, Digitaria longiflora; Eragrostis sp., Hyperthelia dissoluta*		
Phytosociological description (within plot)	*Acacia* Open Bushed Grassland *Acacia* Open scrub *Hyperthelia* Open Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland *Hyperthelia-Digitaria* Open Grassland		
Alien/Invasive Species	None identified		
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.		

Fauna – Priority Species	Area had large populations of Uganda Kob and Buffalo, Good numbers of Oribi, Warthog, Hartebeest and Giraffe Five amphibian and two reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no boreholes at this site. Lithology for borehole DWD25308 provided below. Lithology 0-10m Black topsoil 10-15m Laterite 15-30m Coarse multi-coloured sand 30-70m Fine grained sand 70-92m Brown medium sand				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD25308	334077	256184	654	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l)**	**Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	67.5-	-	-
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): Static Water Level (m.b.g.l): Average – 36; Median –37; Max – 64; Min - 21 Yield m^3/hr: Average – 7; Median – 5; Max – 22; Min - 0.5				
	Water Quality	There are no water quality reports for this well.				
Surface Water	**Closest Surface Water**	Not identified, 574m Wetland, 277m				
	Distance to Lake/River	Albert Nile, 4,402m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Nwoya	Purongo	Murchison Falls NP	-		
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		Pakuba Lodge	4,589m			
Archaeology and Cultural Heritage	**Survey Date** 5th December 2016.	Archaeological remains The lithic assemblage ranged from the Middle Stone Age (MSA) to the LSA period. It included a Levallois side scraper, a convex side scraper and a pyramidal core. All lithic artefacts were of quartz. The presence of prematurely abandoned cores suggests plentiful locally available raw materials. Three large and widespread pottery scatters were noted, as well as many isolated findspots. The pottery was either undecorated or highly abraded, which made dating difficult. The coherent, well-preserved and complex assemblages reflect the lack of				

		ground disturbance in the MFNP over the past century. The degree of abrasion noted on pottery sherds may indicate that settlements in this area were abandoned prior to the establishment of the settlements that were evacuated. Pottery was associated with daub from former settlement structures pre-dating the evacuation of the MFNP area in the early 20th century.
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** <u>Key local characteristics:</u> • This LCA is a large scale upland plateau. This location is elevated but largely flat site. • This site is largely undisturbed but is adjacent to the Pakubu airstrip is a notable physical influence which reduce the levels of wilderness that is typical of the wider landscape. • Landcover within this site is largely open grassland with very few trees and is typical of the LCA as a whole. • This site is void of infrastructure. • Views are wide angled, panoramic. Views to the west, east and south are iconic of MFNP. • The UWA rangers working within this part of MFNP have strong associations and connections with this landscape and the landscape is highly revered.

7. JBR-07	Well pad in MFNP	
Location Block	CA1, MFNP	
Field	JobiRii	
Coordinates	-	-
Elevation (m)	670	
Terrain	flat	
Slope (degrees) and Aspect	2.93506	North
Well Pad Area (ha)	3.2	7.6
District	Nwoya, MFNP	
CHA habitat type	Natural	
Survey date(s) and Type	27/28 November 2016 (Avoidanc	

BIODIVERSITY		
Site description	The area within the buffer comprises open grassland with wallows located to the north of the Pakuba airstrip. In addition there are areas of seasonally flooded grassland. The dominant tree is Borassus. Previous avoidance mapping identified a large kob lek at the northern boundary of the survey buffer zone. The buffer zone overlaps with the adjacent JBR-08 site.	
Vegetation type(s) (WCS mapping)	Open grassland	
Vegetation types recorded (micro-habitats)	Open grassland Open grassland with young Borassus Open grassland with scattered adult Borassus Seasonally flooded open wooded grassland (Borassus) Seasonally flooded open grassland with scattered trees	
Main Biological and Social Features	*Borassus aethiopum* *Balanites aegyptiaca* *Crateva adansonii*	Kob lek Wildlife tracks Dust baths Occasional wallows Termite mounds Drainage channels
Notable Biological and Social Features	The surveyed site is an area of open grassland with scattered young Borassus. The presence of Borassus saplings and elephant dung indicates that this is an area frequented by elephants. Of particular importance were signs of kob lekking within the buffer zone. There are notable biological and social features recorded within the site comprising mature large trees, particularly of *Borassus aethiopum*. There are seasonally flooded grassland (wetland) areas with habitat-specific flora i.e. *Urochloa* sp., *Ludwigia* sp. and *Cyperus* spp. There are various animal tracks that cross the site and occasional wallows and eroded gullies, as well as the ubiquitous termite mounds. Two spotted hyenas were noted on site during the survey.	
Dominant woody species	*Borassus aethiopum, Crateva adansonii*	
Dominant Herbaceous species	*Ctenium newtonii; Digitaria longiflora; Eragrostis sp., Hyperthelia dissolute, Kyllinga alba, Sida ovata, Sporobolus pyramidalis;*	
Phytosociological description (within plot)	*Hyperthelia-Borassus* Grassland *Hyperthelia-Borassus-Crateva* Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland	

Alien/Invasive Species	None identified					
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.					
Fauna – Priority Species	Area had good populations of Uganda Kob, Oribi, Hartebeest, Buffalo and Warthog. Three amphibian and five reptile species were recorded at					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. The soil boring data for DWD 35657 provided below. Lithology 0-12m Red sand and gravel 12-39m Grey clay with fine sand 39-48m Course sand to fine sand 48-60m Brown grey clay 60-75m Dark brown clay and fine sand 75-87m Brown course sand with silt 87-96m Grey clay with fine sand 96-115m Dark grey clay with fine sand				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		35657	332964	258380	421m	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l)**	**Pumping Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)/Specific Cap (m^3/hr/m) and Transmissivity (m2/day)**
		110	64.34	67.40	10.0	3.06 2.36 NA
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): Static Water Level (m.b.g.l) Average – 36 Median –37 Max – 64 Min - 21 Yield (m^3/hr) Average – 7 Median – 5 Max – 22 Min - 0.5				
	Water Quality	No water quality results available.				
Surface Water	**Closest Surface Water**	Not identified, 213m Wetland, 1,134m				
	Distance to Lake/River	Albert Nile, 3,151m				
Socioeconomic Characteristics						

Social	Distict	Subcounty	Parish	Village
	Nwoya	Purongo	Murchison Falls NP	-
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Pakuba Lodge	4,148m	
Archaeology and Cultural Heritage	**Date Surveyed** 2014 (Eco & Partner, 2014) 27th June 2017	Archaeological remains The wellpad area was not very productive in that even some of the open areas yielded no archaeological materials. Late Stone Age lithic cores and a grinding stone were recorded. A concentration of pottery was recorded at an animal watering hole. Some well-fired vessels may have been used for storage rather than cooking. Sparse daub was also recorded, and may indicate former settlement areas pre-dating the evacuation of the MFNP area in the early 20th century. Faunal remains Several scatters of animal bone from wild animals that died naturally, including the remains of hartebeest and buffalo, were present. These have no archaeological or palaeontological significance.		
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** Key local characteristics: • This LCA is a large scale upland plateau and the site is largely flat. • This site is largely undisturbed but is north of the Pakubu airstrip which is a notable physical influence which reduces the levels of wilderness that is typical of the wider landscape. • Landcover within this site is largely open grassland with very few trees and is typical of the LCA as a whole. • This site is void of infrastructure. • Views are wide angled, panoramic. Views to the north, west and east are iconic of MFNP. • The UWA rangers working within this part of MFNP have strong associations and connections with this landscape and the landscape is highly revered.		

8. JBR-08	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation(m)	666		
Terrain	sloping		
Slope (degrees) and Aspect	4.261804	South	
Well Pad Area (ha)	3.8	6.3	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	29 November 2016 (Avoid		

BIODIVERSITY		
Site description	The area within the buffer comprises open grassland with wallows. There is an area of wetland on the eastern boundary of the survey buffer zone. The buffer zone overlaps with the adjacent JBR-07 site.	
Vegetation type(s) (WCS mapping)	Open grassland Swamp (at eastern edge of buffer)	
Vegetation types recorded (micro-habitats)	Open grassland Open grassland with scattered trees Seasonally flooded open wooded grassland Open wooded grassland Wetland	
Main Biological and Social Features	*Acacia sieberiana, Balanites aegyptiaca, Borassus aethiopum, Crateva adansonii, Kigelia africana,* Protected Species -*Tamarindus indica* Invasive species - *Salvinia* and *Eichhornia* in wetland *Urochloa* seasonal wetland	Wildlife tracks Elephant dung Termite mounds Wallows
Notable Biological and Social Features	*Tamarindus indica;* Uganda Red List (VU); IUCN (LC) The surveyed site is an area of open grassland with some open wooded grassland. There is an area of seasonally flooded open wooded grassland along the eastern boundary of the buffer zone. Invasive plant species were identified in some wallows. Notable biological and social features recorded within the site are mature large trees, particularly of *Borassus aethiopum*, *Crateva adadnsonii*, *Balanites aegyptiaca* and *Acacia sieberiana* as well as In addition, there is seasonally flooded *Urochloa* seasonal wetland with habitat-specific flora in a wallow at the site. There are various animal tracks that cross the site and occasional wallows as well as termite mounds.	
Dominant woody species	*Acacia sieberiana; Borassus aethiopum*	
Dominant Herbaceous species	*Chamaecrista kirkii, Ctenium newtonii; Digitaria longiflora , Eragrostis sp., Gisekia sp., Hyperthelia dissoluta*	
Phytosociological description (within plot)	*Hyperthelia-Acacia* Grassland *Hyperthelia-Balanites-Borassus* Grassland *Hyperthelia-Ctenium-Digitaria* Open Grassland	

	Hyperthelia-Ctenium-Digitaria-Borassus Grassland *Hyperthelia-Ctenium-Eragrostis* Open Grassland *Hyperthelia-Digitaria- Acacia* Grassland *Hyperthelia-Digitaria-Borassus-Balanites* Grassland					
Alien/Invasive Species	There are two invasive plant species, *Salvinia molesta* and *Eichhornia crassipes* in a wetland that could proliferate with disturbance.					
Flora - Protected Species	Species of conservation concern were recorded – *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)					
Fauna – Priority Species	Area had good populations of Uganda Kob, Oribi, Hartebeest, Buffalo and Warthog. Four reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this ste. The closest boring is DWD 29473 characterized as Sand (aquifer-fractured bedrock). It is located between JBR-08 and JBR-09. <u>Lithology</u> 0-5m- Black sandy 5-12m – Greyish Brown sand 12-15m – Dark grey sand 15-20m- Greyish brown sand 20 -25m- Dark grey sand mixed with brown sand 29-29m –Light brown fine sand 29-50m – Dark brown sand 50-66m- Grayish brown sandy clay 66-70m – Brownish grey sandy clay 70-90m – Greenish grey sandy clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): <u>Static Water Level (m.b.g.l)</u> Average – 36 Median –37 Max – 64 Min - 21 <u>Yield (m^3/hr)</u> Average – 7 Median – 5 Max – 15 Min - 0.5				
	Water	No water current water quality report available				

	Quality	
Surface Water	**Closest Surface Water**	Not identified, 153m Wetland, 1,818m
	Distance to Lake/River	Albert Nile, 3,049m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Nwoya	Purongo	Murchison Falls NP	-

Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**
	Pakuba Lodge	4,725m

Archeology and Cultural Heritage	**Date surveyed** 2014	Archaeological remains The wellpad area was not very productive in that even some of the open areas yielded no cultural materials. Lithics comprised Late Stone Age cores on volcanic stone and quartz, and a grinding stone. A concentration of pottery was recorded at an animal watering hole. Sparse daub was also recorded, and may indicate former settlement areas pre-dating the evacuation of the MFNP area in the early 20th century. Faunal remains Several scatters of animal bone from wild animals that died naturally, including the remains of hartebeest and buffalo, were present. These have no archaeological or palaeontological significance. Medicinal and cultural uses of plants Medicinal plants included *Kulumbeero.*
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** Key local characteristics: • This LCA is a large scale upland plateau and the site is largely flat. • This site is largely undisturbed but is north of the Pakubu airstrip which is a notable physical influence which reduces the levels of wilderness that is typical of the wider landscape. • Landcover within this site is largely open grassland with very few trees and is typical of the LCA as a whole. • This site is void of infrastructure. • Views are wide angled, panoramic. Views to the north, west and east are iconic of MFNP. • The UWA rangers working within this part of MFNP have strong associations and connections with this landscape and the landscape is highly revered.

9. JBR-09	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	654		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	5.488755	Northeast	
Well Pad Area (ha)	3.4	7.5	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	30 November / 19 December 2016 (Avoidance), 16 April 2017 (Detailed), 26 June 2017(Detailed)		
BIODIVERSITY			
Site description	The site is located in an area of wooded grassland with thicket. There is a significant area of seasonally flooded grassland and swamp located on the northern edge of the survey buffer.		
Vegetation type(s) (WCS mapping)	Wooded grassland with thicket Open grassland Wooded grassland Seasonally flooded grassland Swamp		
Vegetation types recorded (micro-habitats)	Open wooded grassland Open woodland Wooded grassland (*Acacia-Borassus-Balanites-Hyparrhenia-Ctenium*) Dense woodland Open woodland of *Borassus-Acacia* Seasonally flooded open woodland Wetland		
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Borassus aethiopum* *Crateva adansonii* *Imperara cylindrica* community *Kigelia africana*	Seasonal wetland Wallows Wildlife tracks Elephant dung Termite mounds	
Notable Biological and Social Features	The site is generally more wooded than other sites within the MFNP. In addition the site includes significant areas of seasonal wetland and wallows. There are signs of elephant in this area and numerous animal tracks. There are notable biological and social features recorded within the site as mature large trees, particularly of *Acacia sieberiana*, *Borassus aethiopum* and *Balanites aegyptiaca*		
Dominant woody species	*Acacia sieberiana, Borassus aethiopum, Crateva adansonii; Combretum aculeatum, Kigelia Africana,*		
Dominant Herbaceous species	*Cynodon dactylon ,Digitaria longiflora, Gisekia sp., Hyperthelia dissolute, Senna occidentalis, Setaria sphacelata, Sporobolus pyramidalis, Tephrosia pumila, Tribulus terrestris*		
Phytosociological description (within plot)	*Acacia-Balanites-Hyperthelia* Wooded Grassland *Acacia-Borassus-Hyperthelia-Digitaria* Open Woodland *Acacia-Kigelia-Borassus-Digitaria* Wooded Grassland		

	Borassus-Acacia Wooded Grassland *Borassus-Acacia-Hyperthelia* Wooded Grassland *Crateva-Combretum-Borassus* Open Woodland					
Alien/Invasive Species	None identified					
Flora - Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded at this site.					
Fauna – Priority Species	The area had a good population of Uganda Kob, Hartebeest, Buffalo, Oribi, Elephants, Olive Baboons and few Waterbucks. This site is particularly important for elephants. Eight amphibian and four reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. The closest boring is DWD 29473 characterized as Sand (aquifer-fractured bedrock). It is located between JBR-08 and JBR-09. <u>Lithology</u> 0-5m- Black sandy 5-12m – Greyish Brown sand 12-15m – Dark grey sand 15-20m- Greyish brown sand 20 -25m- Dark grey sand mixed with brown sand 29-29m –Light brown fine sand 29-50m – Dark brown sand 50-66m- Grayish brown sandy clay 66-70m – Brownish grey sandy clay 70-90m – Greenish grey sandy clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		29473	261098N	334326E	607m	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		80	55 70	NA	15	NA
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): <u>Static Water Level (m.b.g.l)</u> Average – 36 Median –37 Max – 64 Min - 21 <u>Yield (m^3/hr)</u> Average – 7 Median – 5 Max – 15 Min - 0.5				
	Water Quality	There are no current water quality reports for this well.				
Surface Water	**Closest Surface**	Not identified, 270m Wetland, 651m				

	Water	
	Distance to Lake/River	Albert Nile, 2,354m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Nwoya	Purongo	Murchison Falls NP	-

Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**
	Pakuba Lodge	2,818m

Archaeology and Cultural Heritage	**Date of survey** 2014	Archaeological remains The survey identified a single find of a Late Stone Age quartz whole flake.
Landscape and Visual Amenity	**Landscape Character Area** LCA07	**MFNP North, Savanna Plateau** Key local characteristics: • This LCA is a large scale upland plateau and similar to JBR-07 this site is gently undulating. • This site is largely undisturbed and a strong sense of wilderness prevails which is typical of the wider landscape. • Landcover within this site is largely open grassland and numerous mature trees largely typical of the LCA as a whole. There are however a number of occasional watercourses to the north and south of the site. • This site is void of infrastructure and visually separated from the track to the north-west. . • Views wide angled but fragmented by the numerous trees.

10. JBR-10	Well pad in MFNP		
Location Block	CA1, MFNP		
Field	JobiRii		
Coordinates	-	-	
Elevation (m)	629		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	4.311756	Southwest	
Well Pad Area (ha)	3.8	9.8	
District	Nwoya, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	19 December 2016 (Avoidance), 17 April 2017(Detailed), 25 June 2017(Detailed)		
BIODIVERSITY			
Site description	The site is located in an area of wooded grassland close to the Buligi Circuit track. There are areas of marsh and pond particularly to the north of the site. The edge of the Ramsar site is situated within 200m of the centre point of the survey buffer zone.		
Vegetation type(s) (WCS mapping)	Wooded grassland Marsh/ponds		
Vegetation types recorded (micro-habitats)	Dense bushland with thicket Bushed grassland Open bushland Open bushland with thicket Bushland Grassland Seasonally flooded bushed grassland Seasonally flooded open grassland *Echinochloa-Cyperus* wetland Wetland and seasonal swamp		
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Crateva adansonii* *Echinochloa-Cyperus articulatus seasonal wetland* *Kigelia africana* *Maytenus undata* *Tamarindus indica*	Seasonal wetland Seasonally flooded grassland Wallows Wildlife tracks Burrows Termite mounds	
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) The site is a covered in bushland habitats of various densities. In addition there are areas of seasonal wetland and swamp. There are numerous animal tracks through the area and it lies immediately adjacent to the Ramsar site. There are notable biological and social features recorded within the site as mature large trees, particularly of *Acacia sieberiana.* In addition, there are seasonally flooded grassland (wetland) areas with habitat-specific plant species such as *Echinochloa colona*.		
Dominant woody species	*Acacia senegal; Acacia sieberiana; Capparis fascicularis; Combretum aculeatum; Harrissonia abyssinica; , Harrissonia abyssinica; Cadaba farinosa;Cadaba farinosa; Capparis fascicularis; Capparis fascularis; Capparis tomentosa; Harrisonia abyssinica; Harrisonia abyssinica; Harrissonia abyssinica;*		

	Harrissonia abyssinica, Jasminum sp., Jasminum sp, Maytenus undata, Maytenus undata, Vepris nobilis					
Dominant Herbaceous species	*Commelina benghalensis, Cyperus dubius-ferrugineus, Dichondra repens, Heteropogon, Hyperthelia dissoluta;Marsidenia rubicunda;, Ruellea prostrata, Sansevieria nilotica, Sporobolus pyramidalis, Sansevieria dawei*					
Phytosociological description (within plot)	*Acacia-Harrisonia-Maytenus-Vepris* Open Bushland *Acacia-Maytenus-Harrisonia-Capparis* Bushland with Thicket *Acacia-Vepris-Maytenus-Capparis* Dense Bushland *Harrisonia-Cadaba-Capparis* Bushland-Bushed Grassland mosaic *Harrisonia-Cadaba-Combretum* Bushland-Bushed Grassland *Harrisonia-Capparis Bushland*-Bushed Grassland *Harrisonia-Capparis-Acacia* Bushland-Bushed Grassland mosaic					
Invasive Species	None identified					
Flora - Protected Species	Secies of conservation concern were recorded – *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)					
Fauna – Priority Species	The area had mostly signs of Hippo, Elephant and Giraffe and a few signs of the smaller ungulates. Eight reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no borings at this site. The closest boring is identified as DWRM 4097. The boring log notes the location as Rii-B which is in the vicinity of JBR-10. Lithology is noted as Lake Albert Sediments comprised of - Soil, clayey sand, sand, clayey sand then clay (aquifer – sand). <u>Lithology</u> 0-3 m Grey Soil 3-9m Brown Clayey sand 9-15m Light brown sandy clay 15-36m Grey course sand 36 -45m Grey Clayey sand 45-54m Grey Clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		40971	329368E	248179N	297m	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Pumping Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)/Specific Cap (m^3/hr/m) and Transmissivity (m^2/day)**
		54	10.8	12.83	9	2.02 4.46 226
	Water availability	There are no boreholes at the well pad site. Based on available bore logs for the North Nile (MFNP): <u>Static Water Level (m.b.g.l)</u> Average – 36 <u>Yield (m^3/hr)</u> Average – 7				

		Median - 37 Max – 64 Min - 21	Median – 5 Max – 15 Min - 0.5
	Water Quality	Iron concentrations exceed Ugandan Standards (Date of analysis - 2013)	
Surface Water	**Closest Surface Water**	Not identified, 2,116m Wetland, 768m	
	Distance to Lake/River	Victoria Nile, 1,122m	
Socioeconomic Characteristics			
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Nwoya	Purongo	Murchison Falls NP	-
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Africana Safari Lodge	3,713m	
Archaeology and Cultural Heritage	**Survey Date** 2014 27th June 2017	<u>Archaeological remains</u> Field survey identified pottery, lithics and daub. Lithics included cores and a sandstone grinding stone. The grinding stone is made from sandstone, which may have been imported to the MFNP area. Concentrations of pottery including LIA roulette-decorated pottery were present, as well as individual sherds. Sparse daub was recorded, and may indicate former settlement areas. <u>Faunal remains</u> Terrestrial shell and scatters of animal bone from wild animals that died naturally were present. These have no archaeological or palaeontological significance. <u>Medicinal and cultural uses of plants</u> The medicinal plants identified included: *Lenga*, *Kulumbero*, *Mbumbuula*, cactus and *Mukabyakabya*. Trees traditionally used for construction such as *Uduk* trees were also common in JBR-10. *Lenga* is usually associated with traditional worship sites and is sometimes planted with other crops to ensure good yields. *Kulumbero* is used to treat eye diseases, *Mbumbuula* for wounds and cactus sap for trapping birds. These plants are common in the Buliisa region.		
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** <u>Key local characteristics:</u> • This site is largely comprised of dense scrub and ravine forest across the north Bank and in close proximity to the Murchison Falls-Albert Delta Wetland System (RAMSAR site). • This site is largely undisturbed and a strong sense of wilderness prevails which is typical of the wider landscape. • Landcover within this site is dominated by dense forestry south of the main Albert track heading west. • This site is void of infrastructure and vegetation separates the site from the track to the. • Views contained by the dense forestry.		

11. GNA-01	Well pad in CA1		
Location Block	CA1		
Field	Gunya		
Coordinates	-	-	
Elevation (m)	660		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	1.768126	Northwest	
Well Pad Area (ha)	3.2	6.5	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	1 & 8 December 2016 (Avoid		
BIODIVERSITY			
Site description	Site comprises mainly cultivated land immediately south of a settlement in Kisomere.		
Vegetation type(s) (WCS mapping)	Mainly cultivated land Settlement Some grazing land		
Vegetation types recorded (micro-habitats)	Gardens *Hyparrhenia* grassland Settlement *Acacia-Harissonia-Combretum* thicket		
Main Biological and Social Features	*Acacia sieberiana, Anacardium occidentale, Annona muricata, Artocarpus heterophyllus, Azadirachta indica, Balanites aegyptiaca, Citrus sp., Crateva adansonii, Ficus sp., Grevillia robusta, Kigelia africana, Lannea schweinfurthii, Mangifera indica, Melia azedarach, Pinus sp., Premna sp.* *Tamarindus indica* Termite mound		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); ; IUCN (LC) Mature trees		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat – Agricultural		
Alien/Invasive Species	None identified		
Flora - Protected Species	Species of conservation concern were recorded – *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		
Fauna – Priority Species	No detailed survey for fauna was undertaken.		
Physical Characteristics			
Ambient Air	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		

Quality					
Closet Air Receptor (distance)	Settement to west in the village of Kisomere, 78m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settement to west in the village of Kisomere, 78m				
Distance from Site boundary (not centre of site)	Settlements		Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)					
0-25m	None		None	None	None
25-85m	Approx 1 settement to west in the village of Kisomere, 78m		None	None	None
85-375m	Approx 150 settlements. Majority to north east, east and west. Village of Kisomere. 89m - 375m		None	Alleluyah Church 355m to north. Lam te Kwar Church 200m to south east	Kisomere Pri. School approx. 320m to north west
Wellpad (operational phase, NIGHT)					
0-130m	Approx. 7 settlements to north and south west in village of Kisomere		None	None	None
130-250m	Approx. 66 settlements surrounding the site in village of Kisomere		None	Lam te Kwar Church 200m to south east	None
250-450m	Approx. 200 settlements to north east and south in village of Kisomere		None	Alleluyah Church 355m to north. Kisomere Church of Uganda 416m to north west	Kisomere Pri. School approx. 320m to north west
Soils and Geology	**Soil Type**	There are no borings at this site. Lithological data for DWD 16550 is summarized below. <u>Lithology</u> 0-1m – Brown sandy topsoil 1-4m – Reddish/yellowish clay 4-30m – Brown sticky sandy clay with gravel 30-41m Brown clayed sand with gravels 41-52m- Brown clay with gravels 52-68m – Brown course sand and sandstone 68-70m – Greyish brown clay 70-80m- Brown sand and sandstone 80-90m –Grayish brown clay 90-93m – Brown fine grain sand 93-105m –Grayish clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		16550	244352N	331140E	216m
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)**

		105	53.8	NA	NA	TBD
	Water Availability	There are no boreholes at the well pad. There are 4 DWRM boreholes in the vicinity of the GNA (01-04) well pads. Static water levels in 3 of the four boreholes ranged between approximately 54 to 64 m.b.g.l. The boring log for one borehole the Yield was reported to be 2 m^3/hr; .				
	Water Quality	No water quality report available.				
Surface Water	**Closest Surface Water**	Not identified, 768m Wetland, 2155m				
	Distance to Lake/River	Victoria Nile, 2,445m				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**	
	Buliisa	Ngwedo	Nile	Kisomere LC1	
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**		
		Lam te Kwar Church	200m		
		Alleluyah Church	355m		
		Kisomere Primary School	320m		
	Trees of socio-economic value Houses (some new) Houses of worship				
Archaeology and Cultural Heritage	**Date of survey** August 2013, 2014 & February 2015	Archaeological remains Late Stone Age cores, scrapers and flakes were recorded. Burial places A clan burial site of 20 graves was recorded at Kisomere. Places of worship Places of worship comprise four churches and a mosque (Alleluyah Church, Kisomere Church of Uganda, Kasinyi Church of God, Kisomere Lamtekwaro church, and Kisomere Mosque). Cultural sites There are two Alur sacred trees, both beyond the red-line boundary of GNA-01.			
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens with occasional trees. • Landform is gently undulating and fields accessed by local residents who manage the crops. • This site and surrounding context are characterized by subsistgence farming • Views across the landscape vary with occasional long distance views from more elevated parts of the site.			

12. GNA-02	Well pad in CA1		
Location Block	CA1		
Field	Gunya		
Coordinates	-	-	
Elevation (m)	662		
Terrain	sloping		
Slope (degrees) and Aspect	1.67423	Northwest	
Well Pad Area (ha)	3.7	5.6	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	2 & 9 December 2016 (Avoidance)		
BIODIVERSITY			
Site description	Site comprises mainly cultivated land immediately south of a settlement in Kilyango.		
Vegetation type(s) (WCS mapping)	Mainly cultivated land Settlement		
Vegetation types recorded (micro-habitats)	Gardens Hyparrhenia-Pennisetum old fallow Settlement		
Main Biological and Social Features	*Acacia polyacantha, Acacia sieberiana, Albizia grandibracteata, Annona muricata, Anacardium occidentale, Artocarpus heterophyllus, Balanites aegyptiaca, Cassia siamea, Citrus sp, Crateva adansonii, Ficus capensis Ficus mucuso, Ficus natalensis, Kigelia africana, Lannea schweinfurthii, Mangifera indica, Melia azedarach, Milicia excelsa, Persea americana, Philenoptera laxiflora, Sclerocarya birrea, Tamarindus indica, Termite mound, Vepris nobilis* Tree with bat roosts (yellow winged bat)		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Milicia excelsa* (mature tree) - Iroko; IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved species. *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* Bat roost		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat – Agricultural		
Alien/Invasive	None identified		

Species				
Flora - Protected Species	Species of conservation concern were recorded – *Tamarindus indica*: Uganda Red List (VU); IUCN (LC) *Milicia excelsa* (mature tree) - Iroko; IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved species; *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*			
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.			
Physical Characteristics				
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.			
Closet Air Receptor (distance)	Settlement approx 20m to south in village of Kilyango			
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.			
Closest Noise Receptor (distance)	Settlement approx 20m to south in village of Kilyango			
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	1 settlement approx 20m to south in village of Kilyango	None	None	None
25-85m	Approx 9 settlements to south. Village of Kilyango. 30 - 75m	None	None	None
85-375m	Approx 250 settlements in village of Kilyango. Majority to south west. 88m - 375m	Kilyango Gods mercy clinic - 330m to south west	Kilyango Church of Uganda - 360m south west Kilyango Full Gospel Church - 215m north Kilyango Church of God - 340m south west	None
Wellpad (operational phase, NIGHT)				
0-130m	Approx. 26 settlements to south and north in village of Kilyango	None	None	None
130-250m	Approx. 100 settlements surrounding in village of Kilyango	None	Kilyango Full Gospel Church - 215m north	None
250-450m	Approx. 160 settlements in village of Kilyango	God's mercy clinic - 330m south west	Kilyango Church of Uganda - 360m south west Kilyango Church of God - 340m south west Kilyango St. Kizito Chapel - 450m to east Kilyango Pentecostal Church - 400m south west	None
Soils and Geology	**Soil Type**	There are no borings at this site. Borehole data for boring DWRM 21635 is provided below. Clay and sand (aquifer type – fractured bedrock) <u>Lithology</u> 0-1m Brown sandy topsoil 1-4m Reddish/yellowish clay 4-30m Brown sticky sandy clay with gravel 30-41m Brown clayed sand with gravels 41-52m Brown clay with gravels		

		52-68m Brown course sand and sandstone 68-70m Greyish brown clay 70-80m Brown sand and sandstone 80-90m Grayish brown clay 90-93m Brown fine grain sand 93-105m Grayish clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		21635	245839N	333107E	221	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		87	63.68	NA	2	NA
	Water Availability	There are no boreholes at the well pad. There are 4 DWRM boreholes in the vicinity of the GNA (01-04) well pads. Static water levels in 3 of the four boreholes ranged between approximately 54 to 64 m.b.g.l. The boring log for one borehole the Yield was reported to be 2 m^3/hr;				
	Water Quality	There is no water quality report available.				
Surface Water	**Closest Surface Water**	Not identified, 315m Wetland 1,676m				
	Distance to Lake/River	Victoria Nile, 2,637m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**		**Village**	
	Buliisa	Ngwedo	Nile		Kilyango LC1	
	Nearby Receptor	**Receptor Details**		**Distance to Well Pad (m)**		
		Kilyango Full Gospel Church		215		
		Kilyango God's Mercy Clinic		330		
		Kilyango Pentecostal Church		400		
		St. Kizito Chapel		450		
	Trees of socio-economic value Houses (some new) Historical sites Places of worship					
Archaeology and Cultural Heritage	**Date of survey** 2013, 2014 & 2015	<u>Palaeontological remains</u> A single palaeontological findspot is recorded at Magungu, northwest of GNA-02, dating to the Pleistocene. <u>Archaeological remains</u> A Middle Stone Age core and a Late Stone Age core scraper were recorded. <u>Historical sites</u> To the northeast of the wellpad area is the site of Fort Magungu where the Victoria Nile meets Lake Albert, established by Governor General Charles Gordon in 1876. <u>Burial places</u> Seven burial places were recorded, comprising two burial grounds of ten graves, on burial ground of 14 graves (30m x 30m area) and four individual burial sites. <u>Places of worship</u> Five churches were recorded: Kilyango Church of Uganda, Kilyango Pentecostal Church,				

		Kilyango Full Gospel Church, Kilyango St. Kizito chapel and Kilyango Church of God. Cultural sites Two *abila*, traditional family ancestral shrines, were recorded. An Alur sacred tree is located south of the wellpad area.
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens with occasional trees. • Landform is rolling and fields accessed by local residents who manage the crops. • This site and surrounding context are characterized by self-sufficient farming • Views are largely short distance and fragmented by sporadic vegetation and rolling topography.

13. GNA-03	Well pad in CA1		
Location Block	CA1		
Field	Gunya		
Coordinates	-	-	
Elevation (m)	670		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	1.393165	West	
Well Pad Area (ha)	3.4	5.8	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	3 & 10 December 2016 (Avoidance)		
BIODIVERSITY			
Site description	Site comprises mainly cultivated land immediately south of a settlement in Uduk.		
Vegetation type(s) (WCS mapping)	Mainly cultivated land Settlement		
Vegetation types recorded (micro-habitats)	Gardens *Hyparrhenia* grassland pockets *Harissonia* bushed grassland and thicket Settlement		
Main Biological and Social Features	*Acacia sieberiana, Albizia grandibracteata, Anacardium occidentale, Antiaris toxicaria, Balanites aegyptiaca, Borassus aethiopum, Citrus sp., Crateva adansonii, Elaeis guineensis, Ficus sp., Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Melia azedarach, Moringa oleifera, Persea americana, Sclerocarya birrea, Tamarindus indica, Trichilia emetic* Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora - Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not*		

	assessed)
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.
Physical Characteristics	
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.
Closet Air Receptor (distance)	Unnamed church, 95m
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.
Closest Noise Receptor (distance)	Unnamed church, 95m

Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	None	None	None	None
25-85m	None	None	None	None
85-375m	Approx. 80 settlements in village of Uduk II. Majority to south. 95m - 375m	None	Unnamed church 95 m to south Uduk II Church of God - 225m to south west Uduk II Pentecostal Church - 235m to south west	None
Wellpad (operational phase, NIGHT)				
0-130m	Approx. 5 settlements in village of Uduk II	None	Unnamed church 95 m to south	None
130-250m	Approx 20 settlements in village of Uduk II	None	Uduk II Church of God - 225m to south west Uduk II Pentecostal Church - 235m to south west	None
0-130m	Approx. 5 settlements in village of Uduk II	None	Unnamed church 95 m to south	None

Soils and Geology	**Soil Type**	There are no borings at this site. Lithology for Borehole DWRM 17683 is summarized below. <u>Lithology</u> 0-4m Black topsoil and reddish sandy clay 4-21m Sandy clay with gravel 21-25m Course sand 25-27m Clay with gravel 27-45m Fine sand 45-50m Course sand 50-55m Finesand 55-58m Course sand 58-84m Fine sand 84-100m Green-grey clay

Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		17683	331929N	241767E	237	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		100	63.9	NA	NA	NA

	Water Availability	There are 4 DWRM boreholes in the vicinity of the GNA (01-04) well pads. Static water levels in 3 of the four boreholes ranged between approximately 54 to 64 m.b.g.l. The boring log for one borehole the Yield was reported to be 2 m^3/hr.
	Water Quality	No water quality report available
Surface Water	**Closest Surface Water**	Not identified, 109m Wetland , 2,648m
	Distance to Lake/River	Victoria Nile, 4,818m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Ngwedo	Uduk II LC1

Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**
	Unnamed church	95
	Uduk II Church of God	225
	Uduk II Pentecostal Church	235
	Uduk II LC Office	660

Trees of socio-economic value
Houses, Graveyards

Archaeology and Cultural Heritage	**Date Surveyed** 2013, 2015 & 5th December 2016.	Archaeological remains Surveys recorded pottery, daub, medicinal plants and graveyards. The antiquity of these finds is not certain – many were identified within or in the immediate vicinity of the current villages and homesteads. A pottery scatter and pottery sherds were recorded. Traditional pottery-making techniques and vessel forms have changed little in over 1000 years, and material found within and in the vicinity of current settlements and agricultural areas may derive from recent discard and manuring fields. However, one clearly Late Iron Age sherd with a band of decoration at the shoulder and maize comb rouletting was identified. The pottery was slipped or burnished and tempered with sand and grog. Some sherds were abraded, making them difficult to date. According to a local resident, pottery is not currently made in this area, but is bought at Panymur. Daub signifying construction in the past was also identified. The wellpad area contains a source of soil for smearing house walls. Burial places Three burial places were recorded at Uduk II (three graves; eight graves; and eleven graves). One site was marked with five large mango trees which serve as a grave marker one of the burial site. Places of worship Places of worship comprise the Church of Uganda Church of God and the Uduk II Pentecostal Church. Northwest of GNA-03 is the Akichira Catholic Church. Cultural sites One Alur sacred tree and sacrificial place is located within GNA-03. There is another sacred tree and a sacred area south GNA-03. There is one traditional healer living within GNA-03. Another healer is located north of GNA-03. Medicinal and cultural uses of plants The place-name Uduk derives from the many *Uduk* trees in the village. The *Uduk* trees serve various functions such as building and charcoal making. The barks of the roots of the *Uduk* trees are used for the treatment of worms. The site has other trees that are used by the community such as *Oyomo* tree used to bar sickness from a home. There was also *Lenga*, mango trees and the *Pedo* tree for treatment of gonorrhoea and *Neem* (*Azadirachta indica*) trees.

Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Bulisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens with occasional trees. • Landform is undulating ad fields accessed by local residents who manage the crops. • This site and surrounding context are characterized by self-sufficient farming and pedestrian and vehicular movement influenced by the proximity to Ngwedo. • Views range from mid-range open views to short and channeled views. Shorter range views are fragmented by sporadic vegetation and rolling topography.

14. GNA-04	Well pad in CA1		
Location Block	CA1		
Field	Gunya		
Coordinates	-	-	
Elevation (m)	680		
Terrain	Sloping		
Slope (degrees) and Aspect	2.076308	Northwest	
Well Pad Area (ha)	3.9	5.9	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	4 December 2016 (Avoidance)		
BIODIVERSITY			
Site description	Site comprises mainly cultivated land immediately south of a settlement in Avogera.		
Vegetation type(s) (WCS mapping)	Mainly cultivated land Settlement		
Vegetation types recorded (micro-habitats)	Gardens Hyparrhenia grassland pockets Isolated Harissonia thicket Settlement		
Main Biological and Social Features	*Acacia sieberiana, Albizia grandibracteata, Anacardium occidentale, Antiaris toxicaria, Balanites aegyptiaca, Borassus aethiopum, Citrus sp., Crateva adansonii, Elaeis guineensis, Ficus sp., Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Melia azedarach, Moringa oleifera, Persea americana, Sclerocarya birrea, Tamarindus indica, Trichilia emetic, Artocarpus heterophyllus, Azadirachta indica, Kigelia africana, Pinus sp., Stereospermum kunthianum, Syzygium cumini, Artocarpus heterophyllus, Azadirachta indica, Combretum adenogonium, Lannea schweinfurthii, Milicia excelsa, Moringa oleifera, Philenoptera laxiflora, Stereospermum kunthianum, Terminalia superba* Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Milicia excelsa* (mature tree) - Iroko; IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved species. *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		

Flora - Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC) *Milicia excelsa* (mature tree) - Iroko; IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved species *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*;				
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlement, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	Approx. 5 settlements to south west in village of Avogera. 13m - 23m	None	None	None	
25-85m	Approx. 3 settlements to south west, 25m and 1 settlement to south east, 80m in village of Avogera	None	None	None	
85-375m	Approx. 230 settlements. Majority to east and some to north west. 90m - 375m in village of Avogera	None	Avogera Catholic Church 250m east.	Avogera Primary School 315m east	
Wellpad (operational phase, NIGHT)					
0-80m	0-130m	Approx 35 settlements in village of Avogera	None	None	
80 – 180m	130-250m	Approx 100 settlements in village of Avogera	None	Avogera Catholic Church 250m east.	
180 – 350m	250-450m	Approx. 190 settlements in village of Avogera	None	Avogera Open Heaven Church - 570m south	
Soils and Geology	**Soil Type**	There are no borings at this site. There is no lithological data for DWD 31403. Lithological Data Is available for borehole DWD29476 is located 777m from the well pad. Lithology 0-15m Brown sandy clay 15-20m Light brownish yellow clay 20-35m Brownish sand 35-80m Greenish sandy clay 35-80 Fine sand 80-85m White sand			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		31403	243919N	333911	Within land acquisition
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr** / **Drawdown (m)**

		-	-	-	-	-
	Water Availability	There are no boreholes at the well pad. There are 4 DWRM boreholes in the vicinity of the GNA (01-04) well pads. Static water levels in 3 of the four boreholes ranged between approximately 54 to 64 m.b.g.l. The boring log for one borehole was reported to be 2 m^3/hr; no other information was available.				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 526m Wetland, 1,508m				
	Distance to Lake/River	Victoria Nile, 3,990m				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Avogera	Avogera LC1
	Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Avogera Catholic Church	250	
		Avogera Primary School	315	
		Avogera Open Heaven Church	570	
	Trees of socio-economic value; houses; graveyards			
Archaeology and Cultural Heritage	**Date of Survey** 2013, 2015, 4th December 2016 & 28th June 2017	Archaeological remains Lithic artefacts included a characteristic Late Stone Age crescent-shaped struck stone tool, a grinding stone, a core and an abraded cobble. Two grinding stones, in current use, were noted. Concentrations of potsherds and pottery scatters were noted, as as well as an in situ pottery and lithic scatter. A large assemblage of pottery sherds was recorded. Some of the potsherds were plain while others were decorated with roulette or knotted decoration and grooved lines. Ironworking slag was recorded. Burial places A number of burial places were recorded, including a clan leader's grave, a family plot near the road, a burial ground with multiple graves and two individual burials. Some grave sites were cemented but most were not. Places of worship Places of worship within the wellpad area comprise Avogera Catholic Church and Avogera Open Heaven Church. Avogera Church of Uganda is south of the wellpad area and Avogera Miracle Church lies east of the wellpad area. Cultural sites A traditional healer has a semi-permanent shrine east of the wellpad area. There are sacred trees north of the wellpad area and west of the wellpad area. Medicinal and cultural uses of plants Plants identified in the area include *Neem (Azadirachta indica)* trees, *Bongo* trees (marking a burial site), mango, *Lenga*, *Moringa* (*Moringa oleifera*) and *Mulolo* (*Kigelia africana)* trees.		
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens but largely void of large-scale infrastructure. • This site is adjacent to a local track to the south linking a series of fields and land owners. • Landform is undulating and fields accessed by local residents who manage the crops. • This site and surrounding context are characterized by farming and pedestrian and vehicular movement influenced by the proximity to the settlement of Avogera. • Views north and west are more open than views south and east which are limited by dense thicket vegetation.		

15. KGG-01	Well pad in LA2		
Location Block	LA2- North		
Field	Kigogole		
Coordinates	-	-	
Elevation(m)	688		
Terrain	flat		
Slope (degrees) and Aspect	0.328433	Southeast	
Well Pad Area (ha)	3.9	5.8	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	17 January 2017 (Avoidance)		

BIODIVERSITY

Site description	Survey buffer mainly within cultivated land. Small area of grazing land associated with settlement to north.
Vegetation type(s) (WCS mapping)	Cultivation Grazing land around settlement
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered trees in settlement Bushed grassland with thicket in fallow; Manihot garden Manihot garden Open grassland in settlement; wooded grassland in settlement; small Musa gardens
Main Biological and Social Features	*Albizia coriaria, Albizia grandibracteata, Antiaris toxicaria, Artocarpus heterophyllus, Balanites aegyptiaca, Citrus lemoni, Citrus sinensis, Citrus sp., Combretum molle, Crateva adansonii, Dalbergia melanoxylon, Ficus sp., Lannea schimperi, Lannea schweinfurthii, Mangifera indica, Melia azedarach, Persea americana, Sclerocarya birrea, Stereospermum kuntianum, Tamarindus indica, Ziziphus pubescens* Termite mounds
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*
Dominant Woody Species	No detailed survey completed
Dominant Herbaceous species	No detailed survey completed
Phytosociological Description	Modified habitat – Agricultural
Alien/Invasive Species	None identified
Flora - Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon*: (RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016)

	Albizia grandibracteata. (Red Nongo) NFA Reserved Species, Uganda Red List (VU), IUCN (Not assessed)
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.

Physical Characteristics

Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.
Closet Air Receptor (distance)	Settlements, adjacent
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.
Closest Noise Receptor (distance)	Settlements, adjacent

Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	Approx. 5 settlements in village of Oriibo. 2m - 20m	None	None	None
25-85m	Approx. 8 settlements in village of Oriibo. 40m - 84m	None	None	None
85-375m	Appox. 150 settlements in village of Oriibo. Majority to north. 100m - 375m	None	Ntembiro Church - 200m south east Church of Uganda - 200m east Pentecostal Church of God - 175m north east Charismatic Episcopal Church - 175m north east Church of God - 90m north Uriibo Catholic Church - 270m north	Uribo Prim School - 85m north
Wellpad (operational phase, NIGHT)				
0-130m	Approx 14 settlements in village of Oriibo	None	Church of God - 90m north	Uribo Prim School - 85m north
130-250m	Approx 75 settlements in village of Oriibo	None	Ntembiro Church - 200m sotuh east Church of Uganda - 200m east Pentecostal Church of God - 175m north east Charismatic Episcopal Church - 175m north east	None
250-450m	Approx. 100 settlements in village of Oriibo. Majority to north	None	Uriibo Catholic Church - 270m north	None

Soils and Geology	**Soil Type**	There are no boreholes in the area.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**

		-	-	-	-	-
	Water availability	There are no boreholes in the area.				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 908m Wetland, 897m				
	Distance to Lake/River	Victoria Nile, 10,943m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Buliisa	Buliisa	Nyamitete	Oriibo		
	Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		Uribo Primary School	85			
		Ntembiro Church	200			
		Church of Uganda	200			
		Pentecostal Church of God	175			
		Charismatic Episcopal Church	175			
		Church of God	90			
		Uriibo Catholic Church	270			
	Churches, Graveyards and Schools					
Archaeology and Cultural Heritage	**Survey Date** 2015 & 5th July 2017	Archaeological remains Pottery was noted at 20 locations and lithics at four locations. Pottery sherds, a complete pot and a pottery scatter were noted. Some roulette-decorated pottery dates to the Late Iron Age or later. Burial places Five burial grounds were identified. These comprise one graveyard with several graves marked by a barkcloth tree, a relocated burial ground of the Uribo clan (25 graves), a further Uribo clan graveyard with numerous graves, a group of six graves and eight graves in the burial ground of the Manano family. Places of worship Churches included the Itambiro Iya Bishaka (Ntembiro Church), the Charismatic Episcopal Church, the Church of Uganda, Uriibo Catholic Church and Uriibo Pentecostal Church. The Full Gospel church is located west of the survey area, and the Kijumbya Catholic Church is southwest of the study area. Cultural sites Uriibo is an Alur word meaning a mixture (unity) or different tribes. Uriibo is also the name of the Alur clan which settled here. Confirmed cultural sites comprise an *abila* at a barkcloth tree with cut marks, and an *abila* of the Basiabi family in *Uduk* trees and *Lenga* plants. They use the site especially with the appearance of the new moon. The site is used for snake bites, curses and barrenness. Two large tamarind trees are used for community meetings. There is also a possible sacred tree, three possible sacred tamarind trees and a further possible cultural site marked by barkcloth trees.					
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of an irregular pattern of agricultural crop gardens • The site void of largescale infrastructure and is managed locally for subsistence farming. • The flat and open nature of this site allows mid-to-distant views west and east to the settlement of Oribo.				

16. KGG-03	Well pad in LA2		
Location Block	LA2- North		
Field	Kigogole		
Coordinates	-	-	
Elevation(m)	691		
Terrain	Flat		
Slope (degrees) and Aspect	0.328433	Southeast	
Well Pad Area (ha)	3.9	5.8	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	17 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer encompasses mainly cultivated land with small patch of grazing. There are a number of houses within the buffer zone.		
Vegetation type(s) (WCS mapping)	Mainly cultivation Some grazing land		
Vegetation types recorded (micro-habitats)	Manihot garden ; post cultivated open bushland dominated by *albizia grandibracteata* Manihot garden with thicket Manihot garden with thicket Manihot garden; old bushed grassland fallow Manihot-zea garden; old Manihot fallow		
Main Biological and Social Features	*Acacia polyacantha, Acacia sieberiana, Albizia coriaria, Albizia grandibracteata, Antiaris toxicaria, Artocarpus heterophyllus, Citrus sinensis, Combretum molle, Combretum molle, Crateva adansonii, Dalbergia melanoxylon, Grevillia robusta, Kigelia africana, Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Melia azedarach, Sclerocarya birrea, Securidaca longipedunculata, Stereospermum kunthianum, Tamarindus indica, Terminalia glauscens, Trichilia emetica* Termite mound		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant Woody Species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological Description	Modified habitat - Agricultural		
Alien/Invasive	None identified		

Species					
Flora - Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon*: (RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*				
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlements, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlements, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	Approx. 2 settlements in village of Beroya. 5m east and 5m north	None	None	None	
25-85m	Approx. 3 settlements in village of Beroya. 45m - 65m	None	None	None	
85-375m	Approx. 5 settlements to north and one to east in village of Beroya. 80m - 305m	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx 7 settlements to east in village of Beroya	None	None	None	
130-250m	Approx 2 settlements to north in village of Beroya	None	None	None	
250-450m	Approx 6 settlements village of Beroya	None	None	None	
Soils and Geology	**Soil Type**	There are no known borings within 1 km.			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		None	-	-	No well within 1 km
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	No water quality report available				
Surface Water	**Closest Surface**	Ngazi, 333m Wetland, 1,495m				

	Water			
	Distance to Lake/River	Victoria Nile, 12,502		
Socioeconomic Characteristics				
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Buliisa	Kakoora	Beroya
	Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Beroya Village	adjacent	
	Graveyards			
Archaeology and Cultural Heritage	**Survey Date** 2015 & 4th July 2017	Archaeological remains Lithic artefacts comprised MSA lithic cores and flakes, debitage, an end scraper, a grinding stone and a house rubbing cobble. Materials comprised basalt and local quartz and quartzite. Pottery sherds were found at six locations. A grinding stone was noted. Burial places One extensive burial ground was recorded, which has been in use since 1977. Cultural sites The Beroya sacred place is at a large tree (location uncertain). There is a community tree meeting point at a large *Mukeeku* tree. The survey noted a possible *kibira* in a *Lenga* tree facing a house entrance. Four *Nnongo/Musisiye* trees, called *Muge* in Alur, were noted. *Nnongo/Musisiye* trees are often associated with traditional worship and may be cultural sites A spear planted in the ground may mark a *kibira*, a traditional religious site. Medicinal and cultural uses of plants A number of sisal trees *(Agave sisalana)* are used as boundary markers.		
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises grazing land and scrub alongside agricultural crops. • There are occasional residential dwellings enclosed by scrub vegetation to the east, • Landform is largely flat. • Views are largely short distance and fragmented by sporadic vegetation and rolling topography.		

17. KGG-04	Well pad in LA2		
Location Block	LA2- North		
Field	Kigogole		
Coordinates	-	-	
Elevation(m)	667		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	1.914388	South	
Well Pad Area (ha)	4.0	8.3	
District	Buliisa		
CHA habitat type	Transitional (natural) / Modified		
Survey date(s) and Type	13 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	The western part of the buffer zone is grazing land with the eastern part being mainly cultivation. Bush duiker faeces were noted as well as some aardvark activity.		
Vegetation type(s) (WCS mapping)	Grazing land Cultivation		
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered thicket Bushed grassland-Manihot gardens mosaic Manihot garden; bushed grassland Open bushland; bushed grassland; thicket		
Main Biological and Social Features	*Acacia sieberiana, Albizia grandibracteata, Antiaris toxicaria, Balanites aegyptiaca, Citrus sinensis, Commiphora africana, Commiphora sp., Crateva adansonii, Dalbergia melanoxylon, Euphorbia candelabrum, Ficus natalensis, Ficus sp., Hymenocardia acida, Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Securidaca longipedunculata, Stereospermum kunthianum* Seasonally flooded grassland areas/wetland Termite mounds Some aardvark and bush duiker activity		
Social features	None		
Notable Biological and Social Features	*Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modified habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora - Protected Species	Species of conservation concern were recorded- *Dalbergia melanoxylon*: (RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not*		

	assessed)				
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlement, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	Approx. 1 settlement 5m to north in village of Kichoke Bugana	None	None	None	
25-85m	Approx. 1 settlement 50m to north in village of Kichoke Bugana	None	None	None	
85-375m	Approx. 20 settlements to north east in village of Kijumbya. 110m - 315m	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx. 6 settlements in village of Kijumbya and Kichoke Bugana	None	None	None	
130-250m	Approx. 7 settlements in village of Kijumbya	None	None	None	
250-450m	Approx. 17 settlements in village of Kijumbya	None	Kijumbya Church Of Uganda - 387m north east	None	
Soils and Geology	**Soil Type**	There are no borings at this site. Lithoogy of DWRM boring log for DWD 16040 is provided below. Lithology 0-1m Sandy soil 1-28m Reddish brown medium grained sand 28-38m Sandy clay 38-50m Medium grained sand 50m-64m Greyish sand 64-70m Sand			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		16040	234640N	33167E	676
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr** / **Drawdown (m)**
		70	-	-	- / -

	Water Availability	The reported depth to water is 70.3 m.b.g.l and the yield is 20.4 m^3/hr.[1]		
	Water Quality	No water quality report available		
Surface Water	**Closest Surface Water**	Not identified, 754m Wetland, 676m		
	Distance to Lake/River	Lake Albert, 10,167m		
Socioeconomic Characteristics				
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Buliisa	Bugana	Kichoke Bugana
	Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Kijumbya Church of Uganda	387	
	Kijumbya Church of Uganda, graveyards			
Archaeology and Cultural Heritage	**Date Surveyed** 2015 & 4th July 2017	Archaeological remains Pottery sherds were observed at five locations. Graveyards A burial ground of the Abira clan has been in use since 1964. Cultural heritage There is a cultural site called Chwa in a tarmarind tree that had been burnt. The site is used for rain making rituals. A barkcloth tree (*Mutooma*) is a possible cultural site.		
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site is dominated by grazing land, and comprised of bushland thicket and void of infrastructure. • Views are largely enclosed by thicket vegetation.		

[1] Atacama 2014

18. KGG-05	Well pad in LA2		
Location Block	LA2- North		
Field	Kigogole		
Coordinates	-	-	
Elevation (m)	673		
Terrain	Flat to Sloping		
Slope (degrees) and Aspect	2.076308	Northwest	
Well Pad Area (ha)	3.7	5.6	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	23 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer mainly within cultivated land. Small area of grazing land to the south. Pandiga.		
Vegetation type(s) (WCS mapping)	Cultivation Grazing land		
Vegetation types recorded (micro-habitats)	Bushed grassland; gardens Manihot gardens Manihot-Zea garden; bushed grassland Musa-Manihot garden; fallow		
Main Biological and Social Features	*Acacia sieberiana, Albizia coriaria, Albizia grandibracteata, Antiaris sp., Antiaris toxicaria, Artocarpus heterophyllus, Citrus sinensis, Crateva adansonii, Elaeis guinensis, Erythrina abyssinica, Ficus ?ovata, Ficus sp., Ficus sp. (long petiole), Kigelia africana, Lannea schweinfurthii, Mangifera indica, Securidaca longipedunculata, Stereospermum kunthianum, Tamarindus indica* Termite mound		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		

	Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.

Physical Characteristics

Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.
Closet Air Receptor (distance)	Settlements, 175m
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.
Closest Noise Receptor (distance)	Settlements, 175m

Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	None	None	None	None
25-85m	None	None	None	None
85-375m	Approx. 40 settlements to south east in village of Gotlyech. 175m - 375m	None	None	None
Wellpad (operational phase, NIGHT)				
0-130m	None	None	None	None
130-250m	Approx. 8 settlements in village of Gotlyech	None	None	None
250-450m	Approx. 35 settlements in village of Gotlytech and Ngwedo farm	None	Ngwedo Farm church - 413m north	None

Soils and Geology

Soil Type

There are no borings at this site. Lithology for DWD25893 is provided below.

Lithology

0-16m	Silty clay
16-17m	Clays
18-33m	Sands
34-77m	Clays
50-64m	Greyish sand
64-70m	Sand

Hydrology

Closest Known Well

DWRM ID	Coordinates		Distance to Well Pad (m)
DWD25893	334658E	334658N	406

Borehole Data

Depth (m)	Static Water Level (m.b.g.l.)	Water Level (m.b.g.l)	Yield m^3/hr	Drawdown (m)
76.5	29.8	-	1.9	-

Water availability

There are no boreholes at the well pad site. There are three known boreholes in proximit to the well pad:

DWD25893 – 538m to center point
DWD30263 – 980m to center point
DWD16039 – 1484m to center point

		DWD25893 : Static Water level 29.8 b.m.b.g.l. and Constanct Discharge Yield 1.9 m^3/hr DWD16039 : Static Water level 51.7 b.m.b.g.l. and Yield 0.8 m^3/hr
	Water Quality	No water quality report available
Surface Water	**Closest Surface Water**	Sambiye, 192m Wetland 145m
	Distance to Lake/River	Victoria Nile, 9,832m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Buliisa	Nyamitete	Gotlyech
	Nearby Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Ngwedo Farm Church	413	
	Graveyards, Pandiga village and Gotlyech village			
Archaeology and Cultural Heritage	**Date Surveyed** 2013 & 6th July 2017	Archaeological remains A lithic platform core and a quartz flake were recorded. Concentrations of pottery sherds and pottery findspots were identified across the wellpad area. Roulette-decorated pottery dates to the Late Iron Age or later, while dense pottery scatters may reflect ritual activities. Burial places Surveys identified five burial places, comprising six burials under a *Mutooma* tree and a mango tree, a graveyard marked by five large mango trees and three small burial grounds. Places of worship One place of worship is noted in the study area, Ngwedo Farm church. Cultural sites Gotlyech means 'a place where elephants lived'. It is said elephants used to live in the area. The Sambiye seasonal stream is considered sacred, and has 'male' and 'female' streams. Medicinal plants Medicinal plants not seen at other wellpad sites comprise *Olwedo* tree and *Urweti* plant.		
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens with a noticeable cluster of trees in the northern quadrant. • Landform is undulating and although there are no formal filed boundaries fields are accessed by local residents who manage the crops. • This site and surrounding context are characterized by self-sufficient farming and is relatively tranquil given its distance to any formal tracks or roads. • Views are largely enclosed by vegetation with occasional glimpses south- east towards Nyamiete • At the site one gets a clear view of Ngwedo town and NSO-02.		

19. KGG-06	Well pad in LA2		
Location Block	LA2 North		
Field	Kigogole		
Coordinates	-	-	
Elevation(m)	653		
Terrain	sloping		
Slope (degrees) and Aspect	5.331129	West	
Well Pad Area (ha)	3.5	7.3	
District	Buliisa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	14 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Area of grazing land with no houses within the survey buffer.		
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered thicket Bushed grassland with thicket Bushed wooded grassland with thicket Grassland with thicket Grassland with thicket; bushed wooded grassland with thicket		
Main Biological and Social Features	*Acacia senegal, Acacia sieberiana, Albizia grandibracteata, Antiaris toxicaria, Balanites aegyptiaca, Combretum molle, Crateva adansonii, Dalbergia melanoxylon, Euphorbia candelabrum, Ficus sp., Lannea schweinfurthii, Maerua angolensis, Sapindiaceae sp., Sclerocarya birrea, Securidaca longipedunculata, Tamarindus indica, Ziziphus pubescens* Seasonally flooded grassland close to centre point Termite mound Large raptor nest (Fish eagle?) Aardvark activity		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* Raptor nest (fish eagle?)		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified.		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		

	Dalbergia melanoxylon: (RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*				
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	None within 1 km.				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	None within 1 km.				
Distance from Site boundary (not centre of site)	Settlements		Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)					
0-25m	None		None	None	None
25-85m	None		None	None	None
85-375m	None		None	None	None
Wellpad (operational phase, NIGHT)					
0-130m	None		None	None	None
130-250m	None		None	None	None
250-450m	None		None	None	None
Soils and Geology	**Soil Type**	There are no known boreholes in the area.			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		None	-	-	None within 1 km
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Availability	There are no boreholes in the area; depth to eater and potential yield are unknoen.				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 543m Wetland 587.				
	Distance to Lake/River	Lake Albert, 8,567m				
Socioeconomic Characteristics					
Social	**Distict**	**Subcounty**	**Parish**	**Village**	
	Buliisa	Buliisa	Bugana	Kichoke Bugana	

	Nearby Receptors	**Receptor Details**	**Distance to Well Pad (m)**
		None within 1 km.	NA
	Kraal Seasonally flooded area used by grazing animals		
Archaeology and Cultural Heritage	**Date Surveyed** 3rd July 2017	Archaeological remains Seven pottery findspots were recorded. One daub findspot was noted. Cultural sites A cultural site called Chwa, used for rain making, is located at the site of a burned tamarind tree. Further possible cultural sites noted in the survey, but not verified by traditional religious practitioners, comprise a fire place in a *Munongo* tree, cooking stones in *Nnongo* and *Musingabakazi* trees, a possible sacrificial place in a tamarind tree, an *Amarula* tree, and a large tamarind tree. Medicinal and cultural uses of plants Medicinal plants noted include *Musingabakazi*, *Mudidiyo*, *Mukodoyi*, *Mukabyakabya*, *Musonge*, *Mutuula/Amarula*, *Mukondwe*, *Kulumbero*, *Lenga*, cactus and tamarind.	
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site consists of a broad open pastoral landscape. This open pasture features grazing cattle, short grasses and irregular pattern of semi mature to mature trees with elements of thicket. • Landform gently slopes west, and water drains into a natural semi-permanent attenuation pond. • Views are largely short distance and fragmented by sporadic vegetation and rolling topography.	

20. KGG-09	Well pad in LA2		
Location Block	LA2 North		
Field	Kigogole		
Coordinates	-	-	
Elevation (m)	668		
Terrain	Sloping		
Slope (degrees) and Aspect	2.971457	Northeast	
Well Pad Area (ha)	3.5	5.3	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	Avoidance 9 October 2017, Detailed, April 2017		
BIODIVERSITY			
Site description	Area of cultivation with some areas of bushed grassland. Modified habitat.		
Vegetation types recorded (micro-habitats)	Bushed grassland and cultivated fields (Manihot)		
Main Biological and Social Features	Mature trees.		
Notable Biological and Social Features	*Albizia coriaria* *Albizia grandibracteata* *Dalbergia melanoxylon*		
Dominant woody species	*Harrisonia abyssinica, Combretum molle*		
Dominant Herbaceous species	*Hyperrhenia filipendula* and *Brachiaria scalaris*		
Phytosociological description (within plot)	Bushed grassland with thicket shrub		
Alien/Invasive Species	*Chromolaena odorata*		
Flora– Protected Species	Species of conservation concern were recorded- *Albizia coriaria;* RS, IUCN (Not Assessed) *Dalbergia melanoxylon*: (RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Fauna – Priority Species	No detailed survey for fauna was undertaken at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		

Closet Air Receptor (distance)	Settlement, 80m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, 80m				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	Approx 1 settlement 80m to north in village of Kijumbya Approx 1 settlement 80m to south in village of Kichoke Bugana	None	None	None	
85-375m	Approx 17 settlements in villages of Kijumbya and Kichoke Bugana. 85m to 375m. Majority to south and north west.	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx 4 settlement in village of Kijumbya Approx 4 settlement in village of Kichoke Bugana	None	None	None	
130-250m	Approx 6 settlement in village of Kijumbya Approx 5 settlement in village of Kichoke Bugana	None	None	None	
250-450m	Approx 20 settlement in village of Kijumbya, Kichoke Bugana, and Kikoora	None	None	None	

Soils and Geology	**Soil Type**	There are no boreholes in the area.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Availability	There ae no known boreholes in the area; depth to water and potential yield are unknown.				
	Water Quality	No water quality report available				

Surface Water	**Closest Surface Water**	Ngazi, 188m Wetland, 563m
	Distance to Lake/River	Lake Albert, 11,576m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Buliisa	Kakoora	Kijumbya
	Nearby Receptors	**Receptor Details**	**Distance to Well Pad (m)**	
		Settlement	80	
Archaeology and Cultural Heritage	**Date Surveyed** 5th July 2017	Archaeological remains Lithics included a quartz axe core with a dihedral platform and was periphery worked. A struck stone flake findspot was also noted. Thirty pottery findspots were recorded. Pottery was plain, thick bodied, burnished and tempered with sand with roulette decoration. Medicinal and cultural uses of plants The site has a number of medicinal plants such as *Mbumbuula*, *Uduk*, *Musingabakazi*, cactus, mangoes, *Mulolo* (sausage tree), tamarind and *Marula* which are also common in other surveyed areas. Surveyors noted that Sisal plants *(Agave sisalana)* were used as boundary markers.		
Landscape and Visual Amenity	**Landscape Character Area** LCA02	Buliisa Lowland Rolling Farmland Key local characteristics: • This site is characterized by a mix of agricultural crop gardens and sporadic thicket. The extent of thicket coverage is somewhat greater than the typical landcover within this LCA. • Although no infrastructure or tracks within the site, it is surrounded by a network of informal paths linking clusters of residential properties. • The density of vegetation within the site limits the extent of views with occasional glimpses beyond.		

21. KW-01	Well pad in LA2		
Location Block	LA2- North		
Field	Kasemene-Wairindi		
Coordinates	-	-	
Elevation (m)	615		
Terrain	Sloping		
Slope (degrees) and Aspect	2.32113	East	
Well Pad Area (ha)	3.3	7.1	
District	Buliisa		
CHA habitat type	Transitional (Natural)		
Survey date(s) and Type	10 January 2017 (Avoidance), 7 April 2017 (Detailed), 21 June 2017 (Detailed)		
BIODIVERSITY			
Site description	The site comprises an area of grazing land (transitional habitat) near to the shore of Lake Albert. There are some scattered houses in the area.		
Vegetation type(s) (WCS mapping)	Grazing land Cattle corridors		
Vegetation types recorded (micro-habitats)	Grassland with thicket Bushed grassland Seasonally flooded grassland		
Main Biological and Social Features	Seasonally flooded open grassland Termite mound Open water		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) Seasonally flooded areas Open water Mature large trees, particularly of *Acacia sieberiana* and *Balanites aegyptiaca* may be cut down or damaged. There is also Seasonally Flooded Open Grassland (wetland) areas with habitat-specific species of plants such as *Cyperus articulatus*.		
Dominant woody species	*Acalypha fruticosa, Asparagus africana; Azima tetracantha, Capparis fascicularis, Euphorbia candelabrum, Jatropha curcas, Opuntia sp.*		
Dominant Herbaceous species	*Agave sisalana, Aloe sp; Cissus quadrangularis, Cyperus dubius, Eriochloa fatirensis, Kyllinga alba; Sansevieria dawei; Sporobolus pyramidalis, Setaria sphacelate; Sprobolus rangei*		
Phytosociological description (within plot)	*Azima-Asparagus-Euphorbia* Seasonally Flooded Bushed Grassland *Opuntia-Azima-Acalypha* Bushland *Sporobolus-Azima* Bushed Grassland with Thicket *Sporobolus-Azima-Euphorbia* Seasonally Flooded Grassland with Thicket *Sporobolus-Azima-Euphorbia-Capparis* Seasonally Flooded Grassland with Thicket *Sporobolus-Setaria* Seasonally Flooded Open Grassland *Sporobolus-Setaria-Azima*-Euphorbia Seasonally Flooded Grassland with Thicket		
Flora– Protected	Species of conservation concern were recorded- -		

Species	*Tamarindus indica* : Uganda Red List (VU); IUCN (LC)				
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlement, 315m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, 315m				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	None	None	None	None	
85-375m	Approx 1 settlement 315m north east in village of Kizongi	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	None	None	None	None	
130-250m	None	None	None	None	
250-450m	Approx 3 settlements to north east in village of Kizongi	None	None	None	

Soils and Geology	**Soil Type**	No are no known boreholes within 1km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Availability	There are no known boreholes within 1 km of the well pad. The two closest boreholes are : DWD29952 – 1,288m to center point DWD33438 – 1,663m to center point				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Sambiye, 560m Within wetland				
	Distance to	Lake Albert, 842m				

	Lake/River			
Socioeconomic Characteristics				
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Buliisa TC	Western Ward	Kityanga
	Nearby Receptors	**Receptor Details**	**Distance to Well Pad (m)**	
		Kalolo catholic church and school	737	
	Kisimo, Kityanga, Kizonge villages Kraals Grave / graveyards Community facilities such as Kalolo Catholic Church and school and Treaty Primary school			
Archaeology and Cultural Heritage	**Survey Date** 6th December 2016	Archaeological remains Some of the potsherds were *in situ* in house walls, and places for getting soil for mudding houses also contained exposed pottery. Pottery was red-burnished, slipped on the surface, and tempered with grog and sand. It was decorated with string knotted rouletting (Late Iron Age) and wavy lines (Kansyore period). Burial places Two burial sites were noted. Cultural sites There is one cultural site, a *Mpuluma* for the Kibiro clan in a forested area. Medicinal and cultural uses of plants Plants including cactus, *Kamunye*, *Ntale Ya Ddungu (Zanthoxylum chalybeum)*, neem tree (*Azadirachta indica*), tamarind and aloe vera were identified.		
Landscape and Visual Amenity	**Landscape Character Area** LCA03	**Lake Albert Coastal Fringe** Key local characteristics • This site is at the transition between lowland pastoral fields and semi-natural wetland. • The site itself is void of any notable infrastructure other than existing tracks running between the Lake Albert coast and residential areas further east. • Views are low level and wide angled, particularly west towards Lake Albert.		

22. KW-02A	Well pad in LA2		
Location Block	LA2- North		
Field	Kasemene-Wairindi		
Coordinates	322643E	236562N	
Elevation (m)	623		
Terrain	flat		
Slope (degrees) and Aspect	0.464470	west	
Well Pad Area (ha)	4.1	8.9	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	December 2017		
BIODIVERSITY			
Site description	This site is situated in Kakindo village and it comprises of wooded grassland with scattered thickets. There is no homestead within a radius of 200m from centerline of KW2A. The site has a reasonable number of termite mounds evenly distributed within the quadrangle. Other features of interest at this pad include seasonally flooded bushed grassland with a water pond (102.8m^2) frequently visited by cattle within the area. There was also a small sweet potato garden covering an area of approximately 890m^2.		
Vegetation type(s) (WCS mapping)	Grassland		
Vegetation types recorded (micro-habitats)	*Azima-Opuntia* open Thicket Bushed grassland Bushland *Capparis-Azima* Thicket Garden Open grassland *Opuntia* bushland Thicket Wood lot		
Main Biological and Social Features	Gardens		
Notable Biological and Social Features	The avoidance feature within this site includes termite mound, mature trees, garden, tree woodlot, and seasonal water pond		
Dominant woody species	The dominant plant species at this site include *Lannea schweinfurthii, Balanites aegyptiaca, Albizia coriaria, Acacia sieberiana, Crateva adansonii, Sclerocarya birrea* and *Senna siamea* in tree layer, whereas, *Opuntia vulgaris, Azima tetracantha*, and *Capparis fascularis* in shrubby layer. Dominant woody species inlcdue: *Acacia sieberiana; Balanites aegyptiaca; Crateva adansonii; Opuntia vulgaris*		
Dominant Herbaceous species	Chloris gayana, Hyparrhenia filipendula and Hyperthelia dissoluta		
Phytosociological	*Azima-Opuntia* open Thicket *Capparis-Azima* Thicket		

description (within plot)	*Opuntia* bushland *Lannea-_Balanites-Azima-Hyperthelia-Chloris* wooded grassland with scattered Thicket; *Senna siamea* woodlots			
Alien/Invasive Species	*Senna siamea, Opuntia vulgaris*			
Flora– Protected Species	No threatened, rare or range-restricted species was recorded at the site and no other species of conservation concern were recorded.			
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.			
Physical Characteristics				
Ambient Air Quality	Consistent with an undisturbed area.			
Closet Air Receptor (distance)	Approx. 1 settlement 60m to west in village of Kakindo			
Ambient Noise	This is an undisturbed area where ambient noise levels are influenced by human activities.			
Closest Noise Receptor (distance)	Approx. 1 settlement 60m to west in village of Kakindo			
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	None	None	None	None
25-85m	Approx. 1 settlement 60m to west in village of Kakindo	None	None	None
85-375m	Approx. 25 settlements around the west, north and east in the village of Kakindo. 120m - 350m	None	None	None
Wellpad (operational phase, NIGHT)				
0-130m	Approx 2 settlements to west in village of Kakindo	None	None	None
130-250m	Approx 10 settlementsin village of Kakindo	None	None	None
250-450m	Approx 30 settlementsin village of Kakindo	None	None	None
Soils and Geology		There are no soil borings at this site.		
Hydrology	**Closest**	**DWRM**	**Coordinates**	**Distance to Well Pad (m)**

	Known Well	ID				
		21665	325693	233467	749m	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		120	NA	NA	NA	NA
	Water availability	There closest known boreholes are: DWD21665 – 863m to center point DWD16552 – 1019m to center point				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Sambiye, 302m Wetland, 221m				
	Distance to Lake/River	Lake Albert, 2,766m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Buliisa	Buliisa TC	Northern Ward	Kakindo		
	Nearby Receptors	**Receptor Details**	**Distance to Well Pad (m)**			
		Settlements	60			
Archaeology and Cultural Heritage	No survey completed	N/A				
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site characterized by broad open pastoral landscape with no field boundaries and roaming cattle. • Landform is generally flat and comprised of grassland with sporadic thicket. • The site is accessed by a network of informal tracks. • Views range from short to medium distance and are frequently fragmented by sporadic vegetation				

23. KW-02B	Well pad in LA2		
Location Block	LA2- North		
Field	Kasemene-Wairindi		
Coordinates	-	-	
Elevation (m)	611		
Terrain	sloping		
Slope (degrees) and Aspect	1.353928	southwest	
Well Pad Area (ha)	3.6	6.7	
District	Buliisa		
CHA habitat type	Transitional		
Survey date(s) and Type	December 2017		
BIODIVERSITY			
Site description	The centerline coordinate for this well pad is located within Kisimo village, 100m to the boarder-line with Kisansha west village. The site is composed of bushed grassland with thicket and scattered trees. The site consists of a good number of homesteads distributed evenly within 135m from the centerline point.		
Vegetation type(s) (WCS mapping)	Bushed grassland with Thicket and scattered trees in settlement		
Vegetation types recorded (micro-habitats)	Open grassland Thicket		
Main Biological and Social Features	Homesteads and mature trees Kraal Home stead with a number of fruit trees and shade trees and medicinal *Azadirachta indica.* Protected species *Tamarindus indica* Uganda Red List (VU); IUCN (LC)		
Notable Biological and Social Features	These homesteads have a number of shade and fruit trees in compound. Avoidance features at this point include homesteads, health center, termite mound and mature trees.		
Dominant woody species	*Azadirachta indica, Azima tetracantha ,Balanites aegyptiaca, Crateva adansonii, Euphorbia candelabulum, Mangiferaindica,*		
Dominant Herbaceous species	*Chloris gayana, Hyparrhenia filipendula Hyperthelia dissoluta*		
Phytosociological description (within plot)	*Crateva-Euphorbia-Azima -Hyperthelia* bushed grassland with thicket and scattered trees in settlement		
Alien/Invasive Species	None identified.		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		
Closet Air Receptor (distance)	Settlements, adjacent		
Ambient Noise	Consistent with rural conditions.		
Closest Noise Receptor (distance)	Settlement, adjacent		

Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	Approx. 3 settlements 15m to the east in village of Kisiomo	Kisimo Health Center; within well pad maximum extent	None	None
25-85m	Approx. 2 settlements 35m to north and 1 to south in the village of Kisiomo	None	None	None
85-375m	Approx. 88 settlements to north east and south. 85m - 375m	None	Kakindo Miracle church 300m south east Kisansya East St Paul Church of Uganda - 370m north	None
Wellpad (operational phase, NIGHT)				
0-130m	Approx 13 settlements to east in village of Kisiomo and Kakindo	Kisimo Health Center; within well pad maximum extent	None	None
130-250m	Approx 50 settlements in village of Kisiomo and Kakindo	None	None	None
250-450m	Approx 60 settlements in village of Kisiomo and Kakindo	None	Kakindo Miracle church 300m south east Kisansya East St Paul Church of Uganda - 370m north	None

Soils and Geology	**Soil types**	There are no borings at this site. Lthology for DWD33438 provided below. Lithology- DWD33438 0-4m Top soil 5-13m Yellowish sandy 14-36m Sandy clay 37-65m Sandy clay soil				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD33438	322575E	236070N	374m	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		65.2	7.2	NA	2.44	NA
	Water availability	There are two known boreholes in the vicinity of the the well pad: CD2219 – 557m to center point DWD33438 – 496m to center point				
	Water Quality	No water quality reports available.				
Surface Water	**Closest Surface Water**	Sambiye, 937m Wetland, 891m				
	Distance to Lake/River	Lake Albert, 1,617m				

Socioeconomic Characteristics

Social	Distict	Subcounty	Parish	Village

	Buliisa	Buliisa TC	Northern Ward	Kakindo
	Closest Receptors	**Receptor Details**		**Distance to Well Pad (m)**
		Settlements		Adjacent
Archaeology and Cultural Heritage	No survey undertaken.	No survey undertaken.		
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** <u>Key local characteristics:</u> • This sits within a transitional landscape between the lowland pastoral farmlands and the Nile River Corridor to the north. • The majority of the landcover is characterized by arable grazing and sporadic trees and thicket. • The site is void of notable infrastructure and formal tracks and thicket vegetation occupies much of the northern portion. • Views vary and are more open across low level grassland and interrupted by sporadic vegetation. • There is a relative sense of wildness given its proximity to the Nile and Ramsar boundary.		

24. NGR-01	Well pad in CA1		
Location Block	CA1		
Field	Ngiri		
Coordinates	-	-	
Elevation (m)	628		
Terrain	flat		
Slope (degrees) and Aspect	2.102079	Northeast	
Well Pad Area (ha)	3.6	5.5	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	11 December 2016 / 19 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	The site is mainly cultivated land with some areas of grazing and cattle corridors. The site is very close to the other boundary of the Ramsar site.		
Vegetation type(s) (WCS mapping)	Cultivation Some grazing land		
Vegetation types recorded (micro-habitats)	Gossypium garden; bushed grassland Gossypium garden; Zea garden Open bushland with small patch of *Moringa oleifera* woodlot and Gossypium garden Seasonally flooded bushed grassland; Gossypium garden Young Eucalyptus -pine woodlot		
Main Biological and Social Features	*Acacia senegal, Acacia sieberiana, Balanites aegyptiaca, Crateva adansonii, Kigelia africana, Lannea schweinfurthii, Moringa oleifera, Seasonally flooded grassland, Tamarindus indica, Ziziphus pubescens* Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC)		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		
Closet Air Receptor (distance)	Settlement, adjacent		

Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	Approx. 1 settlement 10m to south in village of Kasinyi	None	None	None	
25-85m	None	None	None	None	
85-375m	Approx. 1 settlement 320m to north east in village of Kasinyi	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx. 1 settlement 10m to south in village of Kasinyi	None	None	None	
130-250m	None	None	None	None	
250-450m	Approx. 1 settlement 320m to north east in village of Kasinyi	None	None	None	

Soils and Geology	**Soil Type**	There are no borings at this site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Availability	There are no known boreholes within 1km.				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 208m Wetland, 840m				
	Distance to Lake/River	Victoria Nile, 923m				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Nile	Kasinyi

Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**
	Kasinyi Church of God	1,371
	Kasinyi St Lawrence Nursery School	1,432

Archaeology and Cultural Heritage	**Date of survey** 2014	A single shell is reported from the site. This is not of any antiquity or of archaeological or palaeontological significance.
Landscape and Visual Amenity	**Landscape Character Area**	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This sits within a transitional landscape between the lowland pastoral

	LCA01	farmlands and the Nile River Corridor to the north. • The majority of the landcover is characterized by arable grazing and sporadic trees and thicket. • The site is void of notable infrastructure and formal tracks and thicket vegetation occupies much of the northern portion. • Views vary and are more open across low level grassland and interrupted by sporadic vegetation. • There is a relative sense of wildness given its proximity to the Nile and Ramsar boundary.

25. NGR-02	Well pad in CA1		
Location Block	CA1		
Field	Ngiri		
Coordinates	-	-	
Elevation (m)	634		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	1.768126	Northeast	
Well Pad Area (ha)	3.7	7.6	
District	Buliisa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	11 December 2016 (Avoidance), 1 April 2017 (Detailed), 15 June 2017(Detailed)		
BIODIVERSITY			
Site description	Site comprises mainly grazing land in Kasinyi District.		
Vegetation type(s) (WCS mapping)	Grazing land Scattered houses		
Vegetation types recorded (micro-habitats)	Bushed grassland Grassland with thicket Thicket Open grassland with thicket Seasonally flooded area		
Main Biological and Social Features	Avoidance features recorded within the site as mature large trees, particularly of *Acacia senegal*, *A. sieberiana*, *Balanites aegyptiaca*, *Crateva adansonii*, *Lannea schweinfurthii*, *Sclerocarya birrera* and *Ziziphus pubescens*, with a high woody biomass Termite mounds Trees that contain bat roosts Closed thickets; suitable for bush buck, bush duiker Seasonally flooded area		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) Closed thickets		
Dominant woody species	*Acacia brevispica; Acacia hockii, Acacia senegal; Acacia sieberiana; Asparagus Africana, Cadaba farinosa, Capparis fascicularis, Carissa spinarum, Dichrostachys cinerea, Indigofera arrecta, Jasminum sp; Stereospermum kunthianum, Ziziphus pubescens*		
Dominant Herbaceous species	*Aloe sp; Cissus rotundifolia, Commelina benghalensis, Cynodon dactylon, Murdannia simplex, Sansevieria nilotica, Sarcostemma viminale, Setaria sphacelata, Tephrosia pumila*		
Phytosociological description (within plot)	*Acacia-Cadaba* Bushed Grassland *Acacia-Ziziphus-Capparis* Bushland *Acacia-Ziziphus-Carissa-Hyperthelia* Grassland with Thicket *Acacia-Ziziphus-Stereospermum* Bushed Grassland with Thicket *Setaria-Cynodon* Seasonally Flooded Grassland		
Alien/Invasive	None identified		

Species					
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)				
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlements, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlements, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	Approx. 1 settlement 50m to south east in village of Kasinyi	None	None	None	
85-375m	Approx 6 settlements 95m - 130m to south east	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx 6 settlements in village of Kasinyi	None	None	None	
130-250m	Approx 1 settlement to south east in village of Kasinyi	None	None	None	
250-450m	Approx. 2 settlements to south in village of	None	None	None	

Soils and Geology	**Soil Type**	There are no borings at this site. No borehole logs available for DWD 29474.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		29474	326889E	243526N	270	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Availability	There are no known borehole data available				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 2,392m Wetland, 1,567m				
	Distance to Lake/River	Victoria Nile, 2,378m				
Socioeconomic Characteristics						

<table>
<tr><td rowspan="4">Social</td><td>Distict</td><td>Subcounty</td><td>Parish</td><td>Village</td></tr>
<tr><td>Buliisa</td><td>Ngwedo</td><td>Nile</td><td>Kasinyi</td></tr>
<tr><td rowspan="2">Closest Receptor</td><td colspan="2">Receptor Details</td><td>Distance to Well Pad (m)</td></tr>
<tr><td colspan="2">Settlements</td><td>Adjacent</td></tr>
<tr><td colspan="4">Trees of socio-economic value
Houses (some new)
Grave
Kraal
Within the site buffer is a barracks for UPDF soldiers.</td></tr>
<tr><td>Archaeology and Cultural Heritage</td><td>Date Surveyed
2013, 2014 & 26th June 2017</td><td colspan="3"><u>Archaeological remains</u>
A single findspot of quartz lithics was recorded.Concentrations of pottery sherds and isolated pottery sherds were noted. The pottery was all plain and was close to the UPDF barracks and the existing NGR wellpad. The pottery is sooted indicating that it was used for cooking. The ceramic traditions and relative dates of the site could not be established since the pottery was largely undecorated.
<u>Burial places</u>
A burial place with eight burials is recorded within the survey area. A cluster of seven burial places are located south of the study area.
<u>Cultural sites</u>
A cultural site, mutwa, of the Basiita clan was recorded. Two possible sacred tamarind trees were noted, although their sacred character was not confirmed by local informants.
<u>Medicinal and cultural uses of plants</u>
Medicinal and useful plants included Aloe Vera, Kulumbero, cactus, tamarind and Nyakatiga plants.</td></tr>
<tr><td>Landscape and Visual Amenity</td><td>Landscape Character Area
LCA01</td><td colspan="3">Buliisa Lowland Pastoral Farmland
<u>Key local characteristics:</u>
• This site is characterized by broad open grazing farmland, north of residential properties in Kirama.
• Although the site itself f is void of infrastructure, its setting is influenced by the residential dwellings to the south along the main track.
• The extent of grazing grassland is tampered with trees and thicket.
• Views south are open and long distance whilst views north are interrupted by intervening vegetation.</td></tr>
</table>

26. NGR-03A	Well pad in CA1		
Location Block	CA1		
Field	Ngiri		
Coordinates	-	-	
Elevation (m)	627		
Terrain	flat		
Slope (degrees) and Aspect	2.646061	West	
Well Pad Area (ha)	4.4	6.5	
District	Buliisa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	12 December 2016 (Avoidance), 2 April 2017 (Detailed), 16 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Site comprises mainly grazing land in Kichoke district.		
Vegetation type(s) (WCS mapping)	Grazing land Cattle corridors Scattered houses		
Vegetation types recorded (micro-habitats)	Bushed grassland with thicket Wooded grassland Grassland with thicket		
Main Biological and Social Features	Avoidance features recorded within the site as mature large trees, particularly of *Acacia sieberiana*, *Balanites aegyptiaca*, *Crateva adansonii*, *Euphorbia candelabrum* and *Lannea schweinfurthii*. Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC)		
Dominant woody species	*Acacia brevispic, Acalypha fruticosa; Cadaba farinosa, Cadaba farinosa, Crateva adansonii; Capparis erythrocarpos, Capparis fascicularis, Euphorbia candelabrum, Jasminum sp, Ziziphus pubescens*		
Dominant Herbaceous species	*Aloe sp.; Digitaria longiflora;; Hyperthelia dissolute, Tephrosia pumila; Sansevieria dawei, Sansevieria nilotica*		
Phytosociological description (within plot)	*Acalypha-Crateva-Capparis* Bushed Grassland *Cadaba-Capparis-Euphorbia* Bushed Grassland with Thicket *Cadaba-Capparis-Ziziphus* Bushed Grassland *Digitaria-Cadaba-Acacia-Euphorbia* Grassland with Thicket *Euphorbia-Cadaba-Ziziphus-Digitaria* Bushed Grassland *Euphorbia-Crateva-Cadaba-Hyperthelia* Bushed Grassland *Tamarindus-Cadaba-Acalypha* Bushed Grassland		
Alien/Invasive Species	No detailed survey for fauna was undertaken at this site.		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		
Fauna - Priority	None identified		

Species				
Physical Characteristics				
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.			
Closet Air Receptor (distance)	Settlements, adjacent			
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.			
Closest Noise Receptor (distance)	Settlements, adjacent			
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	Approx. 15 settlements to the north and east in the village of Kirama. 0m - 25m	None	None	None
25-85m	Approx. 30 settlements surround the site. 25m - 80m in the village of Kirama	None	None	None
85-375m	Approx. 170 settlements to north east in village of Kichoke Approx. 160 settlements to east and west in village of Kirama Approx. 60 settlements to south in village of Kiyere	None	Kichoke Church of Uganda - 330m north west	None
Wellpad (operational phase, NIGHT)				
0-130m	Approx. 90 settlements in villages of Kiyer, Kirama and Kichoke	None	None	None
130-250m	Approx. 130 settlements in villages of Kiyer, Kirama and Kichoke	None	None	None
250-450m	Approx. 300 settlements in villages of Kiyer, Kirama and Kichoke	None	Kichoke Church of Uganda - 330m north west	None

Soils and Geology	**Soil Type**	There are no boreholes at this site. Lithology for borehole DWRM 16551 provide below. Lithology 0-4 m Brown Sandy Clay 4-7m Yellowish brown clay 7-18m Brown sticky clay with gravels 18-27m Brown sandy clay with gravels 27-32m Brown sand with gravels 32-36 m Yellowish brown clay with gravels 36-45 m Darkish brown clay 45-55m Greyish brown clay 55-64m Brown fine grain sand 64-100m Greyish green clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		16551	323079E	240209N	374	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		54	NA	NA	0.5	NA
	Water	There are no boreholes at the well pad site. Based on available bore logs (5) in the vicinity of NGR-03-06				

	availability	Static Water Level (m.b.g.l) Average – 27 Median –27 Max – 37 Min - 19	Yield (m^3/min) Average – 7 Median – 5 Max – 20 Min - 0.5	
	Water Quality	No water quality report available.		
Surface Water	**Closest Surface Water**	Not identified, 2,349m Wetland, 215m		
	Distance to Lake/River	Victoria Nile, 2,548m		
Socioeconomic Characteristics				
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Kigwera	Karama	Kirama
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Kichoke Church of Uganda	330	
	Trees of socio-economic value Houses (some new) Kraals Graveyards Cultural sites			
Archaeology and Cultural Heritage	**Date Surveyed** No survey undertaken	No survey undertaken		
Landscape and Visual Amenity	*Musingabakazi* **Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site is characterized by grazing farmland typical of the wider LCA. • Landcover is dominated by a mix of grassland and bushland thicket. • Several informal tracks pass through the site but there is no notable infrastructure. • This site lies west and in close proximity to the residential dwellings in Kirama. • Views tend to be fragmented and glimpsed due to intervening bushland thicket.		

27. NGR-05A	Well pad in CA1		
Location Block	CA1		
Field	Ngiri		
Coordinates	-	-	
Elevation (m)	647		
Terrain	Flat		
Slope (degrees) and Aspect	1.857269	East	
Well Pad Area (ha)	3.8	8.4	
District	Buliisa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	14 December 2016 (Avoidance), 3 April 2017 (Detailed), 17 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Site comprises mainly grazing land in Kasinyi village.		
Vegetation type(s) (WCS mapping)	Grazing land		
Vegetation types recorded (micro-habitats)	Wooded grassland with thicket Grassland with thicket Bushed grassland Open grassland Thicket Wooded grassland		
Main Biological and Social Features	Avoidance features recorded within the site as mature large trees, particularly of *Acacia sieberiana*, *A. senegal*, *Albizia coriaria*, *Balanites aegyptiaca*, *Crateva adansonii, Euphorbia candelabrum*, *Lannea schweinfurthii, Sclerocarya birrea* and *Ziziphus pubescens* Seasonal wetland Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* Seasonal wetland		
Dominant woody species	*Acacia brevispica; Acacia sieberiana,Cadaba farinosa; Capparis fascicularis, Cissus rotundifolia,Crateva adansonii, Euphorbia candelabrum, Jasminum sp., Maerua triphylla, Opilia celtidifolia, Tamarindus indica; Ziziphus pubescens*		
Dominant Herbaceous species	*Chasmanthera dependens,Digitaria longiflora; Hyperthelia dissolute, Sansevieria dawei, Sarcostemma viminale,Tephrosia pumila, Zornia pratensis*		
Phytosociological description (within plot)	Acacia-Cadaba-Crateva-Digitaria Bushed Grassland Capparis-Hyperthelia-Digitaria Bushed Grassland *Digitaria-Acacia-Cadaba* Grassland with Thicket *Tamarindus-Acacia-Ziziphus* Wooded Grassland *Ziziphus-Capparis-Cadaba* Wooded Grassland with Thicket		
Alien/Invasive Species	None identified		
Flora– Protected	Species of conservation concern were recorded –		

Species	*Tamarindus indica*. Uganda Red List (VU), IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*				
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlements, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlements, adjacent				
Distance from Site boundary (not centre of site)	Settlements		Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)					
0-25m	None		None	None	None
25-85m	None		None	None	None
85-375m	Approx. 15 settlements to west in village of Kirama. 180m - 330m		None	None	None
Wellpad (operational phase, NIGHT)					
0-130m	None		None	None	None
130-250m	Approx. 8 settlements in village of Kirama		None	None	None
250-450m	Approx. 8 settlements in village of Kirama		None	None	None
Soils and Geology	**Soil Type**	There are no boreholes at this site. No litholgocal data for DWD25975			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		DWD25975	325266	242117	749
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr** / **Drawdown (m)**
		80	37	NA	4.3 / NA
	Water availability	There are no boreholes at the well pad site. Based on available bore logs (5) in the vicinity of NGR-05A. Static Water Level (m.b.g.l) Average – 27 Median –27 Max – 37 Min - 19 Yield (m^3/hr) Average – 7 Median – 5 Max – 20 Min - 0.5			
	Water Quality	There are no water quality reports available.			
Surface Water	**Closest Surface Water**	Not identified, 1,659m Wetland, 1,651m			

	Distance to Lake/River	Victoria Nile, 3,668m

Socioeconomic Characteristics				
Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Kigwera	Karama	Kirama
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Bukindwa Church of God	1,276	
		Kirama Primary School	1,743	
	Kirama villages; Trees of socio-economic value Kraals			
Archaeology and Cultural Heritage	**Date Surveyed** 2014 & 29th June 2017	Archaeological remains Lithics comprised a LSA core and a further undated core. Pottery comprised sparse undecorated sherds. Cultural sites There are two possible sacred tamarind trees, although their sacred character was not confirmed by local practitioners. Medicinal and cultural uses of plants Medicinal and culturally important plants such as *mabaale*, *marula*, sisal, *musingabakazi*, *mbumbuula* and *muzinge* were observed. While these are plants that are readily available in other parts of Buliisa, the *muzinge* is said to be rare.		
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site is characterized by grazing farmland and is entirely typical of the wider LCA. • Landcover is dominated by a mix of grassland and bushland thicket. • Very few informal tracks pass through the site and there is no physical infrastructure. • Views tend to be fragmented with occasional glimpses beyond the intervening bushland thicket.		

28. NGR-06	Well pad in CA1		
Location Block	CA1		
Field	Ngiri		
Coordinates	-	-	
Elevation (m)	643		
Terrain	Flat		
Slope (degrees) and Aspect	0.328433	Southwest	
Well Pad Area (ha)	3.2	6.4	
District	Buliisa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	15 December 2016 (Avoidance), 4 April 2017 (Detailed), 18 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Site comprises mainly grazing land in Kiyere village.		
Vegetation type(s) (WCS mapping)	Grazing land with cattle corridors		
Vegetation types recorded (micro-habitats)	Grassland with thicket Bushed grassland with thicket Bushed grassland		
Main Biological and Social Features	Avoidance features recorded within the site as mature large trees, particularly of *Albizia coriaria*, *Balanites aegyptiaca*, *Crateva adansonii*, *Euphorbia candelabrum*, *Lannea schweinfurthii* and *Sclerocarya birrea.* Termite mounds		
Notable Biological and Social Features	None		
Dominant woody species	*Acacia brevispica; Cadaba farinosa; Capparis erythrocarpos, Capparis fascicularis, Combretum molle, Euphorbia candelabra, Lannea schweinfurthii,*		
Dominant Herbaceous species	*Digitaria longiflora; Hyperthelia dissoluta; Digitaria longiflora; Hyperthelia dissoluta; Sansevieria dawei,Tephrosia pumila;*		
Phytosociological description (within plot)	*Acacia-Cadaba-Euphorbia-Hyperthelia* Grassland with Thicket *Acacia-Cadaba-Hyperthelia* Bushed Grassland with Thicket *Acacia-Capparis-Cadaba-Hyperthelia* Bushed Grassland with Thicket *Hyperthelia-Cadaba-Capparis-Acacia* Grassland with Thicket *Hyperthelia-Cadaba-Combretum-Euphorbia* Grassland with Thicket *Hyperthelia-Digitaria-Euphorbia-Cadaba* Grassland with Thicket *Lannea-Capparis-Cadaba-Hyperthelia* Bushed Grassland		
Alien/Invasive Species	Yes- *Cassia siamea* invasive tree species planted for firewood and building.		
Flora– Protected Species	No threatened, rare or range-restricted species was recorded at the site. No species of conservation concern were recorded at this site.		
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.		

Physical Characteristics

Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.			
Closet Air Receptor (distance)	Settleemnts, 300m			
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.			
Closest Noise Receptor (distance)	Settlements, 300m			
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)				
0-25m	None	None	None	None
25-85m	None	None	None	None
85-375m	Approx 3 settlements 300m to west in village of Kigwera SE	None	None	None
Wellpad (operational phase, NIGHT)				
0-130m	None	None	None	None
130-250m	None	None	None	None
250-450m	Approx 13 settlements in village of Kigwera NE and E	None	None	None

Soils and Geology	**Soil Type**	There are no known boreing withn 1km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None witin 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no boreholes at the well pad site. Based on available bore logs (5) in the vicinity of NGR-03-06 Static Water Level (m.b.g.l) Average – 27 Median –27 Max – 37 Min - 19 Yield (m^3/hr) Average – 7 Median – 5 Max – 20 Min - 0.5				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 801m Wetland, 816m				
	Distance to Lake/River	4,158m – Lake Albert				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**

	Buliisa	Kigwera	Kisanya	Bukongolo
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Kigwera Nursery and Primary School	1,295	
		Kirama Catholic Church	1,552	
	Trees of socio-economic value Graves Cultural heritage			
Archaeology and Cultural Heritage	**Date of survey** 2013 & 2014	Archaeological remains Archaeological surveys only noted recent animal bone. Graves Two family burial places were recorded. Cultural sites A sacred tree was recorded. Although this place is still in existence, the practice of offering sacrifices has reduced due to conversion to Christianity. However, practitioners of traditional religion are not willing to cut it down.		
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site is characterized by grazing farmland and is entirely typical of the wider LCA. • Landcover is dominated by a mix of grassland and bushland thicket. • No tracks pass through the site and there is no physical infrastructure. • Views from the site tend to be fragmented with occasional glimpses beyond the intervening bushland thicket.		

29. NSO-01	Well pad in LA2		
Location Block	LA2- North		
Field	Nsoga		
Coordinates	-	-	
Elevation(m)	690		
Terrain	Flat		
Slope (degrees) and Aspect	0.328433	Southwest	
Well Pad Area (ha)	4.3	8.1	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	21 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer mainly within cultivated land. Small area of grazing land. Ngwedo.		
Vegetation type(s) (WCS mapping)	Cultivation Grazing land		
Vegetation types recorded (micro-habitats)	Manihot garden- bushed grassland with thicket mosaic Manihot garden with thicket Manihot garden; fallows Manihot garden-bushed grassland -fallow mosaic Manihot garden-Pennisetum polystarchion fallow-thicket mosaic		
Main Biological and Social Features	*Acacia sieberiana, Albizia grandibracteata, Antiaris sp., Crateva adansonii, Dalbergia melanoxylon, Euphorbia candelabrum, Ficus natalensis, Ficus sp.* (long petiole & attenuate base), *Lannea schweinfurthii, Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Securidaca longipedunculata, Stereospermum kunthianum* Termite mound		
Notable Biological and Social Features	*Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Flora– Protected Species	Species of conservation concern were recorded: *Dalbergia melanoxylon*: NFA Reserved Species; Uganda Red List (VU), IUCN 2018 (RL/NT) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		
Closet Air Receptor (distance)	Settlements, 340m		
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel		

engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.

Closest Noise Receptor (distance)	Settlements, 340m				
Distance from Site boundary (not centre of site)	Settlements		Healthcare	Worship	Education
Wellpad (operational phase, DAYTIME)					
0-25m	None		None	None	None
25-85m	None		None	None	None
85-375m	Approx. 1 settlement 340m to south in village of Ngwedo		None	None	None
Wellpad (operational phase, NIGHT)					
0-130m	None		None	None	None
130-250m	None		None	None	None
250-450m	Approx. 6 settlement in village of Ngwedo		None	None	None
Soils and Geology	**Soil Type**	There are no borings within 1 km of the site.			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		None	-	-	None within 1 km
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no boreholes at the well pad site. The closest well is DWD33448 , approximately 2 km from the site. Depth to water is reported at 91 m.b.g.l. and an average yield of 20.4 m^3/hr.[2]				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface Water**	Not identified, 1,382m Wetland, 1371m				
	Distance to Lake/River	Victoria Nile, 6,943m				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Buliisa	Ngwedo	Ngwedo	Ngwedo LC1		
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		Ngwedo Church	1,080			
		Ngwedo School	1,110			
	None recorded					
Archaeology and Cultural Heritage	**Date Surveyed** 8th December 2016	NSO-01 was heavily vegetated and it was difficult to gain access and view material on the ground surface. Find comprise a single undiagnostic, abraded pottery sherd.				
Landscape and	**Landscape**	**Buliisa Lowland Rolling Farmland**				

[2] Atacama 2014. Project Brief: Proposes Geophysical and Geotechnical Survey sin EA2 , Sept 2014

Visual Amenity	**Character Area** LCA02	Key local characteristics: • This site comprises of a series of agricultural crop gardens with mainly cassava crops. • Landform is undulating and although there are no formal filed boundaries with occasional clusters of trees. • Informal tracks link these fields to the residential dwellings to the south of the site. • Views are largely enclosed by tall cassava crops and background trees with occasional glimpses beyond.

30. NSO-02	Well pad in LA2		
Location Block	LA2- North		
Field	Nsoga		
Coordinates	-	-	
Elevation(m)	688		
Terrain	flat		
Slope (degrees) and Aspect	2.076308	Southeast	
Well Pad Area (ha)	3.4	5.2	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	23 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer mainly within cultivated land. Small area of grazing land to the south. Ngwedo Farm.		
Vegetation type(s) (WCS mapping)	Cultivation Grazing land		
Vegetation types recorded (micro-habitats)	Manihot garden; bushed grassland - fallow mosaic Manihot gardens Manihot gardens-fallow-thicket mosaic *Pennisetum polystachion* fallow; Manihot garden; scattered thicket Seasonally flooded bushed grassland with scattered trees		
Main Biological and Social Features	*Acacia sieberiana, Artocarpus heterophyllus, Azadirachta indica, Citrus sinensis, Citrus sp, Crateva adansonii, Dalbergia melanoxylon, Euphorbia candelabrum, Ficus platyphylla, Ficus sp., Gardenia terniflora, Kigelia africana, Lannea schweinfurthii, Mangifera indica, Persea americana, Sclerocarya birrea, Seasonal wetland, Vitex doniana grove, Ziziphus pubescens* Seasonal wetland Termite mounds		
Notable Biological and Social Features	*Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU)		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora– Protected Species	Species of conservation concern were recorded- *Dalbergia melanoxylon*: NFA Reserved Species; Uganda Red List (VU), IUCN 2018 (RL/NT)		

Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Ngwedo Farm Church, 638m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Ngwedo Farm Church, 638m				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	Approx. 3 settlements 45m-60m to south in village of Ngwedo farm	None	None	None	
85-375m	Approx. 60 settlements surrounding the site in the village of Ngwedo farm. 100m - 375m	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx. 6 settlements in village of Ngwedo farm.	None	None	None	
130-250m	Approx 30 settlements in village of Ngwedo farm	None	None	None	
250-450m	Approx 30 settlements in village of Ngwedo farm	None	None	None	
Soils and Geology	**Soil Type**	There are no borings at this site. Lithology for boring DWD25893 is provided below. Lithology 0-16m Silty Clay 16-17m Clays 17-33m Silty Sands 33-87m Sandy clays			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		DWD25893	238102N	334658E	626
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l)**	**Yield m^3/hr**	**Drawdown (m)**
		76	29.77	-	-	-
	Water availability	There are no boreholes at the well pad site.				
	Water Quality	No water quality report available				
Surface Water	**Closest Surface**	Sambiye, 198m Wetland, 687m				

	Water				
	Distance to Lake/River	Victoria Nile, 8,931m			
Socioeconomic Characteristics					
Social	**Distict**	**Subcounty**	**Parish**	**Village**	
	Buliisa	Ngwedo	Mvule	Ngwedo farm	
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**		
		Ngwedo Farm Church	638		
		Ngwedo Farm Community Play Ground	1,174		
	Graveyard				
Archaeology and Cultural Heritage	**Date Surveyed** 2nd July 2017	Archaeological remains Thirty findpots of pottery sherds were recorded. Large concentrations were present in the vicinity of present-day occupation areas. Moster sherds were plain. Burial places The site has three burial places. Cultural sites At one location plain sherds were noted close to a shrub; this area might be a sacrificial place because of the concentration of materials. The Sambiye seasonal stream is considered sacred, and has 'male' and 'female' streams			
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics: • This site comprises of a series of agricultural crop gardens with mainly cassava crops typical of the Ngwedo Farm area. • Landform is gently undulating and the field layout irregular. • Views are relatively open and long distance across lower crops but partially fragmented by thicket vegetation.			

31. NSO-03	Well pad in LA2		
Location Block	LA2- North		
Field	Nsoga		
Coordinates	-	-	
Elevation(m)	664		
Terrain	sloping		
Slope (degrees) and Aspect	2.823035	South	
Well Pad Area (ha)	3.8	7.7	
District	Bulissa		
CHA habitat type	Transitional (natural)		
Survey date(s) and Type	16 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	The site is located in a large expanse of grazing land with no cultivation or housing nearby.		
Vegetation type(s) (WCS mapping)	Grazing land		
Vegetation types recorded (micro-habitats)	Bushed grassland with thicket Grassland with thicket Bushed grassland Bushed grassland with thicket and scattered trees		
Main Biological and Social Features	*Acacia senegal, Acacia sieberiana, Acacia sieberiana, Albizia coriaria, Albizia grandibracteata, Antiaris sp., Balanites aegyptiaca, Commiphora sp., Crateva adansonii, Dalbergia melanoxylon, Euphorbia candelabrum, Lannea schweinfurthii, Maerua angolensis, Sclerocarya birrea, Seasonal wetland, Securidaca longipedunculata, Stereospermum kuntianum, Tamarindus indica, Terminalia glauscens, Ziziphus pubescens* Termite mounds Some aardvark activity		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat – Grazing land		
Alien/Invasive Species	None identified		
Flora– Protected Species	Species of conservation concern were recorded – *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		

	Dalbergia melanoxylon: RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*				
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.				
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	None within 350m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	None within 350m				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	None	None	None	None	
85-375m	None	None	None	None	
Wellpad (operational phase, NIGHT)					
0-130m	None	None	None	None	
130-250m	None	None	None	None	
250-450m	None	None	None	None	
Soils and Geology	**Soil Type**	No boring log is available however the lithology is generally recorded as Sedimentary sandy formation; sandy clay in this area.			
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**
		None	-	-	None within 1 km
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no boreholes at the well pad site				
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Not identified, 589m Wetland, 500m				
	Distance to Lake/River	Lake Albert, 7,362m				
Socioeconomic Characteristics					
Social	**Distict**	**Subcounty**	**Parish**	**Village**	

	Bulisa	Ngwedo	Ngwedo	Kibambura
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Cultual Heritage	Well pad	
	Graveyards			
Archaeology and Cultural Heritage	**Date Surveyed** 7th December 2016 1st July 2017	Archaeological remains Pottery scatters were noted in open areas. Cultural sites Cultural sites include: • a *kihongo* (sacrifice site) called Buswa in a tamarind tree for the Basiabi clan • a site called Kayese, a *kihongo* for the Batemula clan • a *kihongo* called Nyina barongo for the Batera clan, for fertility • Kayere, a shrined at of a Munonde tree where goats are sacrificed to cure insanity The Sambye seasonal stream is considered sacred, and has 'male' and 'female' streams. Medicinal and cultural uses of plants Identified medicinal and sacred plants include cactus, *Musingabakazi*, *Malakwang*, *Mukolyo*, *Mbumbuula*, Aloe vera and *Kadaali*.		
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics : • This site comprises of grazing farmland and is entirely typical of this LCA as a whole. • Landform is generally flat and is comprised of bushland thicket, grasslands and trees. • The site of void of any infrastructure or tracks. • Views are fragmented by the sporadic nature of the vegetation.		

32. NSO-04	Well pad in LA2		
Location Block	LA2- North		
Field	Nsoga		
Coordinates	-	-	
Elevation(m)	655		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	1.184028	West	
Well Pad Area (ha)	3.1	7.7	
District	Buliisa		
CHA habitat type	Transitional (natural) / Modified		
Survey date(s) and Type	20 January 2017 (Avoidance), 6 April 2017 (Detailed), 20 June 2017 (Detailed)		
BIODIVERSITY			
Site description	Grazing land with some areas of cultivation with survey buffer. Grass is very short and over-grazed.		
Vegetation type(s) (WCS mapping)	Grazing land Cultivation		
Vegetation types recorded (micro-habitats)	Bushed grassland with thicket Bushed grassland; seasonally flooded woodland Bushed wooded grassland Grassland with thicket; bushed grassland		
Main Biological and Social Features	*Dalbergia melanoxylon* may be damaged or even depleted from the site as it often occurs in low abundance. There are also mature large trees, particularly of *Acacia sieberiana*, *Albizia coriaria*, *Balanites aegyptiaca, Crateva adansonii*, *Kigelia africana*, *Lannea schweinfurthii* and *Trichilia emetica*. Seasonally flooded woodland Seasonal wetland Seasonally flooded grassland dominated by *Setaria sphacelata* Termite mounds		
Notable Biological and Social Features	*Dalbergia melanoxylon:* NFA Reserved Species; Uganda Red List (VU) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* Seasonally flooded woodland NSO-04 is located in two villages of Kijumbya and Kibambura. The two villages are separated by the seasonal River Sambiye that runs across the site.		
Dominant woody species	*Acacia hockii; Acacia senegal, Acacia sieberiana, Balanite aegyptium; Cassia siamea, Crateva adansonii, Harrisonia abyssinica, Hoslundia opposite,Lannea schweinfurthii, Thevetia peruviana, Trichilia emetic, Ziziphus pubescens;*		
Dominant Herbaceous species	*Bulbostylis filamentosa, Digitaria longiflora; Hyperthelia dissolute, Murdannia simplex, Sansevieria dawei, Setaria sphacelata; Tephrosia pumila;*		
Phytosociological description	*Acacia-Hyperthelia-Digitaria Bushed* Grassland with Thicket *Acacia-Ziziphus-Lannea-Harrisonia* Open Bushland with Thicket		

(within plot)	*Balanites-Lannea-Hyperthelia-Digitaria* Modified Wooded Grassland *Crateva-Digitaria-Hyperthelia* Bushed Grassland with Thicket *Digitaria-Bulbostylis-Acacia* Grassland with Thicket *Digitaria-Hyperthelia-Acacia* Bushed Grassland with Thicket *Ziziphus-Hyperthelia-Bulbostylis* Bushed Grassland *Ziziphus-Lannea-Ficus-Albizia Seasonally Flooded Woodland*					
Alien/Invasive Species	Yes – Invasive- *Cassia siamea* was recorded. Exotic - *Thevetia peruviana* is an exotic					
Flora– Protected Species	Species of conservation concern were recorded – *Dalbergia melanoxylon:* RS; LR/NT (IUCN 2018); Nationally VU (WCS 2016) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)*					
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Kibambura LC office, 368m					
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.					
Closest Noise Receptor (distance)	Kibambura LC office, 368m					
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education		
Wellpad (operational phase, DAYTIME)						
0-25m	Approx. 1 settlement 18m to east in village of Kibambura	None	None	None		
25-85m	Approx. 2 settlements in village of Kibambura. 75m north west and 70m east.	None	None	None		
85-375m	Approx. 30 settlements to the north and west in the village of Kibambura. 95m - 370m	None	None	None		
Wellpad (operational phase, NIGHT)						
0-130m	Approx 5 settlements in village of Kibambura	None	None	None		
130-250m	Approx 1 settlements in village of Kibambura	None	None	None		
250-450m	Approx 30 settlements in village of Kibambura	None	Kibamura Church of Uganda - 450m north	None		
Soils and Geology	**Soil Type**	There are no known soils boring in the area.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole	**Depth**	**Static Water**	**Water Level**	**Yield m^3/hr**	**Drawdown (m)**

	Data	**(m)**	**Level (m.b.g.l.)**	**(m.b.g.l.)**		
		-	-	-	-	-
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Sambiye, 161m Wetland, 100m				
	Distance to Lake/River	Lake Albert, 8,522m				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Ngwedo	Kibambura
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Kibambura LC office	368	
		Kibamura Church of Uganda	407	
	Kijumbya and Kibambura villages Graves and cultural sites			

Archeology and Cultural Heritage	**Date of Survey** 2013, 2015 & 2nd July 2017	<u>Archaeological remains</u> Lithics comprise cores and debitage, including a MSA Levalois core, an end scraper, a basalt grinding stone and a fishing weight. The Kibambura part of the site contains extensive pottery scatters. The dense concentration of pottery could be explained by the ritual activities that take place within the site. There were five findspots of Late Iron Age roulette-decorated pottery. An ironworking tuyère was recorded, as well as the foundations of an abandoned homestead. <u>Burial places</u> There are two burial places, comprising ten graves of the Bacchwa clan and five graves of the Basiabi clan. <u>Places of worship</u> Places of worship in the NSO-04 wellpad study area comprise Kibambura Church of Uganda and Kisansya East Town Church. <u>Cultural sites</u> There are two cultural sites within NSO-04, • a *kihongo* called Ekihongo kya Sambiye in a big Musisiye tree (ACH-02-424), where sacrifices are offered to address problems of crop failure and sickness among the people. • a *kihongo* called Lubanga in large trees where sacrifices are offered to prevent sickness and stop wild animals from attacking the community. The seasonal River Sambiye that crosses the wellpad area is considered sacred. <u>Medicinal and cultural uses of plants</u> Medicinal, cultural and/or useful plants noted in the area include *Mudendemule* trees, which are used for the construction of family shrines and *Lusama*, used to make soap.
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** <u>Key local characteristics :</u> • This site comprises of grazing farmland and is largely typical of this LCA as a whole. • Landform is generally flat and is comprised of bushland thicket, grasslands and trees. • There is no notable infrastructure other than a few informal tracks. • The setting and activity through the site is notably influenced by the residential area of Kibambura to the north. • Views are typically short range and fragmented by the sporadic nature of the vegetation.

33. NSO-05	Well pad in LA2		
Location Block	LA2- North		
Field	Nsoga		
Coordinates	-	-	
Elevation(m)	679		
Terrain	Flat		
Slope (degrees) and Aspect	0.734367	North	
Well Pad Area (ha)	3.4	5.5	
District	Buliisa		
CHA habitat type	Transitional (natural) / Modified		
Survey date(s) and Type	20 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer partly grazing land (western section) and partly cultivation (eastern section). Settlement area to the east. Grass not overgrazed however.		
Vegetation type(s) (WCS mapping)	Grazing land Cultivation		
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered thicket *Combretum- Hyperthelia* woodland patch Manihot graden-fallow-bushed grassland mosaic		
Main Biological and Social Features	*Acacia sieberiana, Albizia coriaria, Anacardium occidentale, Artocarpus heterophyllus, Citrus sinensis, Combretum molle, Commiphora africana, Crateva adansonii, Euphorbia candelabrum, Ficus sp., Kigelia africana, Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Mangifera indica, Sapindaceae sp., Sclerocarya birrea, Stereospermum kunthianum* Termite mound		
Social features	None recorded		
Notable Biological and Social Features	None		
Flora– Protected Species	No species of conservation concern were recorded		
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		

Closet Air Receptor (distance)	Ngwedo School, 697m				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Ngwedo School, 697m				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-130m	Approx 5 settlements in village of Kibambura	None	None	None	
130-250m	Approx 1 settlements in village of Kibambura	None	None	None	
250-450m	Approx 30 settlements in village of Kibambura	None	Kibamura Church of Uganda - 450m north	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx. 2 settlements in village of Kibambura	None	None	None	
130-250m	Approx. 3 settlements in village of Kibambura	None	None	None	
250-450m	Approx. 8 settlements in village of Kibambura	None	None	None	

Soils and Geology	**Soil Type**	There are no borings at this site. Lithology for DWD30264 is provided below. Lithology 0-11 m Clay 11-23m Sand 23-26m Clay 26-47m Sandy Clay 47-83m Clay				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD30264 VPL-3054 CD2245	331712 332502 332508	235998 236827 233602	970 965 972	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	7 (DWD30264)	-
	Water availability	There is no information available.				
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Not identified, 322m Wetland, 340m.				
	Distance to Lake/River	Victoria Nile, 9148m.				

Socioeconomic Characteristics

<table>
<tr><td rowspan="5">Social</td><td>Distict</td><td>Subcounty</td><td>Parish</td><td>Village</td></tr>
<tr><td>Buliisa</td><td>Ngwedo</td><td>Ngwedo</td><td>Ngwedo LC1</td></tr>
<tr><td rowspan="3">Closest Receptor</td><td colspan="2">Receptor Details</td><td colspan="2">Distance to Well Pad (m)</td></tr>
<tr><td colspan="2">Ngwedo School</td><td colspan="2">697</td></tr>
<tr><td colspan="2">Ngwedo Church</td><td colspan="2">741</td></tr>
<tr><td colspan="5">Ngwedo Catholic Church, Ngwedo Christian Fellowship Uganda, Ngwedo Church of Uganda and Ngwedo Mosque.</td></tr>
<tr><td>Archeology and Cultural Heritage</td><td>Date Surveyed
2015 8th December 2017</td><td colspan="3"><u>Archaeological remains</u>
Nine pottery findspots were recoreded. Most of the pottery was plain and highly abraded, but there were two Iron Age sherds, one rouletted and one with a band of punctated decoration (Urewe Ware). Daub suggests past structures in in the area.
<u>Places of worship</u>
Four places of worship were identified east of the wellpad area, comprising Ngwedo Catholic Church, Ngwedo Christian Fellowship Uganda, Ngwedo Church of Uganda and Ngwedo Mosque.
<u>Medicinal and cultural uses of plants</u>
The medicinal/useful plants identified in the site are similar to other sites and included: mukolyo, mbumbuula, kwogo, cactus and mango trees.</td></tr>
<tr><td>Landscape and Visual Amenity</td><td>Landscape Character Area
LCA01</td><td colspan="3">Buliisa Lowland Pastoral Farmland
<u>Key local characteristics :</u>
• This site is dominated by grazing pasture, bushland thicket and trees.
• There is no notable infrastructure or tracks within this site.
• Views within the site are largely enclosed y mature vegetation.</td></tr>
</table>

34. NSO-06	Well pad in LA2		
Location Block	CA1		
Field	Nsoga		
Coordinates	-	-	
Elevation (m)	702		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	2.625656	Southwest	
Well Pad Area (ha)	3.8	5.8	
District	Buliisa		
CHA habitat type	Modified		
Survey date(s) and Type	22 January 2017 (Avoidance)		
BIODIVERSITY			
Site description	Survey buffer entirely within cultivated land. Ngewedo Farm.		
Vegetation type(s) (WCS mapping)	Cultivation Settlements		
Vegetation types recorded (micro-habitats)	Bushed grassland-fallow-Manihot garden mosaic Fallow-Open grassland with scattered trees-gardens mosaic *Gossypium-Zea* gardens-bushed grassland-fallow mosaic Manihot garden Manihot garden; bushed fallow		
Main Biological and Social Features	*Anacardium occidentale, Antiaris sp., Antiaris toxicaria, Artocarpus heterophyllus, Azadirachta indica, Citrus sinensis, Combretum molle, Crateva adansonii, Ficus natalensis, Ficus natalensis, Lannea schweinfurthii, Maerua angolensis, Mangifera indica, Sclerocarya birrea, Stereospermum kunthianum, Tamarindus indica* Termite mounds		
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC)		
Dominant woody species	No detailed survey completed		
Dominant Herbaceous species	No detailed survey completed		
Phytosociological description (within plot)	Modfied habitat - Agricultural		
Alien/Invasive Species	None identified		
Flora– Protected Species	Species of conservation concern were recorded- *Tamarindus indica*: Uganda Red List (VU); IUCN (LC)		
Fauna - Priority	No detailed survey for fauna was undertaken at this site.		

Species					
Physical Characteristics					
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.				
Closet Air Receptor (distance)	Settlement, adjacent				
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.				
Closest Noise Receptor (distance)	Settlement, adjacent				
Distance from Site boundary (not centre of site)	Settlements	Healthcare	Worship	Education	
Wellpad (operational phase, DAYTIME)					
0-25m	None	None	None	None	
25-85m	Approx. 4 setttlements to north and west in village of Uduk I. 50m - 75m Approx. 1 settlement 50m to east in village of Ngwedo farm	None	None	None	
85-375m	Approx. 5 settlments 215m - 320m to south east in village of Ngwedo farm Approx. 240 settlements 100m - 375m to north, west and south west in village of Uduk I	None	Uduk I Burranam Tabanacle Church - 300m north west Uduk I Pentecostal Church of Uganda - 280m west Uduk I End of Time Message Church (Parnam) - 300m north west	None	
Wellpad (operational phase, NIGHT)					
0-130m	Approx 30 settlements in village of Uduk I and Ngwedo farm	None	None	None	
130-250m	Approx 50 settlements in village of Uduk I and Ngwedo farm	None	None	None	
250-450m	Approx 200 settlements in village of Uduk I and Ngwedo farm	None	Uduk I Burranam Tabanacle Church - 300m north west Uduk I Pentecostal Church of Uganda - 280m west Uduk I End of Time Message Church (Parnam) - 300m north west	None	

Soils and Geology	**Soil Type**	There are no known boriings within 1 km of the well pad.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water availability	There are no known boriings within 1 km of the well pad.				

	Water Quality	No water quality reports available
Surface Water	**Closest Surface Water**	Not identified, 546m Wetland , 2,284m
	Distance to Lake/River	Victoria Nile, 6919m

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Mvule	Uduk I LC1

Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**
	Uduk I LC Office	253
	Uduk I Burranam Tabanacle	328

Ngwedo Farm and Uduk I villages

Graves and cultural sites

Places of worship within the NSO-06 study area comprise the Burranam Tabernacle Church, the Pentecostal Church of Uganda and the End of Time Message Church (Parnam). Southwest of the study area are Shongambe Church of Uganda and Shongambe Church of Uganda. To the south of the study area is Ngwedo Farm St. Charles Lwanga Catholic Church.

Archeology and Cultural Heritage	**Survey Date** 2013, 2015 & 3rd July 2017	Archaeological remains Two Late Stone Age cores and lithics were recorded. Pottery was also common. A few decorated sherds dated to the Middle Iron Age (Chobi Ware) or were Later Iron Age roulette-decorated sherds. Ironworking tuyères were recorded. Abandoned homesteads and the foundations of former homesteads were also noted. Burial places Thirteen burial places were noted during surveys. These comprise a cemetery with about 30 graves marked by a *Mutooma* tree, a burial ground for the Jonam clan with 17 graves marked by *Uduk* trees, the burial ground of the Abira clan, the burial place of Awase Mukambo's clan, with at least 11 graves, two graves, six graves, a burial place, two graves, a burial ground with six graves, a graveyard of about 10 graves, Uduk I Communal Grave Site, seven graves and a graveyard of more than 20 graves. Places of worship Places of worship within the NSO-06 study area comprise the Burranam Tabernacle Church, the Pentecostal Church of Uganda and the End of Time Message Church (Parnam). Southwest of the study area are Shongambe Church of Uganda and Shongambe Church of Uganda. To the south of the study area is Ngwedo Farm St. Charles Lwanga Catholic Church. Cultural sites There is a clan shrine marked by three sets of three stones close to *Uduk* trees. There are three family shrines (*kibira*) and a further possible shrine located in *Lenga* and *Uduk* trees in front of a homestead. A shrine (*abila*) and traditional healing point is located to the northeast of the study area.
Landscape and Visual Amenity	LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics : • This site is largely characterized by arable crop fields arranged in an irregular layout. • The dominant crop is cassava and activity is at the human scale with no notable infrastructure. • Due to intervening topography and vegetation views vary from short range to longer glimpses.

35. Victoria Nile HDD Crossing (N) - Option 1	MFNP	
Location Block	CA1, MFNP	
Field	Ramsar	
Coordinates	- -	
Elevation (m)	631	
Terrain	flat	
Slope (degrees) and Aspect	0.734367 West	
Area	30m x 25m 0.08ha	
District	Nwoya	
CHA habitat type	Natural	
Survey date(s) and Type	20 December 2016 (Avoidance), 18 April 2017(Detailed),23 June 2017(Detailed)	
BIODIVERSITY		
Site description	The site is located in an area of bushed grassland on the north side of the Nile, within the MFNP. The survey recorded signs of elephant, hartebeest and other animals.	
Vegetation type(s) (WCS mapping)	Bushed grassland	
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered trees Bushland with scattered trees Patches of open bushland Riverine woodland Bushed grassland with scattered thicket	
Main Biological and Social Features	*Acacia sieberiana, Balanites aegyptiaca, Crateva adansonii, Euphorbia candelabrum, Kigelia africana, Tamarindus indica, Tricalysia niamniamensis, Trichilia emetica*	Wallows Tracks Termite mound Seasonal wetland
Notable Biological and Social Features	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) Wallows and seasonal wetland.	
Dominant woody species	*Acacia sieberiana, Maytenus undata, Capparis fascicularis; Harrisonia abyssinica,; Crateva adansonii; Acacia Senegal, Jasminum sp; Vepris nobilis;*	
Dominant Herbaceous species	*Sansevieria nilotica; Sporobolus pyramidalis, Ruellia prostrata,*	
Phytosociological description (within plot)	*Acacia-Capparis Open Bushland with Bushed Grassland* *Acacia-Vepris-Maytenus Bushland* *Capparis-Acacia-Vepris-Harrisonia Open Bushland* *Capparis-Crateva Bushed Grassland* *Harrisonia-Acacia-Capparis Bushland-Bushed Grassland mosaic* *Harrisonia-Vepris-Capparis Open Bushland-Bushed Grassland mosaic* *Vepris-Harrisonia-Acacia Bushland*	
Alien/Invasive Species	Though not recorded from any plot, two invasive species were encountered along the Nile – *Eichhornia*	

	crassipes and *Salvinia molesta.* Both are aquatic species that may proliferate with disturbance as they propagate vegetatively.					
Flora– Protected Species	Species of conservation concern were recorded – *Tamarindus indica:* Uganda Red List (VU); IUCN (LC)					
Fauna - Priority Species	Area is mostly frequented by Olive Baboon, Black and White Colobus, Warthogs, Hippos, and Elephants other species may range into this area but not in large numbers. Fifteen amphibian and eleven reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife (adjacent)					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife (adjacent)					
Soils and Geology	**Soil Type**	There are no known boreholes within 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m.b.g.l.)**	**Water Level (m.b.g.l.)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Victoria Nile, 160m.				
	Distance to Lake/River	See above.				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Nwoya	Purongo	Murchison Falls NP	-		
	Closest Village	**Receptor Details**	**Distance to site (m)**			
		None within 1 km	None within 1 km			
Archeology and Cultural Heritage	**No Field Survey**	No Field Survey				
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** <u>Key local characteristics :</u> • This site is largely characterized by dense bushland thicket typical of the vegetation within the Victoria Nile Corridor LCA. • This site crosses the Murchison Falls-Albert Delta Wetland System (RAMSAR site) and the north MFNP and the landscape is entirely typical of the northern bank of the Nile and is largely enclosed from surrounding tracks. • Views are entirely enclosed by dense bushland vegetation.				

36. Victoria Nile HDD Crossing (S) Option 1	South Nile	
Location Block	CA1	
Field	Ramsar	
Coordinates	-	-
Elevation (m)	625	
Terrain	Flat	
Slope (degrees) and Aspect	0.734367	North
Area	30m x 25m	0.08ha
District	Buliisa	
CHA habitat type	Natural	

Survey date(s) and Type	17 December 2016 (Avoidance), 20 April 2017(Detailed)
BIODIVERSITY	
Site description	The site is located in an area of bushed grassland at the edge of a papyrus swamp fringing the river. The flowline crosses through areas of bushland, grassland and fallow areas which could have potential supporting mostly small fauna.
Vegetation type(s) (WCS mapping)	Riverine Forest Woodland with grassland patches
Vegetation types recorded (micro-habitats)	Bushed grassland with scattered trees Bushland with scattered trees Patches of open bushland Riverine woodland and riverine swampt Bushed grassland with scattered thicket Wetland Finging papyris swamp Cultivated areas
Main Biological and Social Features	*Acacia sieberiana, Balanites aegyptiaca, Crateva adansonii, Euphorbia candelabrum, Ficus mucuso, Kigelia africana, Maytenus undata, Milicia excelsa Tamarindus indica, Tricalysia niamniamensis, Trichilia emetica* Termite mound Seasonal wetland Wallows Tracks Riverine swamp Cotton farm
Notable Biological and Social Features	*Milicia excelsa* , IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved species; *Tamarindus indica:* Uganda Red List (VU) Wallows and seasonal wetland.
Dominant woody species	*Acacia sieberiana; Euphorbia tilucalli, Kigelia africana, Maytenus undata; Trichilia emetica; Vepris nobilis; Ziziphus pubescens;*
Dominant	*Achyranthes aspera, Commelina latifolia; Hyperthelia dissolute, Oplismenus hirtellus*

Herbaceous species						
Phytosociological description (within plot)	*Hyperthelia-Maytenus-Acacia-Euphorbia Grassland with Thicket* *Maytenus-Vepris-Kigelia Riverine forest* *Trichilia-Kigelia-Vepris Riverine forest* *Trichilia-Vepris-Maytenus Riverine forest* *Ziziphus-Maytenus-Kigelia Riverine forest*					
Alien/Invasive Species	Yes- *Chromolaena odorata.* Though not registered during these surveys, invasive species *Mimosa pigra*, *Eichhornia crassipes* and *Salvinia molesta* are also likely to be within the site.					
Flora– Protected Species	Species of conservation concern were recorded – *Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Milicia excelsa* (mature tree) - Iroko; IUCN Globally LR/NT; Uganda Red List (EN), CHA Criterion 1e. NFA Reserved Species					
Fauna - Priority Species	There were signs of Hippo, Warthog and Baboons in this area. The area has large wallows which makes it a suitable area for Warthogs and Buffalo. The dense bushy nature of the vegetation here also suggests that Bushbuck could frequent this area Five amphibian and six reptile species were recorded at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife					
Soils and Geology	**Soil Type**	There are no known soil borings within 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Victroria Nile, 198m				
	Distance to Lake/River	See above.				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Buliisa	Ngwedo	Nile	Kilyango LC1		
	Closest Receptor	**Receptor Details**	**Distance to site (m)**			
		None within 1 km	None witin 1 km			
	Kraal in riverine forest					

	New houses	
Archeology and Cultural Heritage	No Field Survey	None known.
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** Key local characteristics : • This is largely characterized by dense bushland thicket, and woodlands typical of the vegetation within the Victoria Nile Corridor LCA south of the Nile. • This site sits within the south MFNP and the landscape is entirely typical of the northern bank of the Nile and is largely enclosed from surrounding tracks. • Views are largely enclosed by dense vegetation however there ar eocassional glimpses beneath the canopy of more open woodland.

37. Victoria Nile HDD Crossing (N) Option 2	North Nile	
Location Block	CA1	
Field	N/A	
Coordinates	- -	
Elevation (m)	613	
Terrain	Flat	
Slope (degrees) and Aspect	1.038495 Northeast	
Area	30m x 25m 0.08ha	
District	Nwoya	
CHA habitat type	Natural	
Survey date(s) and Type	14 January 2018 (Avoidance), 15 November 2017 (Avoidance)	
BIODIVERSITY		
Site description	The site is located in an area of dense bushland on the north side of the Victoria Nile.	
Vegetation type(s) (WCS mapping)	Bushed grassland	
Vegetation types recorded (micro-habitats)	Bushland with Thicket Riverine dense bushed woodland Riverine dense bushland with Thicket Riverine forest	
Main Biological and Social Features	*Acacia sieberiana* *Balanites aegyptiaca* *Borassus aethiopum* *Crateva adansonii* *Kigelia Africana* *Maytenus undata* *Tamarindus indica* *Trichilia emetica*	Mature Trees Termite mound Wallow Wildlife trail Wildlife Activity - elephant dung and Waterbuck skull
Notable Biological and Social Features	*Tamarindus indica*; Ugnanda Red List (VU); IUCN (LC) Wallows and seasonal wetlands	
Dominant woody species	No detailed survey completed	
Dominant Herbaceous species	No detailed survey completed	
Phytosociological description (within plot)	Wetland patch of *Pistia stratiotes, Aeschynomene indica, Cyperus articulatus, Azolla nilotica, Lugwigia sp., Marsilea minuta.*	
Alien/Invasive Species	None reported.	
Flora– Protected	Species of conservation concern were recorded –	

Species	*Tamarindus indica*, Uganda Red List (VU), IUCN (LC)					
Fauna - Priority Species	No detailed survey completed.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM10 and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife and settlements					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife					
Soils and Geology	**Soil Type**	There are no borings at this site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Area (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	No water quality reports available				
Surface Water	**Closest Surface Water**	Victoria Nile, 230m				
	Distance to Lake/River	See above				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Nwoya	Purongo	Murchison Falls NP	-		
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		None within 1 km	None within 1 km			
Archeology and Cultural Heritage	No Field Survey	None known.				
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** Key local characteristics : • This is largely characterized by dense bushland thicket, and woodlands typical of the vegetation within the Victoria Nile Corridor LCA south of the Nile. • This site sits within the south MFNP and the landscape is entirely typical of the northern bank of the Nile and is largely enclosed from surrounding tracks. • Views are largely enclosed by dense vegetation however there are eocassional glimpses beneath the canopy of more open woodland.				

38. Victoria Nile HDD Crossing (S) Option 2	South Nile	
Location Block	CA1	
Field	_	
Coordinates		
Elevation (m)	620	
Terrain	Flat	
Slope (degrees) and Aspect	0.328433	Northeast
Area	30m x 25m	0.08ha
District	Buliisa	
CHA habitat type	Natural/Modified	
Survey date(s) and Type	January 2018 (Avoidance) and November 2017 (Avoidance)	
BIODIVERSITY		
Site description	The site is characterized by grasslands, gardens and cultuivated fields and riverine swamps.	
Vegetation type(s) (WCS mapping)	Bushed grassland Cultivation field Eucalyptus garden Gossypium garden Manihot- Gossypium Garden Riverline swamp	
Vegetation types recorded (micro-habitats)	Bushed grassland Eucalyptus garden Fallow Gossypium garden Ipomoea garden Manihot- Gossypium Garden Papyrus swamp	
Main Biological and Social Features	*Acacia polyacantha* *Antiaris toxicaria* *Artocarpus heterophyllus* *Azadirachta indica* *Carica papaya* *Citrus sinensis* *Crateva adansonii* *Ficus mocuso* *Ficus natalensis* *Kigelia africana* *Lannea schweinfurthii* *Melia azadirach* *Moringa oleifera* *Tamarindus indica* *Trichilia emetica* Fallow Farm land Mature trees Termite mound Water source Wetland	
Notable Biological and Social Features	*Suddia sagittifolia* Uncommon species and *Tamarindus indica* Uganda Red List (VU)	

Dominant woody species	No detailed survey completed					
Dominant Herbaceous species	No detailed survey completed					
Phytosociological description (within plot)	*Tamarindus-Acacia-Ziziphus* Wooded Grassland					
Alien/Invasive Species	None reported.					
Flora– Protected Species	Species of conservation concern were recorded- *Suddia sagittifolia* - Range-restricted species; *Tamarindus indica*; Uganda Red List (VU); IUCN (LC) Wallows and seasonal wetlands					
Fauna - Priority Species	No detailed survey completed.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM10 and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife and settlements					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife and settlements					
Distance from Site boundary (not centre of site)	Settlements		Healthcare		Worship	Education
NIV (S) Option 2 (operational phase, DAYTIME)						
0-25m	none		none		none	none
25-85m	none		none		none	none
85-375m	16 settlements		none		none	none
NIV (S) Option 2 (operational phase, NIGHT)						
0-130m	none		none		none	none
130-250m	none		none		none	none
250-450m	18 settlements		none		none	none
Soils and Geology	**Soil Type**	There are no known soil borings within 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		None	-	-	None within 1 km	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-

	Water Quality	No water quality reports available
Surface Water	**Closest Surface Water**	Victroria Nile, 376m.
	Distance to Lake/River	See above.

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Nile	Kasinyi
	Closest Receptor	**Receptor Details**	**Distance to Aea (m)**	
		Settlement	85	
Archeology and Cultural Heritage	No field Survey	None known		
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** Key local characteristics : • This is largely characterized by dense bushland thicket, and woodlands typical of the vegetation within the Victoria Nile Corridor LCA south of the Nile. • This site sits within the south MFNP and the landscape is entirely typical of the northern bank of the Nile and is largely enclosed from surrounding tracks. • Views are largely enclosed by dense vegetation however there ar eocassional glimpses beneath the canopy of more open woodland.		

39. Water Abstraction Station	South Nile		
Location Block	CA-1		
Field	NA		
Coordinates	-	-	
Elevation (m)	630		
Terrain	Flat to sloping		
Slope (degrees) and Aspect	0.928879	West	
Area	200 m x 200 m	1ha	
District	Buliisa		
CHA habitat type	Transitional (Natural)		
Survey date(s) and Type	20 December 2016 (Avoidance), 29 March 2017 (Detailed), 14 June 2017 (Detailed)		
BIODIVERSITY			
Site description	The site is located in an area of seasonally flooded grassland adjacent to Lake Albert.		
Vegetation type(s) (WCS mapping)	Seasonally flooded grassland Lake		
Vegetation types recorded (micro-habitats)	Seasonally flooded grassland Patches of permanent wetland		
Main Biological and Social Features	*Borassus aethiopum* *Cyperus articulatus-Leersia and Cyperus articulatus-Leersia-Panicum* wetland *Cyperus articulatus-Oryza and Cyperus articulatus-Utricularia* marsh *Cyperus dives* marsh *Cyperus -Leersia-Limnophyton-Utricularia* marsh *Cyperus papyrus* swamp *Cyperus-Cynodon-Panicum* wetland *Cyperus-Eichhornia* wetland *Cyperus-Leersia* wetland Invasive *Eichhornia crassipes and Pistia stratiotes* Invasive *Eichhornia in Eichhornia-Cyperus* wetland Invasive *Salvinia molesta and Eichhornia crassipes* Permanent wetland of *Cyperus articulatus-Leersia-Ludwigia* marsh Permanent wetland of *Cyperus papyrus-Phragmites-Typha* *Persicaria-Cyperus laevigatus-Mimosa wetland* *Phragmites* permanent wetland patch *Phragmites* wetland with *Pistia* and *Eichhornia* *Phragmites-Cyperus articulatus*-swamp with *Ludwigia leptocarpa* and *Nymphaea lotus* *Typha* wetland *Typha-Cyperus* swamp Seasonal flooding Termite mounds		
Notable Biological and Social Features	Seasonal flooding areas (various) Alteration of the physical conditions may compromise the survival of habitat-specific species such as *Cyperus articulatus*, *Leersia hexandra* and *Oryza*		

Dominant woody species	*Aeschynomene elaphroxylon*					
Dominant Herbaceous species	*Cynodon dactylon; Cyperus papyrus, Eichhornia crassipes, Kyllinga alba, Paspalidium geminatum, Phragmites mauritianum; Phyla nodiflora, Sporobolus pyramidalis, Typha sp*					
Phytosociological description (within plot)	*Aeschynomene-Phragmites-Typha-Cyperus* Swamp *Cynodon-Paspalidum-Phyla* Seasonally Flooded Grassland *Cynodon-Paspalidum-Sporobolus* Seaonally Flooded Grassland *Cynodon-Sporobolus* Seasonally Flooded Grassland *Kyllinga-Cynodon-Sporobolus* Seasonally Flooded Grassland *Paspalidum-Cynodon-Phyla-Kyllinga* Seasonally Flooded Grassland					
Alien/Invasive Species	Invasive *Eichhornia crassipes and Pistia stratiotes* Invasive *Eichhornia in Eichhornia-Cyperus* wetland Invasive *Salvinia molesta and Eichhornia crassipes*					
Flora– Protected Species	No threatened, rare or range-restricted species was recorded at the site					
Fauna - Priority Species	Ten amphibian and six reptile species were recorded at this site. No surveys for mammals were undertaken at this site.					
Physical Characteristics						
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Waluhoiza C.O.U (Church), 930m					
Ambient Noise	Representative baseline daytime noise levels for the Lake Albert Water Abstraction Station have been measured at 44 dB $L_{Aeq,T}$. Baseline noise measurements indicate that existing daytime noise levels do not exceed the IFC daytime noise level criteria (07:00 – 22:00 $L_{Aeq,15h}$ 55 dB) or Ugandan Regulations maximum permissible noise level for residential areas (06:00 – 22:00 $L_{Aeq,8h}$ 45 dB).					
Closest Noise Receptor (distance)	Waluhoiza C.O.U (Church), 930m					
Soils and Geology	**Soil Type**	There is no soil known boring within 1 km of the sites.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		-	-	-	-	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	There is no known sol boringiwthin 1 km of the site.				
Surface Water	**Closest Surface Water**	Closest to Lake Albert.				
	Distance to Lake/River	Lake Albert, 75m.				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Buliisa	Buliisa TC	Northern Ward	Kisiomo		
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**			
		Waluhoiza C.O.U (Church)	930			

		Kaiolo BMU office	1,328
Archeology and Cultural Heritage	**DateSurved** Not surveyed	An archaeological and cultural heritage survey of the area was not requested and therefore not undertaken. The nearest areas where a survey was undertaken were KW-01 and KW-02. Surveys at both of these location recorded lithics, pottery sherds, graves and sacred plants. A number of *kibira* were also identified, as were a number of abandoned structures. Archaeological and cultural heritage sites have been recorded in the course of other work in the vicinity of the Water Abstraction Point. These include burial places (including Katuugo Cemetery), Waluhoiza Church of Uganda, Covenant Pentecostal Church and Full Gospel Church, and a sacred Bibaale tree. These are all located in Kisiimo Cell.	
Landscape and Visual Amenity	**Landscape Character Area** LCA03	**Lake Albert Coastal Fringe** Key local characteristics : • This site is characterized by the costal lowlands typical of the eastern banks of Lake Albert. • Landform is low-level and vegetation is comprised of wetland grassland species. • This site is connected to residential areas through a network of informal tracks but there is no infrastructure of note. • Views are open and panoramic and visual amenity is orientated west across the lake and the mountain range across the backdrop.	

40. Industrial Area	Industrial Area		
Location Block	CA1		
Field	NA		
Coordinates	-	-	
Elevation, m	371		
Terrain	Varies across the site		
Slope (degrees) and Aspect	Varies across the site		
Area	2050m x 1500m	307ha	
District	Buliisa		
CHA habitat type	Modified and Transitional		
Survey date(s) and Type	30-31 March 2017 (Avoidance) and 10-11 October 2017 (Avoidance)		
BIODIVERSITY			
Site description	The site is very large and covers a variety of vegetation types. These comprise a combination of cultivated land (manihot), bushed grassland, open over-grazed grassland with thicket, settlements and some areas of open and/or seasonally flooded grassland.		
Vegetation type(s) (WCS mapping)	Grazing land, cultivated land with some houses.		
Vegetation types recorded (micro-habitats)	Cultivation (manihot garden) Bushed grassland Open over-grazed grassland with thicket Settlements Open grassland Seasonally flooded grassland		
Main Biological and Social Features	*Acacia sieberiana, Acacia senegale, Albizia coriaria, Albizia grandibracteata, Antiaris toxicaria, Azadirachta indica, Balanites aegyptiaca, combretum mole, Crateva adansonii, Crinum macowanii, ficus gromosa, Ficus sp., Gardenia terniflora, Lannea schweinfurthii, Maerua angolensis, Maerua triphylla, Mangifera indica, Melia azedarach, Opilia celtidifolia, Philenoptera laxiflora, Sclerocarya birrea, Securidaca longipedunculata, Tamarindus indica, Trichilia emetica, Ziziphus pubescens* Termite mounds were not specifically recorded but will be present.		
Notable Biological and Social Features	Species of conservation concern were recorded- *Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* *Albizia coriaria* RS, IUCN (Not Assessed)		
Dominant woody species	*Lannea schweinfurthii* and Crateva *adansonii*		
Dominant Herbaceous species	Not recorded specifically, but mainly grasses and manihot.		
Phytosociological	Mainly cultivated land, with bushed over-grrazed grassland.		

description (within plot)				
Alien/Invasive Species	None recorded			
Flora– Protected Species	*Tamarindus indica:* Uganda Red List (VU); IUCN (LC) *Albizia grandibracteata: (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)* *Albizia coriaria* NFA Reserved Species			
Fauna - Priority Species	No detailed survey for fauna was undertaken at this site.			
Physical Characteristics				
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.			
Closet Air Receptor (distance)	Kasinyi Musingabakazi, 77m			
Ambient Noise	Ambient noise levels are influenced by and reflective of daily human activities (shops, people, and diesel engines). The daytime noise levels range between 50-70 dB(A) Leq. Nighttime levels would be lower.			
Distance from Site boundary (not centre of site)	**Settlements**	**Healthcare**	**Worship**	**Education**
Wellpad (operational phase, DAYTIME)				
0–150m	Approx. 12 settlements 30m - 150m to south in village of Uduk II. Approx. 24 settlements 0m - 150m to north in village of Kasinyi	None	None	None
150-950m	Approx. 25 settlements 175m - 950m to south east in village of Uduk II; Approx. 1 settlement 260m to south in Kibambura; Approx. 20 settlements to 450m - 950m to east in Kisomere. Approx. 110 settlements 150m - 950m to north in village of Kasinyi	None	None	Kasinyi St Lawrence Nursery School - 820m to north
Wellpad (operational phase, NIGHT)				
0-40m	Approx. 1 settlement 30m to south in village of Uduk II. Approx. 9 settlements 0m - 40m to north in village of Kasinyi	None	None	None
40-225m	Approx. 15 settlements 75m - 180m to south in village of Uduk II. Approx. 30 settlements 40m -	None	None	None

	225m to north in village of Kasinyi.			
225m-1050m	Approx. 1 settlement 260m to south in Kibambura. Approx. 40 settements 660m - 1050m in village of Uduk II. Approx. 40 settlements 480m - 1050m to east in village of Kisomere. Approx 130 settlements 225m - 1050m to north in village of Kasinyi.	None	None	Kasinyi St Lawrence Nursery School - 820m to north

Soils and Geology

Lithology MW1

0-0.5m	Brown slightly silty sand
0.5-3 m	Light orange brown with depth silty s
3-8m	Light orange brown clayey silted san
8-12m	Light grey speckled light orange clay silty fine to medium sand
12-21m	Light greenish grey silty Clay
21-28 m	Light greenish grey fine to coarse sa Clay
28-30 m	Light greenish grey slightly clayey fir sandy silt
30-37 m	Light greenish grey silty fine sand wi widely spaced thin beds of clay
37-38m	Light greenish grey fine sandy silt
38-39m	Light yellowish brown slightly silty fi coarse sand
40-41m	Light grey with minor light orange st fine sand
41-43 m	Light greenish grey fine sandy silt
43-46 m	Light greenish grey fine to medium s clay with widely spaced thin fine to medium sand beds.
46-51m	Light greenish grey slightly silty fine medium sand
49-50m	Thin medium spaced beds of hard s
51-55m	Grey slightly organic slightly fine sa clayey silt with widely spaced lenses fine to medium sand

Lithology MW2

0-0.5m	Greyish brown slightly silty fine to medium sand
0.5-3m	Light orangey brown silty fine to medium sand
3-7m	Light greyish brown streaked light orange clayey fine to medium sand
7-11m	Light grey very fine to medium sandy clay with widely spaced thin beds of clayey sand
11-13m	Light greenish grey slightly sandy clay
13-15m	Light greyish green slightly clayey silty fine to coarse sand
15-17m	Light greenish grey silty fine sand with medium spaced thin beds of silt
17-19m	Light greenish grey fine sandy clayey silt
19-24m	Light yellowish to light greenish grey clayey silty fine to medium sand
24-26m	Light yellowish fine to medium sand
26-30m	Light grey fine to coarse sand with medium spaced thin silty fine sand
30-35m	Light greenish grey clayey fine to coarse sand.
35-38m	Light grey slightly silty fine to medium sand
38-44m	Greenish grey slightly fine sandy closely sheared silty clay
44-47m	Greenish grey slightly clayey silty fine sand
47-55m	Light greenish grey with dark grey streaks fine to medium sand

Lithology MW3

0-1.5m	Light brown slightly silty fine to med grained sand
1.5-5m	Light greyish brown fine to coarse g sand

Lithology MW4

0-0.5m	Light orange brown silty fine to medium grained sand
0.5-6m	orange brown slightly clayey silty sand
6-12 m	Light grey stained orange clayey silty sand

5-8m	Light grey blotched light orangey grey sand	12-20m	Light bluish grey with zones of yellowish orange staining slightly sandy clayey silt.
8-11 m	Light grey sandy clay	20-23m	Light greenish grey with minor blotches of orange staining silty clay.
11-13m	Light grey slightly sandy silty clay with isolated narrow bands of silt	23-33m	Sandy material
13-15m	Light greenish grey slightly silty fine to medium grained sand	33-38m	Very closesly sheared light greenish grey clayey silt
15-16m	Light greenish grey silty clay	38-45m	Sandy material
16-29m	Light greenish grey silty fine to medium grained sand with interbedded closely to widely spaced thin beds of silty clay.	46-50m	Light greenish grey with zones of orange staining clayey silt
		50-55 m	Light grey blotched and stained yellow and orange silty fine grained sand
29-31m	Greenish grey silty clay with occasional beds of silty fine grained sand		
31-39 m	Light greenish grey with minor orange staining clayey silty fine grained sand with occasional thinly bedded widely spaced clay lenses.		
39-40m	Closely sheared light greenish grey silty clay interbedded with widely spaced thinly bedded sandy material		
40-46m	Very light grey with minor streaks of heavy minerals slightly silty fine grained sand with minor thing beds of silty and clayey materials		
46-55m	Light greenish grey speckled and blotched orange and dark grey slightly sandy clayey silt		

Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		DWD25901	329450	240729	397m	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		76.5	-	-	-	-
	Water Quality	One or more samples exceeded the US EAS 12:2014 water quality standards for potable water for:turbidity, color, arsenic, aluminum, barium, chlorides, iron and manganese.				
Surface Water	**Closest Surface Water**	Stream within the bouindary				
	Distance to Lake/River	Victoria Nile, 3,118m				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Nile	Kasinyi
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Kasinyi St Lawrence Nursery School	820	
	There are a few scattered settlements and paths connecting them in this area. There is a larger settlement to the south of the site boundary. A seasonal watercourse is indicated south of the site draining towards the east.			
Archaeology and Cultural Heritage	**Date Surveyed:** 2013, 4th December 2016, April-	Archaeological remains The CPF has the potential to have further archaeological remains. Lithics collected included a number of flakes and scrapers. Other stone tools included a stone pick-axe, pestle and grinding stones, although though these may be of a later date. Most of the pottery was highly abraded indicating extensive post-depositional disturbance. There was one extensive pottery scatter and one *in situ* pottery scatter. Daub and ironworking tuyères were also recorded.		

	May 2017 RAP	Burial places Burial places comprise a graveyard with ten burials and a Bacchwa clan graveyard. A further 49 graves were recorded during the RAP survey. Cultural sites The CPF area contains a relatively large number of cultural sites. These include: • a spear *kibira* surrounded by Lenga plants • the *kibira* of Tundulu Bidindwa of the Bacchwa clan, located in a Musingabakazi tree close to the clan graveyard • a shrine for the Kirunga spirit, a big Musingabakazi tree with a small thatched hut • the *kibira* of Kabagambe, located within Kabagambe's compound • the *kibira* of the Bawala clan • the Balyambwa shrine • a *kibira* in a Barkcloth tree • the *kibira* of Aeron Katogole • family shrines in Tamarind trees • a family shrine for healing • three further family shrines and two further cultural sites. A large tamarind tree is used as a medicinal plant for Kasinyi village. It has been used as a school and a polling station. A cultural site immediately northwest of the CPF area is *Munyagi*, used by the Basiita clan throughout the entire Bunyoro region. It is located in in a *Musingabakazi* tree. Medicinal and cultural uses of plants Medicinal plants included tamarind, cactus for the treatment of *amakebe* in young cows, neem trees(*Azadirachta indica*), *Kamunye*, *Omusomo*, mahogany (*Muvule*) and mango trees.
Landscape and Visual Amenity	**Landscape Character Area** LCA01	**Buliisa Lowland Pastoral Farmland** Key local characteristics : • This is site lies at the boundary of the pastoral lowlands and the rolling farmlands LCA to the east, but is largely characterized by grazing land and dense bushland vegetation. • The site also includes a number of residential dwellings linked by a local network of informal paths. • There is no formal or substantial infrastructure beyond basic dwellings. • Landform is gently rolling and covered in bush grassland and numerous mature trees. • Views vary from occasional long glimpses across the landscape and shorter range views fragmented by trees and taller grassland vegetation.

41. Victoria Nile Ferry Crossing (N)	MFNP	
Location Block	CA1	
Field	NA	
Coordinates	-	-
Elevation (m)	611	
Terrain	sloping	
Slope (degrees) and Aspect	2.202137	South
Area	4,720 m^2	0.472 ha
District	Buliisa, MFNP	
CHA habitat type	Natural/Modified	

Survey date(s) and Type	17 April 2017 (Detailed), 24 June 2017 (Detailed)
BIODIVERSITY	
Site description	This site is along the Nile River just by the jetty
Vegetation type(s) (WCS mapping)	The vegetation is Riverine *Kigelia* woodland with *Harrisonia* thicket.
Vegetation types recorded (micro-habitats)	The vegetation is Riverine *Kigelia* woodland with *Harrisonia* thicket. Along the river Nile is *Vossia-Cyperus* marsh. *Kigelia africana*; *Acacia sieberiana*; *Crateva adansonii* are the dominant species in the woody layer while *Sporobolus pyramidalis* and *Setaria sphacelata* dominate the herb layer
Main Biological and Social Features	None identified
Notable Biological and Social Features	None identified
Dominant Woody Species	Kigelia africana; Acacia sieberiana; Crateva adansonii
Dominant Herbaceous species	Sporobolus pyramidalis, Setaria sphacelata
Phytosociological Description	Kigelia-Harissonia;Sporobolus-Setaria Riverine Woodland; Vossia-Pycreus Marsh
Alien/Invasive Speceis	Yes – *Eichornia crassipes, Salvinia molesta* *Salvinia molesta* and *Eichhornia crassipes* at low abundance along the Nile. These are both aquatic species that will remain at the edges of the river unless carried out deliberately or inadvertently away from the river, which may occur during construction activities.
Flora– Protected Species	No threatened, rare or range-restricted species was recorded at the site.
Fauna - Priority Species	Area is mostly frequented by Olive Baboon, Black and White Colobus, Warthogs, Hippos, and Elephants other species may range into this area but not in large numbers. Fifteen amphibian and eleven reptile species were recorded at this site

Physical Characteristics

Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wild Frontiers and MFNP ferry crossing and lodges					
Ambient Noise	Noise associated with ferry operations.					
Closest Noise Receptor (distance)	Wild Frontiers and MFNP ferry crossing and lodges; adjacent and within 500m					
Soils and Geology	**Soil Type**	There is no known soil boring withn 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		-	-	-	-	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	There are no water quality reports available.				
Surface Water	**Closest Surface Water**	Victoria Nile, 50m.				
	Distance to Lake/River	See above.				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Murchison Falls NP	-
	Closest Receptor	**Receptor Details**	**Distance to faciltiy (m)**	
		Wild Frontiers and lodges	Adjacent and witin 500m	
Archaeology and Cultural Heritage	**Date Surveyed** 28 June 2017	Archaeological remains Late Stone Age single-and multi-platform cores as well as cores, scrapes, and a double bored stone. Pottery sherds were recorded. Scatters included ironworking tuyères and roulette-decorated pottery. Medicinal and cultural uses of plants Medicinal plants included *Mbumbuula* and *Mulolo/Yago/*sausage (Kigelia africana) trees and *Kulumbero.*		
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** Key local characteristics : • This is largely characterized by dense bushland thicket wetland vegetation along the north banks of the Nile. • This site sits within the Murchison Falls-Albert Delta Wetland System (RAMSAR site) and the north MFNP and the landscape is entirely typical of the north bank of the Nile. • Views are channeled along the Nile itself which are occasional long distance and of notable quality.		

42. Victoria Nile Ferry Crossing (S)	MFNP		
Location Block	CA1		
Field	NA		
Coordinates	-	-	
Elevation (m)	616		
Terrain	sloping		
Slope (degrees) and Aspect	4.870799	North	
Area	2,330m^2	0.233ha	
District	Buliisa, MFNP		
CHA habitat type	Natural		
Survey date(s) and Type	19 April 2017 (Detailed), 2 July 2017 (Detailed)		
BIODIVERSITY			
Site description	This site is along the Nile River just a few tens of metres from the jetty on the south end of the Nile.		
Vegetation type(s) (WCS mapping)	*Phragmites-Vossia-Cyperus* swamp fringed by *Acacia-Combretum* bushland *Sesbania sesban* and floating *Salvinia molesta* on the edge of the River.		
Vegetation types recorded (micro-habitats)	The vegetation is *Phragmites-Vossia-Cyperus* swamp fringed by *Acacia-Combretum* bushland *Sesbania sesban* and floating *Salvinia molesta* on the edge of the River. *Sesbania sesban*; *Acacia senegal*; *Kigelia africana* are dominant in the woody layer of the Bushland while *Phragmites mauritianum*; *Vossia cuspidata*; *Cyperus papyrus* are the dominant herbaceous species		
Main Biological and Social Features	None identified		
Notable Biological and Social Features	None identified.		
Dominant Woody Species	*Sesbania sesban; Acacia senegal; Kigelia africana*		
Dominant Herbaceous species	*Phragmites mauritianum; Vossia cuspidata; Cyperus papyrus*		
Phytosociological Description	*Sesbania-Acacia-Kigelia* swamp		
Alien/Invasive Species	Yes- *Eichhornia crassipes, Mimosa pigra, Salvinia molesta, Uraria picta*		
Flora– Protected Species	No threatened, rare or range-restricted species was recorded at the site.		
Fauna - Priority Species	There were signs of Hippo, Warthog and Baboons in this area. The area has large wallows which makes it a suitable area for Warthogs and Buffalo. The dense bushy nature of the vegetation here also suggests that Bushbuck could frequent this area Five amphibian and six reptile species were recorded at this site.		
Physical Characteristics			
Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.		
Closet Air Receptor	Weild Frontierrs, lodges		

(distance)						
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wild Frintiers, Paraa Safari Lodge					
Soils and Geology	**Soil Type**	There are no known borings within 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Well Pad (m)**	
		-	-	-	-	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	There are no water quality reports available.				
Surface Water	**Closest Surface Water**	Victoria Nile, 86m.				
	Distance to Lake/River	See above.				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Buliisa	Ngwedo	Murchison Falls NP	-
	Closest Receptor	**Receptor Details**	**Distance to Pad (m)**	
		Wild Friontiers, Paara Ferry, Paraa Lodge	Adjacent and within 500m	

Archaeology and Cultural Heritage	**Date Surveyed** 28 June 2017	<u>Archaeological remains</u> Late Stone Age single-and multi-platform cores as well as cores, scrapes, and a double bored stone. Pottery sherds. Scatters included ironworking tuyères and roulette-decorated pottery. <u>Medicinal and cultural uses of plants</u> Medicinal plants included *Mbumbuula* and *Mulolo/Yago/Sausage (Kigelia africana)* trees and *Kulumbero.*
Landscape and Visual Amenity	**Landscape Character Area** LCA04	**Victoria Nile Corridor** <u>Key local characteristics :</u> • This is largely characterized by dense bushland thicket wetland vegetation along the north banks of the Nile. • This site sits within the Murchison Falls-Albert Delta Wetland System (RAMSAR site) and the north MFNP and the landscape is entirely typical of the south bank of the Nile. • Views are channeled along the Nile itself which are occasional long distance and of notable quality.

43. Bugungu Air Strip	MFNP		
Location Block	CA1		
Field	NA		
Coordinates (NW Corner)	-	-	
Elevation (m)	725		
Terrain	flat		
Slope (degrees) and Aspect	1.04	North	
Area	300mx100m	3 ha	
District	MFNP		
CHA habitat type	Woodland		
Survey date(s) and Type	19 April 2017 (Detailed), 2 July (Detailed)		
BIODIVERSITY			
Site description	This site is located within well wooded vegetation with moderate to tall grass. There is hardly any bare ground owing to a very good cover of the ground by grass.		
Vegetation type(s) (WCS mapping)	Wooded grassland		
Vegetation types recorded (micro-habitats)	Open woodland with scattered trees Woodland with dense shrub and jerbaceous layer.		
Main Biological and Social Features	One species of conservation concern is *Albizia grandibracteata* (Red Nongo) an NFA Reserved Species		
Notable Biological and Social Features	Mature Trees and protected flora species.		
Dominant woody species	*Acacia sieberiana; Albizia coriaria, Albizia grandibracteata, Combretum molle; Crateva adansonii; Philenoptera laxiflora; Pseudocedrella kotschyi, Securidaca longipedeculata, Strychnos innocua*		
Dominant Herbaceous species	*Brachiaria brizantha; Hyparrhenia filipendula; Hyperthelia dissolute, Panicum maximum; Vigna unguiculata*		
Phytosociological description (within plot)	*Acacia-Albizia-Brachiaria-Hyperthelia* Woodland *Combretum-Albizia-Brachiaria* Woodland *Philenoptera-Albizia-Combretum-Brachiaria* Woodland *Philenoptera-Brachiaria-Hyperthelia-Hyparrhenia* Woodland *Philenoptera-Combretum-Albizia* Open Woodland *Pseudocedrella*-Albizia Woodland		
Alien/Invasive Species	Yes- *Chromolaena odorata*		
Flora– Protected Species	Species of conservation concern were recorded- *Albizia grandibracteata* (Red Nongo) NFA Reserved Species; Uganda Red List (VU), IUCN (Not assessed)		
Fauna - Priority Species	The direct area of impact had very little evidence of mammal activity in this area. The grass seemed ungrazed with the overgrown grasses of Brachiaria, Hyperthelia and Hyparrhenia looking very un-palatable. Some Bushpig/warthog and Aardvark activity evidence was observed. This area did not seem to support large populations of any mammal species in both survey periods Three reptile species were recorded from this site,		

Physical Characteristics

Ambient Air Quality	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.					
Closet Air Receptor (distance)	Wildlife, adjacent					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources. Levels in the range of 30-45 dB(A) (Leq) were noted within MFNP. Night time levels are higher; 33-49 dB(A) (Leq) attributed to the increased noise from insects.					
Closest Noise Receptor (distance)	Wildlife, adjacent					
Soils and Geology	**Soil Type**	There are no known soil borings within 1 km of the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Pad (m)**	
		-	-	-	-	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	There are no water quality reports avaialable.				
Surface Water	**Closest Surface Water**	Not identified, 200m.				
	Distance to Lake/River	Victoria Nile, 6,456m.				

Socioeconomic Characteristics

Social	**Distict**	**Subcounty**	**Parish**	**Village**
	Masindi	Murchison Falls NP	Murchison Falls NP	-
	Closest Receptor	**Receptor Details**	**Distance to Well Pad (m)**	
		Mabaku Town Lodge	5,168	
Archaeology and Cultural Heritage	**Date Surveyed** Not Surveyed	An archaeological and cultural heritage survey of the area was not requested and therefore not undertaken. The nearest areas where a survey was undertaken were to the west at NSO-06, NSO-02 and KGG-05, all of which were over 8km away. Two archaeological assets have been recorded by other surveys in the area of the airfield. A sacred tree has also been recorded to the west of the airfield.		
Landscape and Visual Amenity	**Landscape Character Area** LCA02	**Buliisa Lowland Rolling Farmland** Key local characteristics : • This site is characterized by the existing airstrip and therefore flat and open but is enclosed by fencing and surrounding vegetation. • Views from the site are enclosed by the surrounding woodland and bushland vegetation		

44. Masindi Airstrip		
Location Block	NA	
Field	NA	
Coordinates	- -	
Elevation	NA	
Terrain	flat	
Slope (degrees) and Aspect	NA NA	
Area (ha)	1.8	
District	Masindi	
CHA habitat type	Transition	
Survey date(s) and Type	February 2018, detailed	
BIODIVERSITY		
Site description	Open grass land surrounded by cultivation	
Vegetation type(s) (WCS mapping)	Open grassland of *Hyperthelia dissoluta* and *Hyparrhenia filipendula* surrounded by cultivation of maize with very occasional Mango trees, *Erythrina abyssinica, Albizia coriaria* and *Maesopsis eminii*	
Vegetation types recorded (micro-habitats)	Grassland	
Main Biological and Social Features	None	
Notable Biological and Social Features	None	
Dominant woody species	*Acacia hockii*	
Dominant Herbaceous species	*Hyperthelia dissoluta*	
Phytosociological description (within plot)	Open grassland of *Hyperthelia dissoluta* and *Hyparrhenia filipendula* surrounded by cultivation.	
Alien/Invasive Species	*Lantana camara*	
Flora– Protected Species	None identified.	
Fauna - Priority Species	None identified.	
Physical Characteristics		
Ambient Air	Consistent with rural conditions; good quality. PM_{10} and TSP increase during dry periods.	

Quality						
Closet Air Receptor (distance)	None within 1 km					
Ambient Noise	Noise levels are consistent with the overall absence of anthropogenic noise sources.					
Closest Noise Receptor (distance)	None within 1 km					
Soils and Geology	**Soil Type**	No known soil boring at the site.				
Hydrology	**Closest Known Well**	**DWRM ID**	**Coordinates**		**Distance to Pad (m)**	
		-	-		-	
	Borehole Data	**Depth (m)**	**Static Water Level (m)**	**Water Level (m)**	**Yield m^3/hr**	**Drawdown (m)**
		-	-	-	-	-
	Water Quality	No water quality data available. The closest boreholes are: DWD26516 – 5096m DWD32389 – 7984m DWD32859 – 7397m				
Surface Water	**Closest Surface Water**	River Biraizi, 600m.				
	Distance to Lake/River	See above.				
Socioeconomic Characteristics						
Social	**Distict**	**Subcounty**	**Parish**	**Village**		
	Masindi	Masindi	Masindi	Kyamugwera		
	Closest Receptor	**Receptor Details**	**Distance to Site (m)**			
		None within 1 km	None wiithin1km			
Archaeology and Cultural Heritage	**Date Surveyed** Not Surveyed	None reported.				
Landscape and Visual Amenity	**Landscape Character Area**	NA				

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Annex A

Annex A Satellite Imagery Major Infrastructure

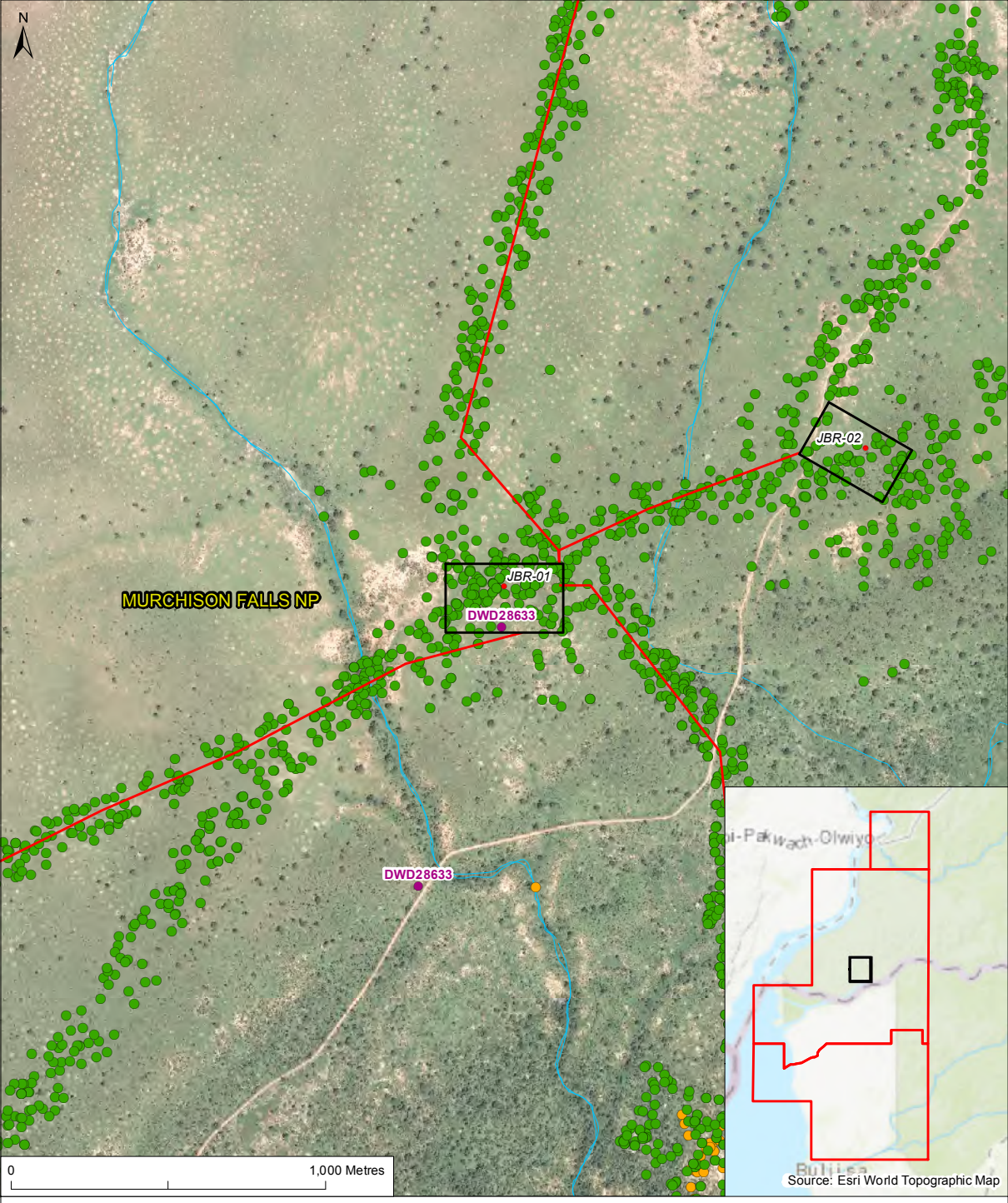
Project Layout

FACT SHEET - PROJECT LAYOUT OVERVIEW

- Project Area
- Wellpad Extent - Maximum
- Water Abstraction System
- Victoria Nile Pipeline HDD Crossing - Option 1
- Victoria Nile Pipeline HDD Crossing - Option 2
- Victoria Nile Ferry Crossing
- Production and Injection Network
- Industrial Area
- Camp
- Bugungu Airstrip
- Masindi Vehicle Check Point
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse
- DWRM Well

Drawn: LC Checked: GM Approved: MW Date: 29/03/2018 Scale @ A4 1:200,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-01

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 1
- Production and Injection Network
- Parish
- Village

Main Social Receptors

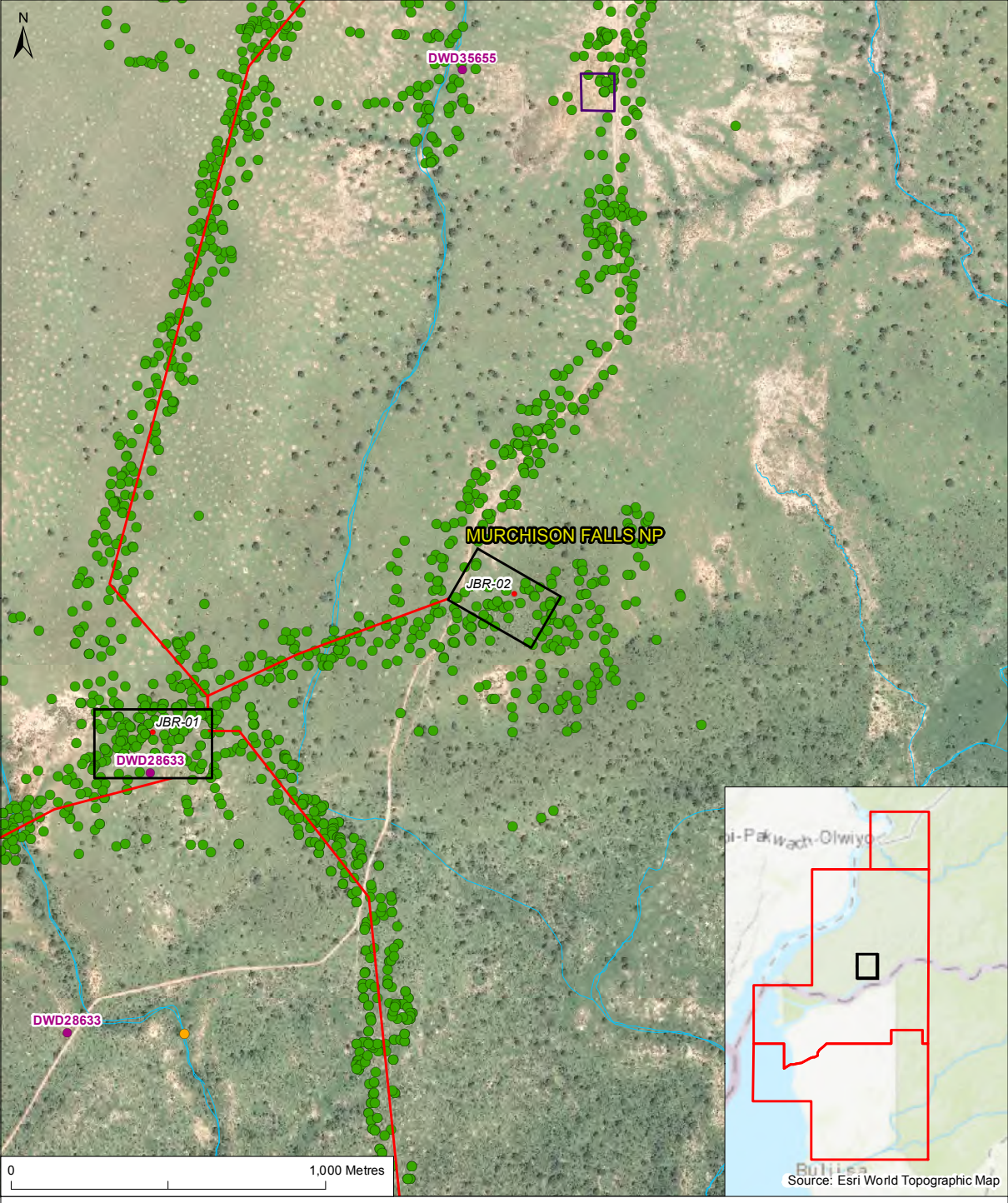
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-02

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

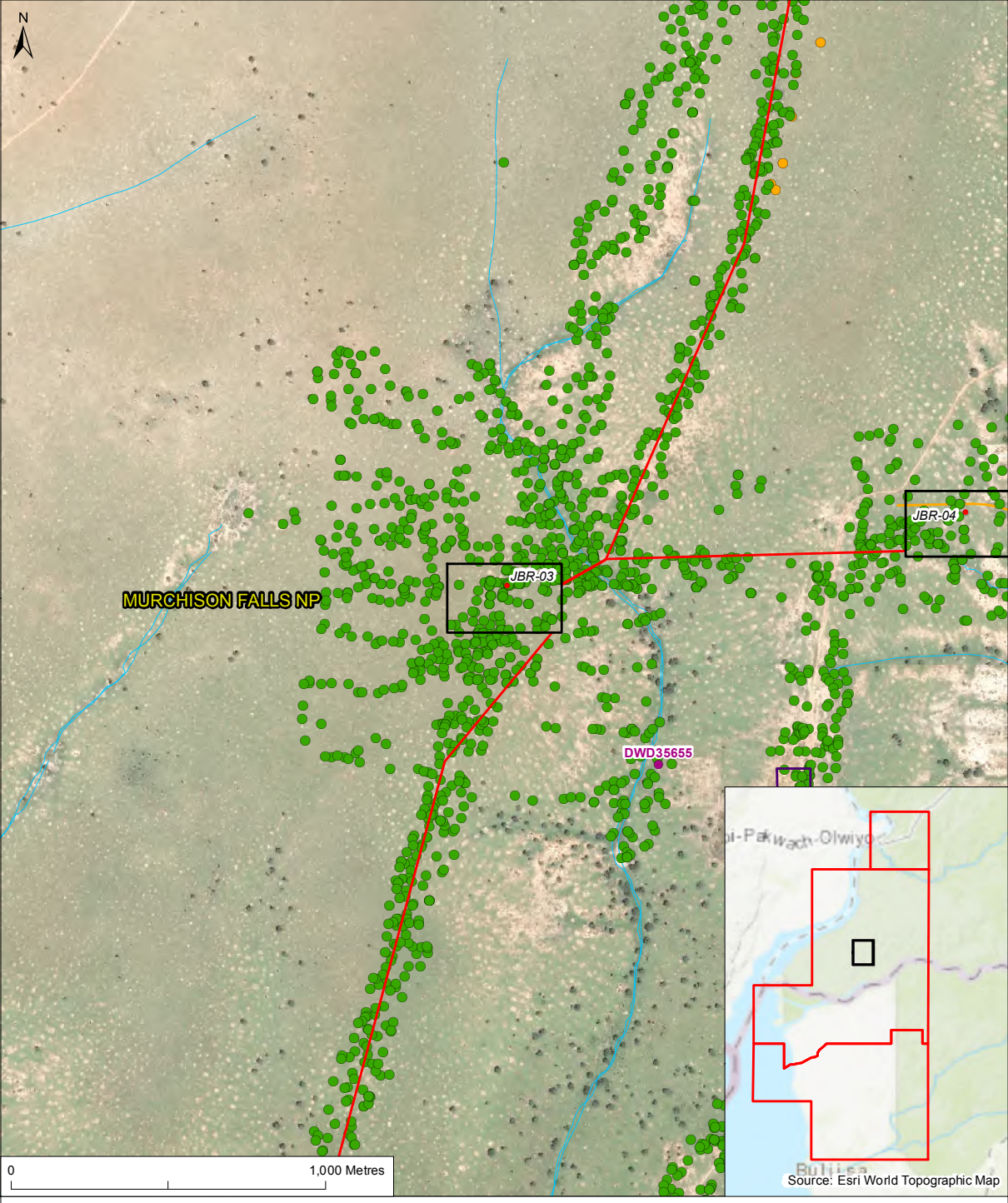
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

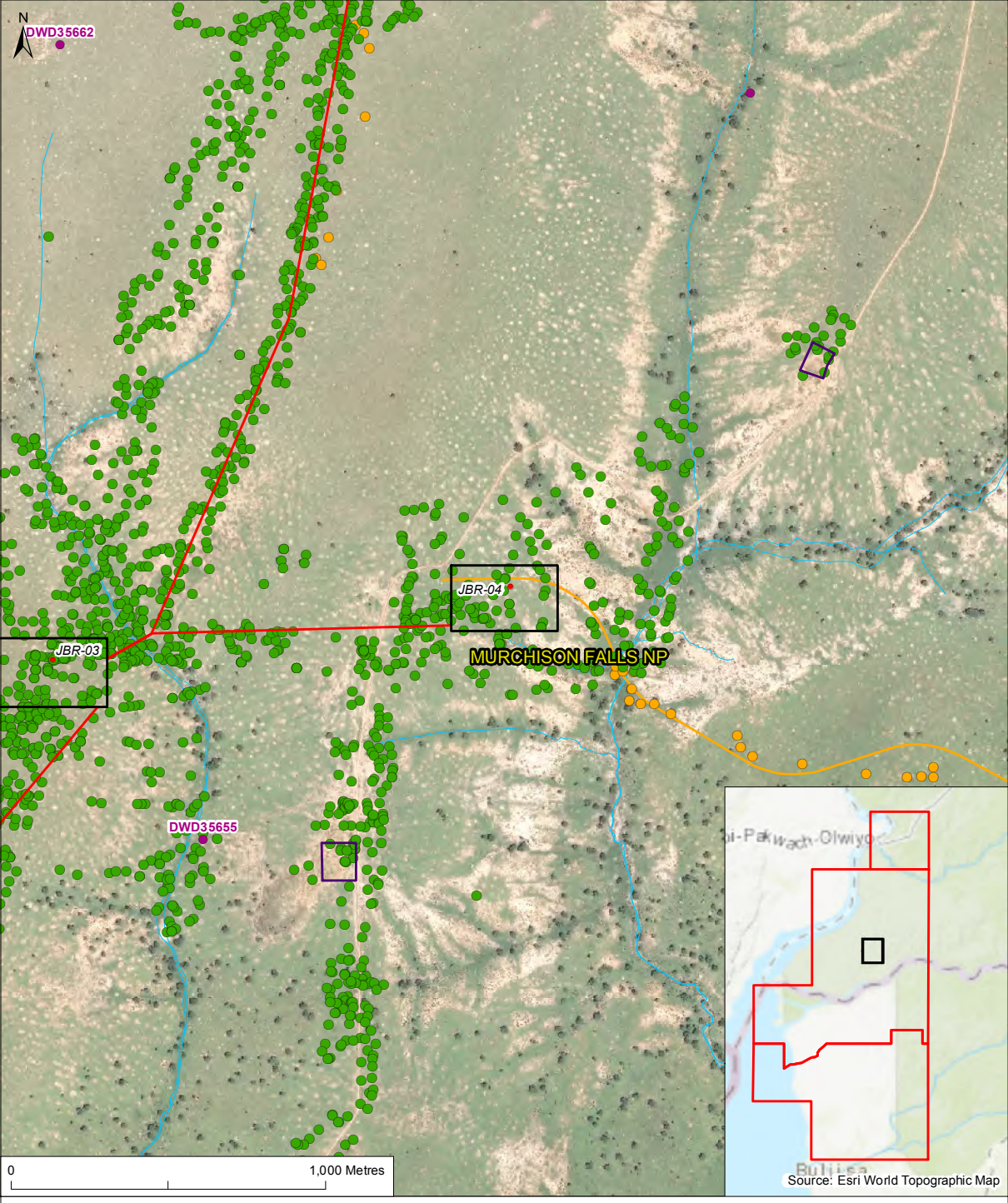
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - WELLPAD JBR-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

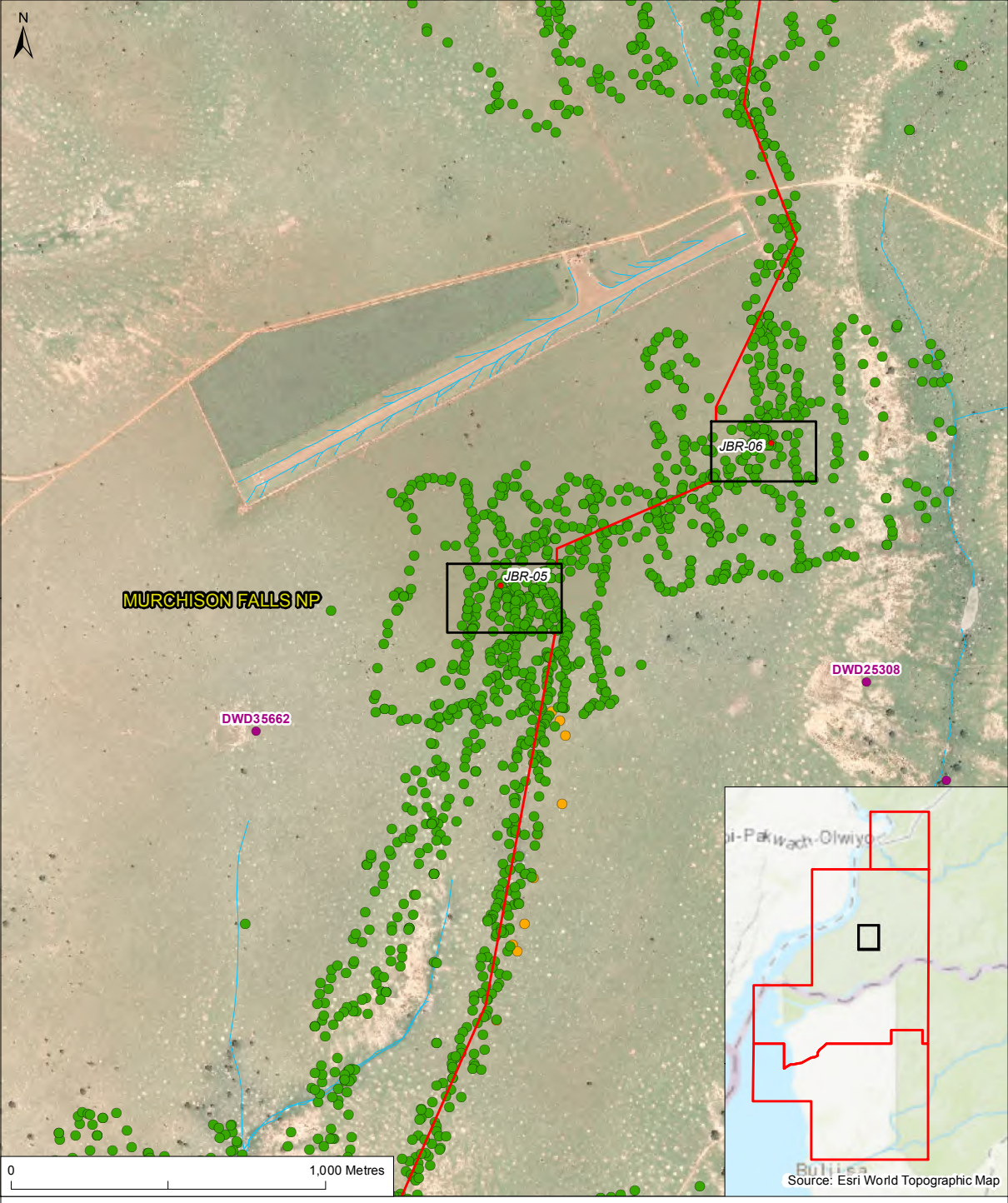
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-05

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

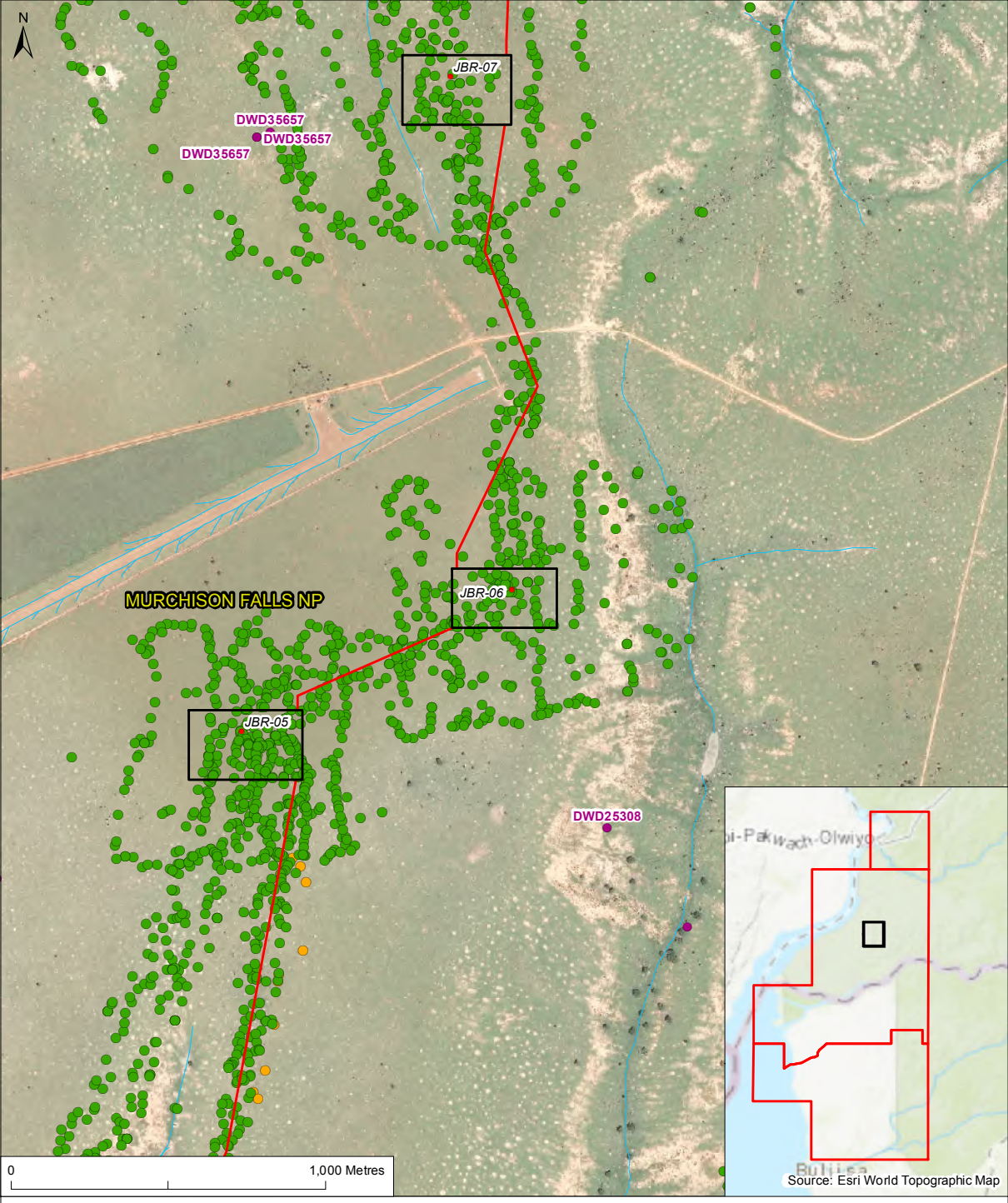
Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N



FACT SHEET - WELLPAD JBR-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

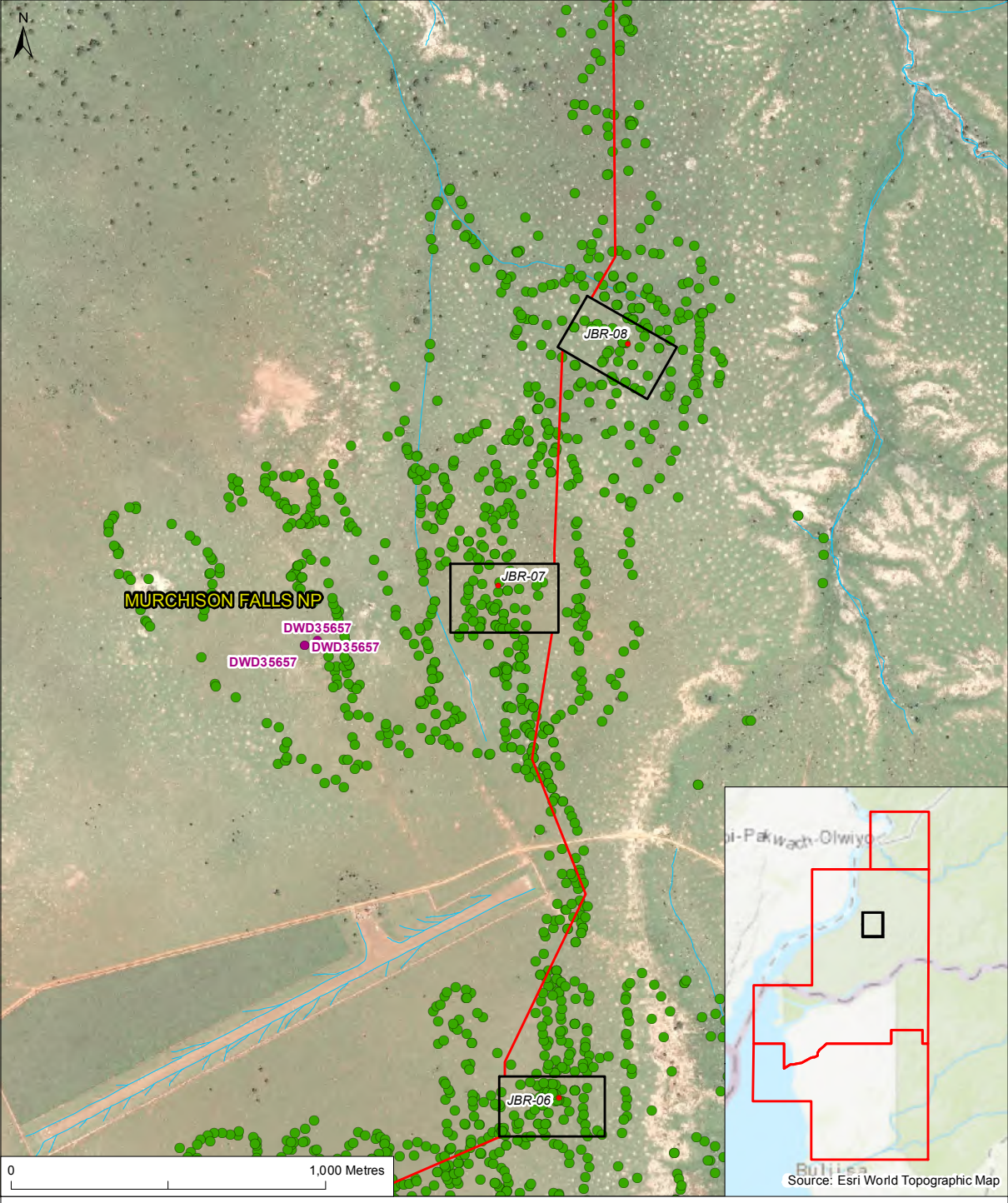
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-07

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

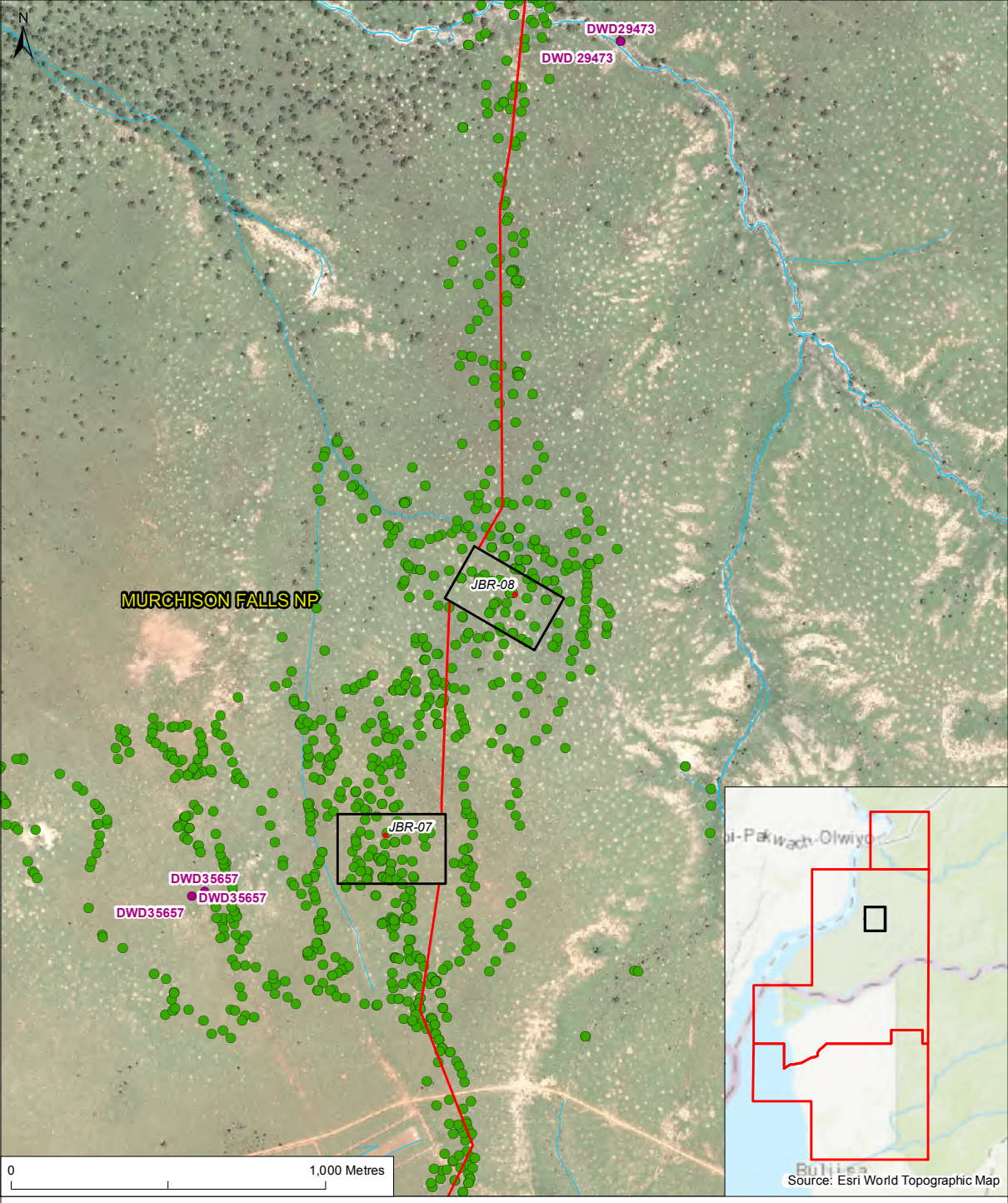
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-08

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

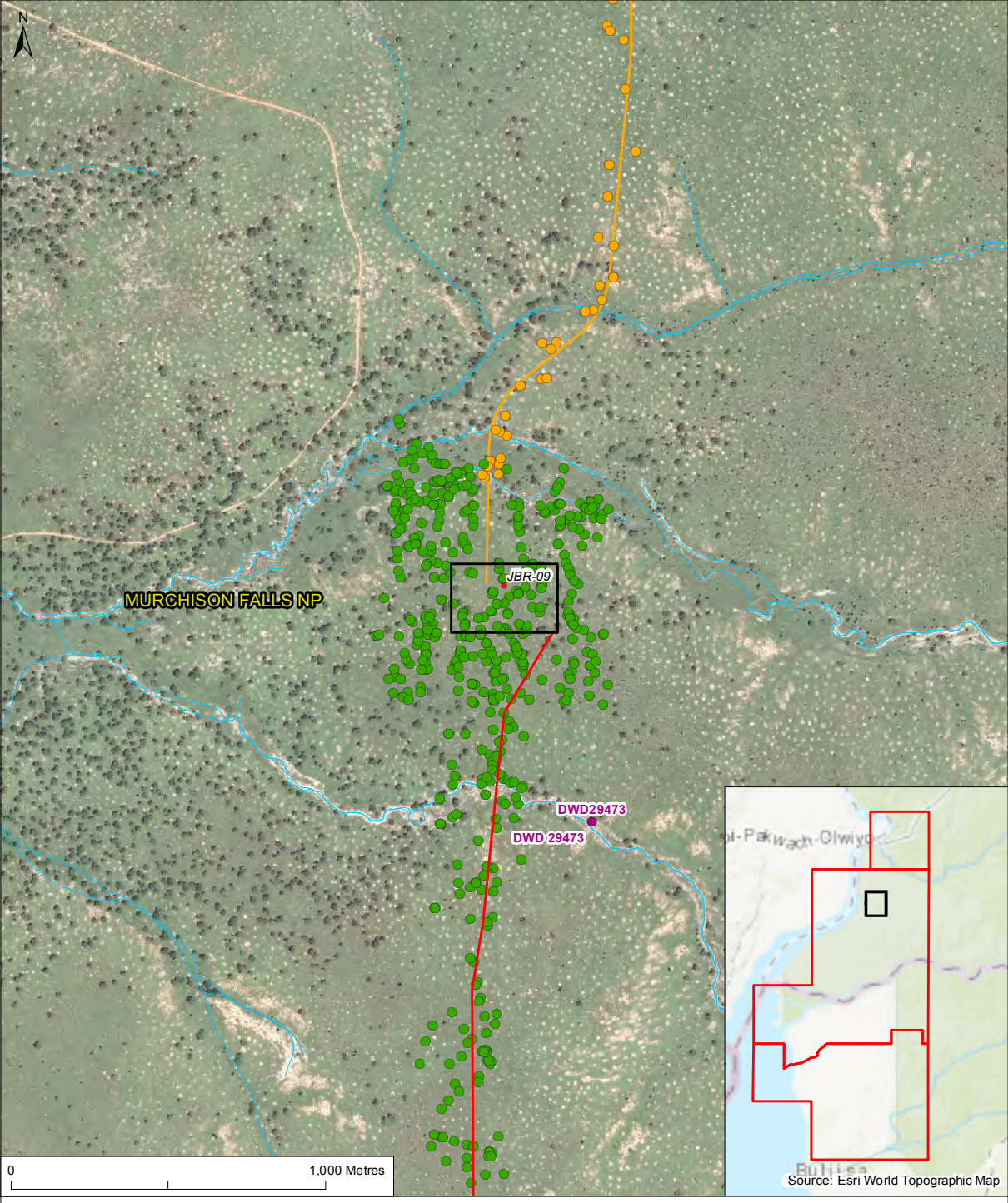
Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N



FACT SHEET - WELLPAD JBR-09

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

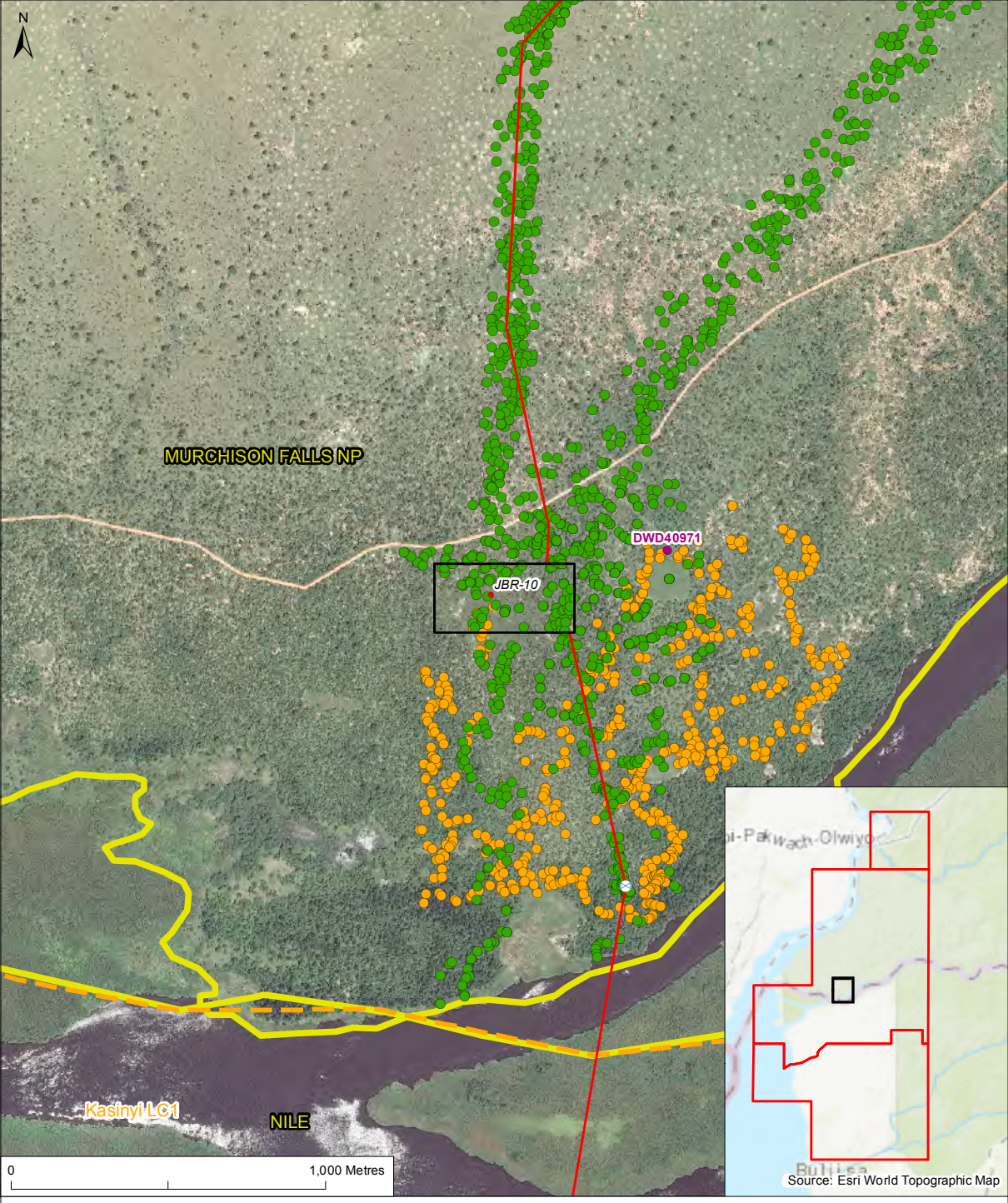
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD JBR-10

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 2
- Production and Injection Network
- Parish
- Village

Main Social Receptors

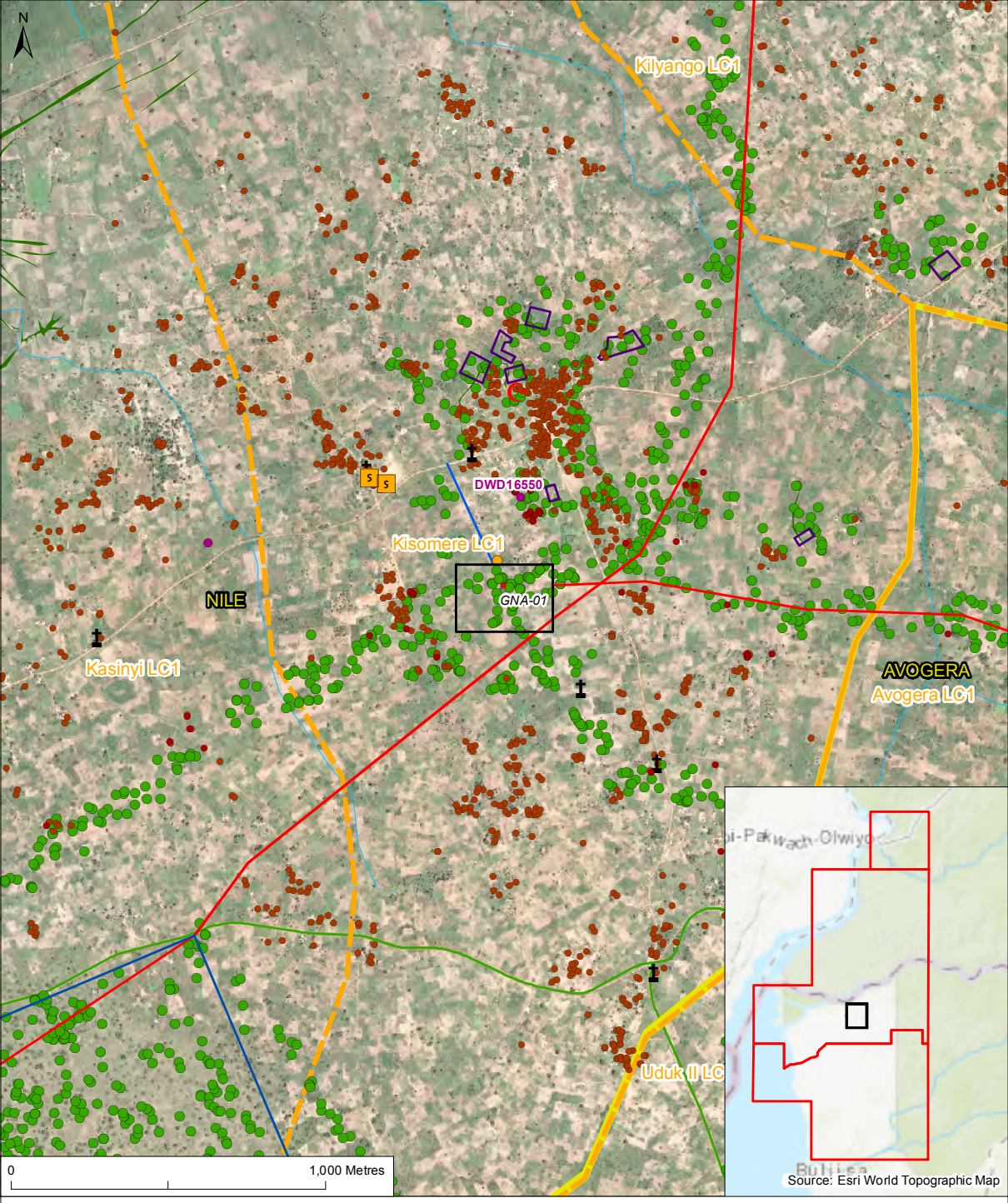
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD GNA-01

- Wellpad location
- Wellpad Extent - Maximum
- Industrial Area
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

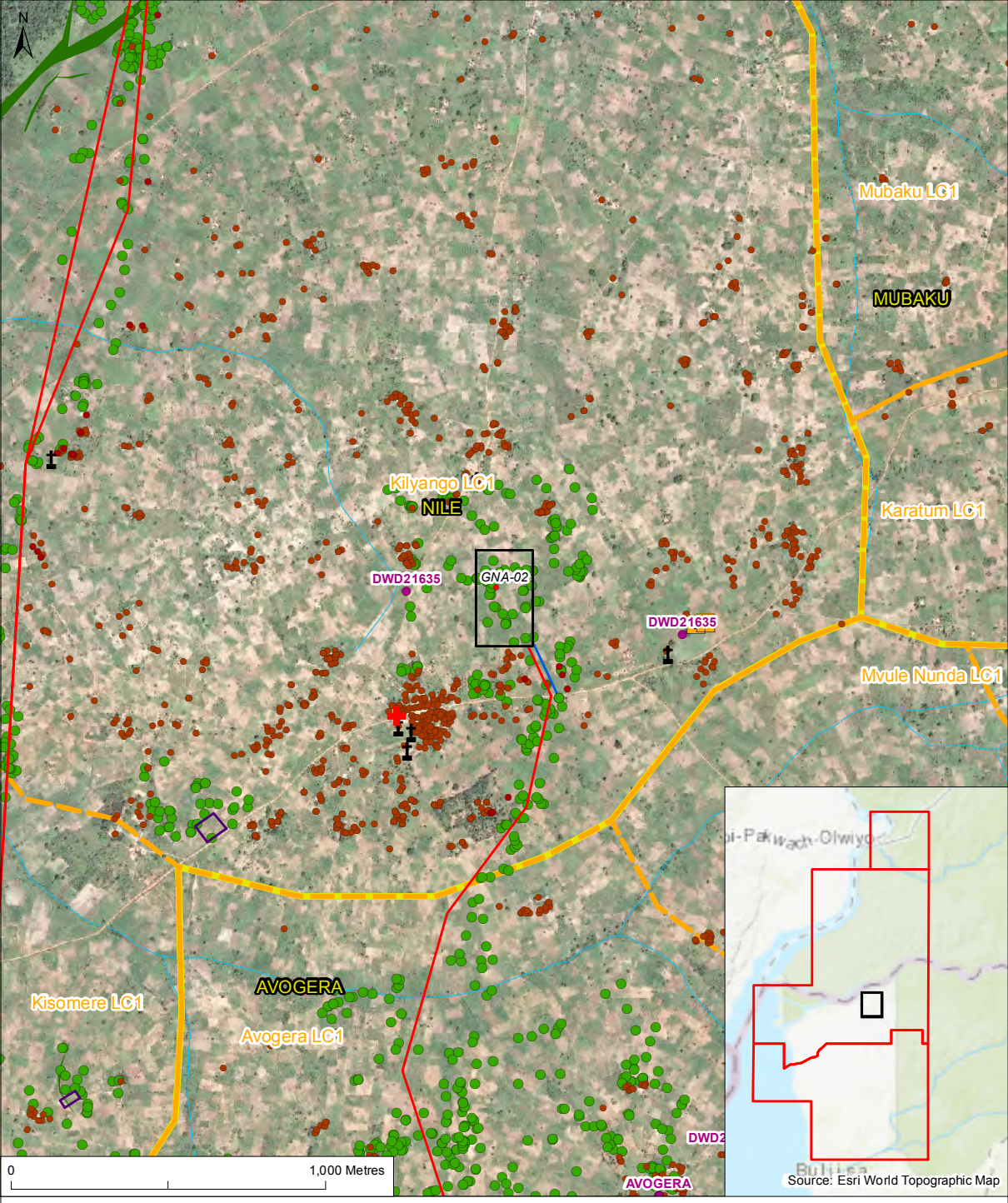
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD GNA-02

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

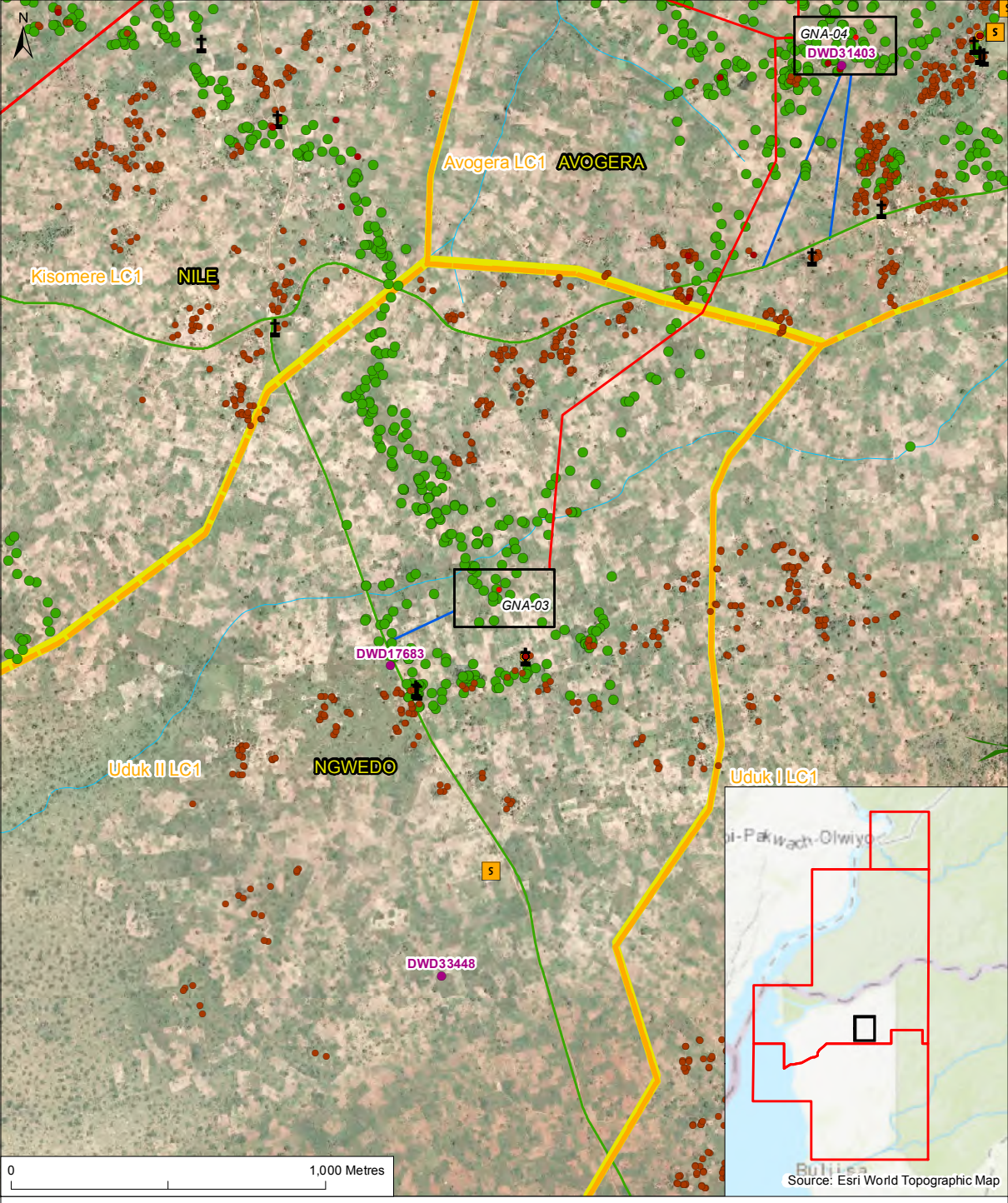
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD GNA-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

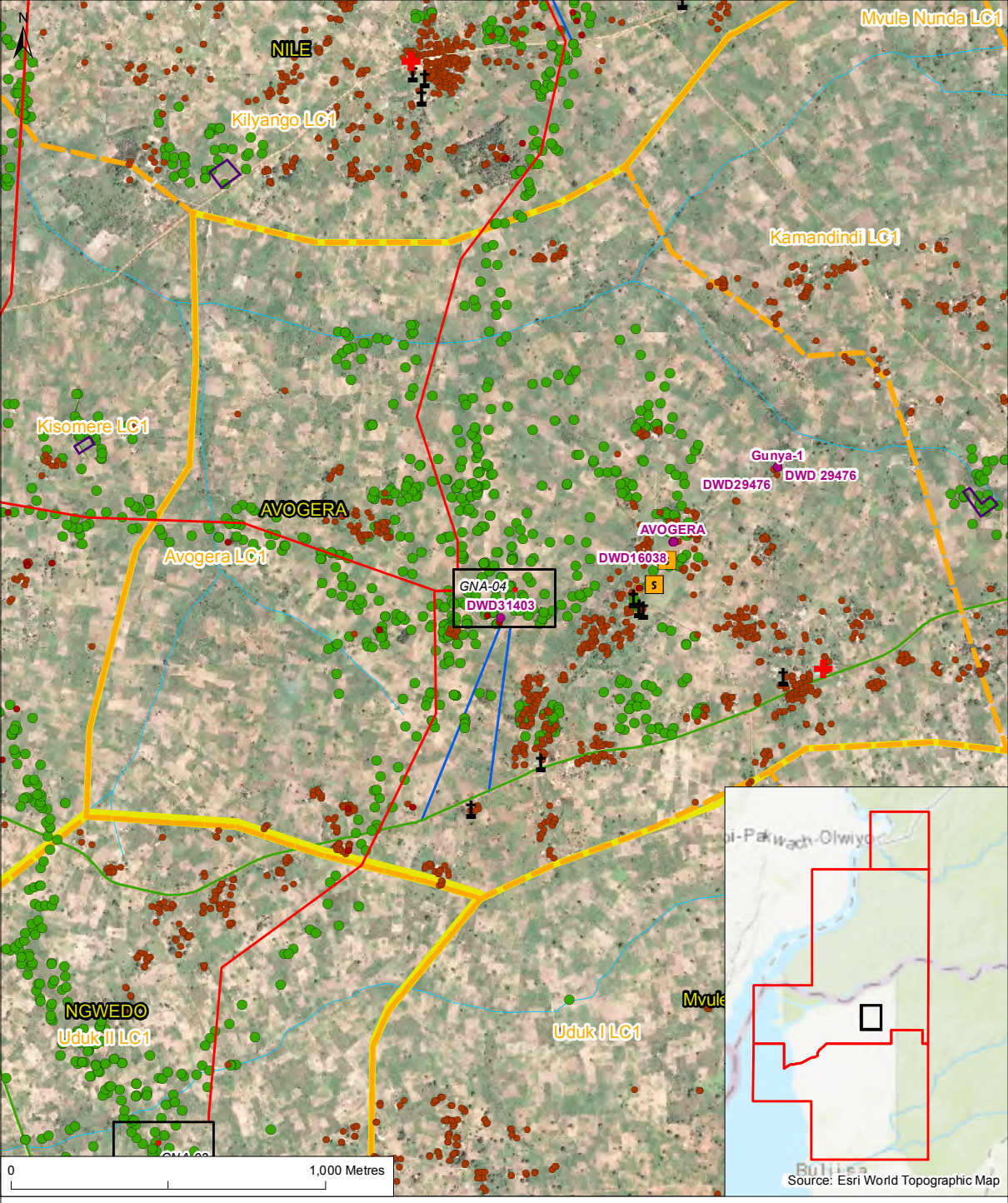
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD GNA-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

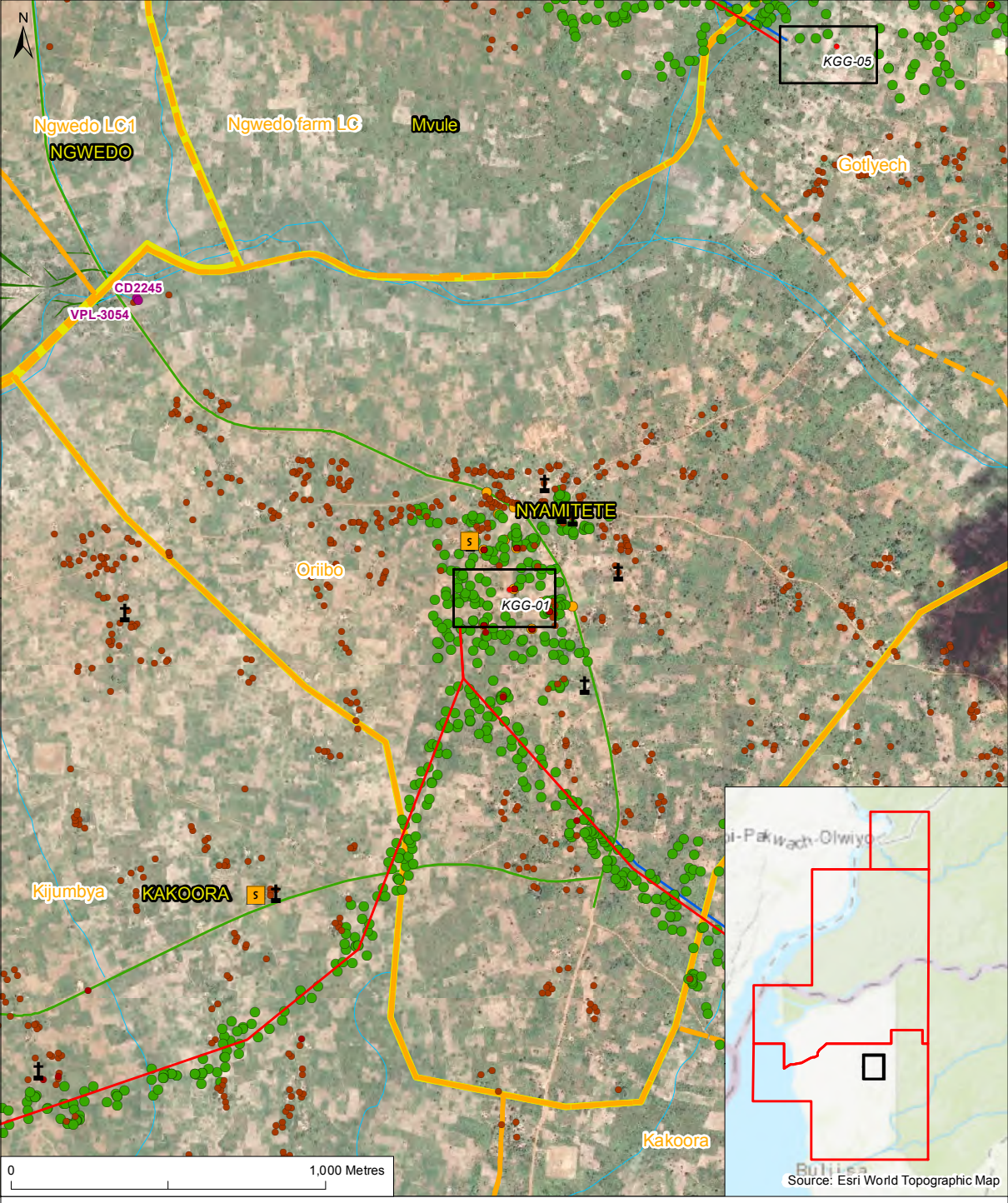
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KGG-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

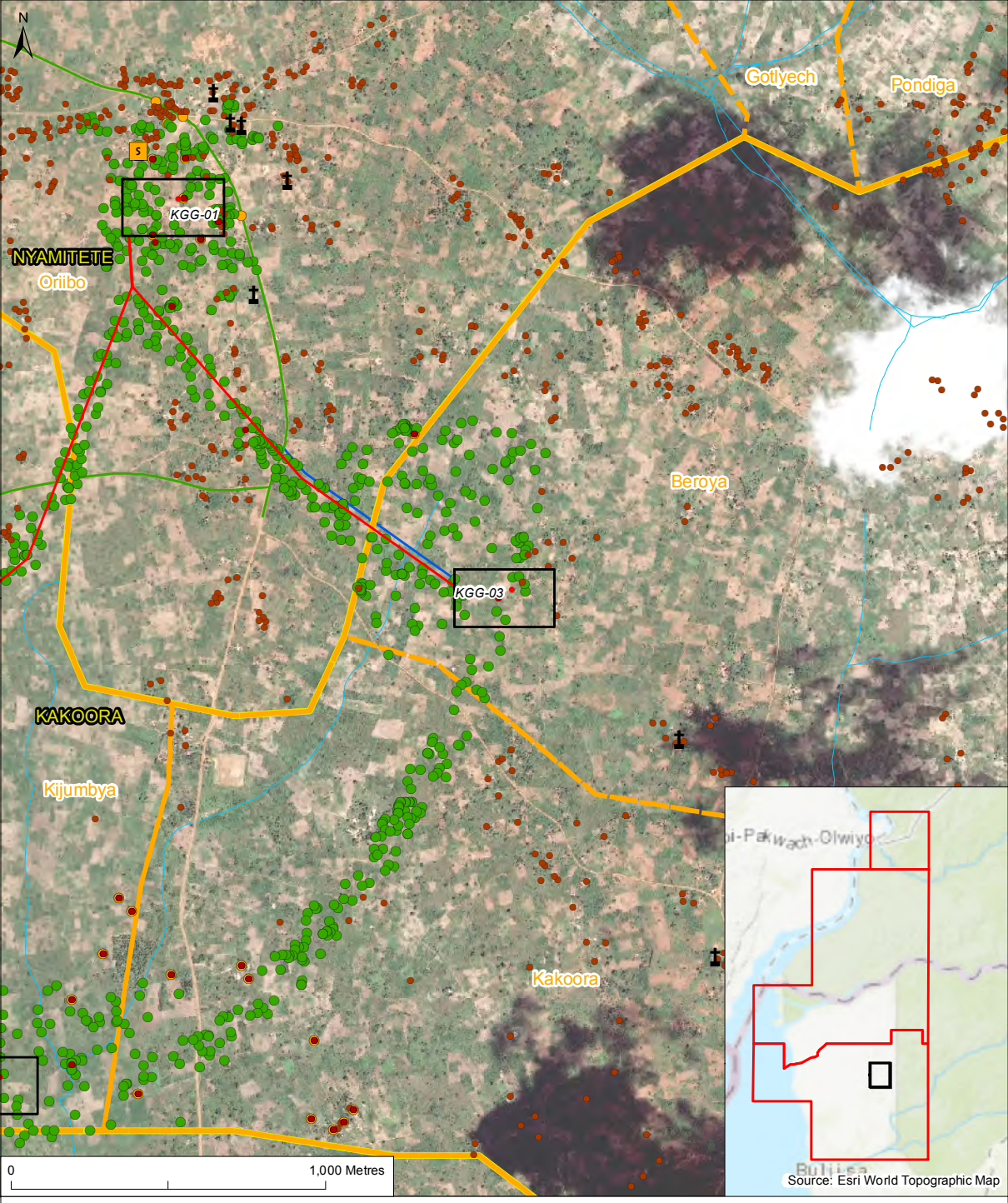
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KGG-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

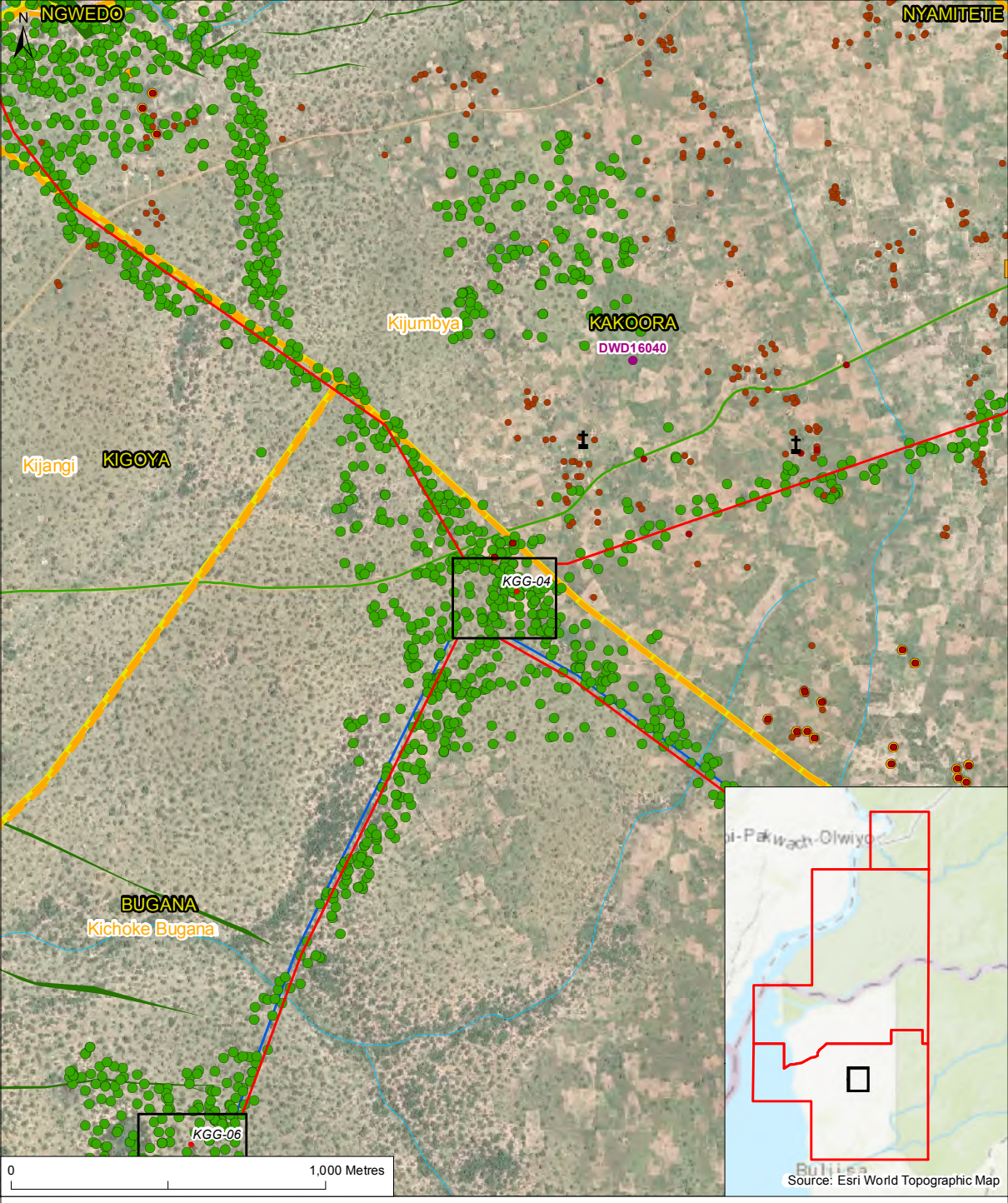
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KGG-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

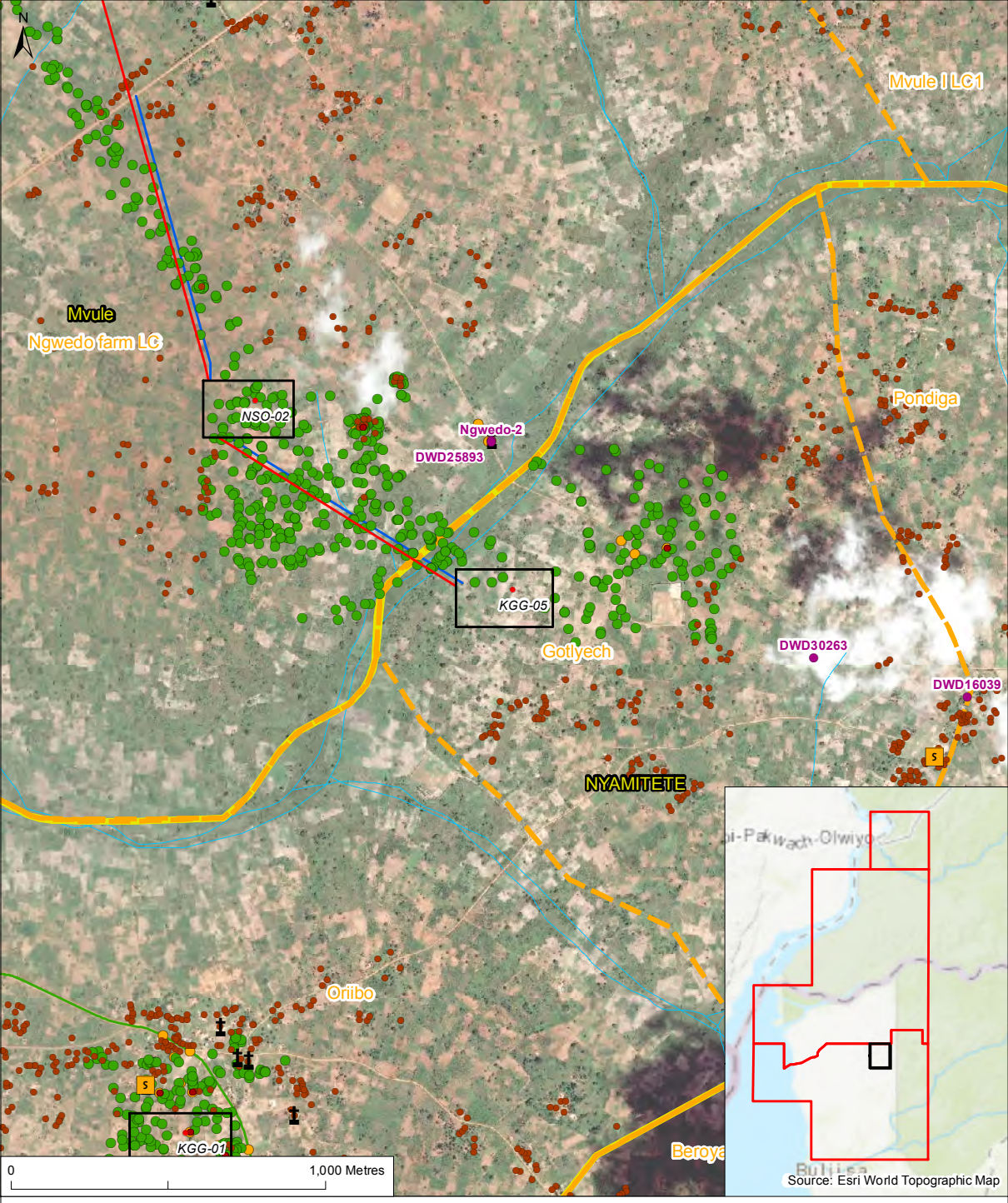
Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N



FACT SHEET - WELLPAD KGG-05

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

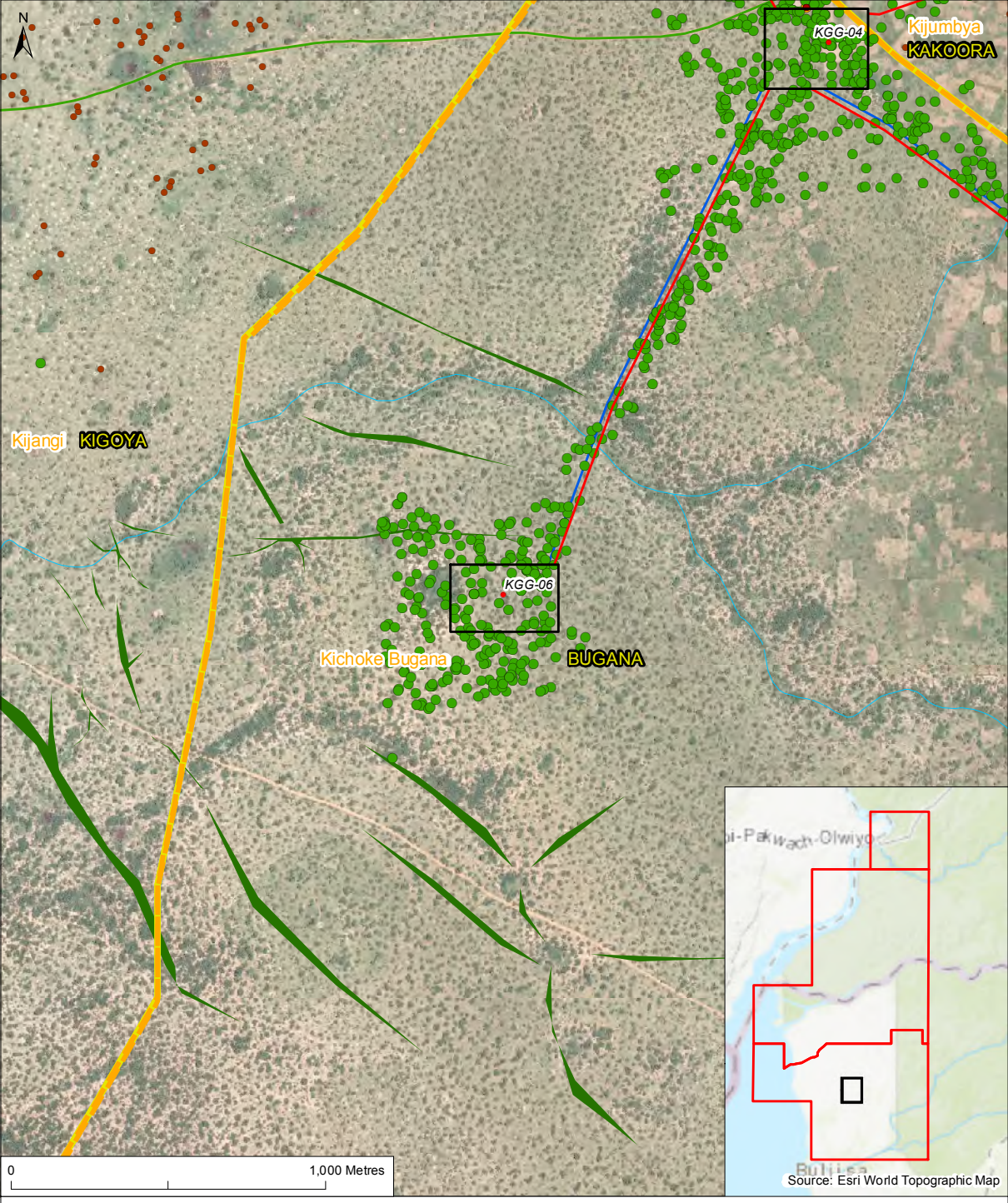
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - WELLPAD KGG-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

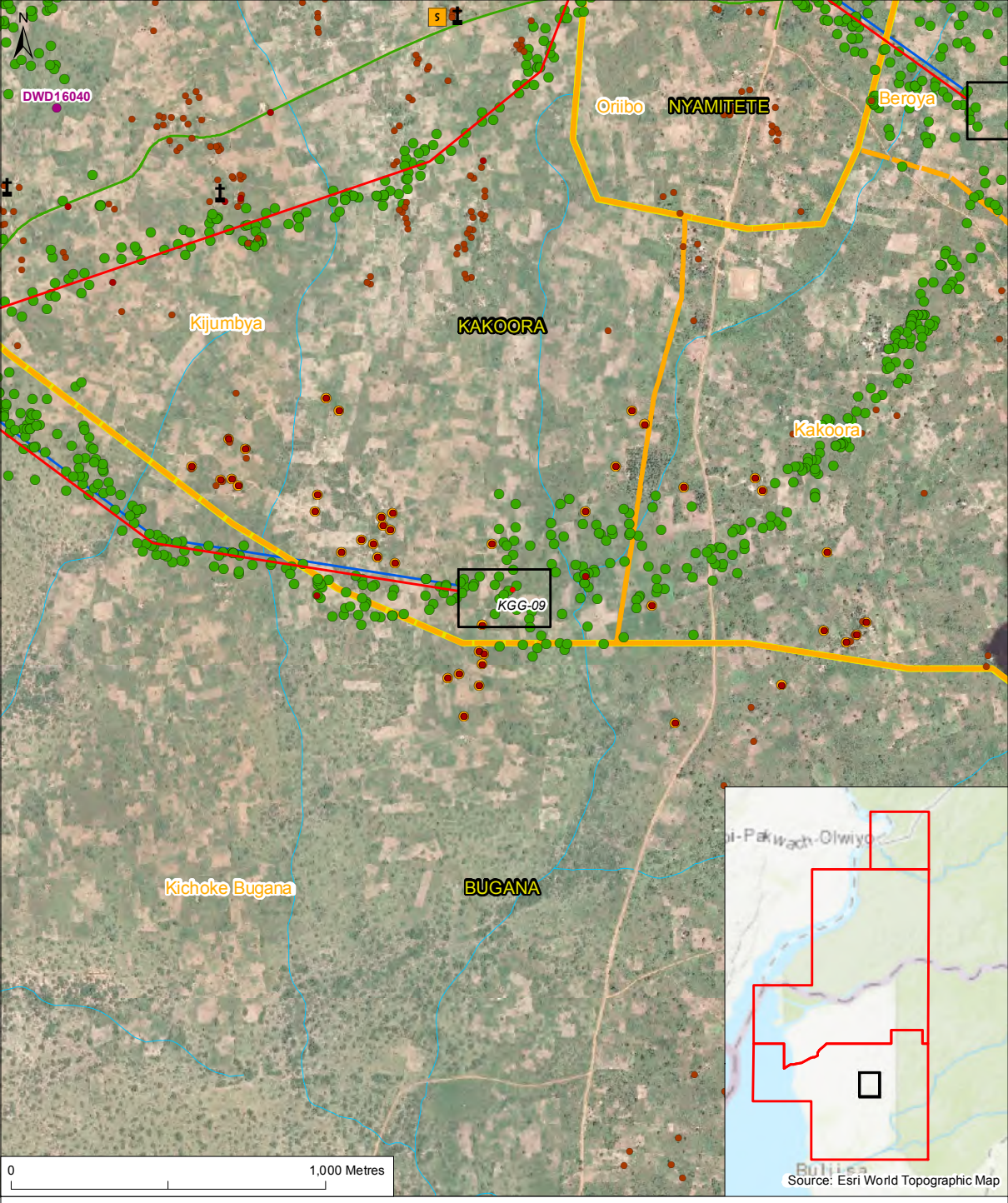
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KGG-09

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

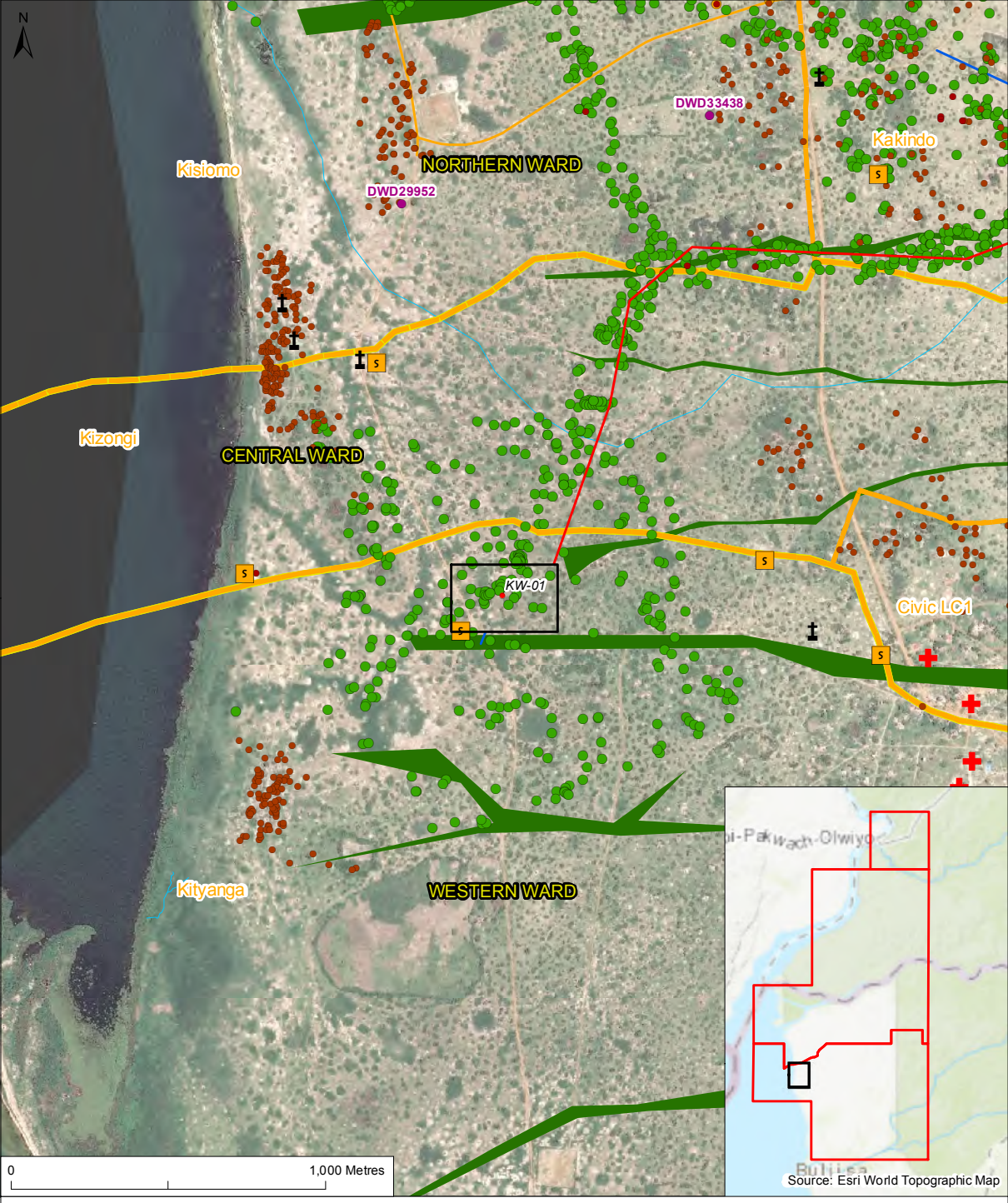
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KW-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

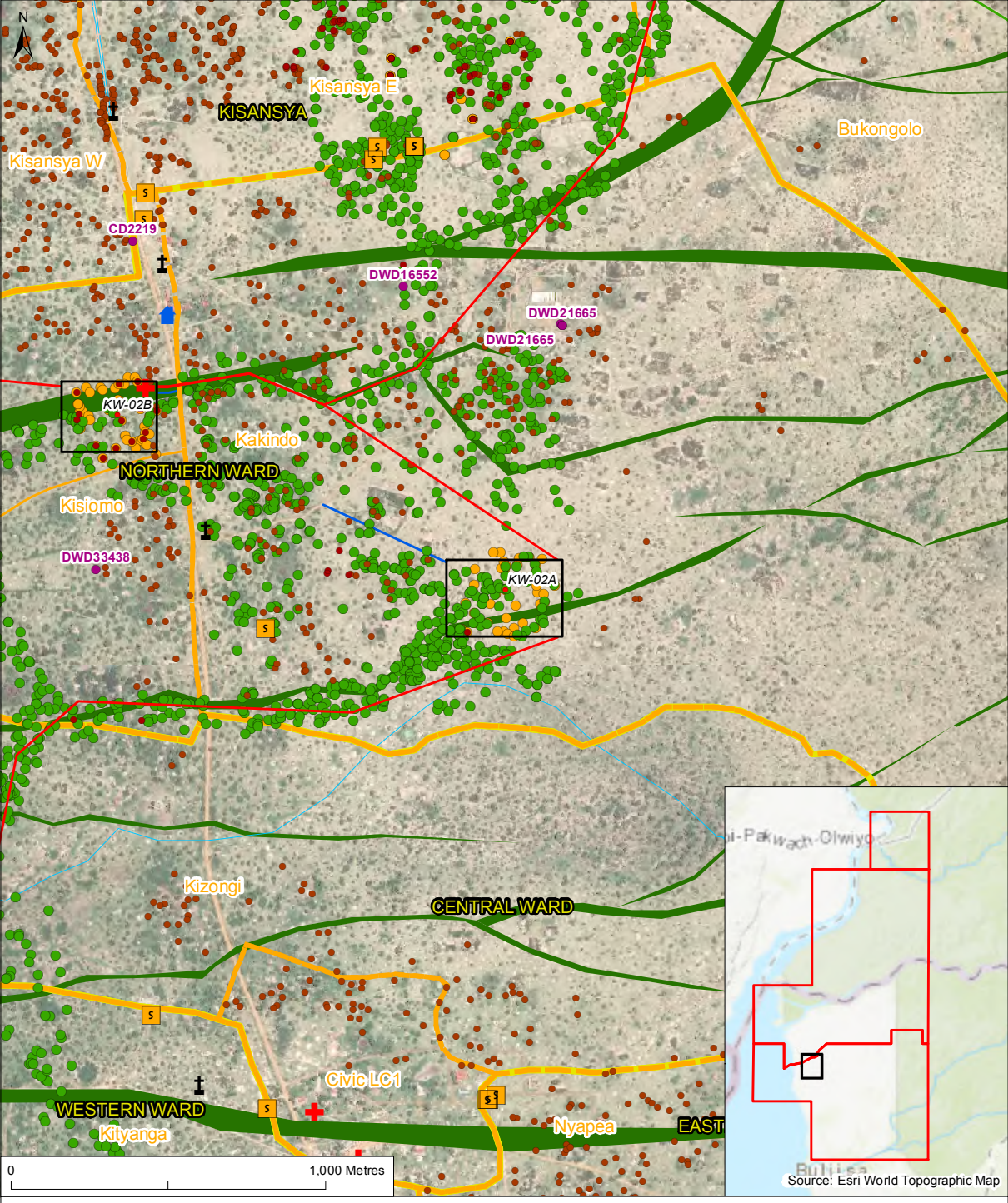
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KW-02A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

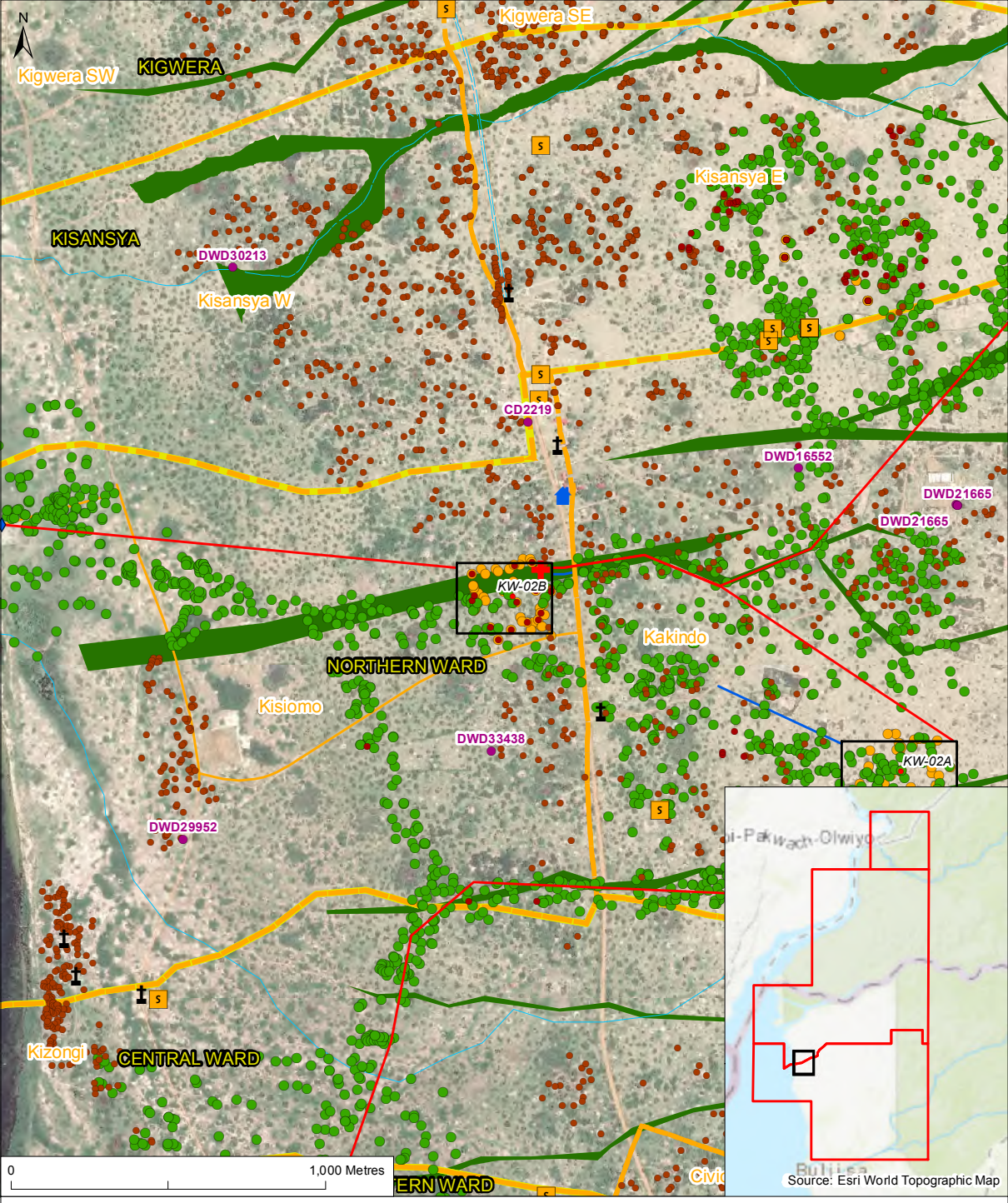
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD KW-02B

- Wellpad location
- Wellpad Extent - Maximum
- Water Abstraction System
- Production and Injection Network
- Parish
- Village

Main Social Receptors

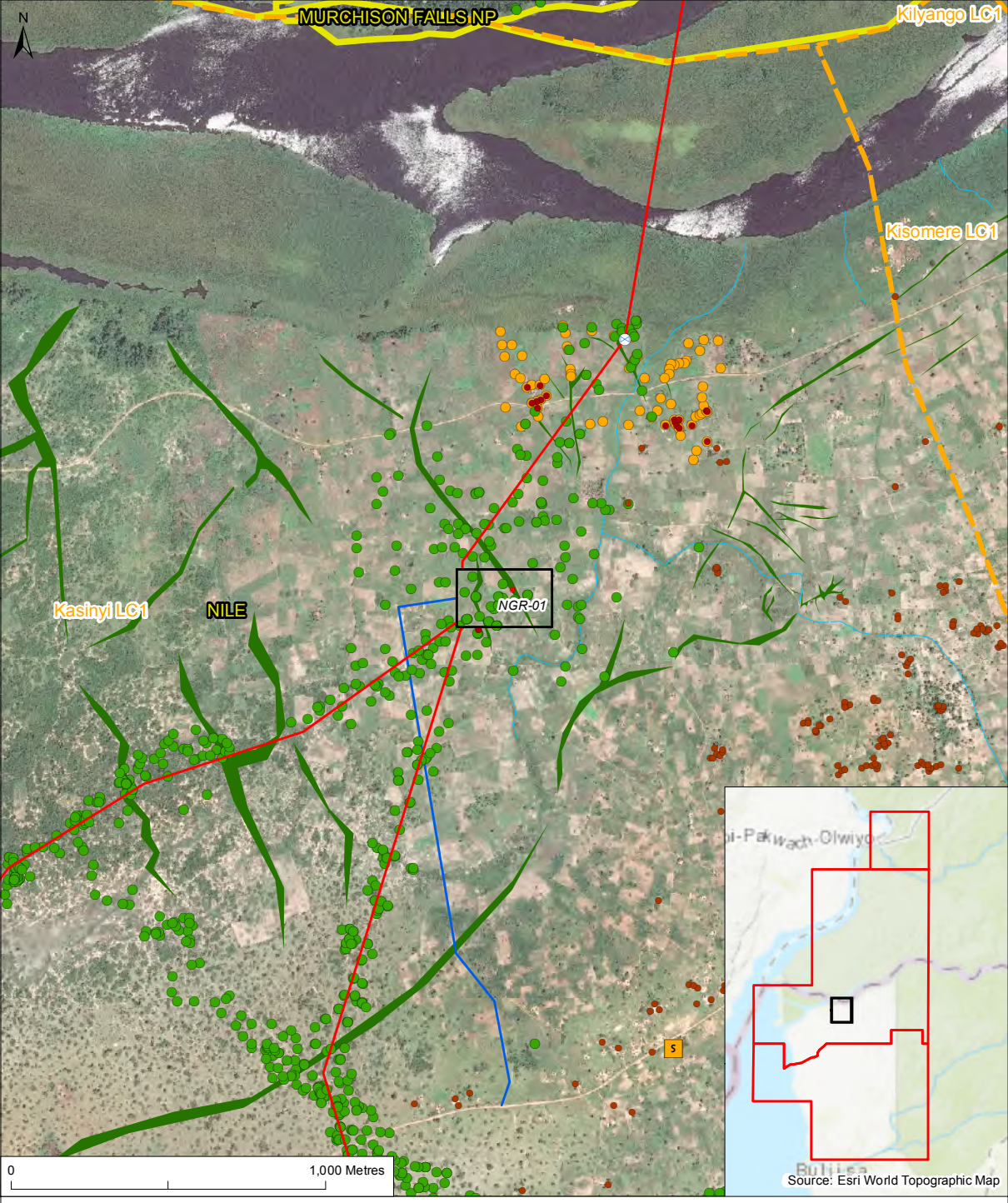
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NGR-01

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 2
- Production and Injection Network
- Parish
- Village

Main Social Receptors

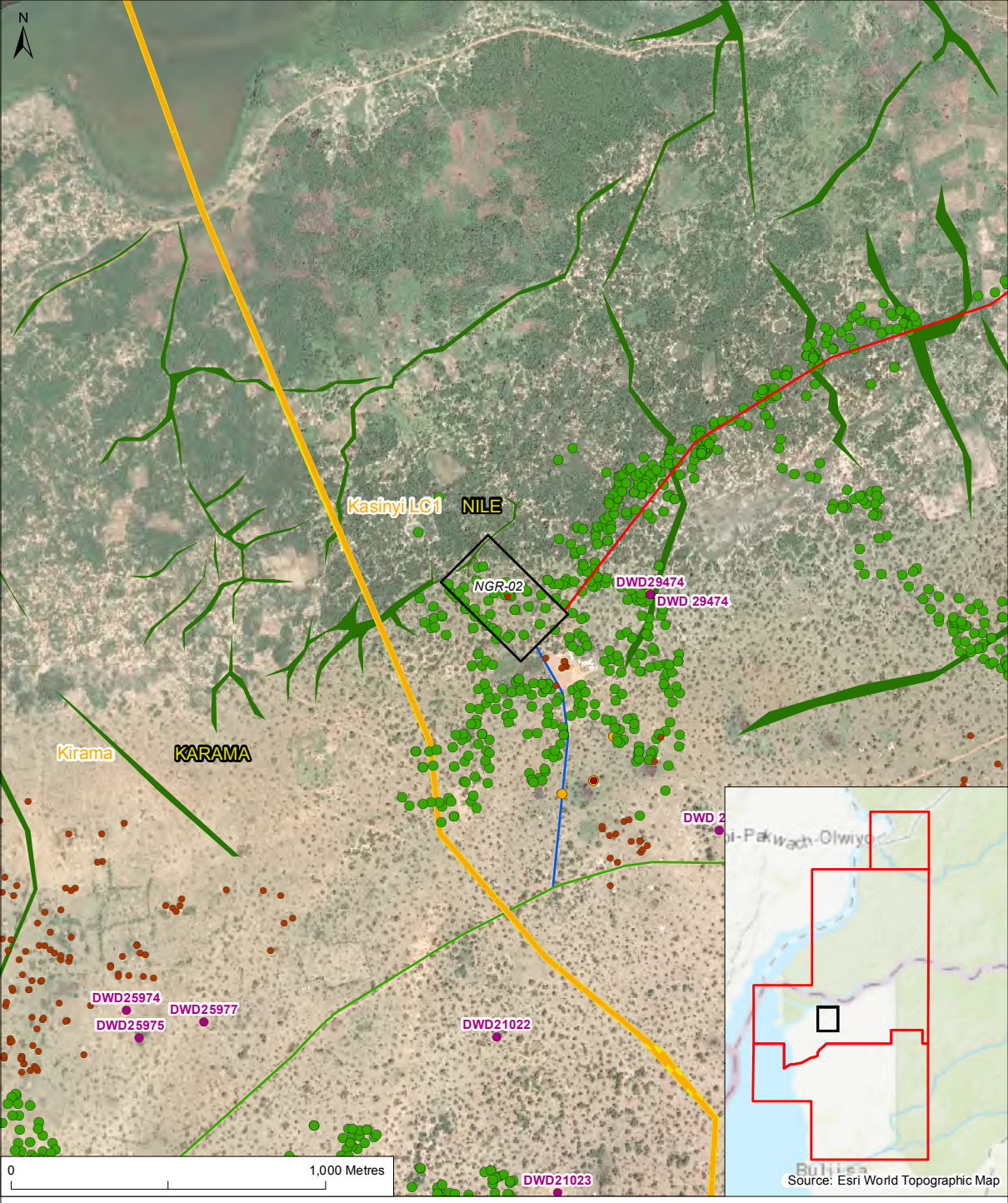
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NGR-02

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

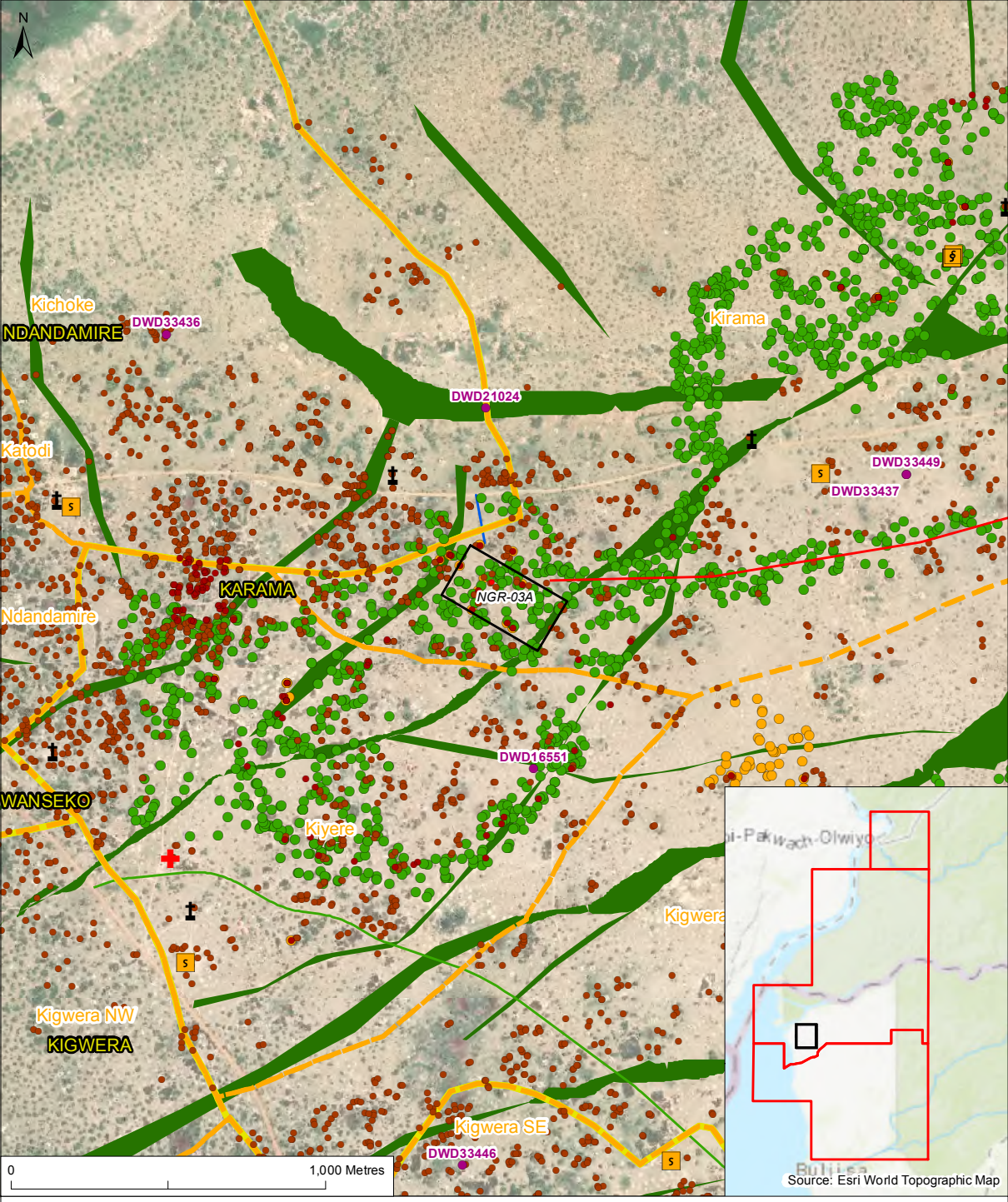
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NGR-03A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

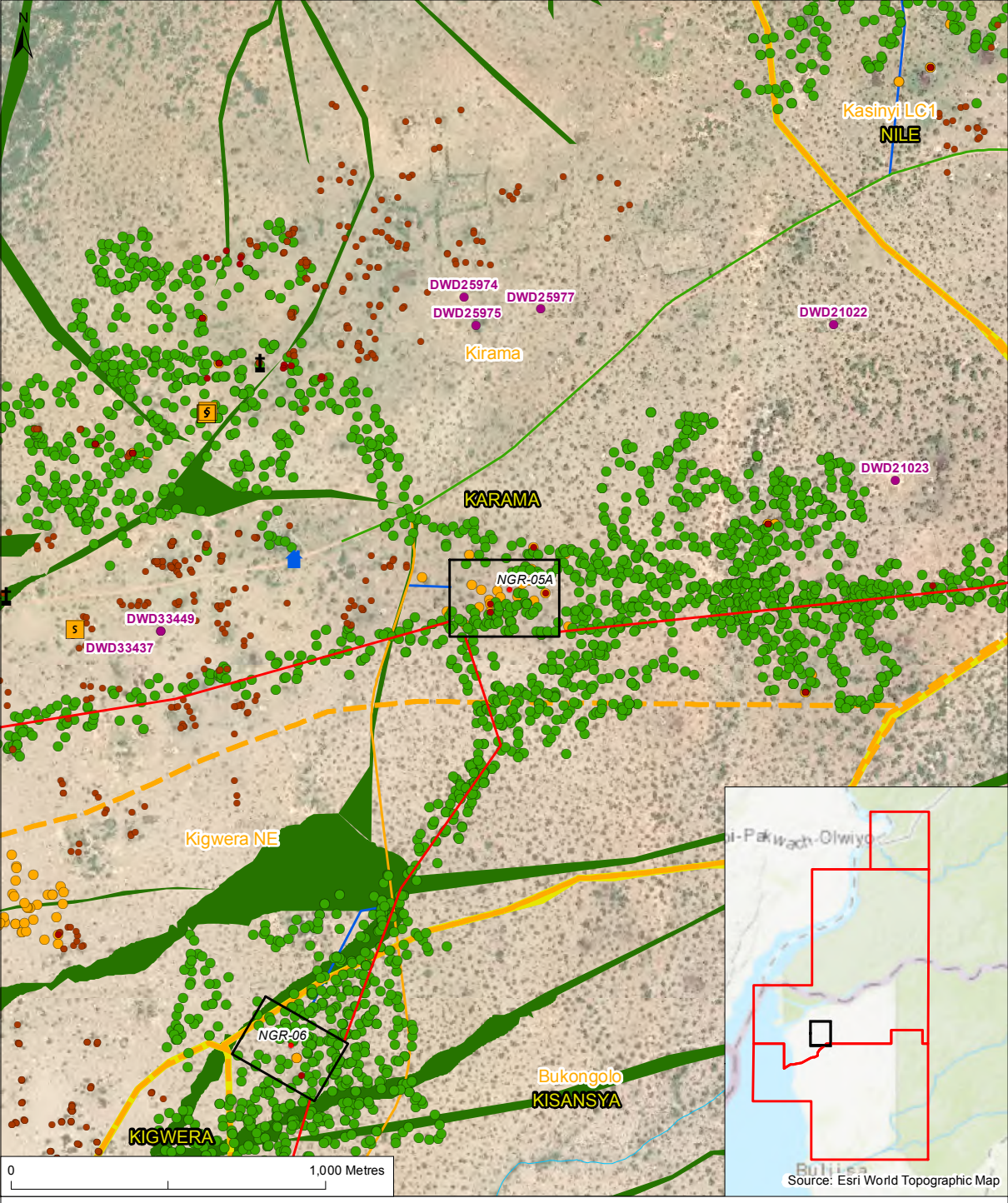
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NGR-05A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

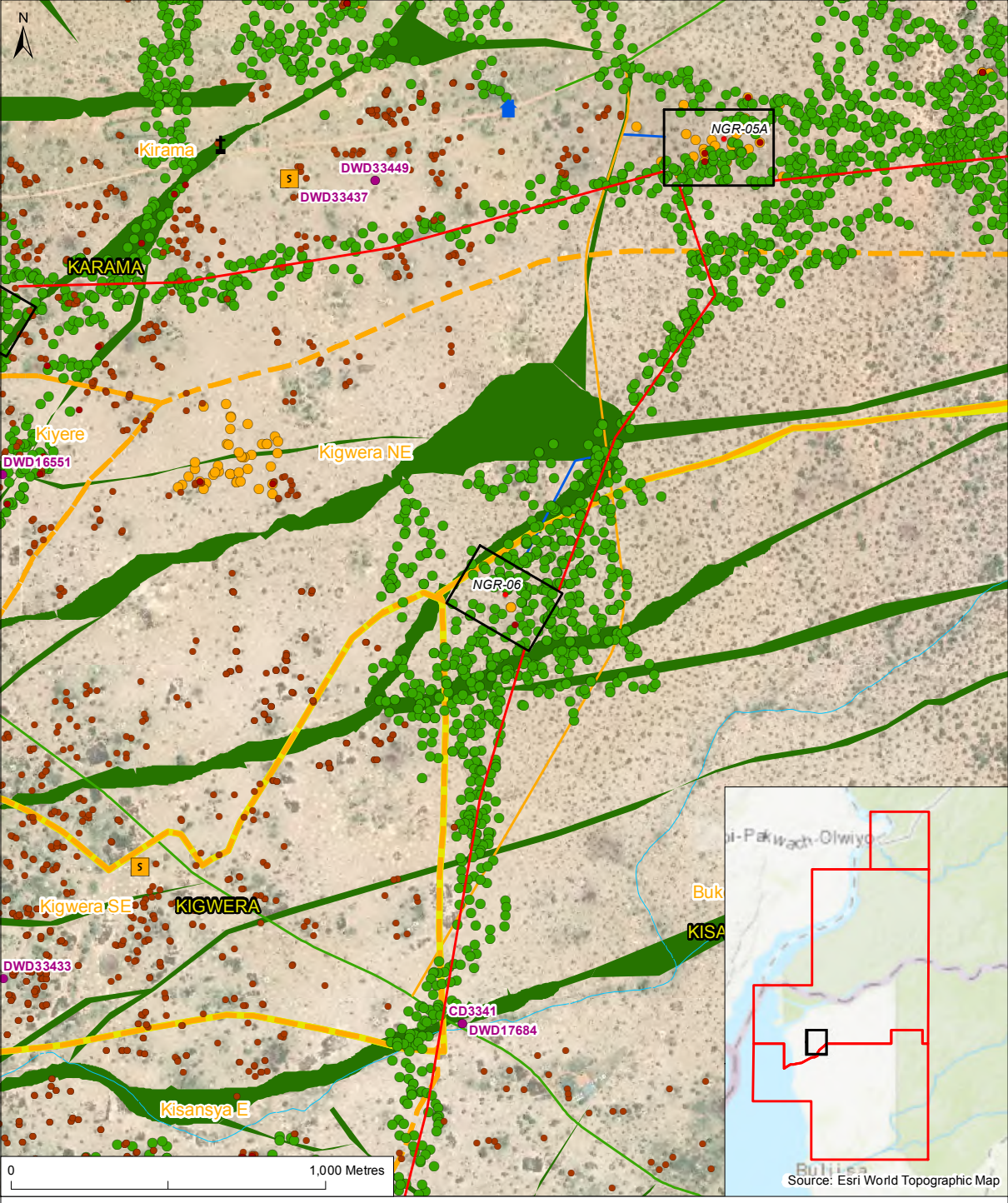
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NGR-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

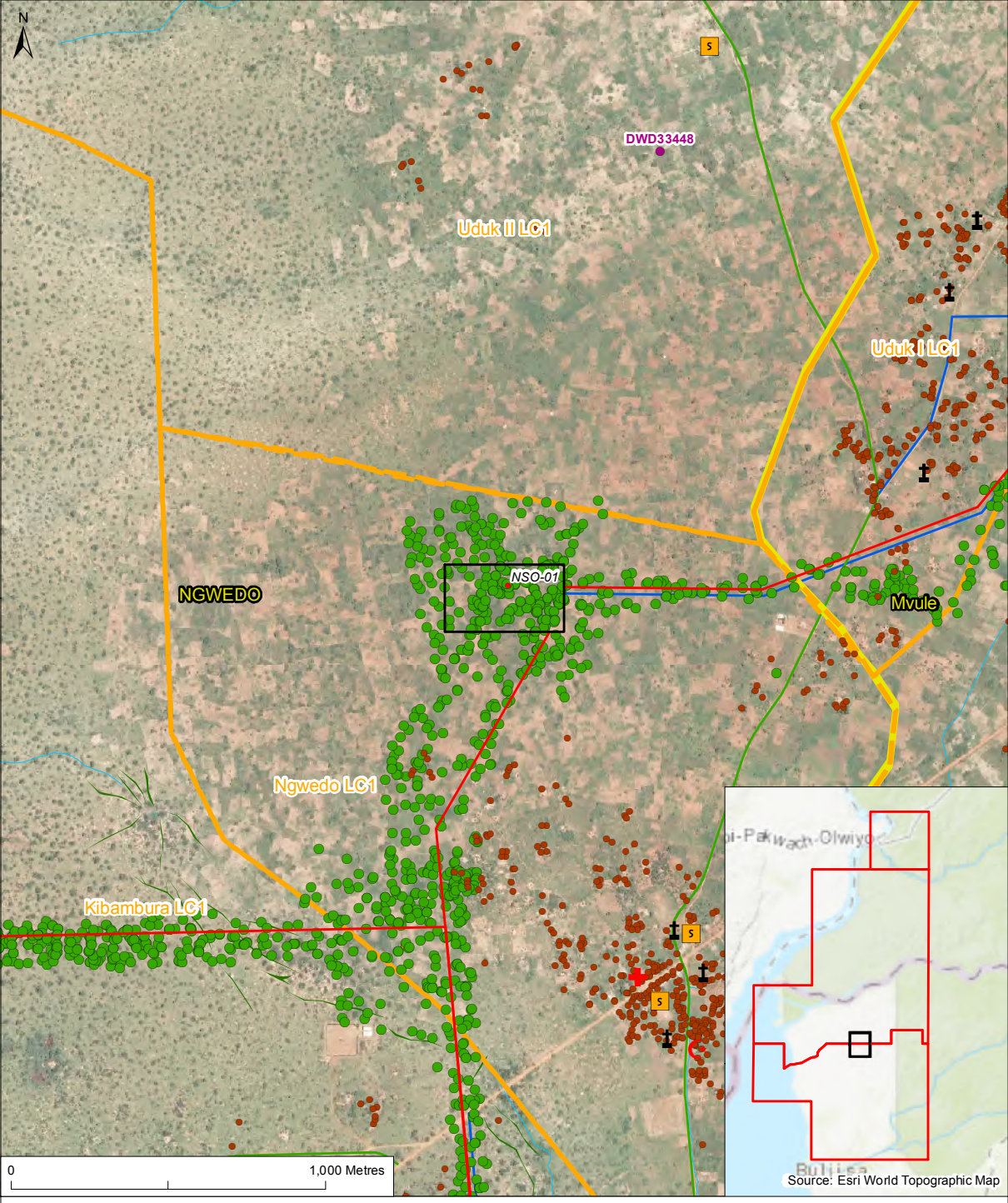
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NSO-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

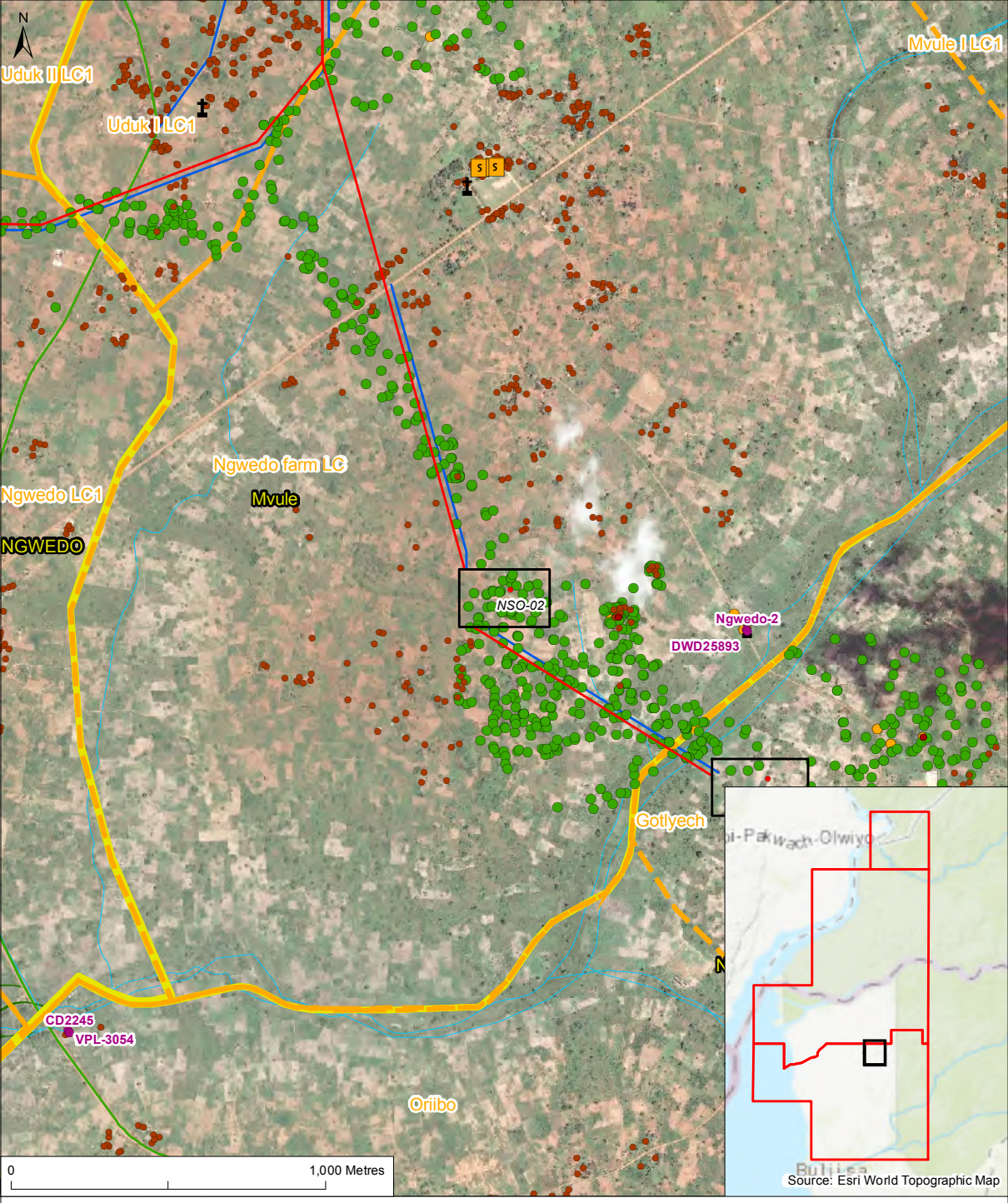
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NSO-02

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

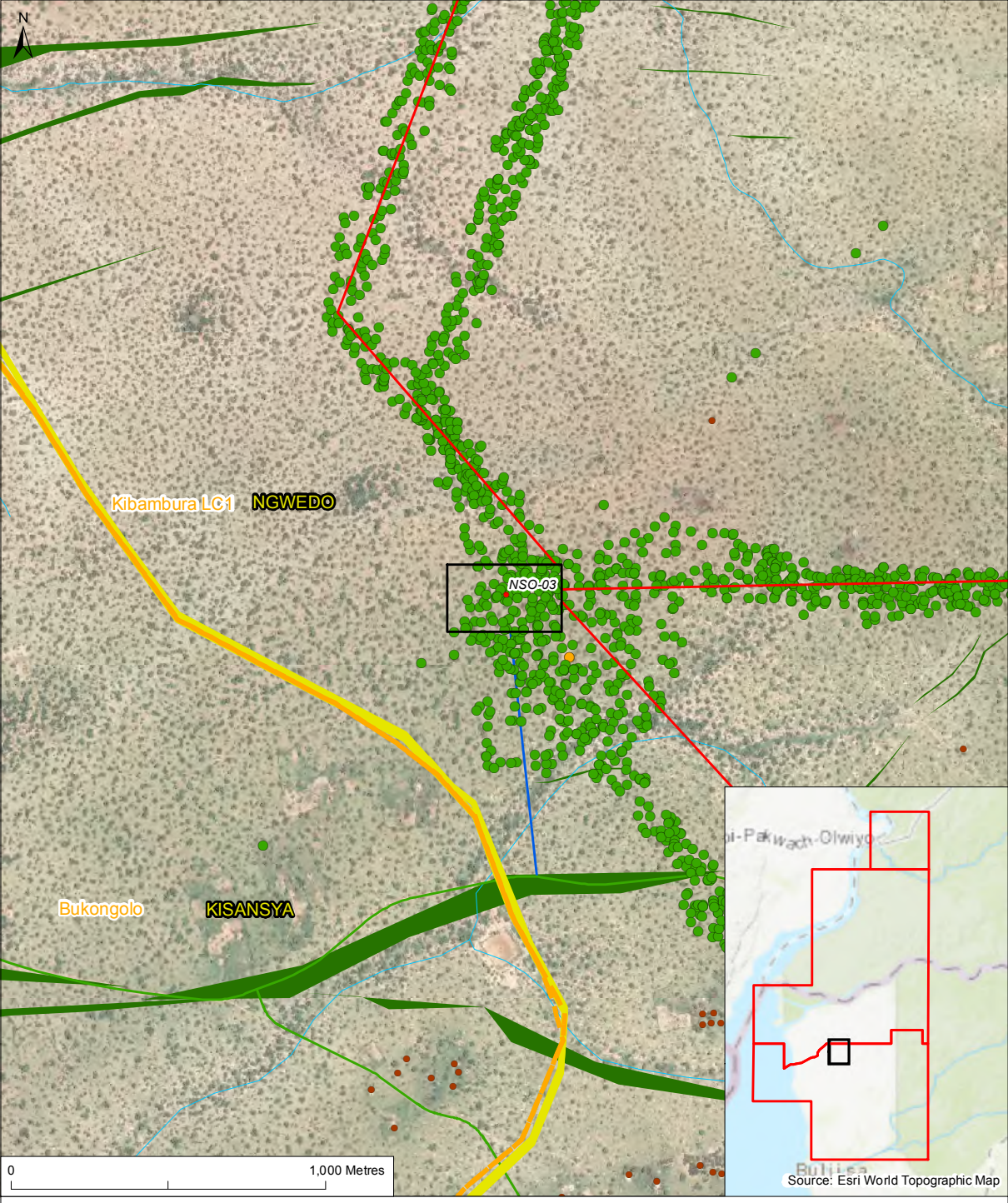
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NSO-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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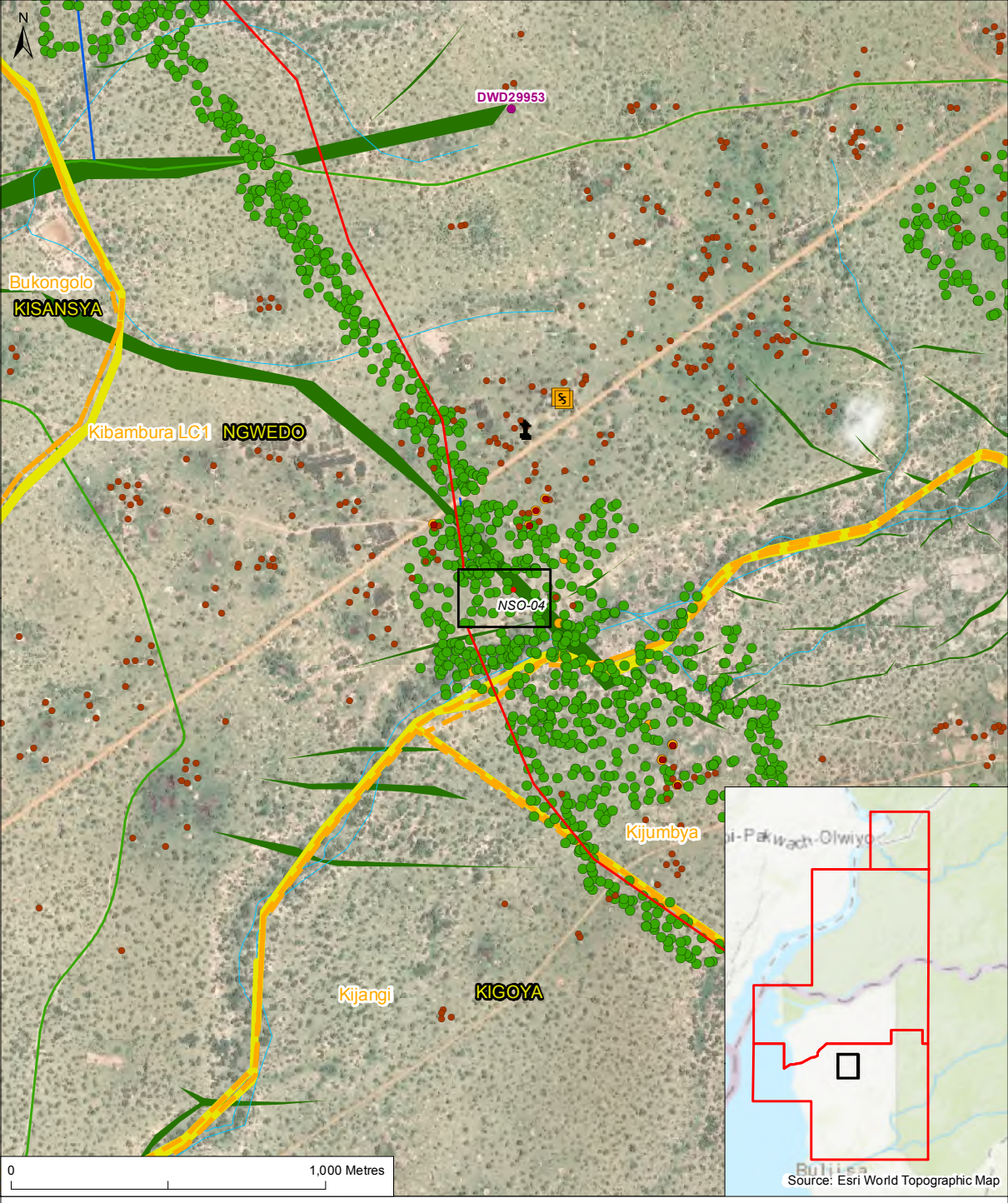

FACT SHEET - WELLPAD NSO-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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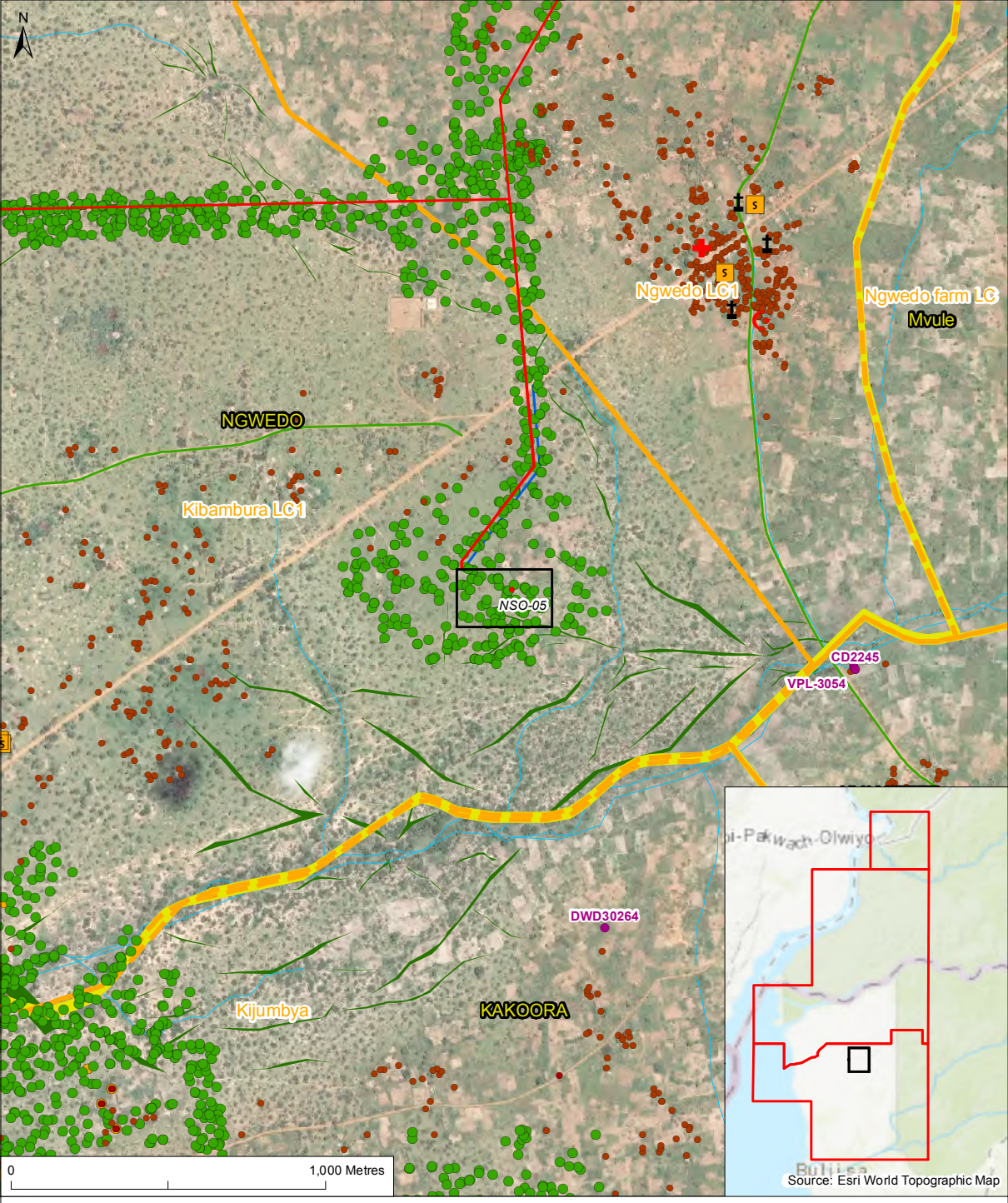


FACT SHEET - WELLPAD NSO-05

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

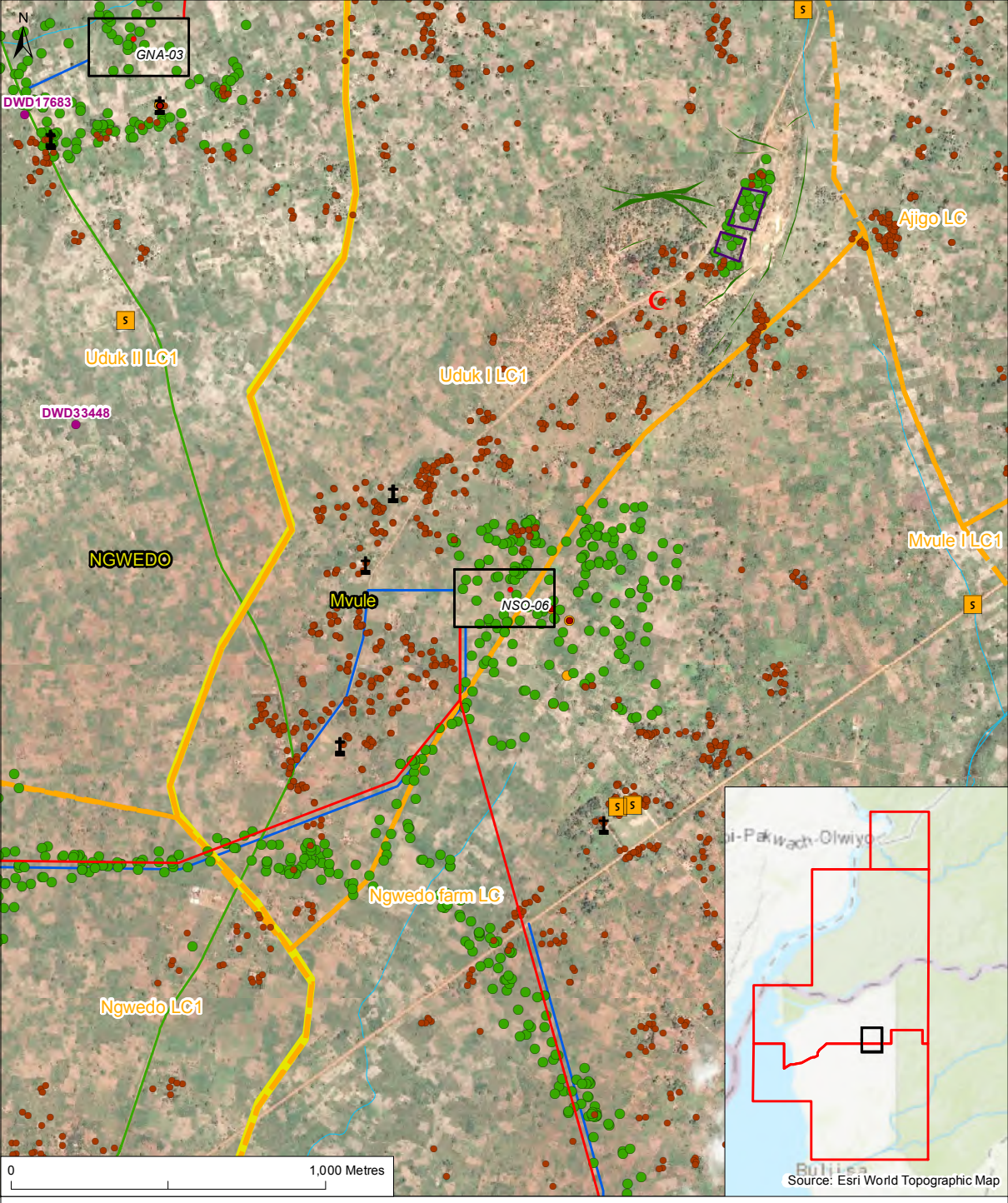
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WELLPAD NSO-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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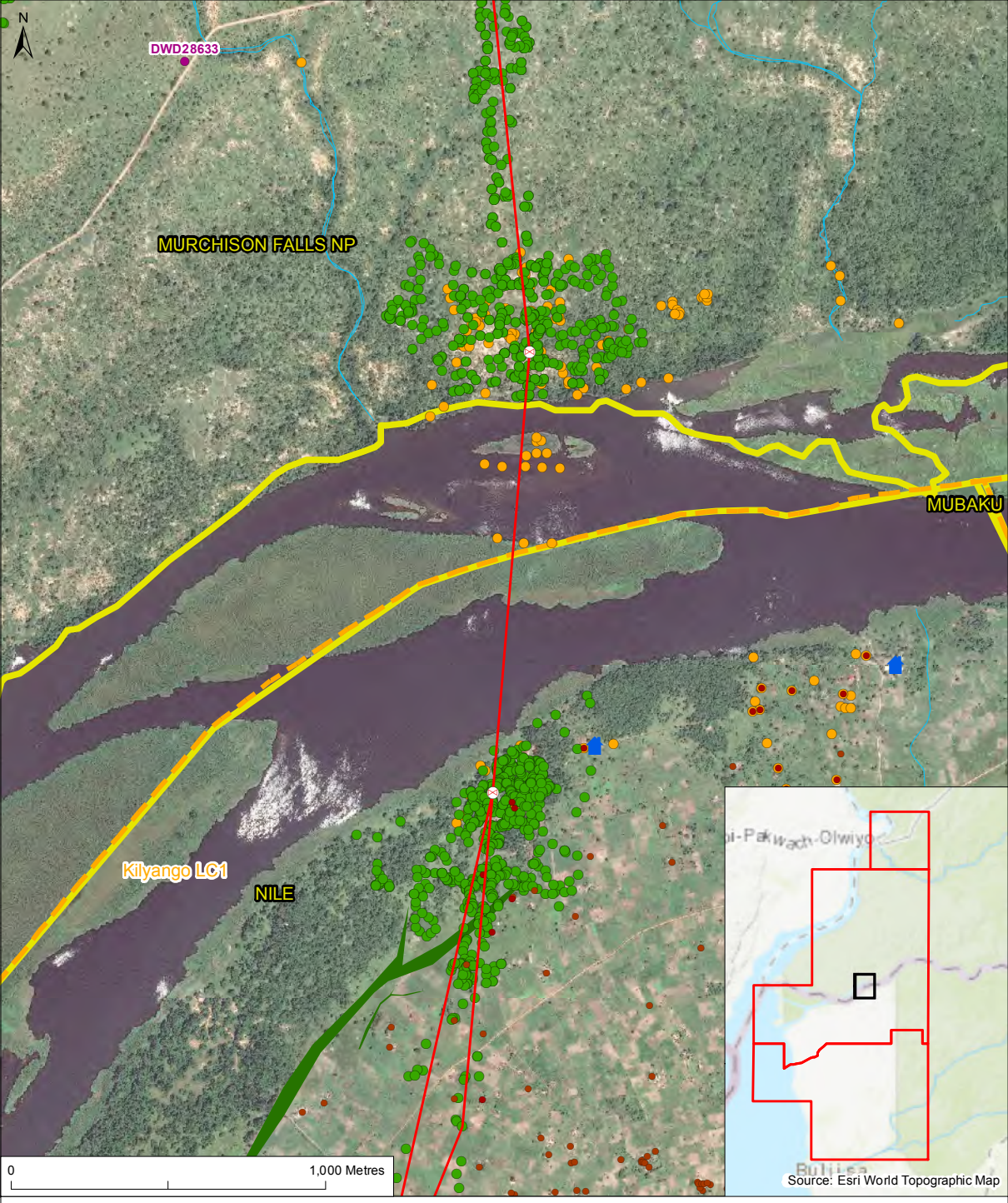

FACT SHEET - VICTORIA NILE PIPELINE HDD CROSSING - OPTION 1

- Victoria Nile Pipeline HDD Crossing - Option 1
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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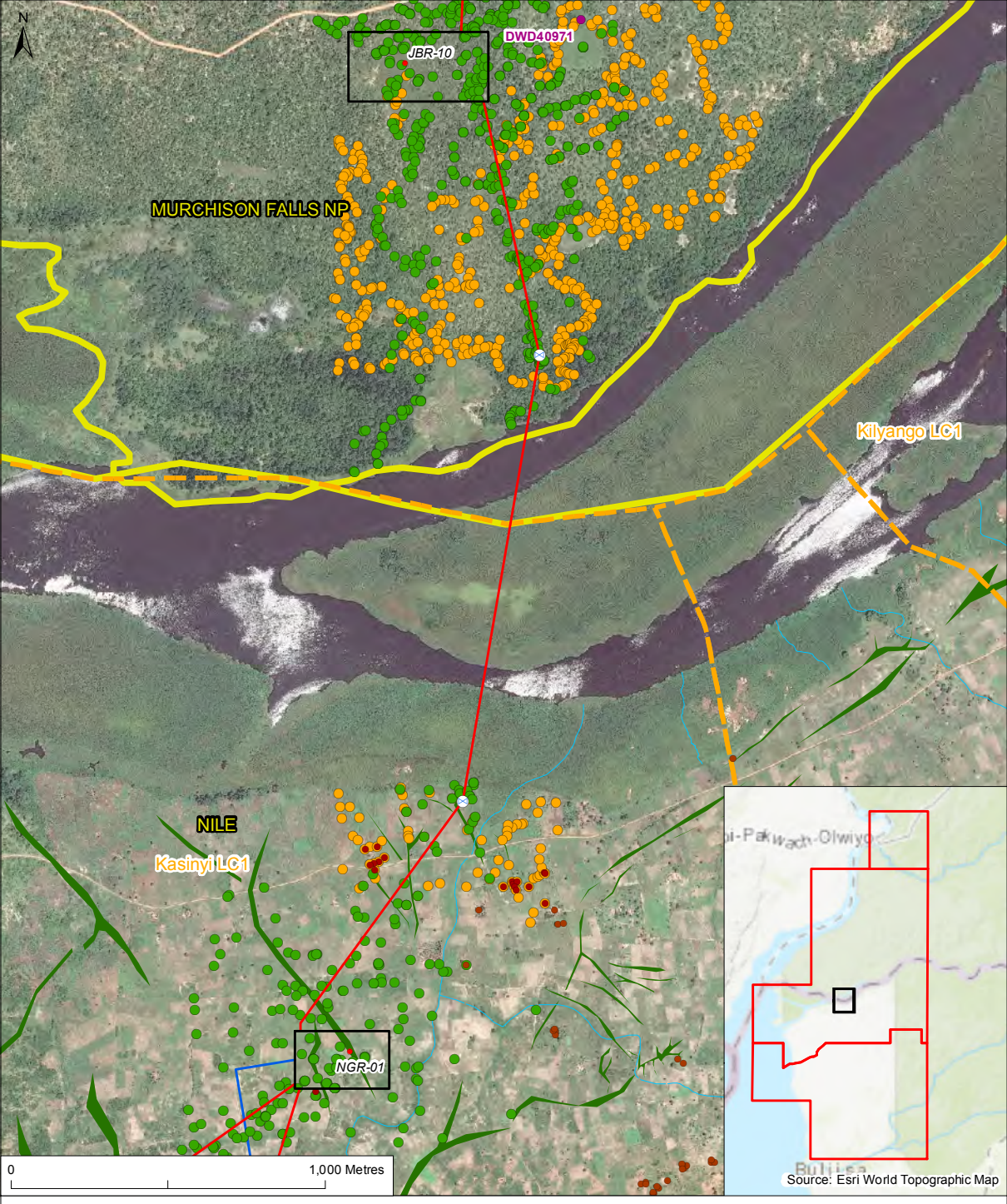


FACT SHEET - VICTORIA NILE PIPELINE HDD CROSSING - OPTION 2

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 2
- Production and Injection Network
- Parish
- Village

Main Social Receptors

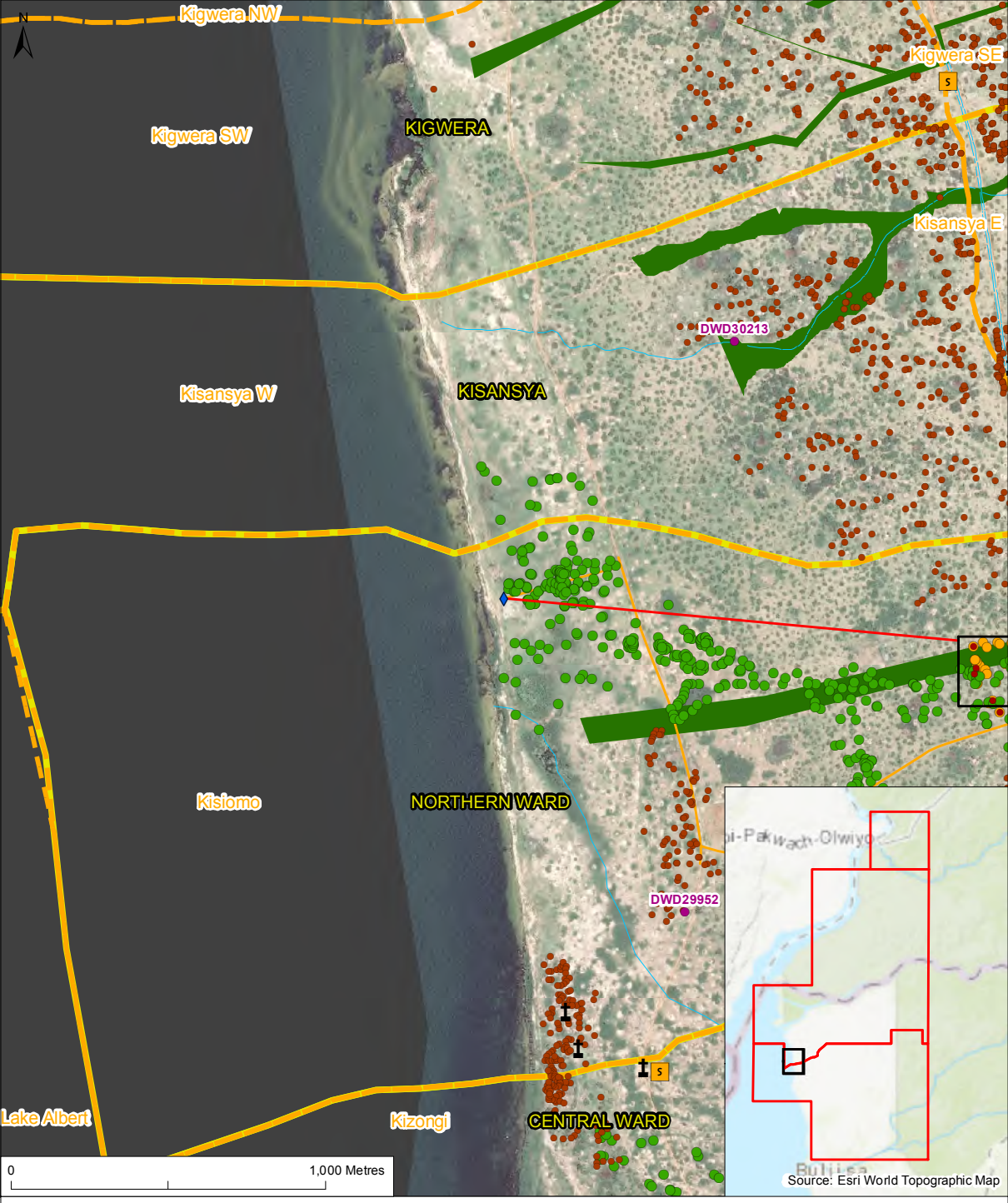
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - WATER ABSTRACTION SYSTEM

- Wellpad Extent - Maximum
- Water Abstraction System
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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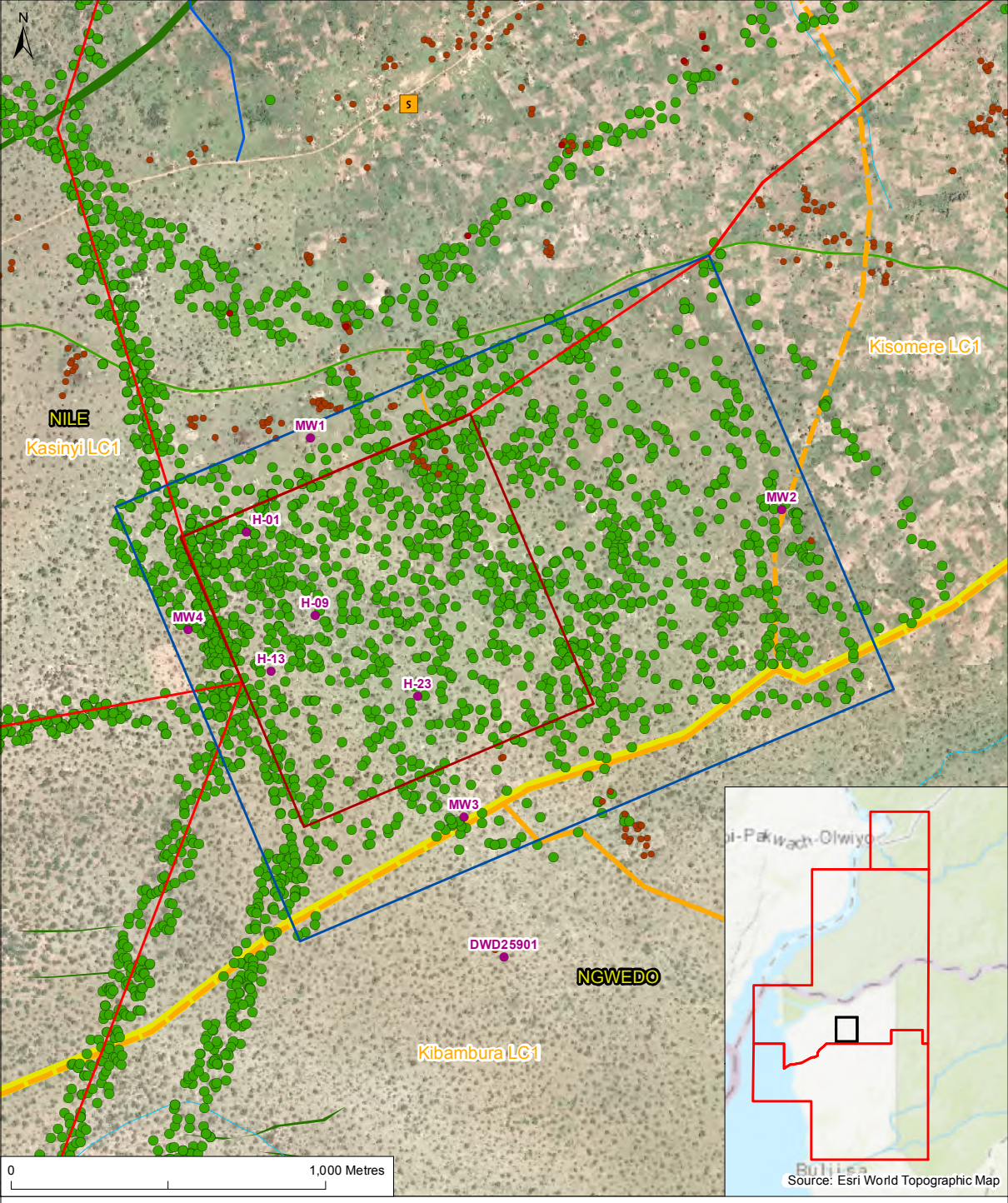

FACT SHEET - INDUSTRIAL AREA

- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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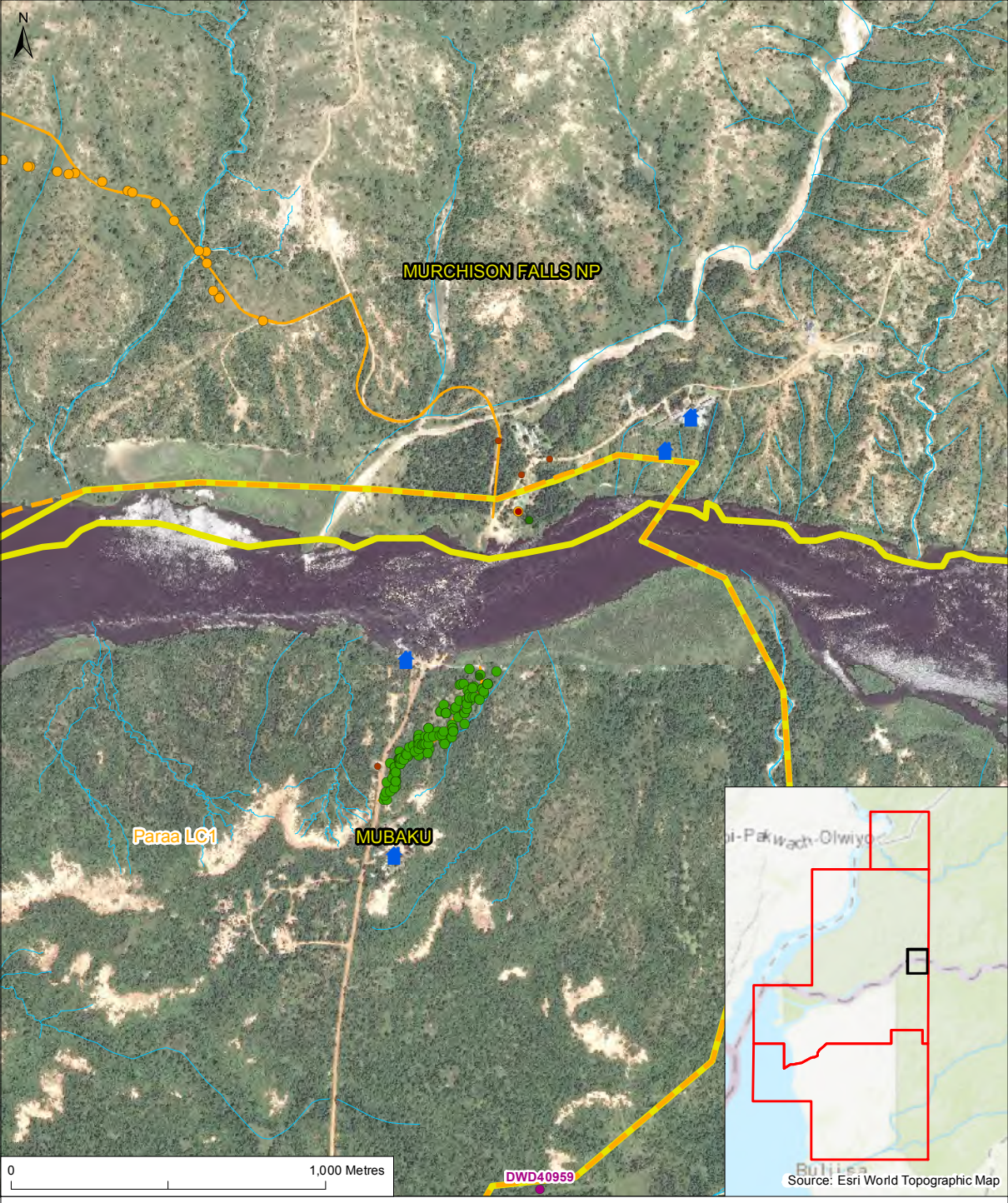

FACT SHEET - VICTORIA NILE FERRY CROSSING

- Victoria Nile Ferry Crossing
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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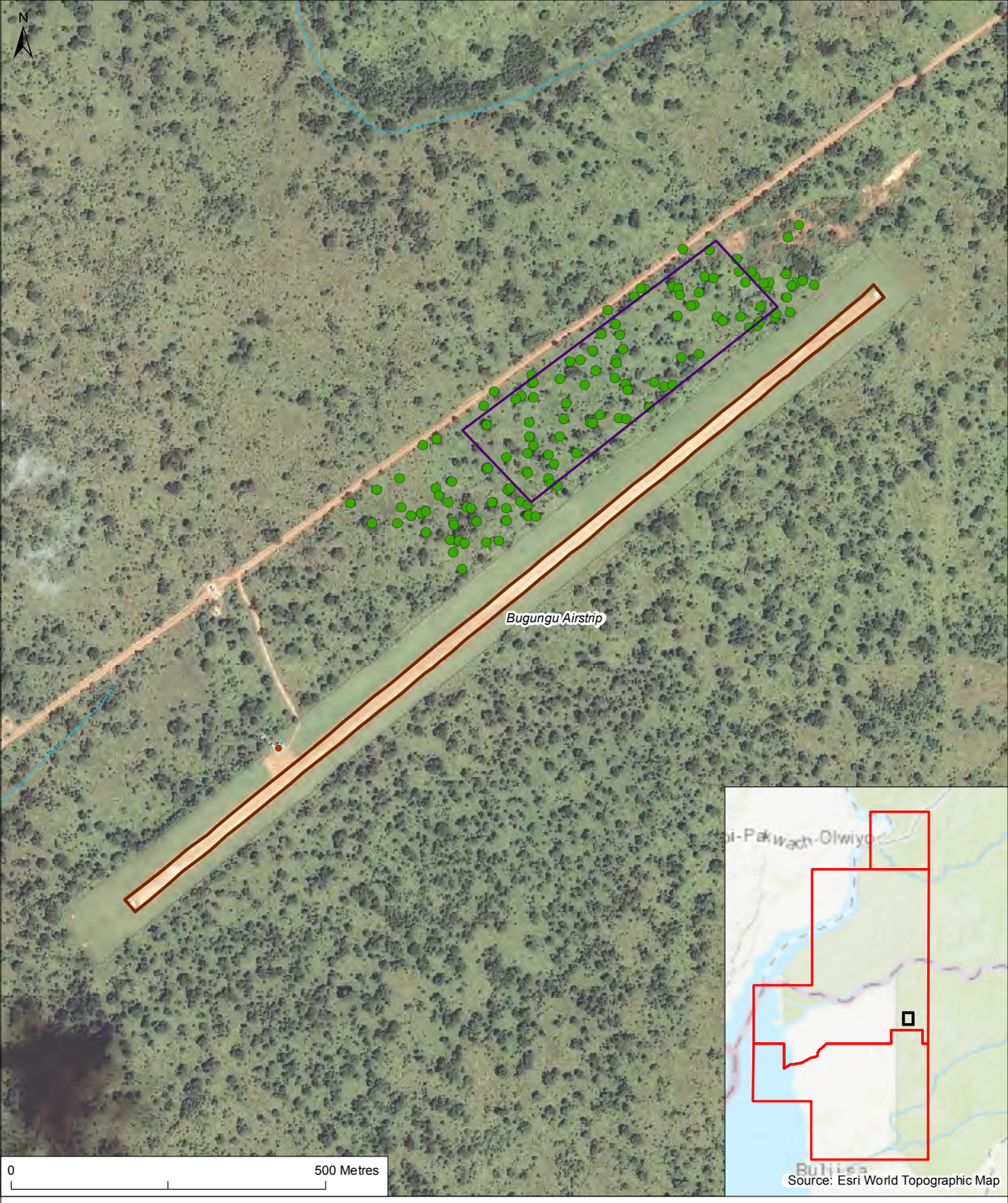

FACT SHEET - BUGUNGU AIRSTRIP

- Bugungu Airstrip
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

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FACT SHEET - MASINDI VEHICLE CHECKPOINT

- Masindi Vehicle Check Point
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

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Annex B

Annex B Satellite Imagery of Borrow Pits

Borrow Pit Overview

B.1 UWA Begeri Park Borrow Pit

B.2 Ajigo Borrow Pit 1

B.3 Uduku Borrow Pit 1

B.4 Kisomere Borrow Pit 1

B.5 Kisomere Borrow Pit 2

B.6 Kisomere Borrow Pit 3

B.7 Kisomere Borrow Pit 4

B.8 Kisomere Borrow Pit 5

B.9 Kisomere Borrow Pit 6

B.10 Kisomere Community

B.11 UWA Park Borrow Pit (Alternative)

B.12 Kilyango Borrow Pit

B.13 Avogera Borrow Pit

B.14 Got Apwoyo Borrow Pit 1

B.15 Got Apwoyo Borrow Pit 2

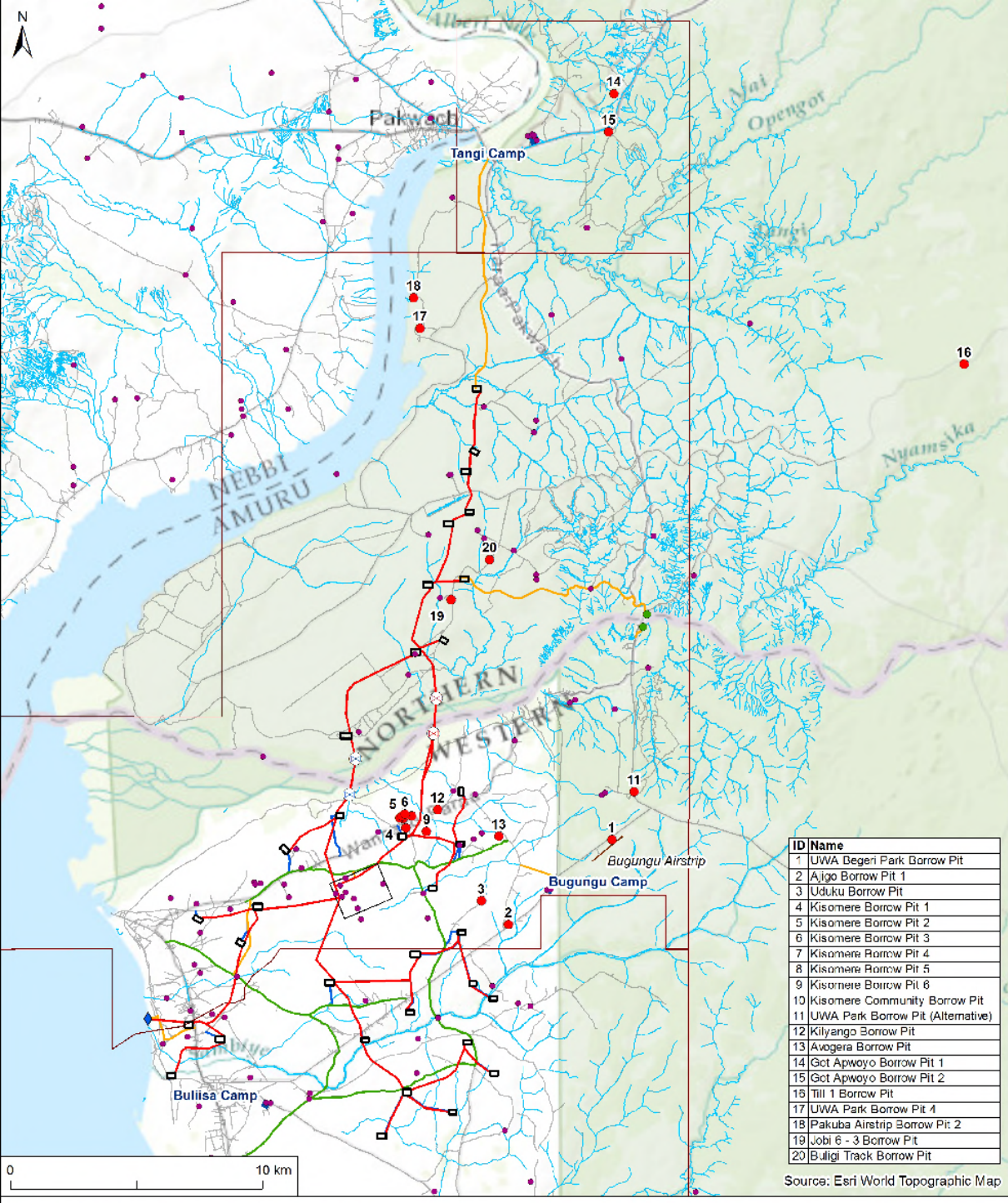
B.16 Til 1 Borrow Pit

B.17 UWA Park Borrow Pit 3 and 4

B.18 Pakuba Airstrip Borrow Pit 2

B.19 Jobi 6-3 Borrow Pit

B.20 Buligi Track Borrow Pit



ID	Name
1	UWA Begeri Park Borrow Pit
2	Ajigo Borrow Pit 1
3	Uduku Borrow Pit
4	Kisomere Borrow Pit 1
5	Kisomere Borrow Pit 2
6	Kisomere Borrow Pit 3
7	Kisomere Borrow Pit 4
8	Kisomere Borrow Pit 5
9	Kisomere Borrow Pit 6
10	Kisomere Community Borrow Pit
11	UWA Park Borrow Pit (Alternative)
12	Kilyango Borrow Pit
13	Avogera Borrow Pit
14	Got Apwoyo Borrow Pit 1
15	Got Apwoyo Borrow Pit 2
16	Till 1 Borrow Pit
17	UWA Park Borrow Pit 4
18	Pakuba Airstrip Borrow Pit 2
19	Jobi 6 - 3 Borrow Pit
20	Buligi Track Borrow Pit

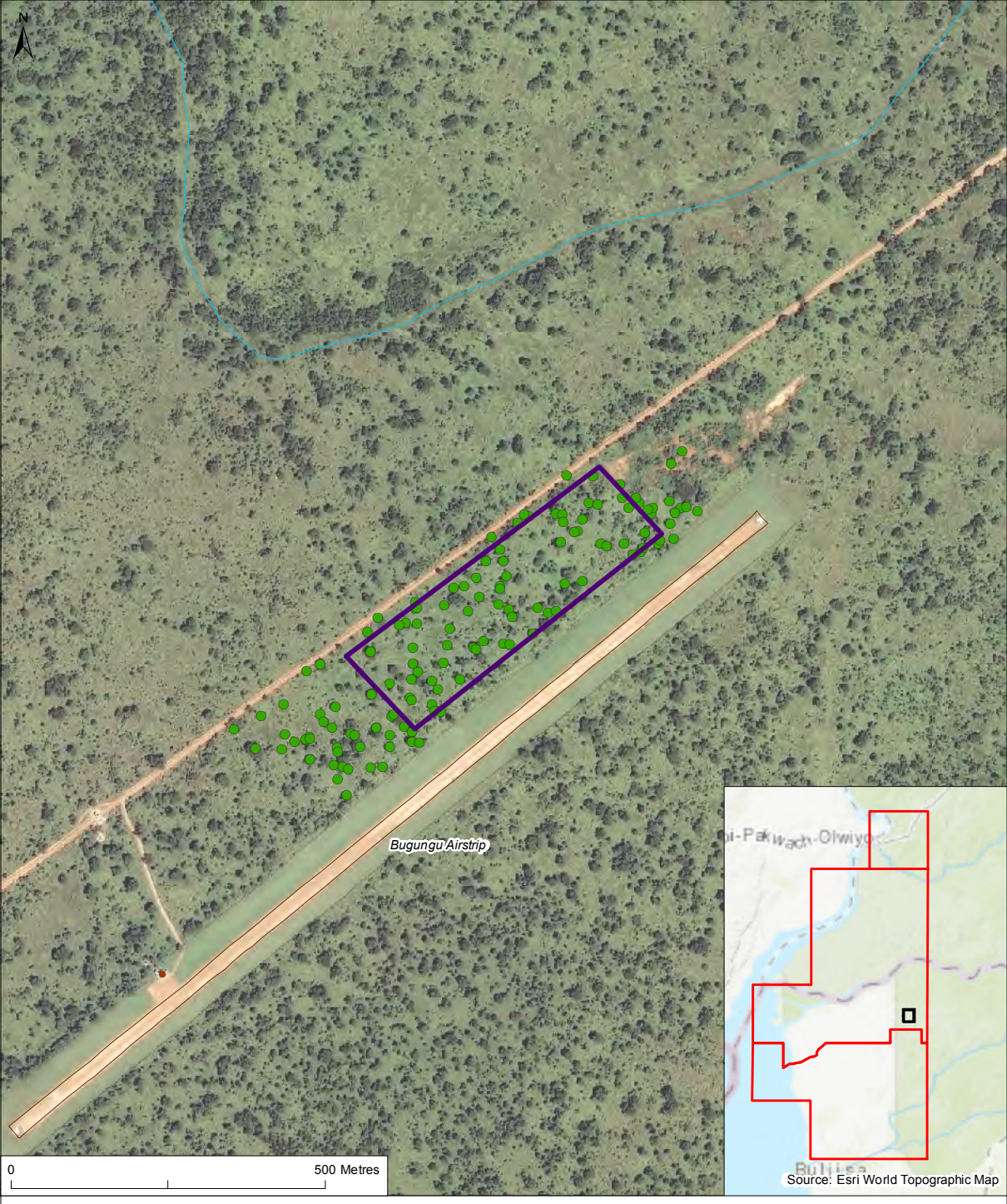
Source: Esri World Topographic Map

FACT SHEET - BORROW PIT OVERVIEW

- Project Area
- Wellpad Extent - Maximum
- Water Abstraction System
- Victoria Nile Pipeline HDD Crossing - Option 1
- Victoria Nile Pipeline HDD Crossing - Option 2
- Victoria Nile Ferry Crossing
- Production and Injection Network
- Industrial Area
- Camp
- Bugungu Airstrip
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse
- Murram Borrow Pit Location
- DWRM Well

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:250,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - UWA BEGERI PARK BORROW PIT

- Murram Borrow Pit Location
- Bugungu
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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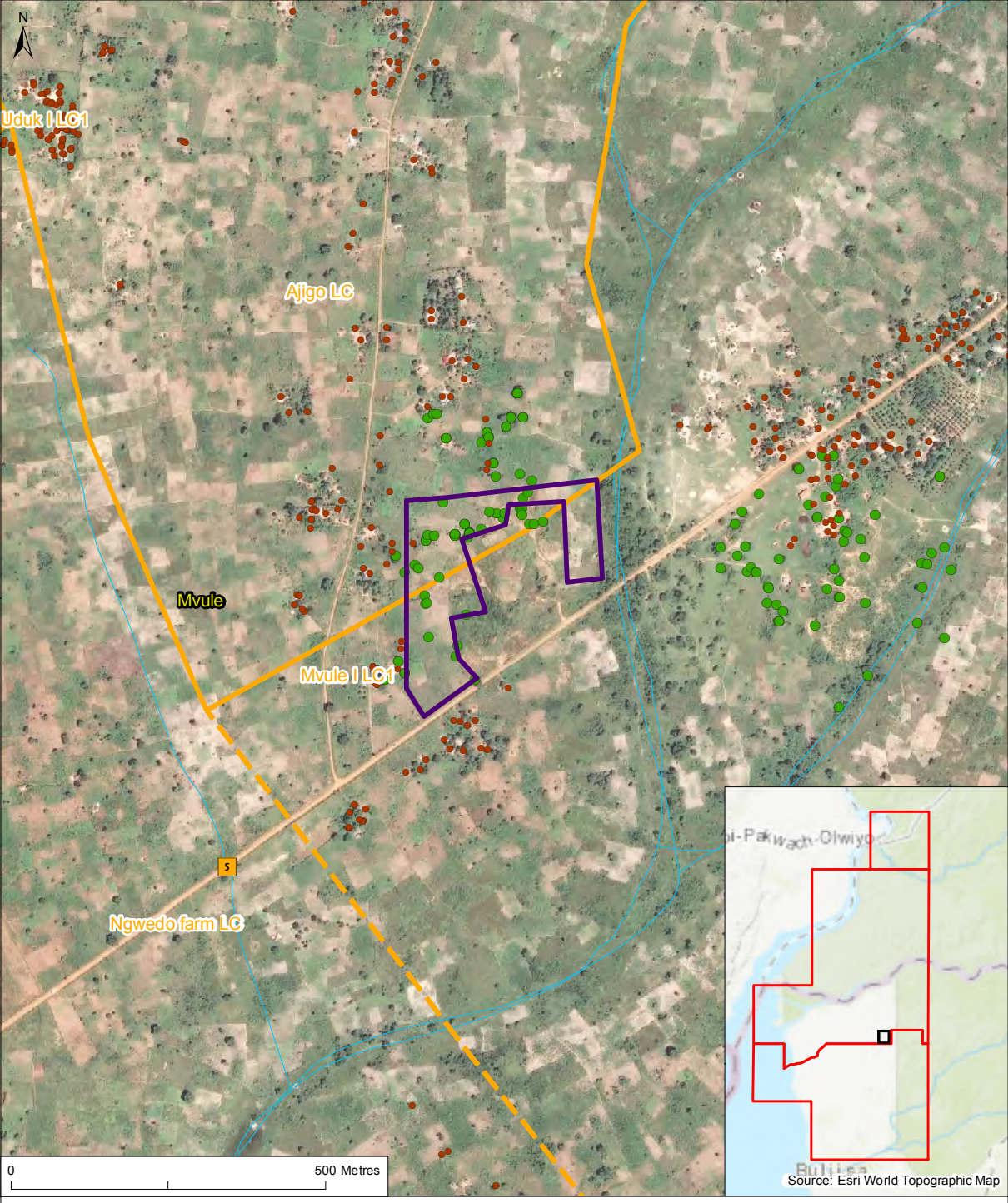

FACT SHEET - AJIGO BORROW PIT 1

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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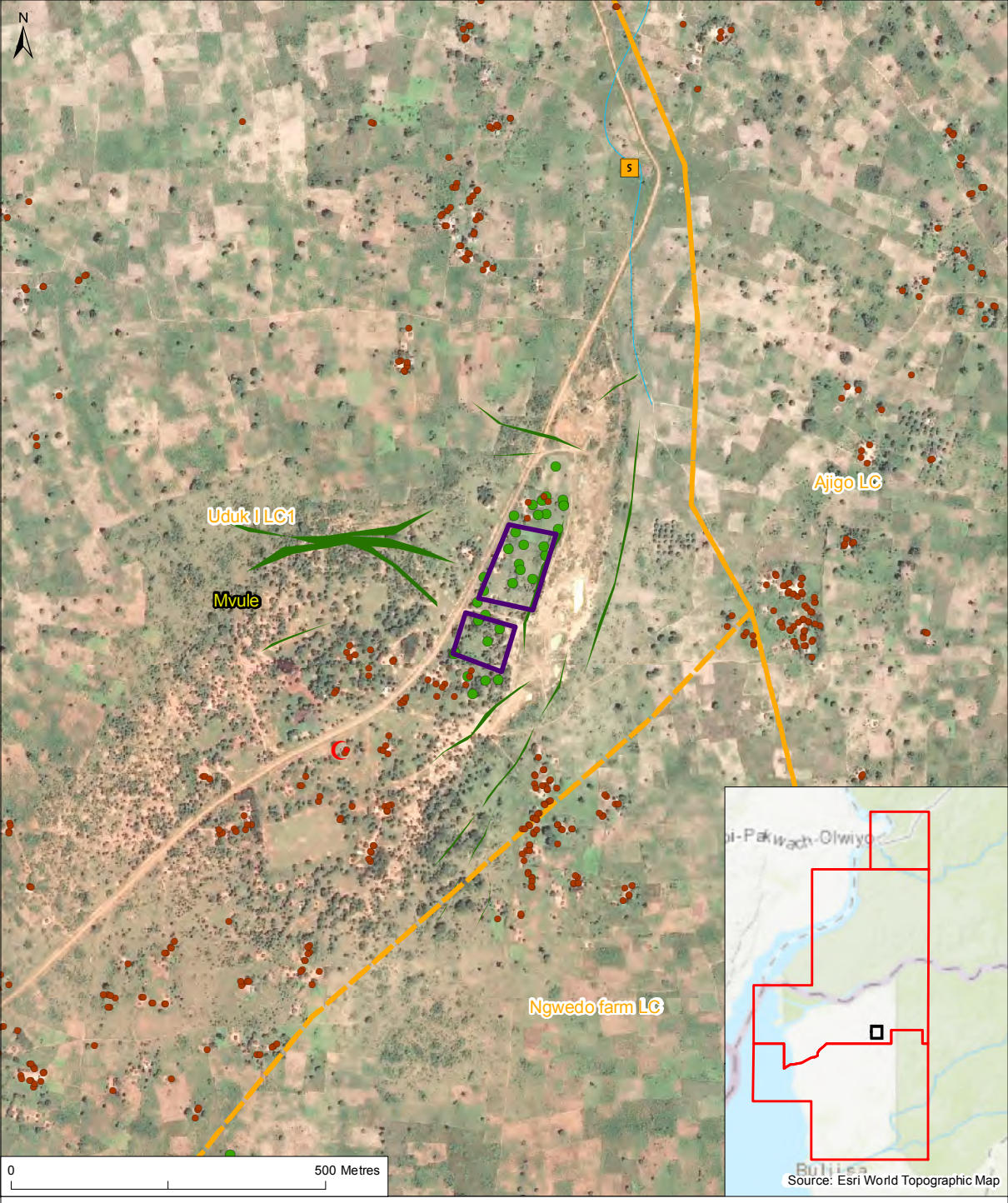

FACT SHEET - UDUKU BORROW PIT

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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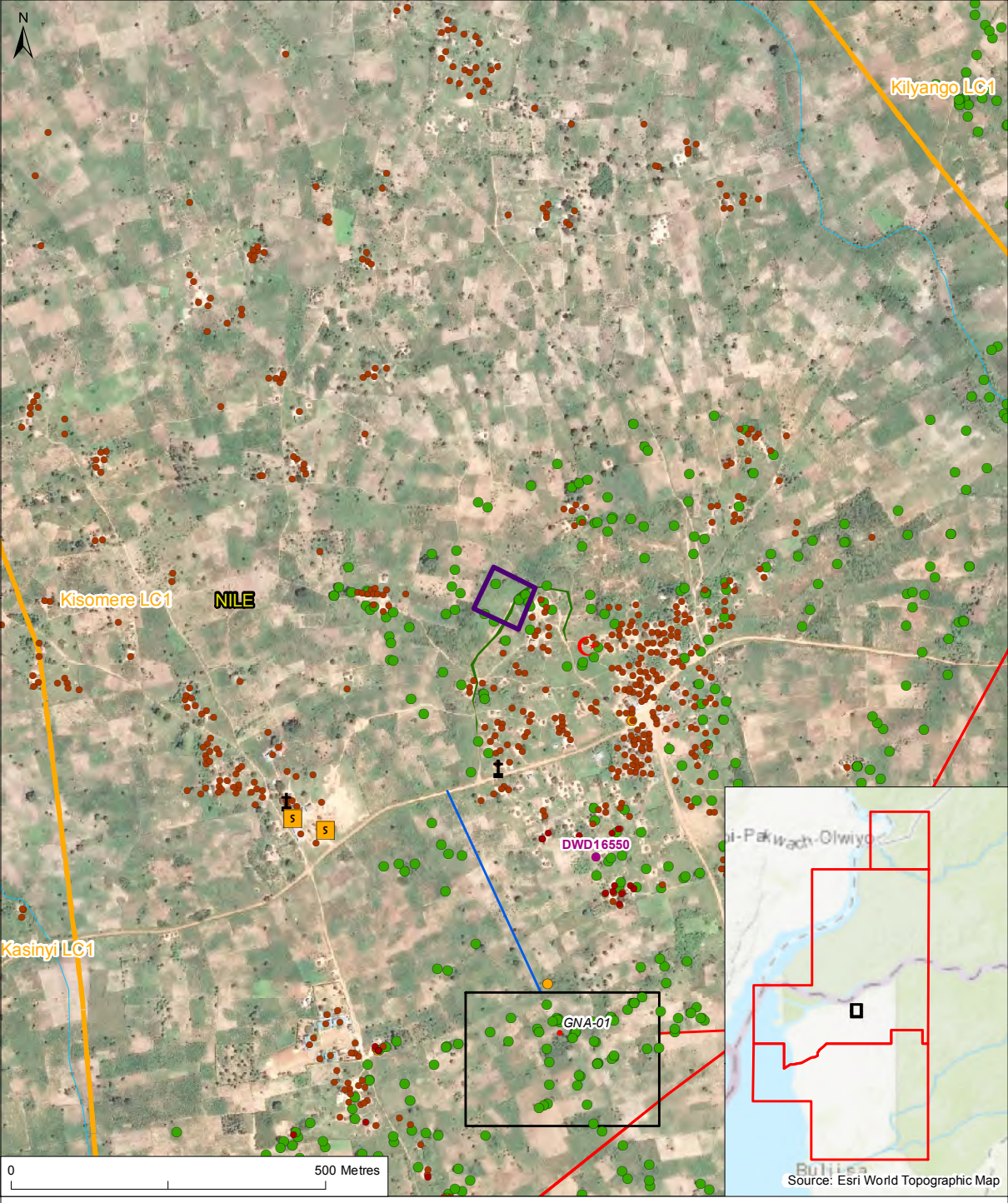

FACT SHEET - KISOMERE BORROW PIT 1

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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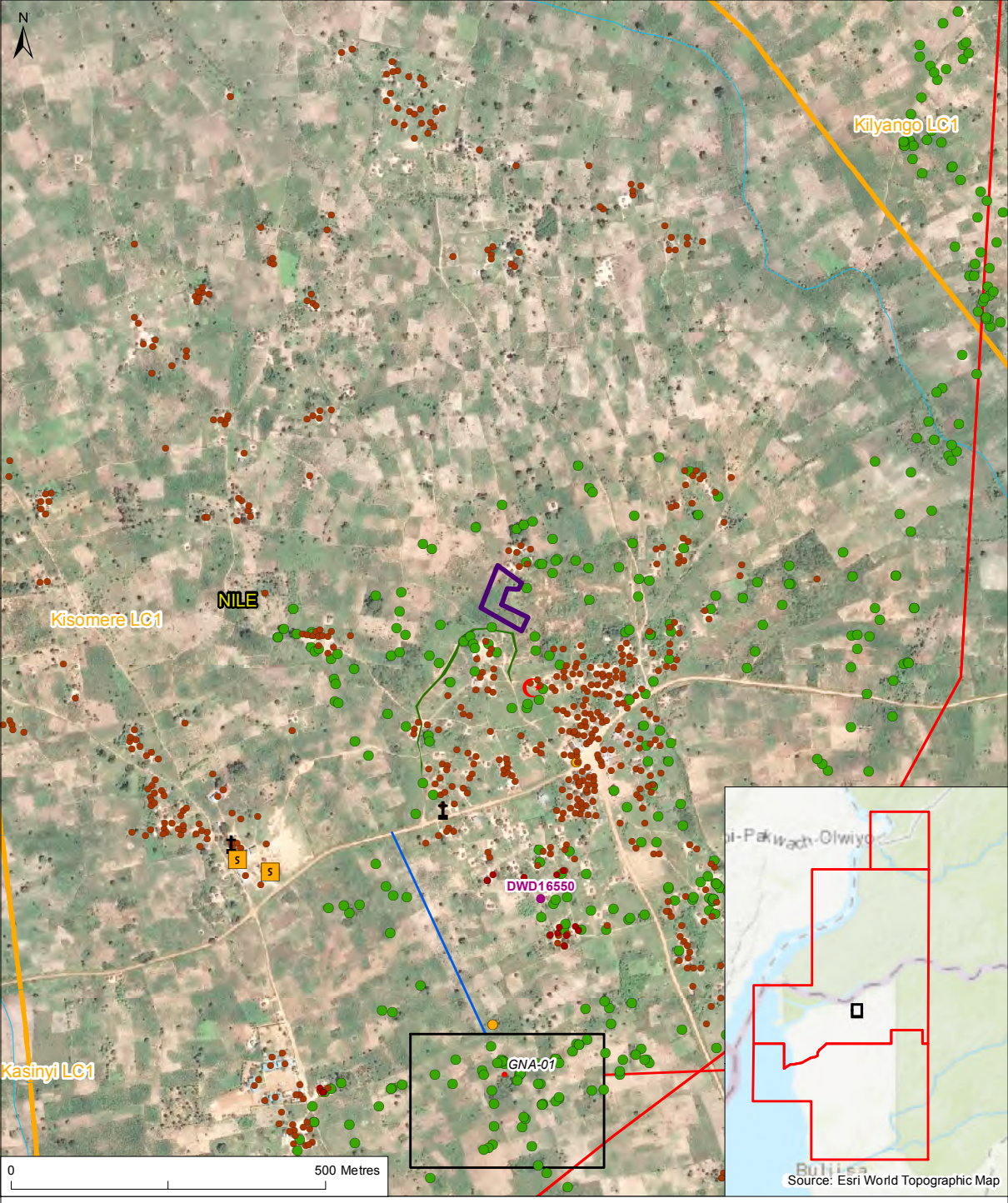

FACT SHEET - KISOMERE BORROW PIT 2

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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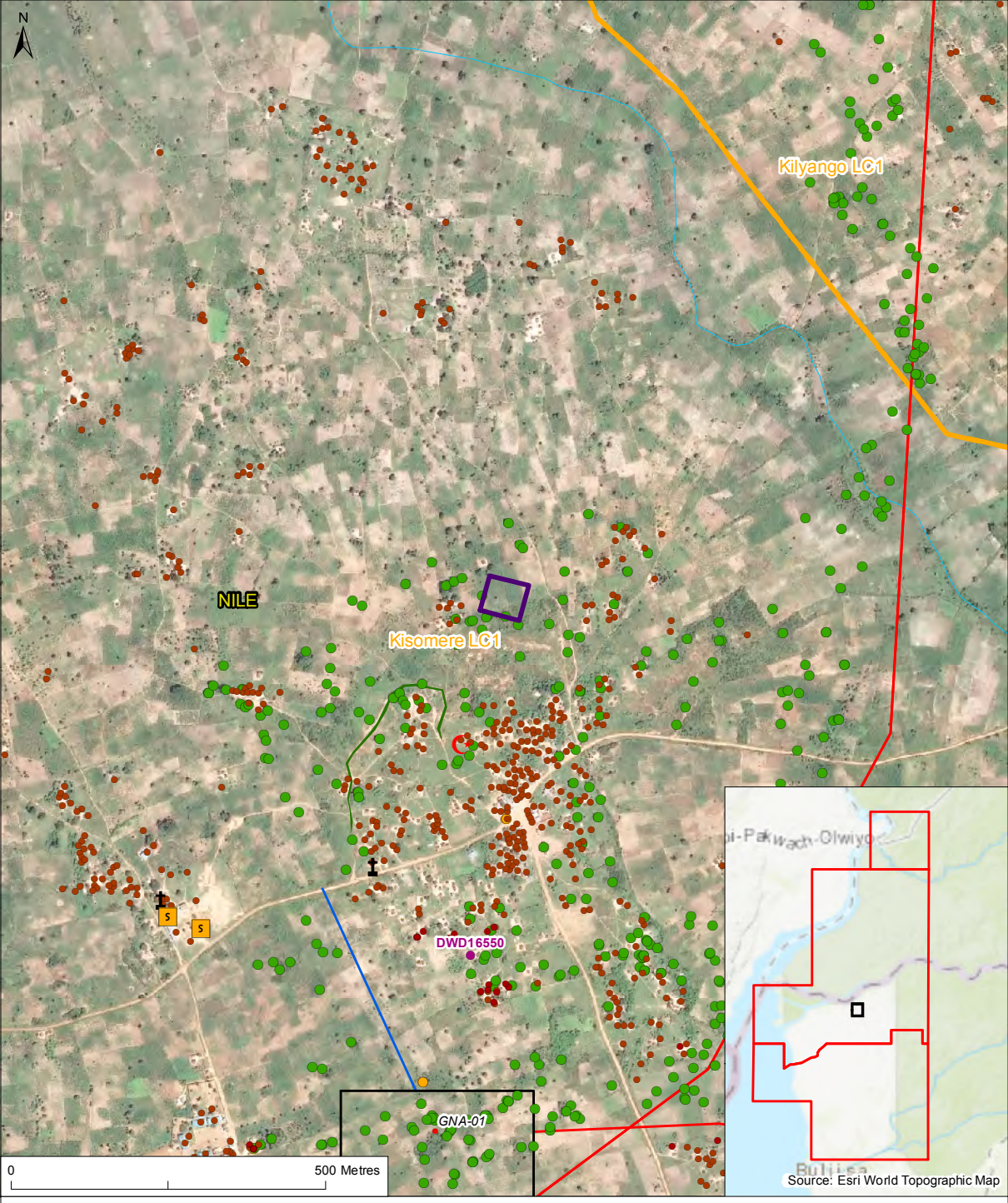


FACT SHEET - KISOMERE BORROW PIT 3

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

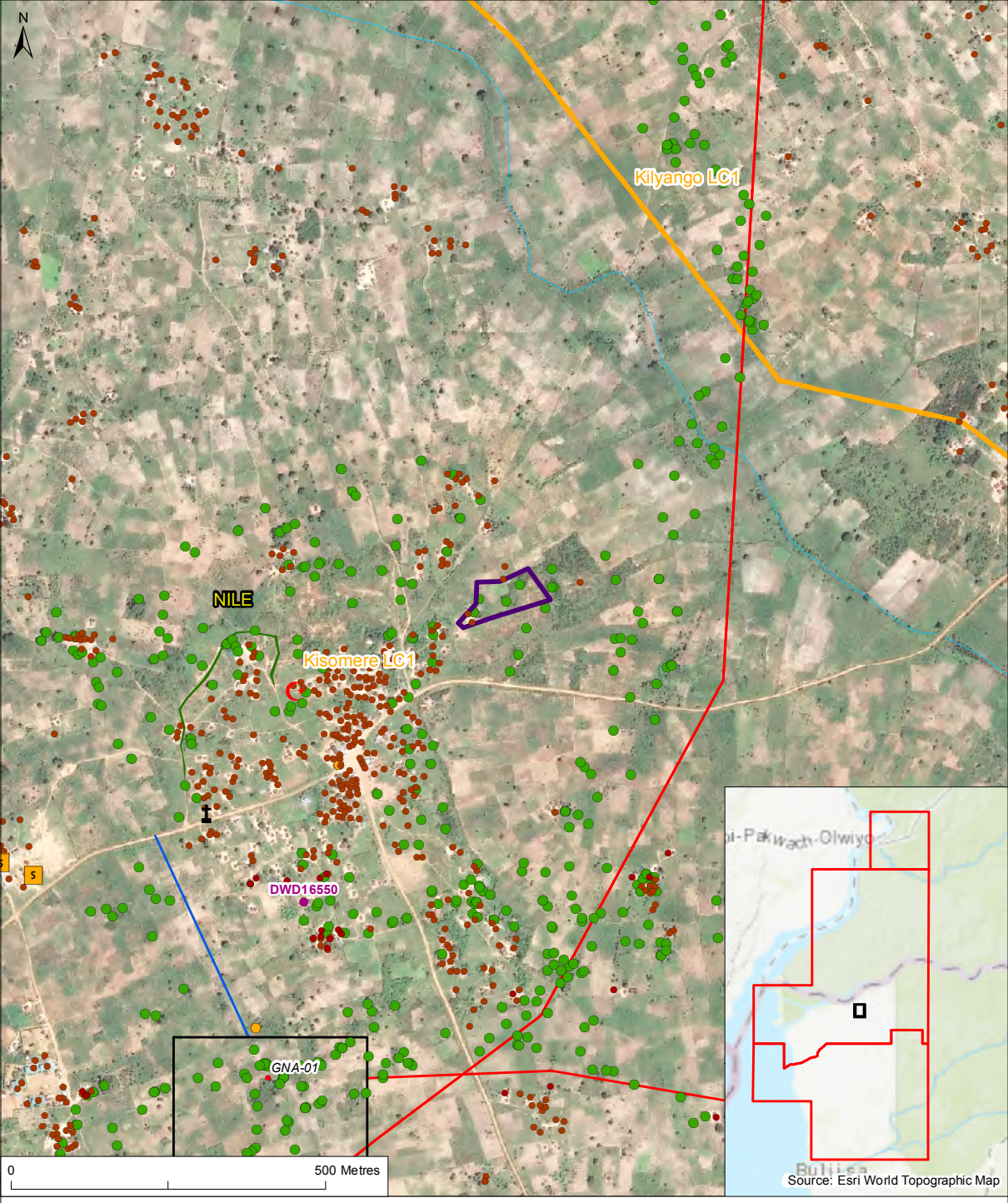
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - KISOMERE BORROW PIT 4

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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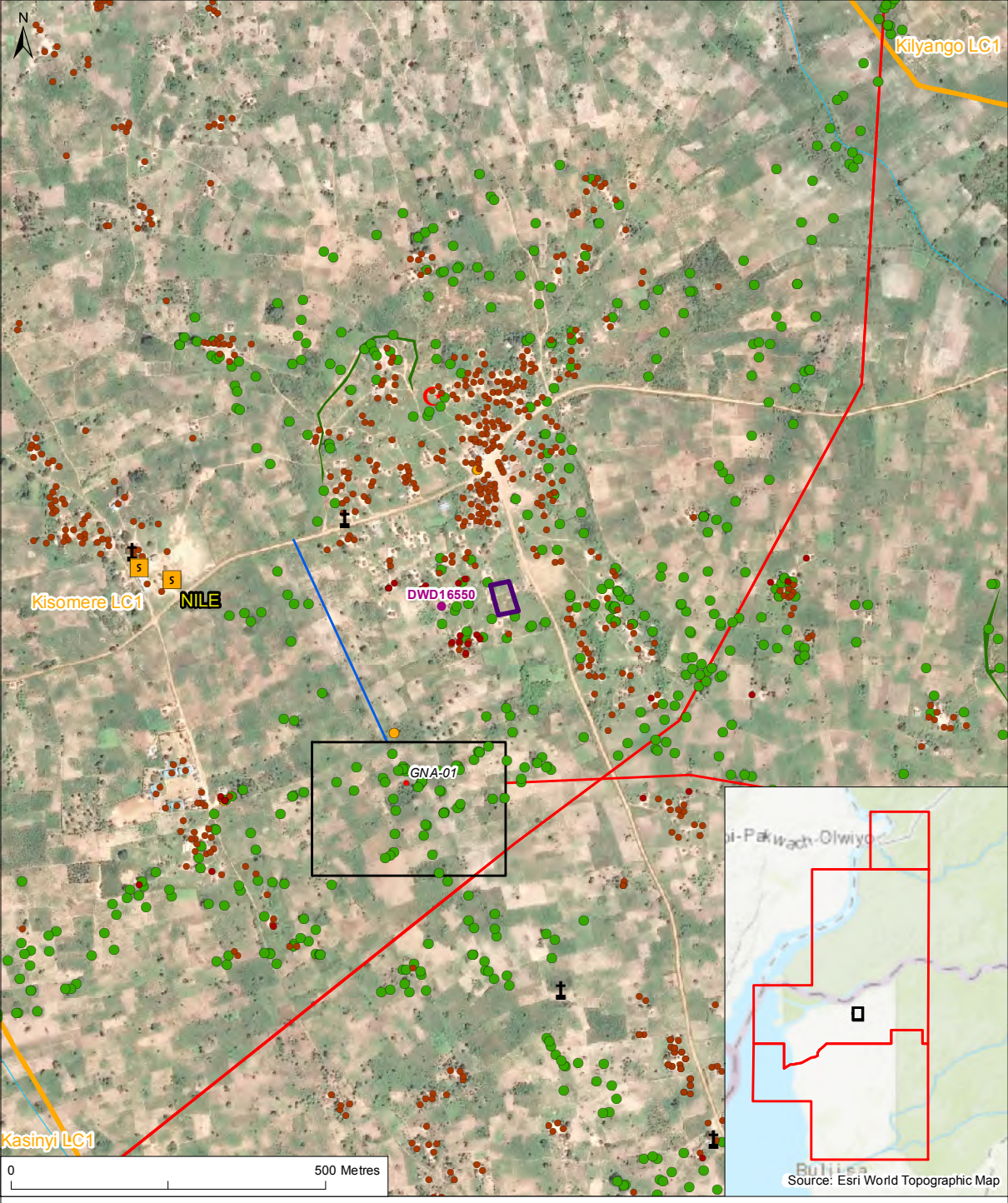


FACT SHEET - KISOMERE BORROW PIT 5

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

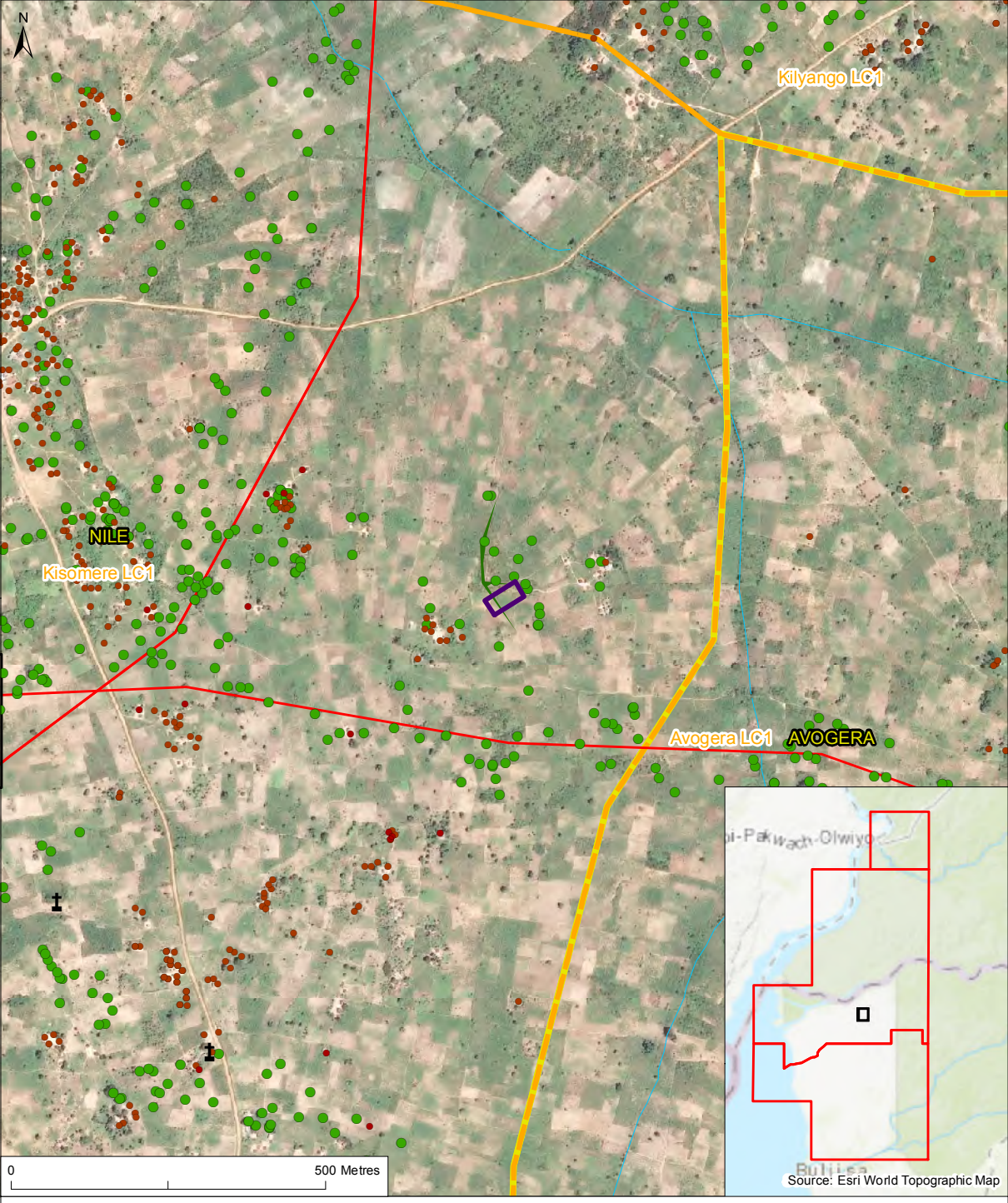
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - KISOMERE BORROW PIT 6

- Murram Borrow Pit Location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

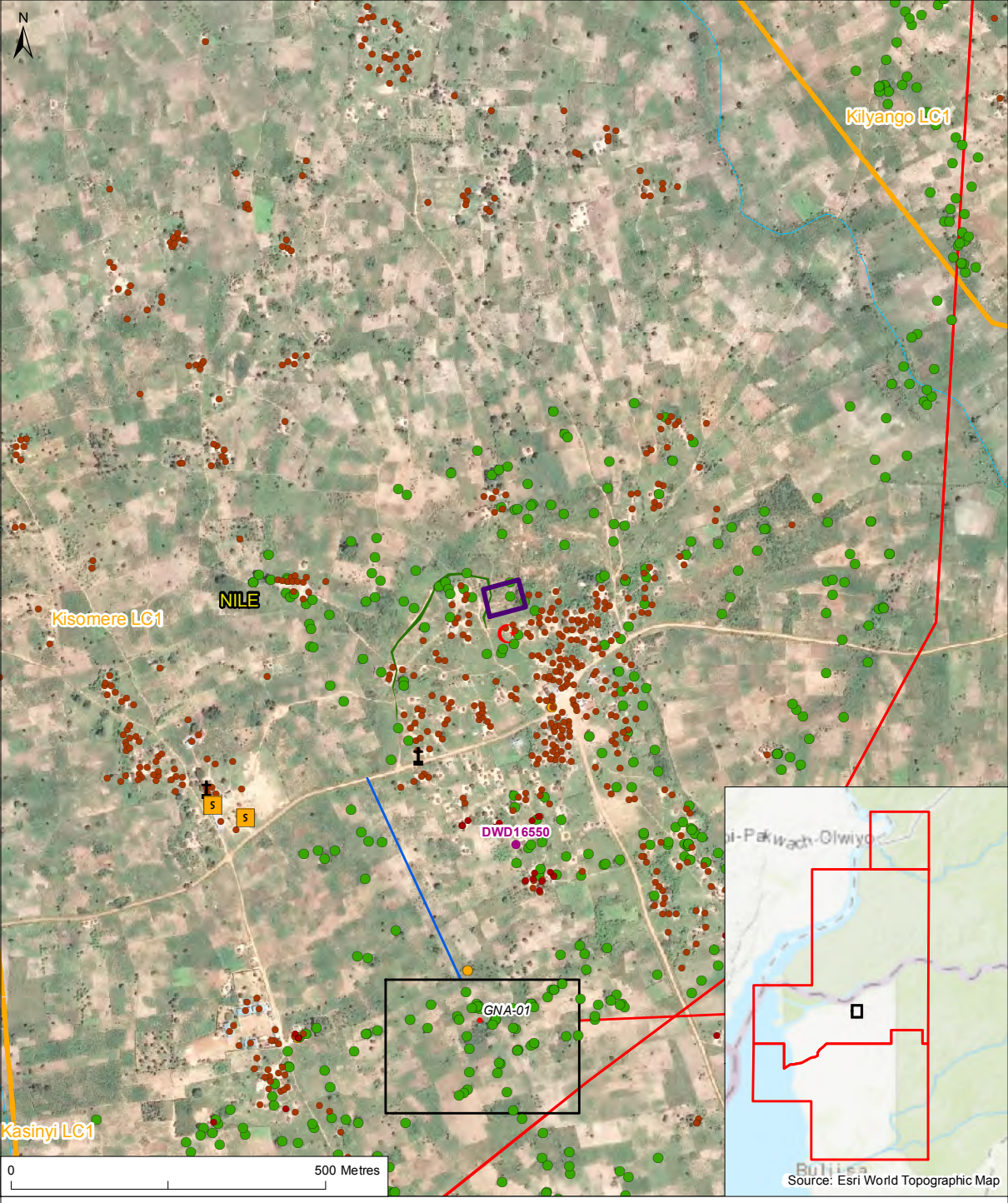
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - KISOMERE COMMUNITY BORROW PIT

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

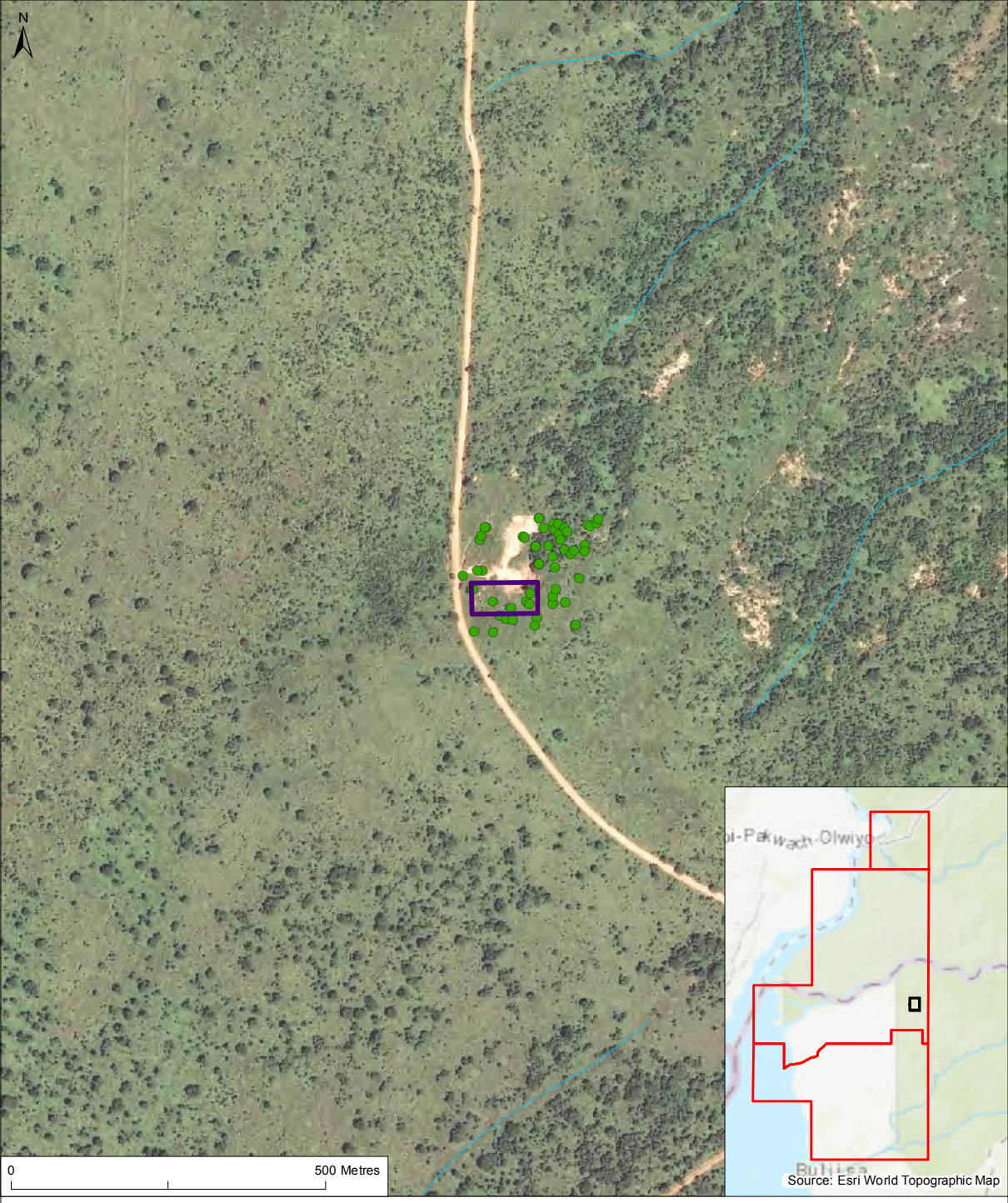
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - UWA PARK BORROW PIT (ALTERNATIVE)

Murram Borrow Pit Location
Parish
Village

Main Social Receptors
Settlement
School
Lodge
Clinic / Drug Shop / Health Center
Place of worship
Place of worship - Mosque

DWRM / MW Well
New roads
Upgraded roads
Inter field access roads
Watercourse

AECOM Biodiversity Surveys (2016- 2018)
TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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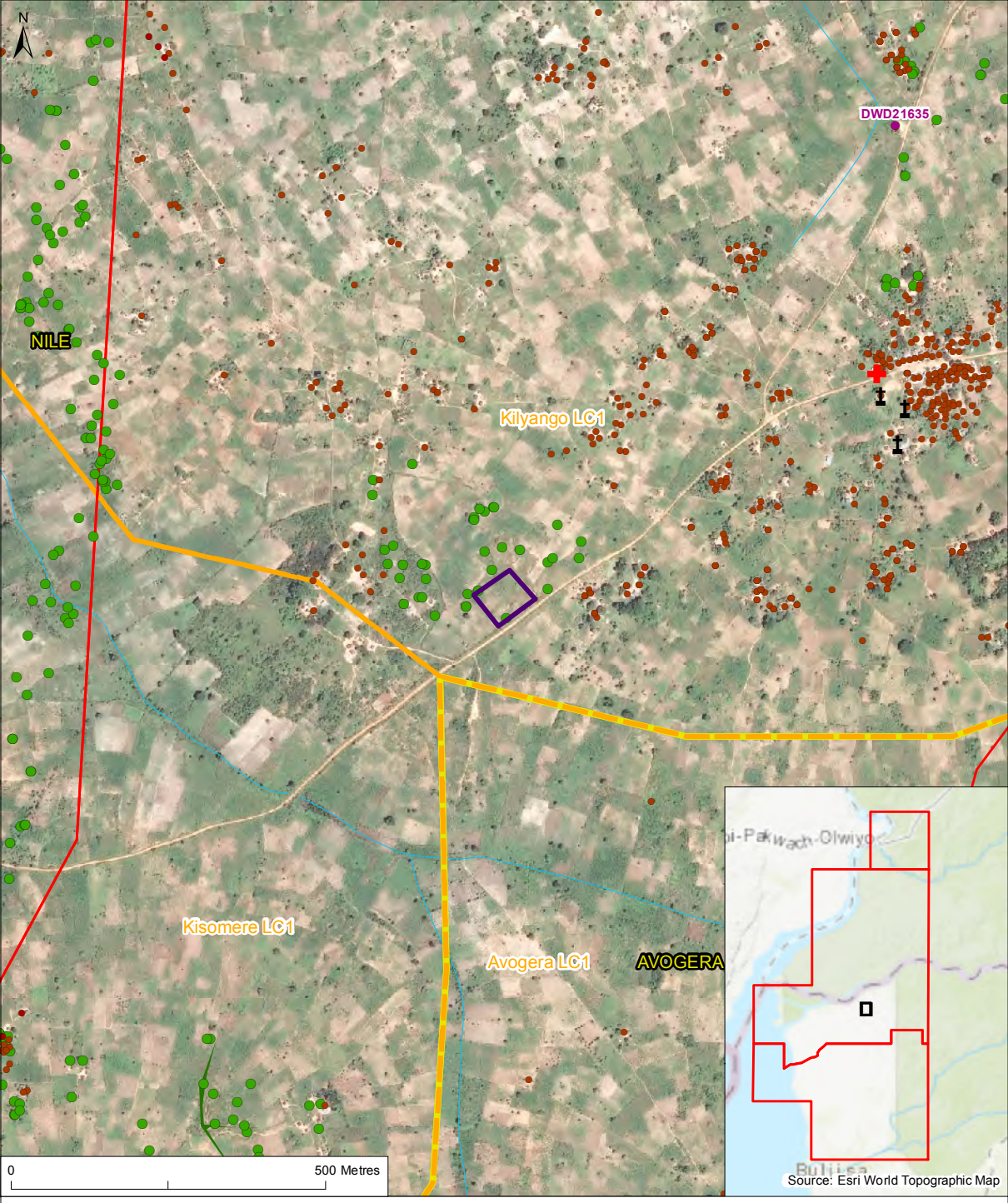

FACT SHEET - KILYANGO BORROW PIT

- Murram Borrow Pit Location
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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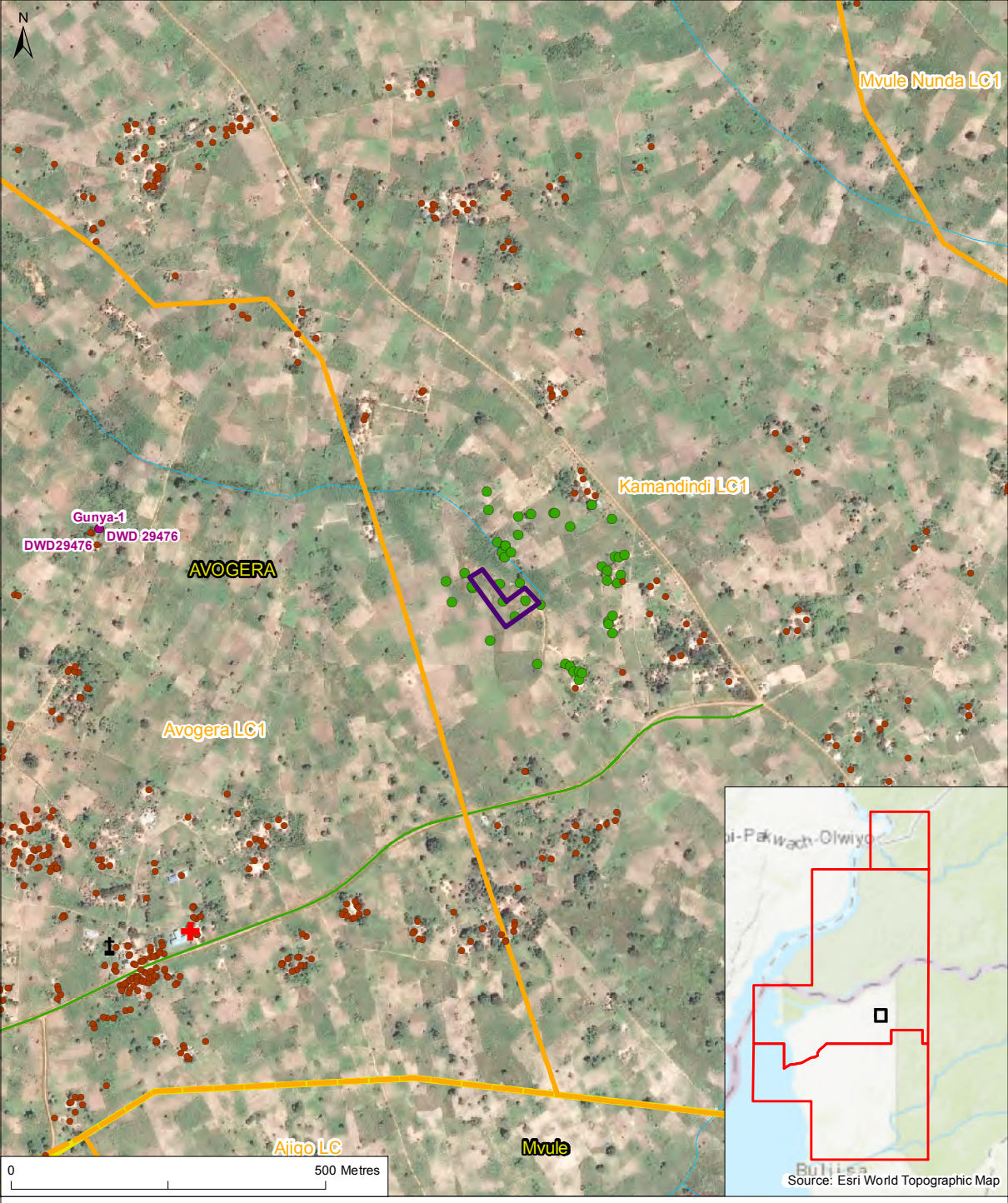

FACT SHEET - AVOGERA BORROW PIT

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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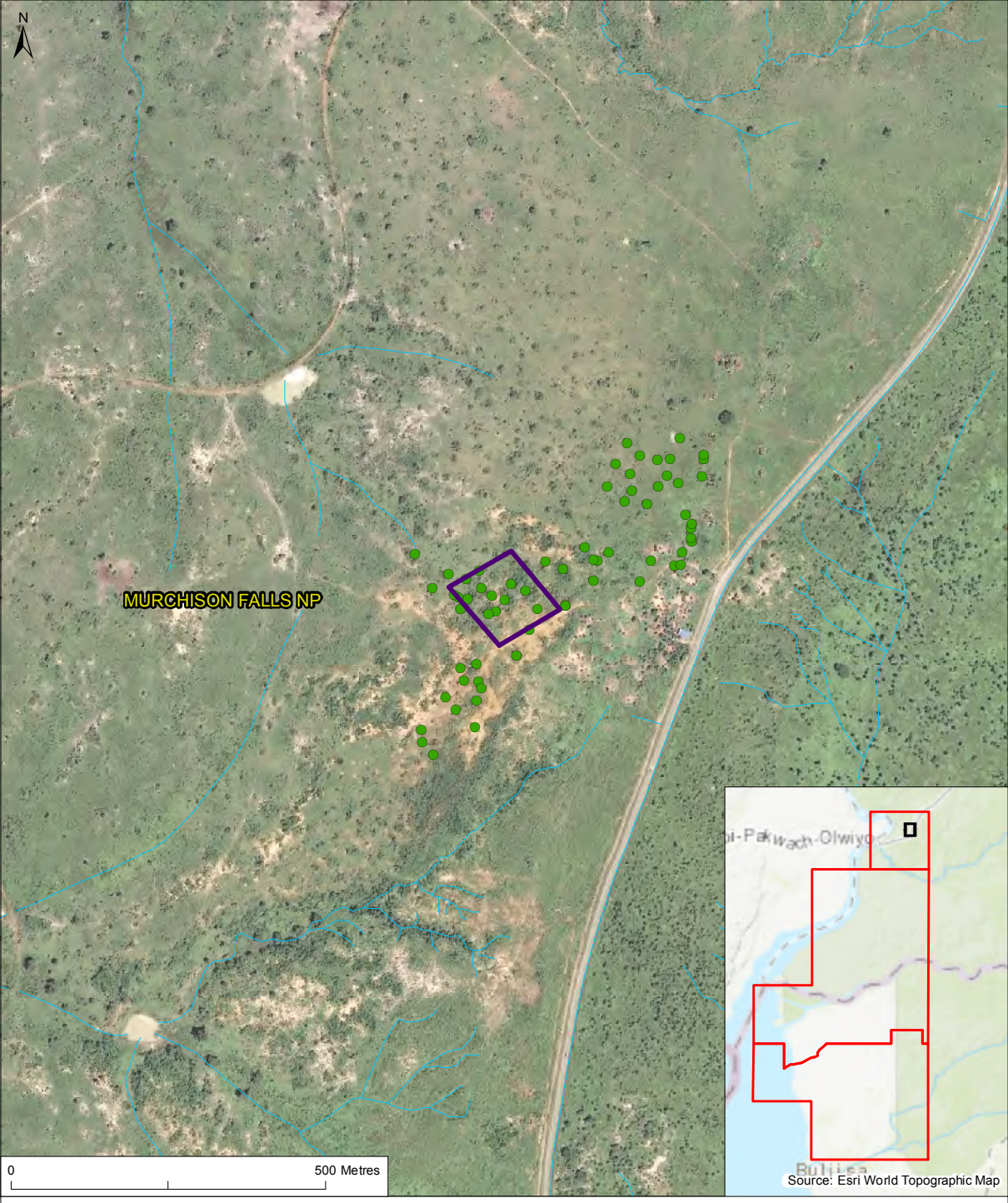

FACT SHEET - GOT APWOYO BORROW PIT 1

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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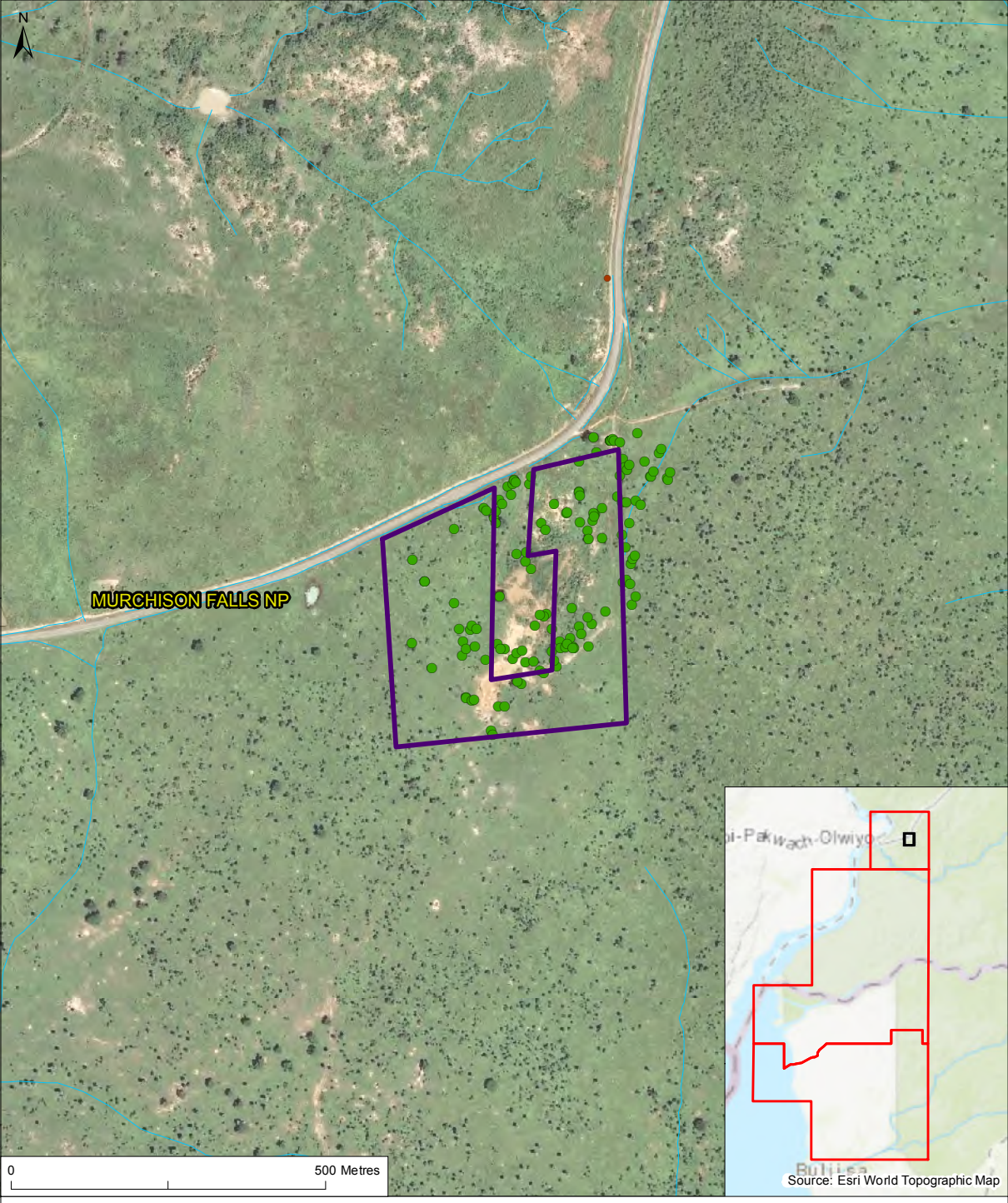


FACT SHEET - GOT APWOYO BORROW PIT 2

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

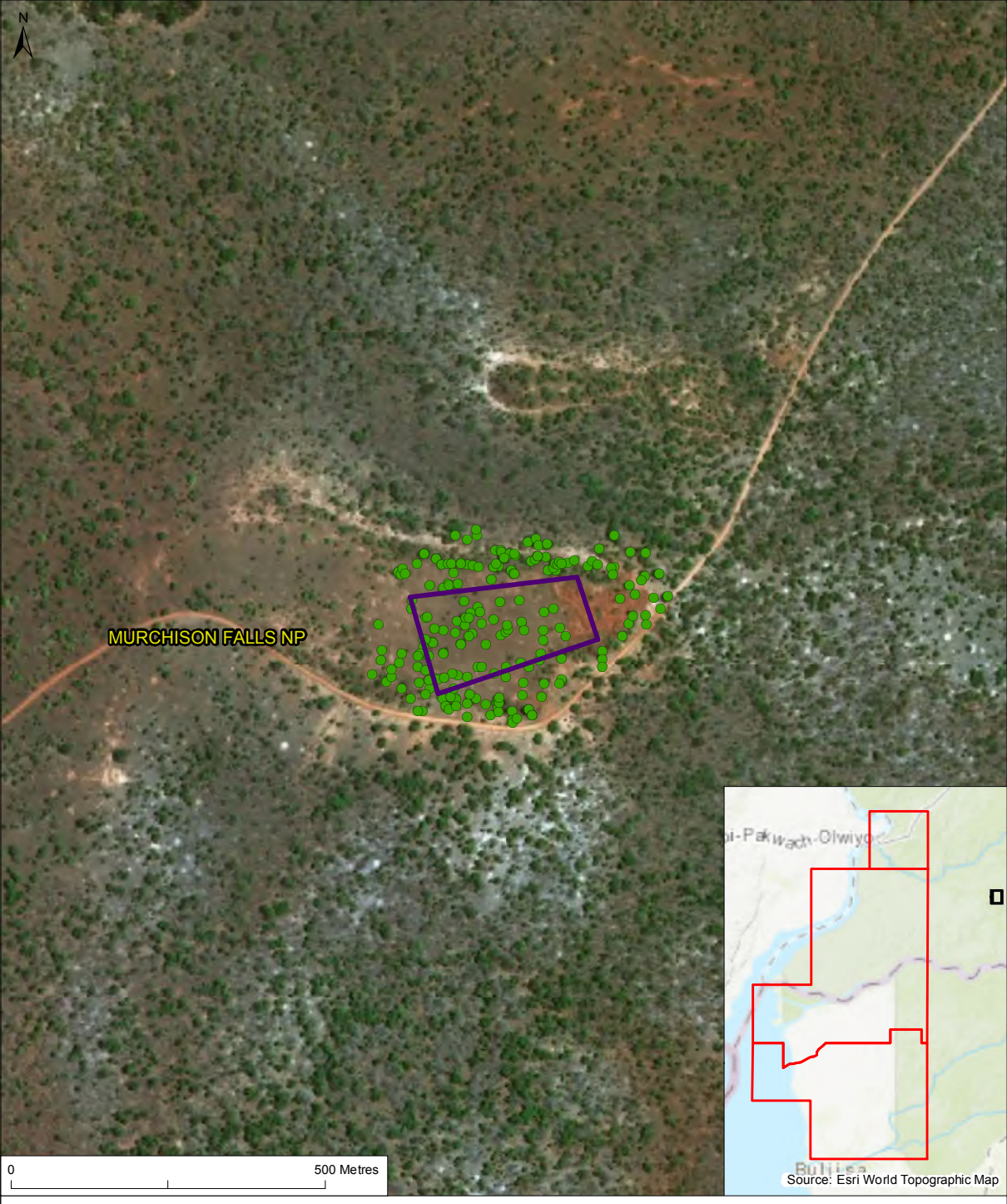
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - TILL 1 BORROW PIT

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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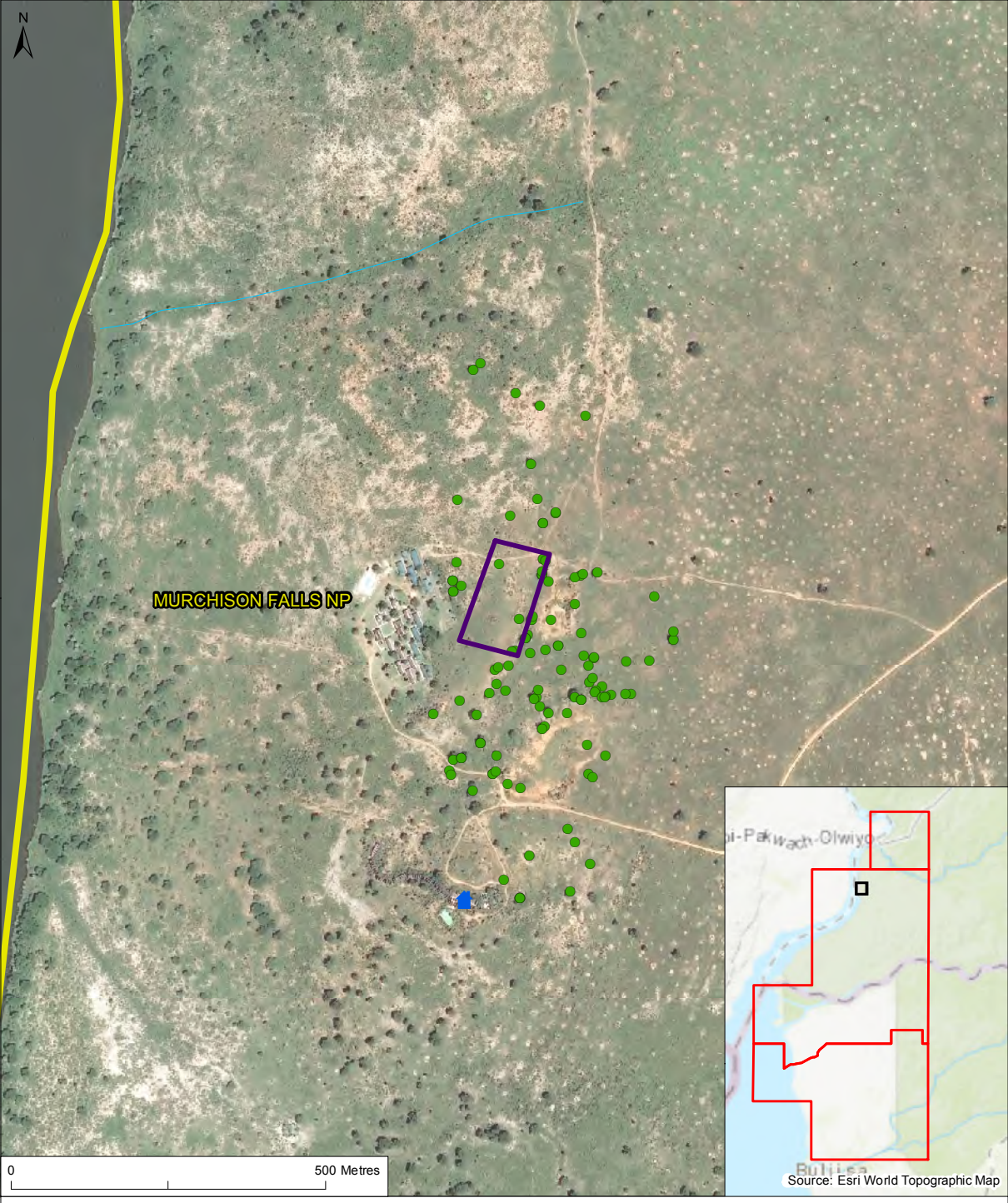

FACT SHEET - UWA PARK BORROW PIT 4

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
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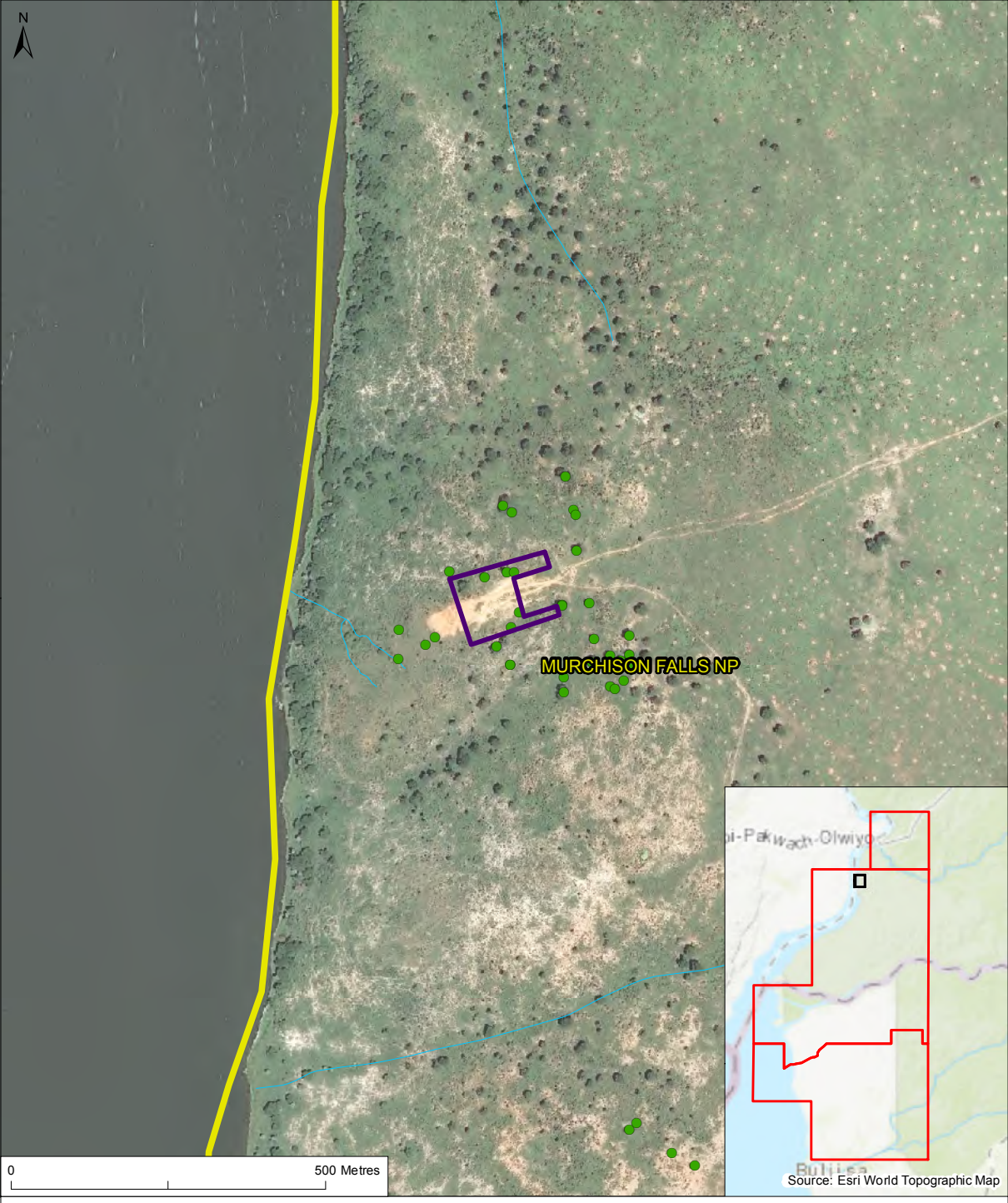


FACT SHEET - PAKUBA AIRSTRIP BORROW PIT 2

- Murram Borrow Pit Location
- Parish
- Village

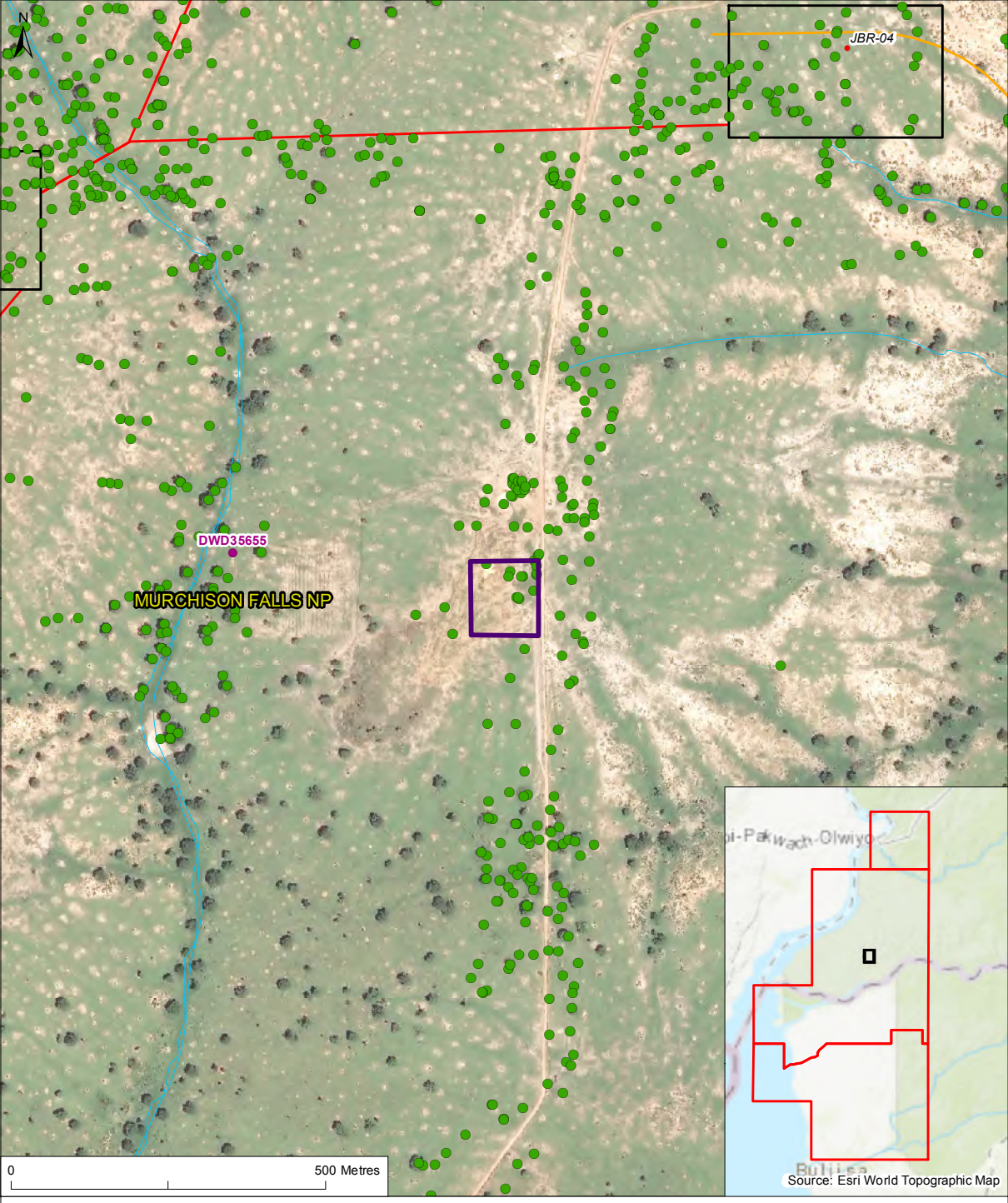
Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N



FACT SHEET - JOBI 6 - 3 BORROW PIT

- Murram Borrow Pit Location
- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

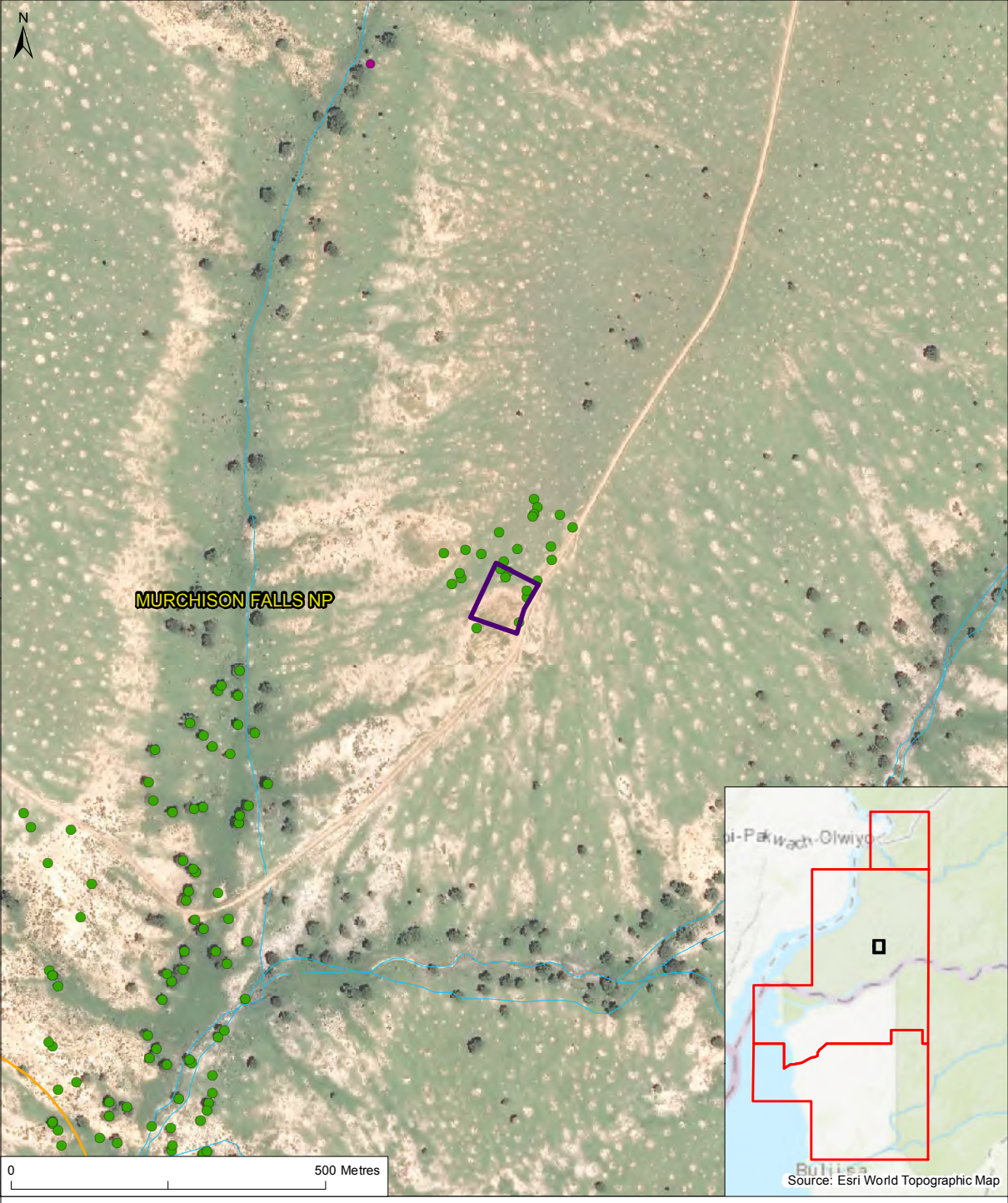
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - BULIGI TRACK BORROW PIT

- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:10,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM

Annex C

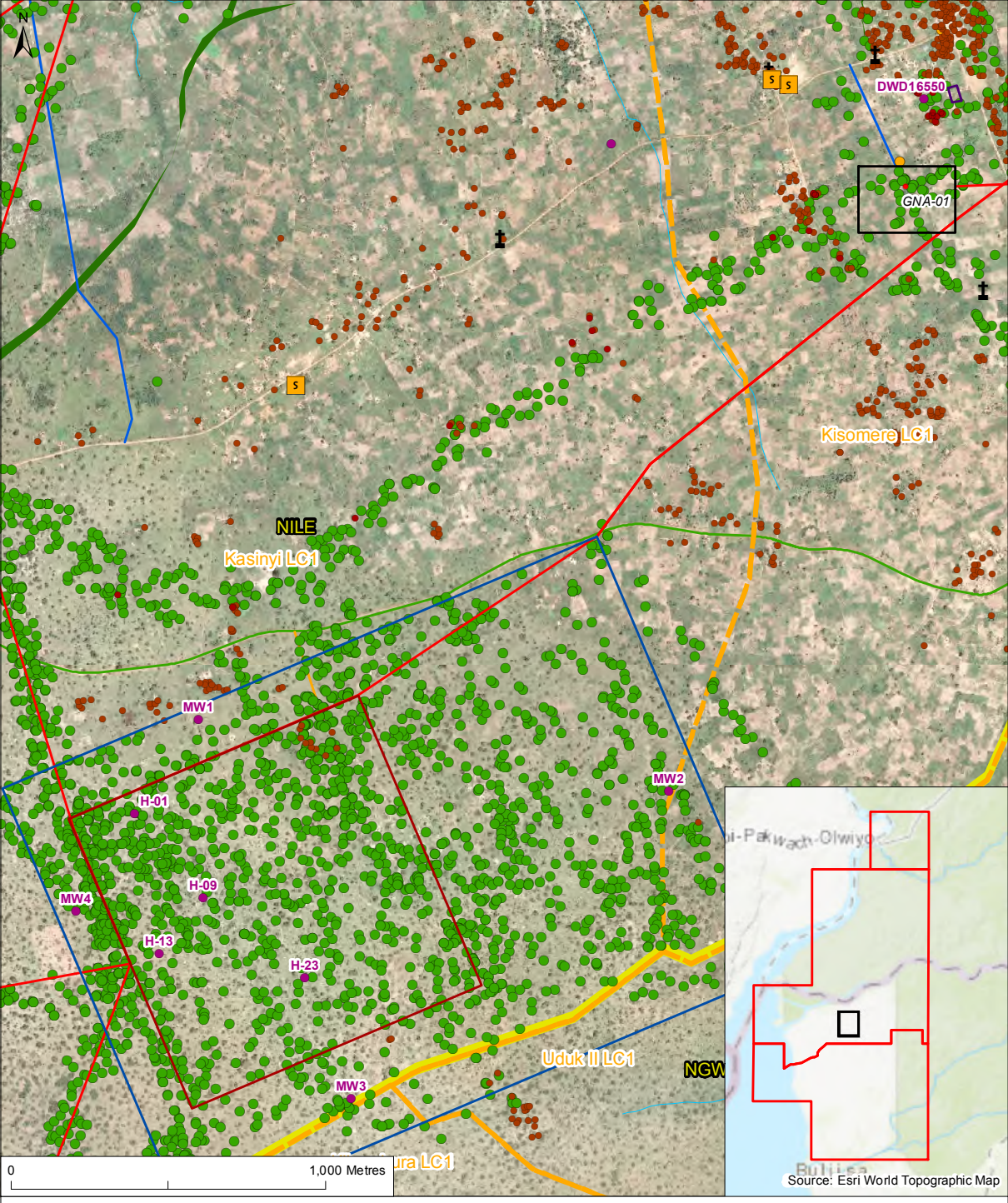
Annex C Satellite Imagery of Flowlines

FACT SHEET - PROJECT LAYOUT OVERVIEW

- Project Area
- Wellpad Extent - Maximum
- Water Abstraction System
- Victoria Nile Pipeline HDD Crossing - Option 1
- Victoria Nile Pipeline HDD Crossing - Option 2
- Victoria Nile Ferry Crossing
- Production and Injection Network
- Industrial Area
- Camp
- Bugungu Airstrip
- Masindi Vehicle Check Point
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse
- DWRM Well

Drawn: LC Checked: GM Approved: MW Date: 29/03/2018 Scale @ A4 1:200,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE GNA-01 to CPF

- Wellpad location
- Wellpad Extent - Maximum
- Industrial Area
- CPF
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

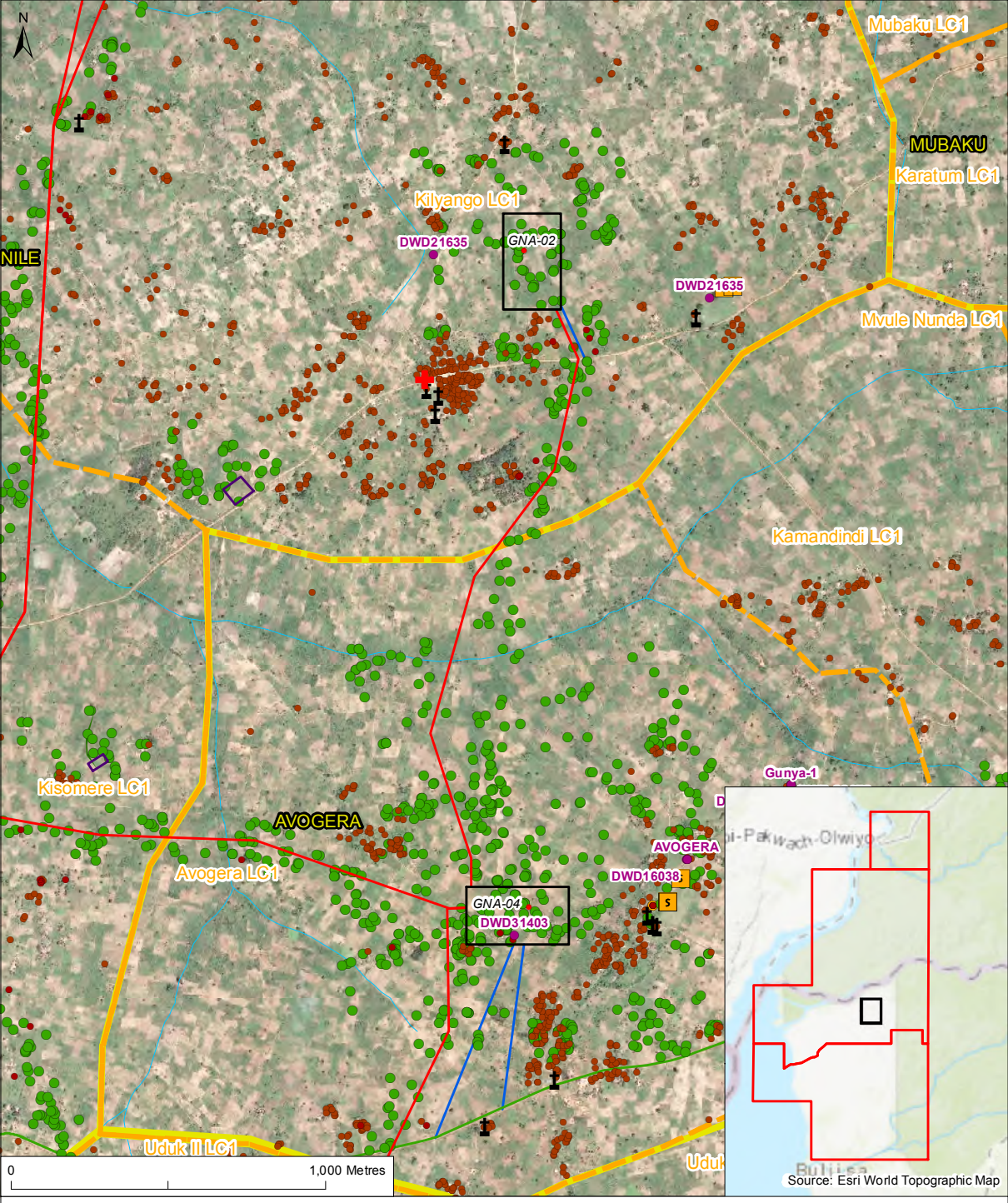
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE GNA-02 to GNA-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

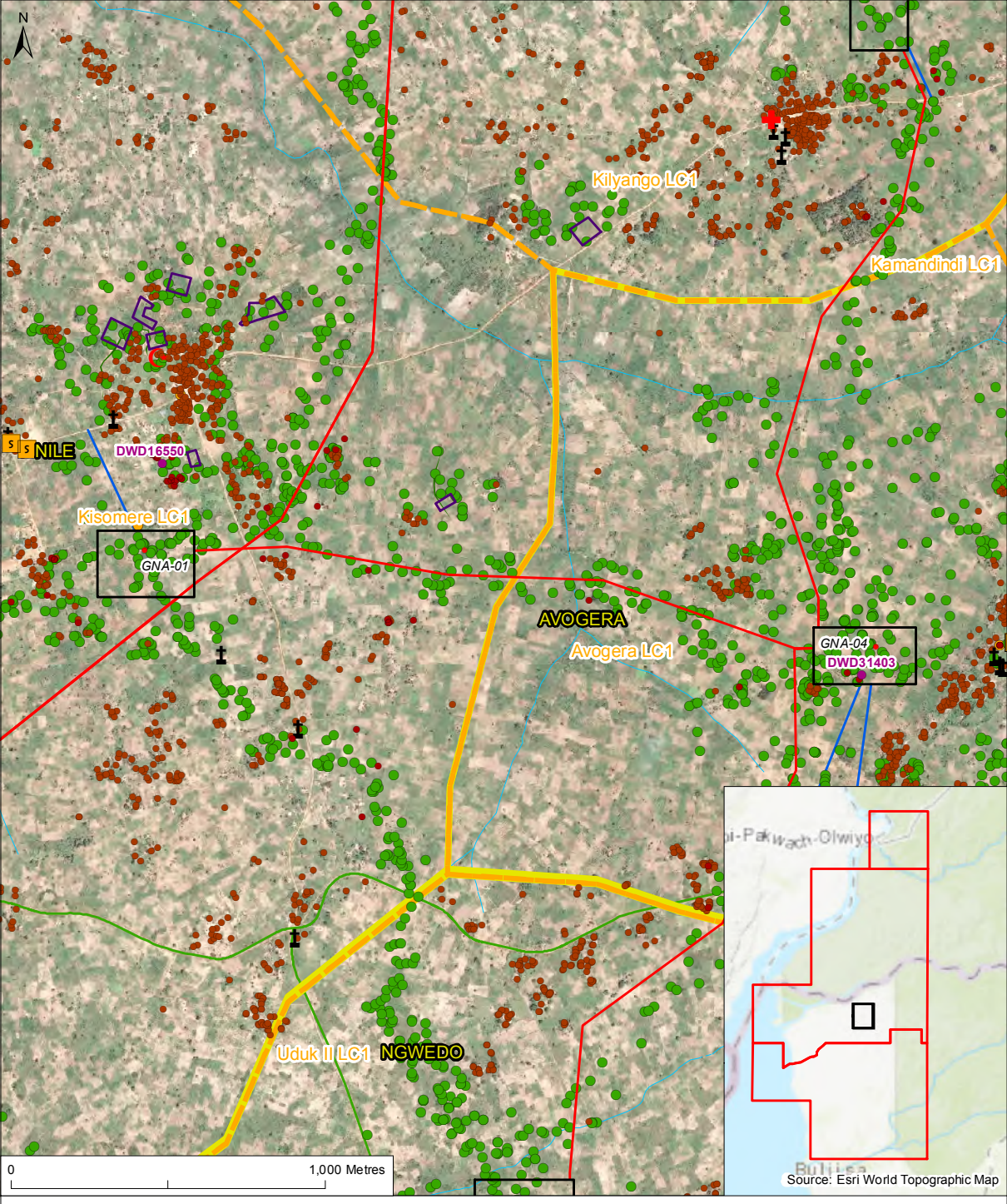
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE GNA-04 to GNA-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

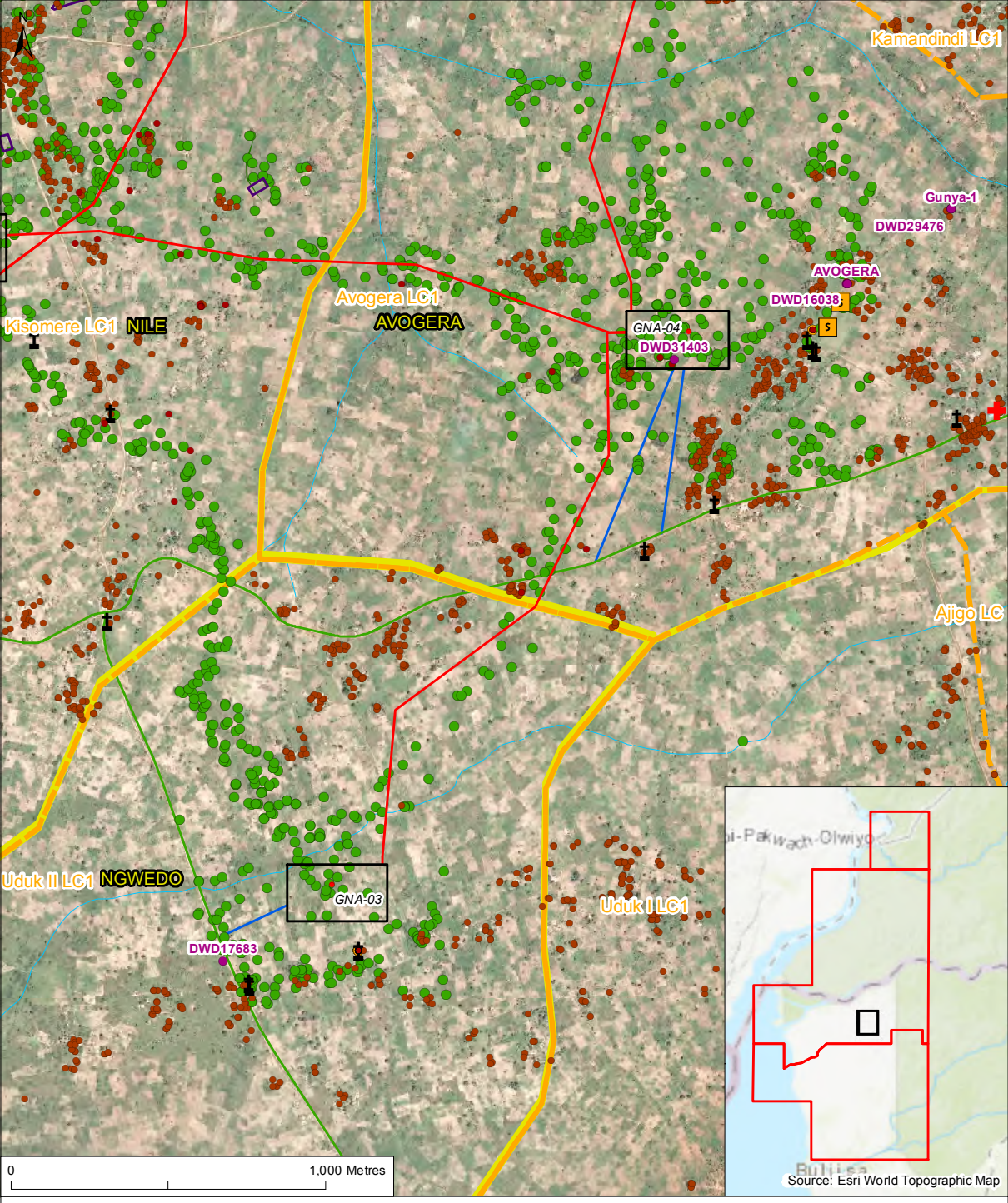
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - FLOWLINE GNA-04 to GNA-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

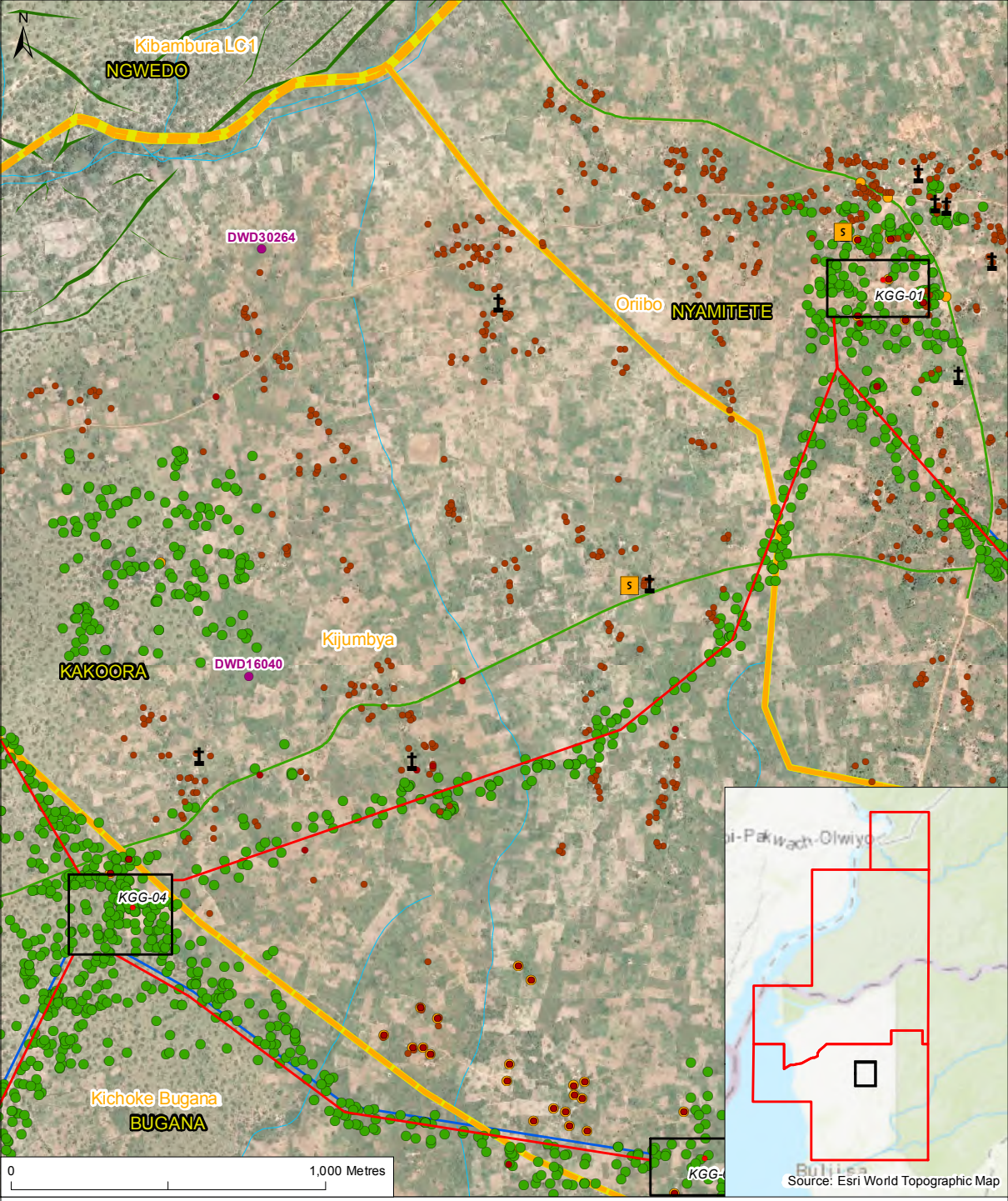
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - FLOWLINE KGG-01 to KGG-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

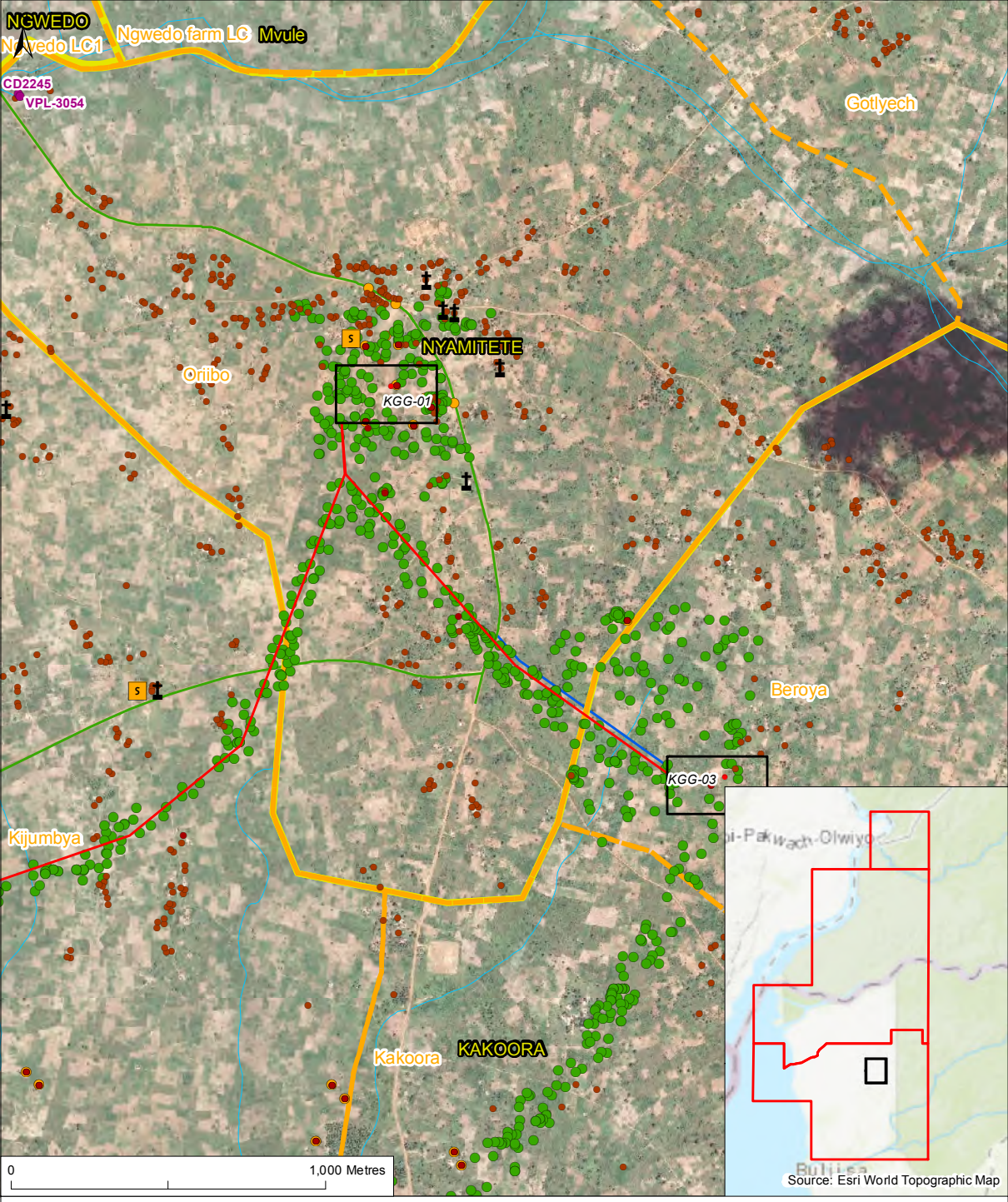
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - FLOWLINE KGG-03 to KGG-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

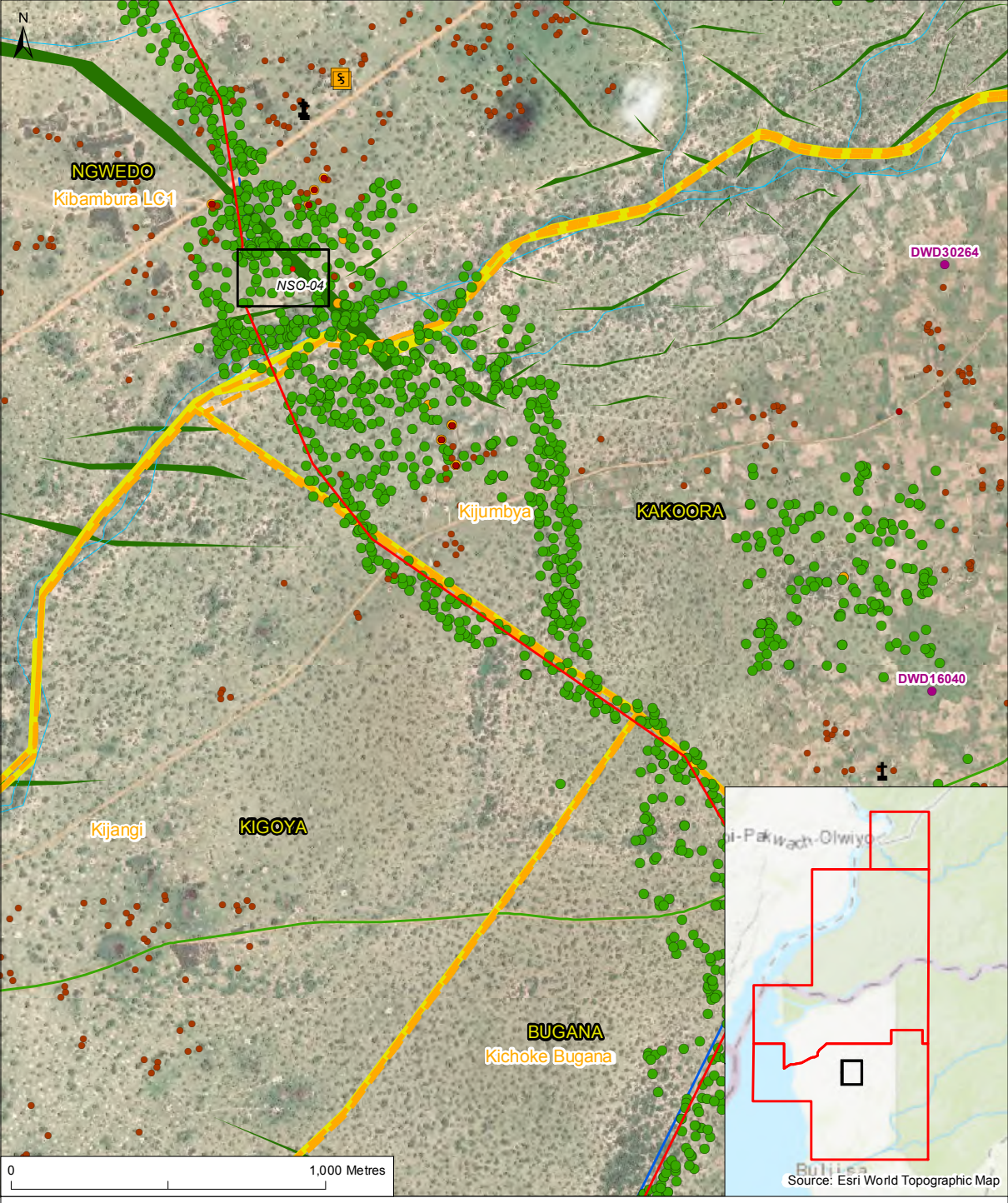
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KGG-04 to NSO-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

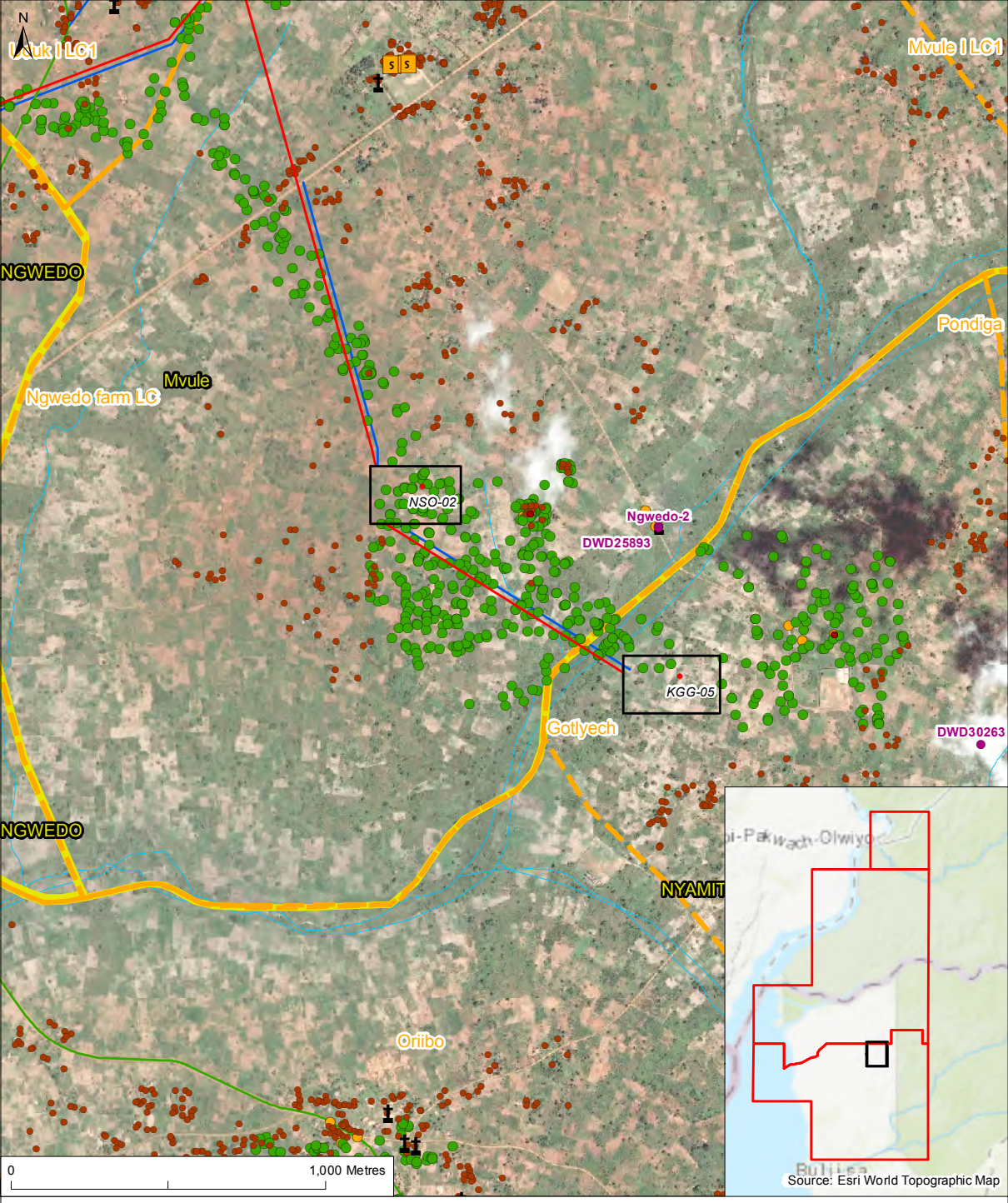
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KGG-05 to NSO-02

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

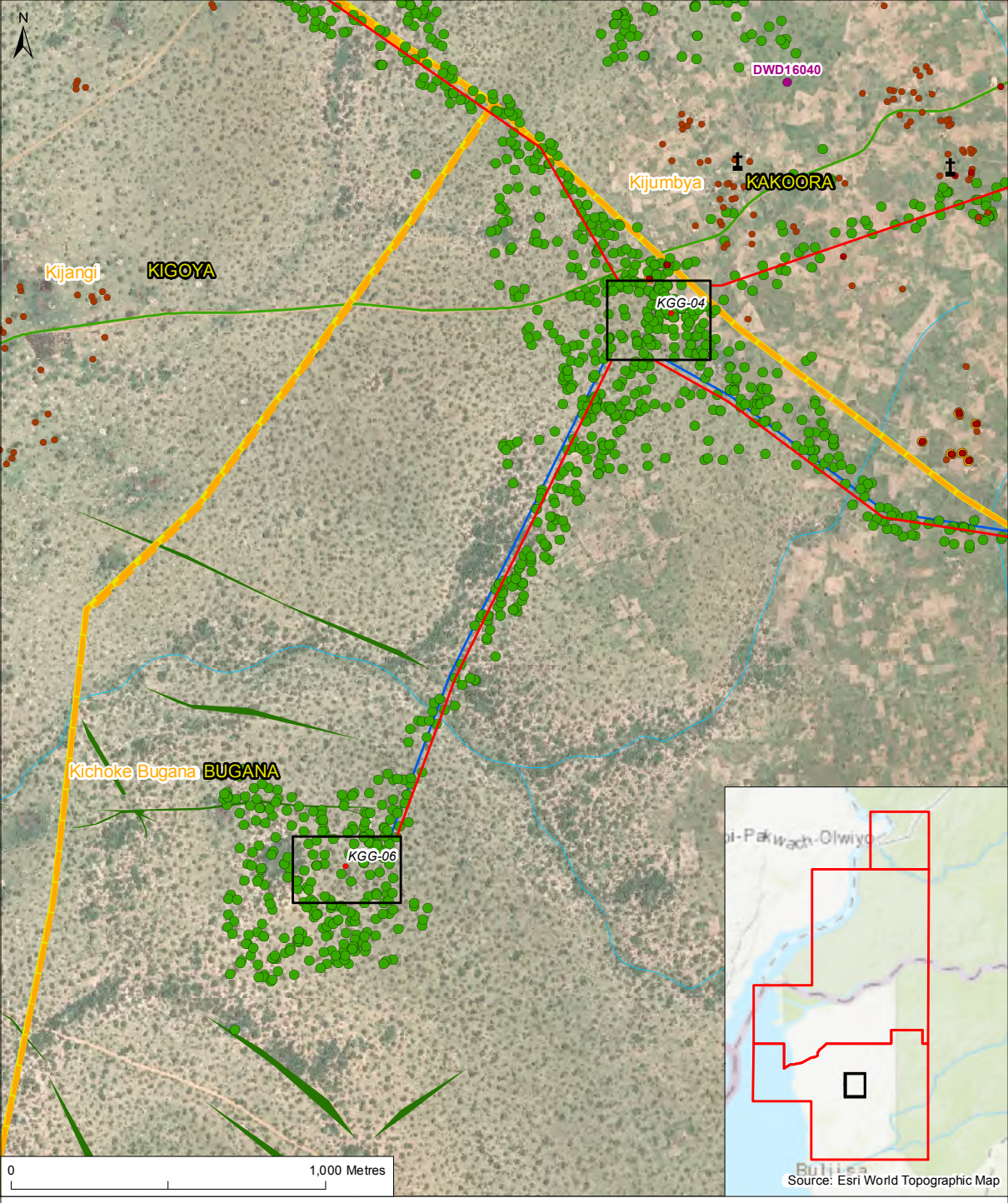
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KGG-06 to KGG-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

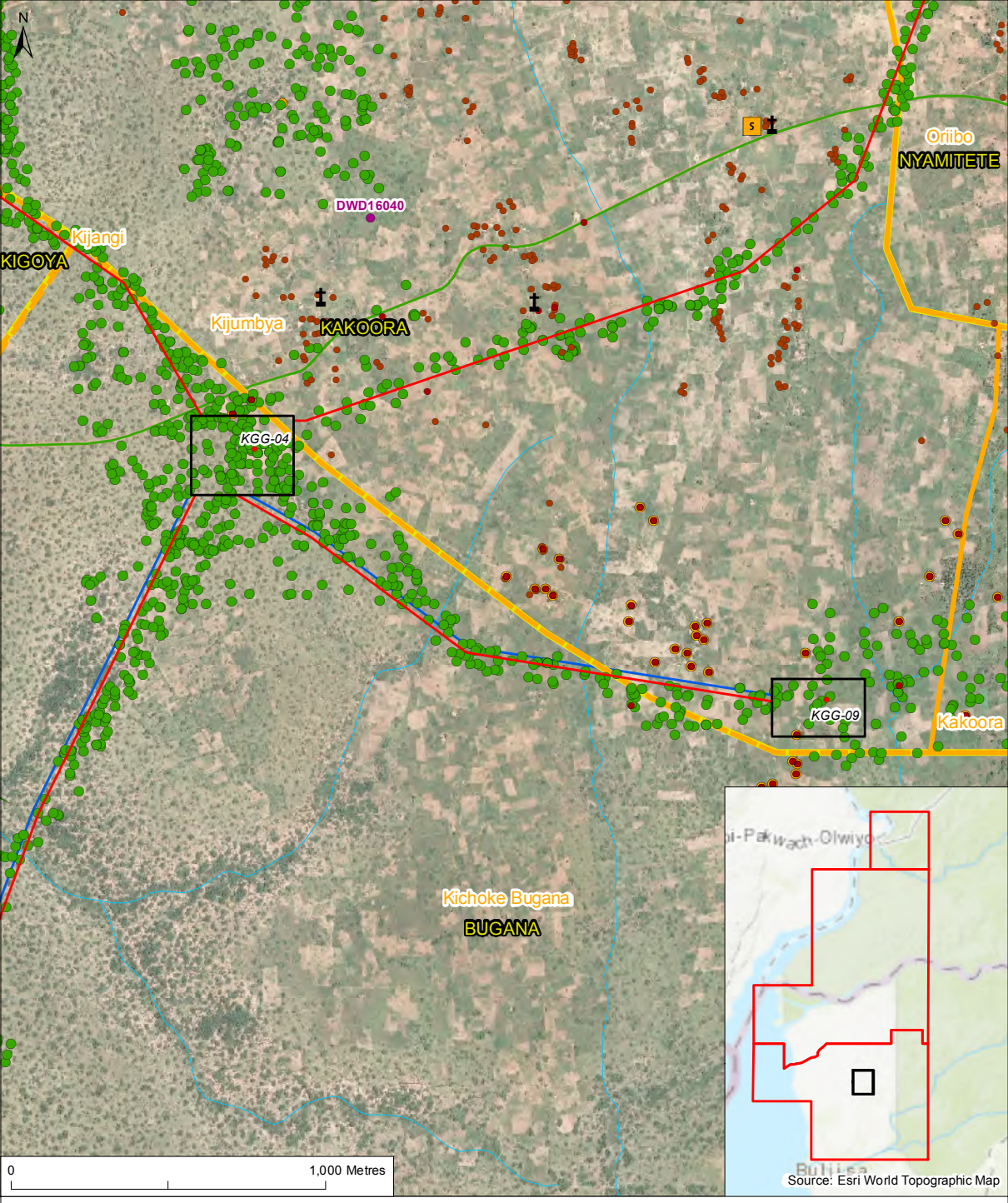
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KGG-09 to KGG-04

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

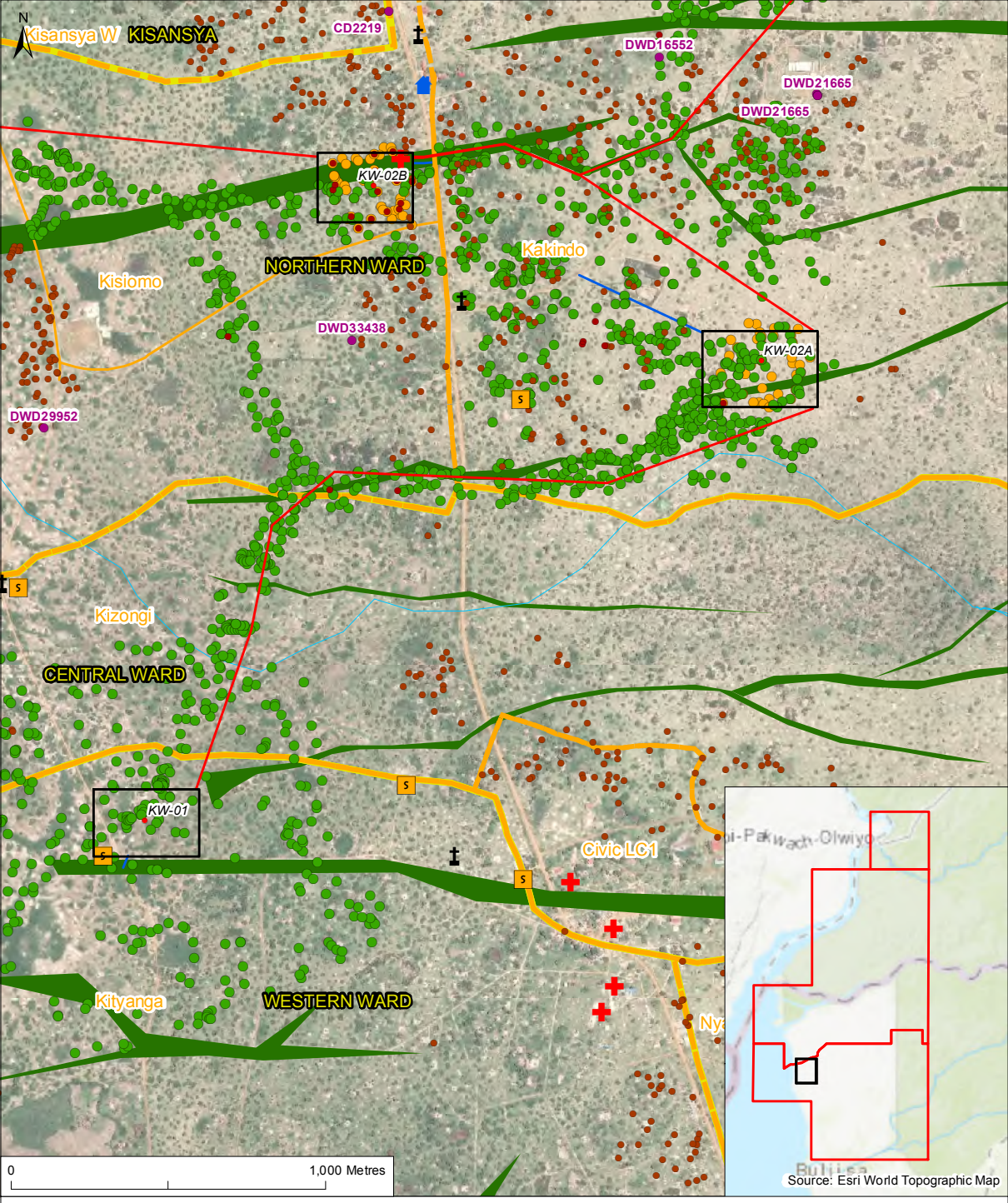
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KW-01 to KW-02A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

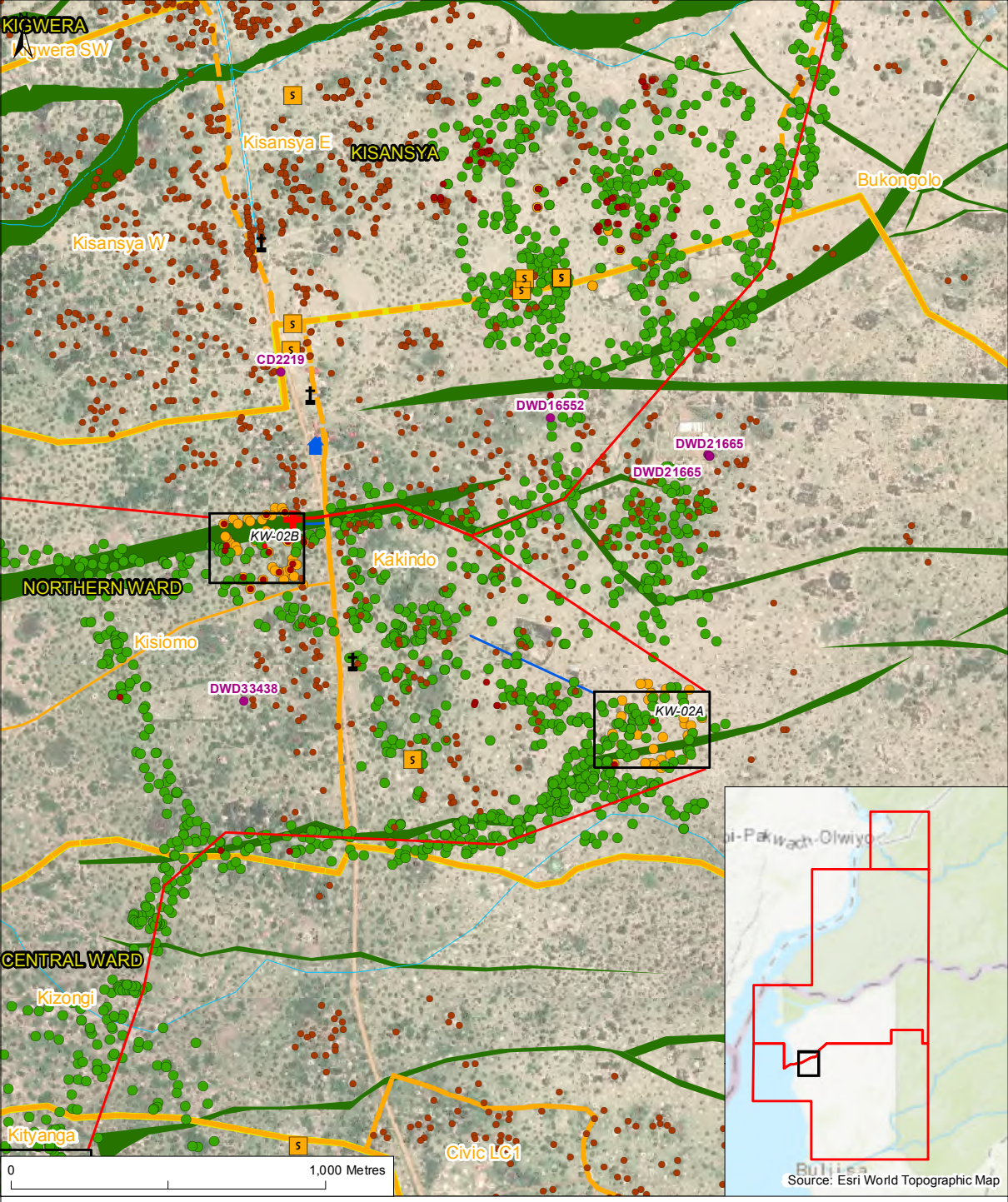
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KW-02A to KW-02B

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

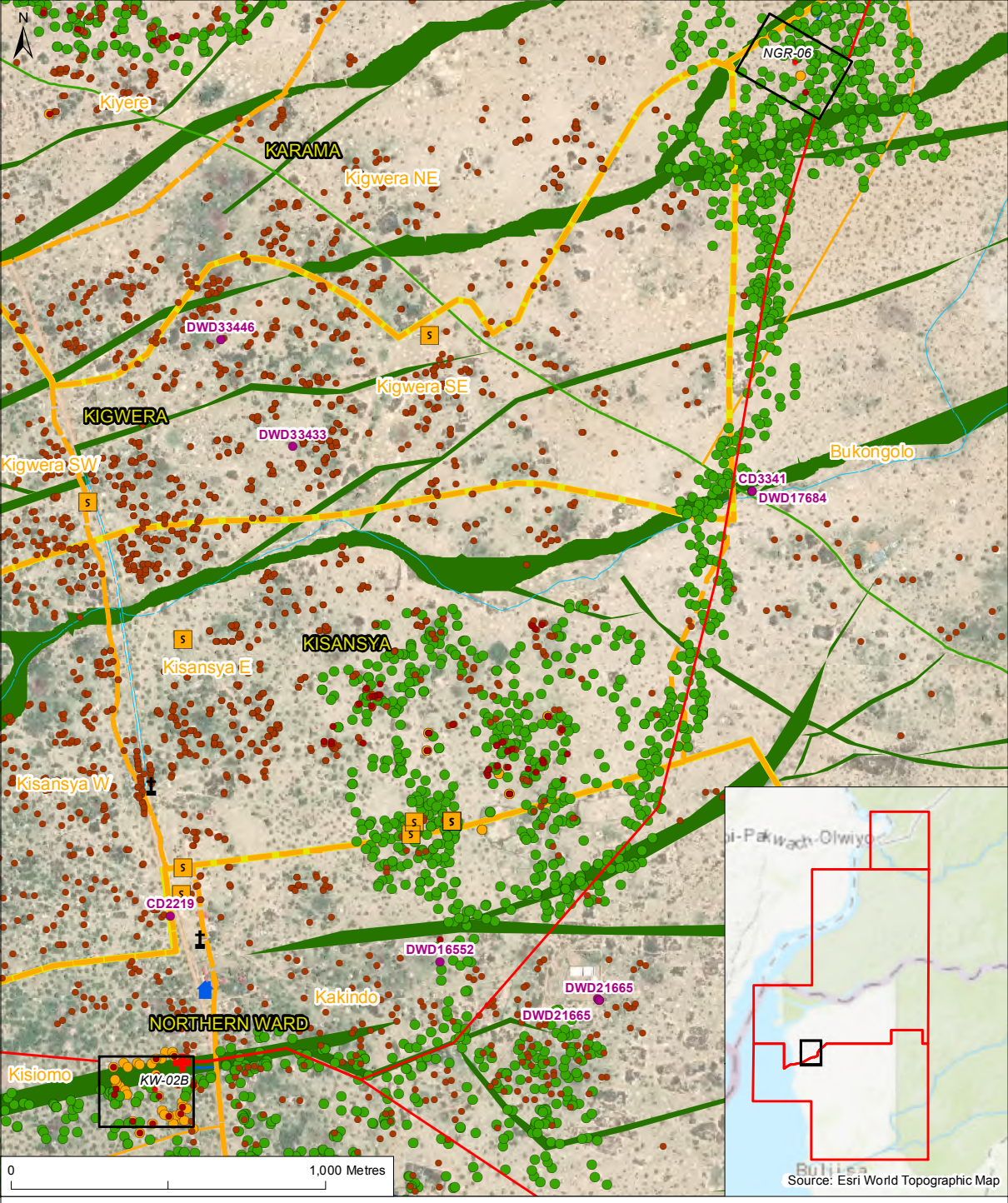
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE KW-02B to NGR-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

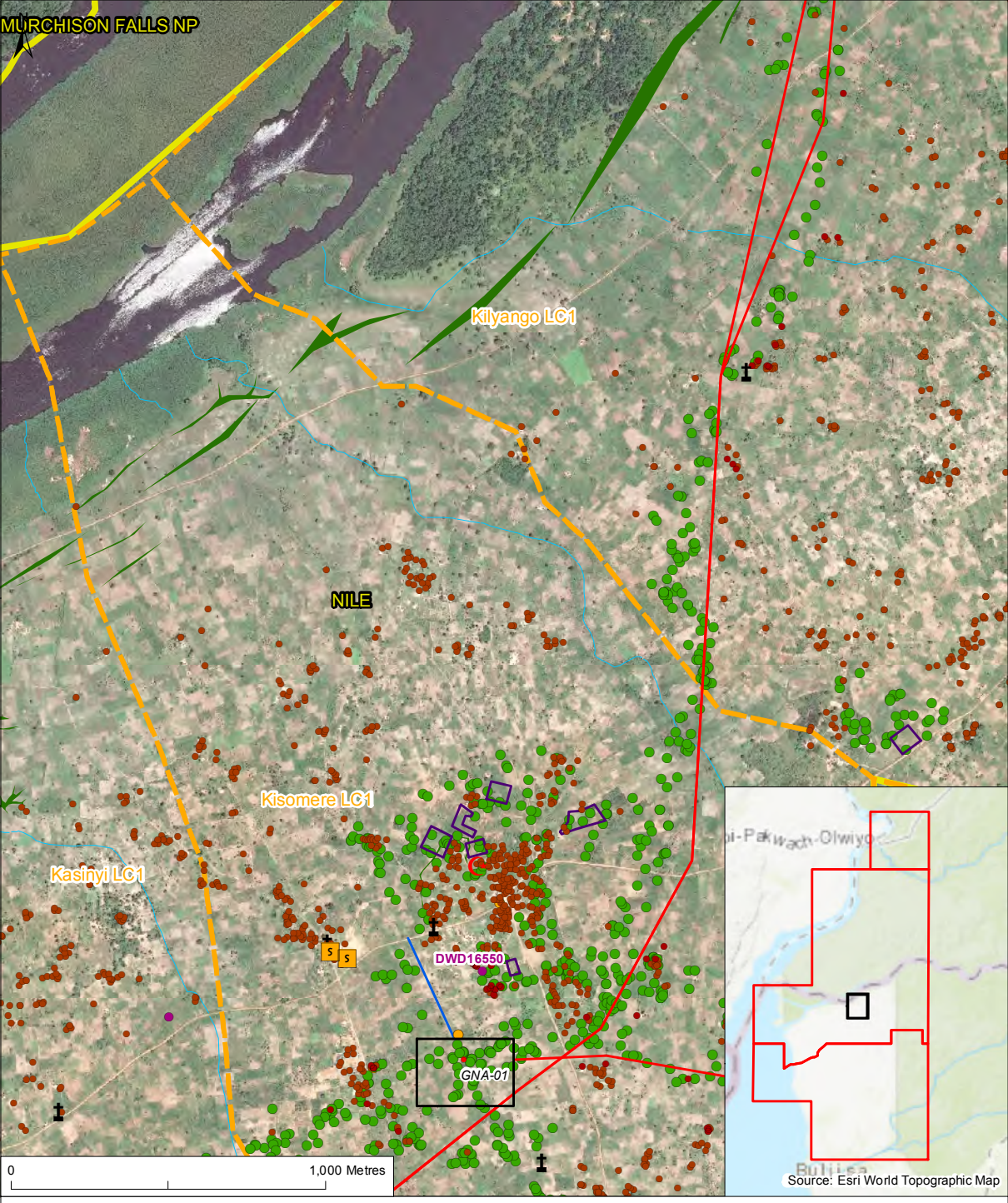
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NIV (Option 1) to CPF

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

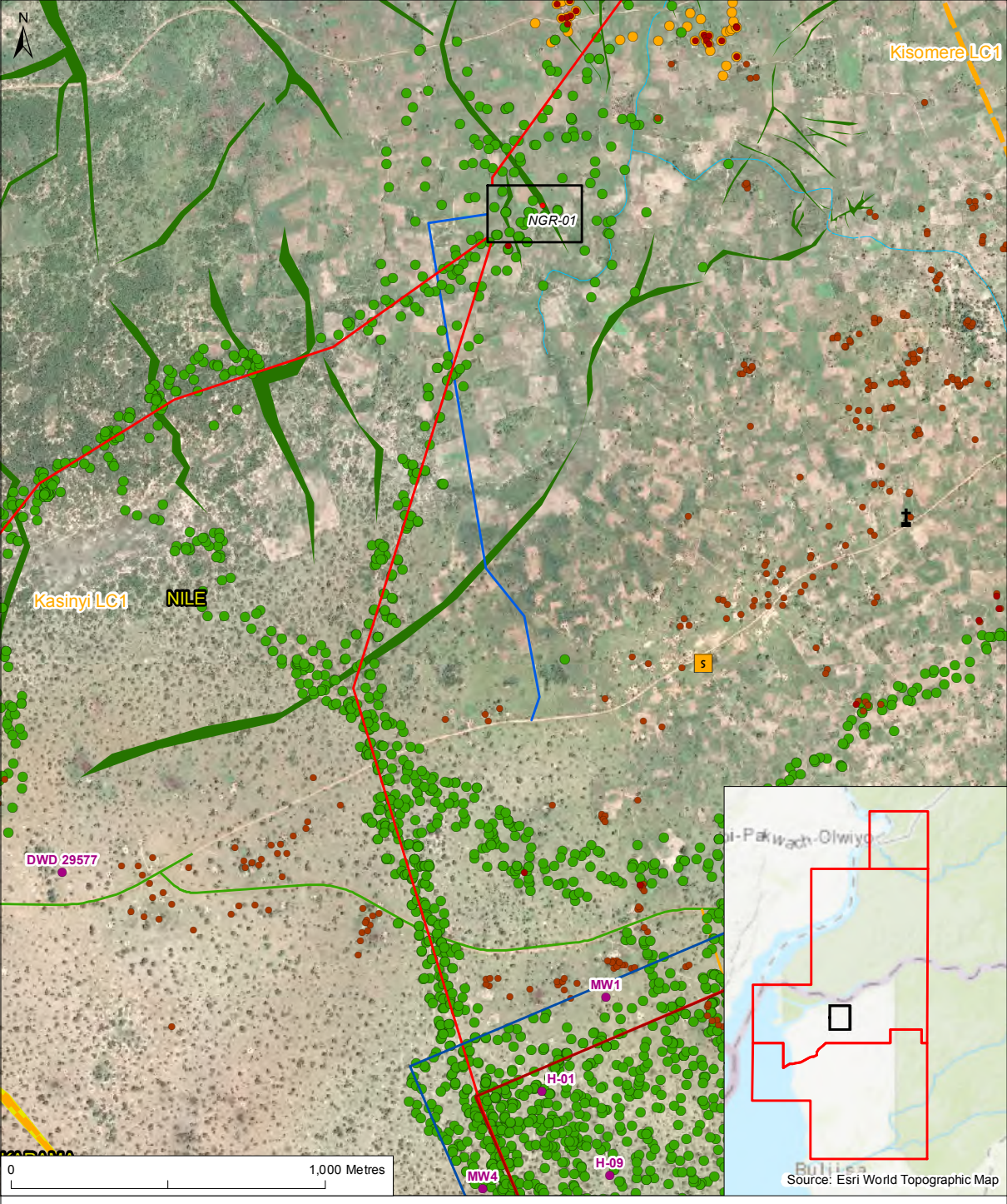
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NIV (Option 2) to CPF via NGR-01

- Wellpad location
- Wellpad Extent - Maximum
- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

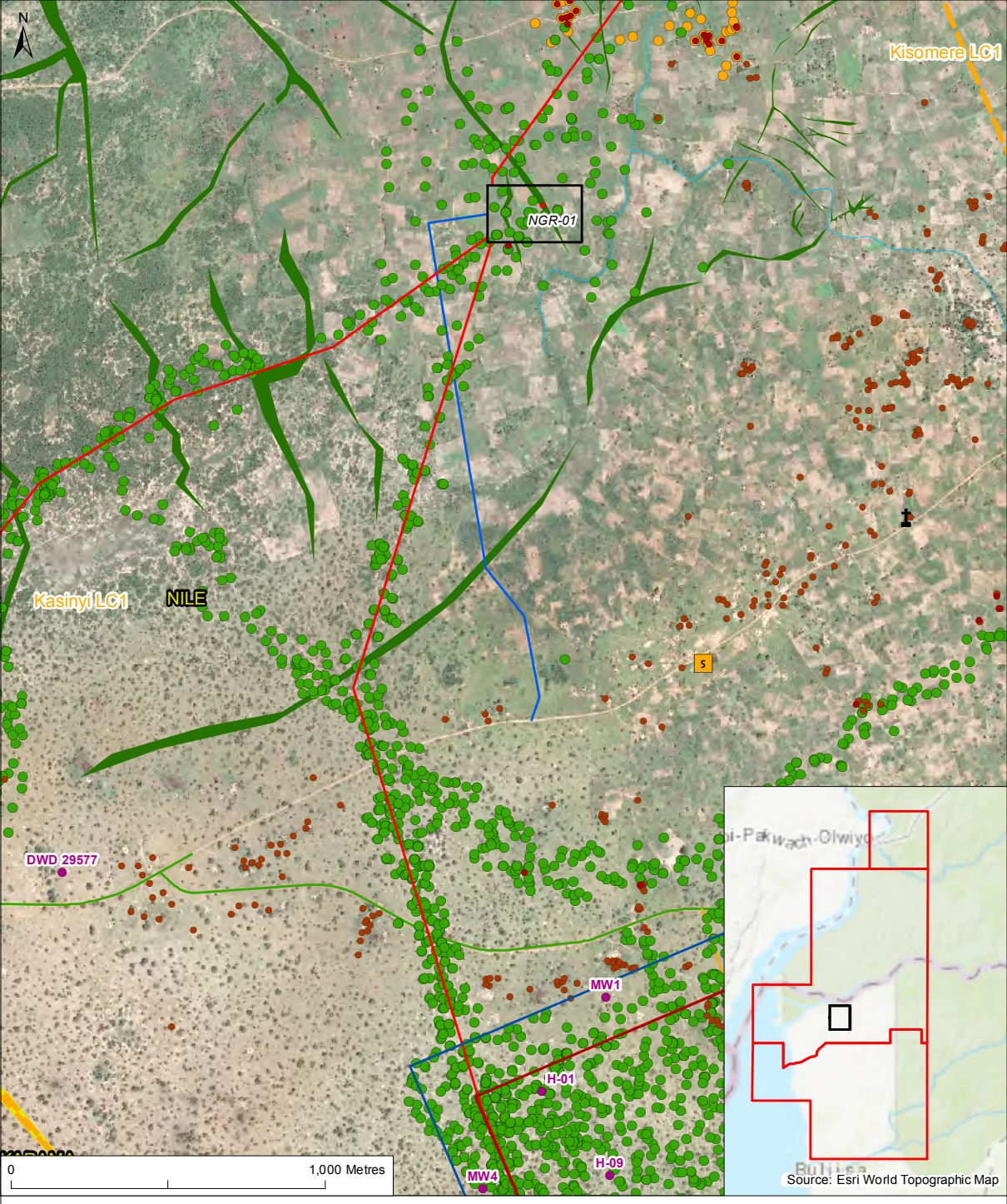
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NIV (Option 2) to CPF via NGR-01

- Wellpad location
- Wellpad Extent - Maximum
- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

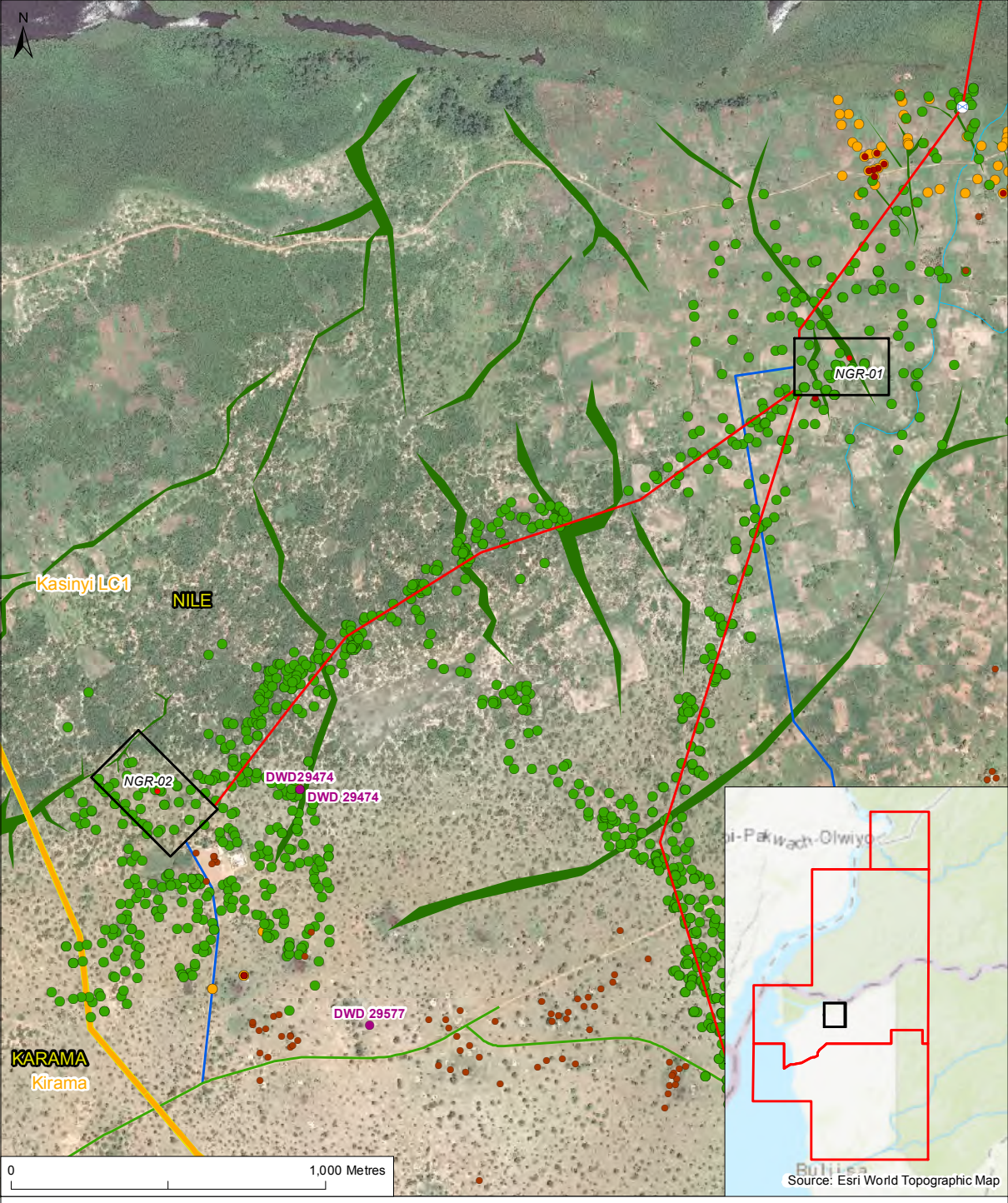
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NGR-02 to NGR-01

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 2
- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

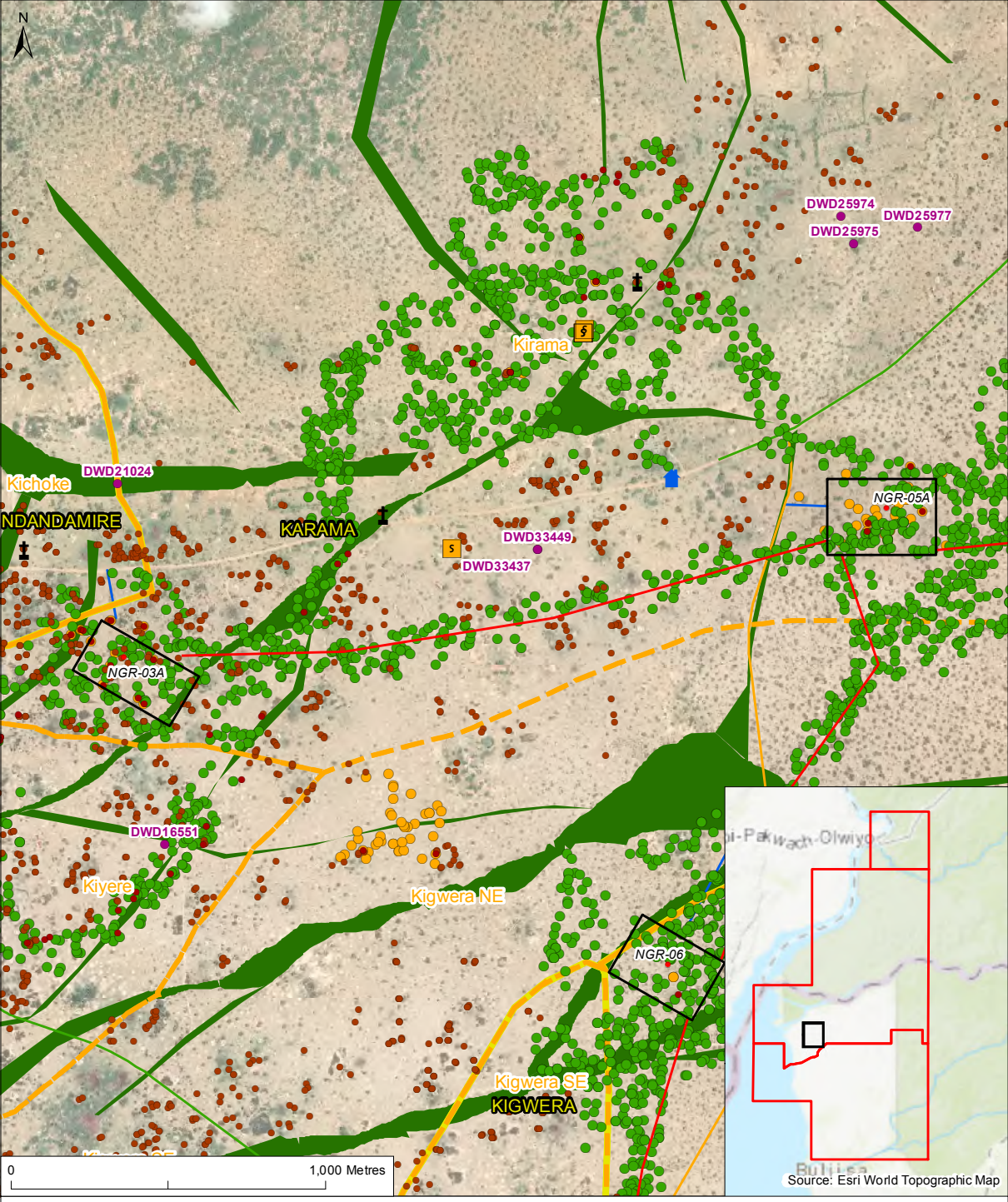
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NGR-03A to NGR-05A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

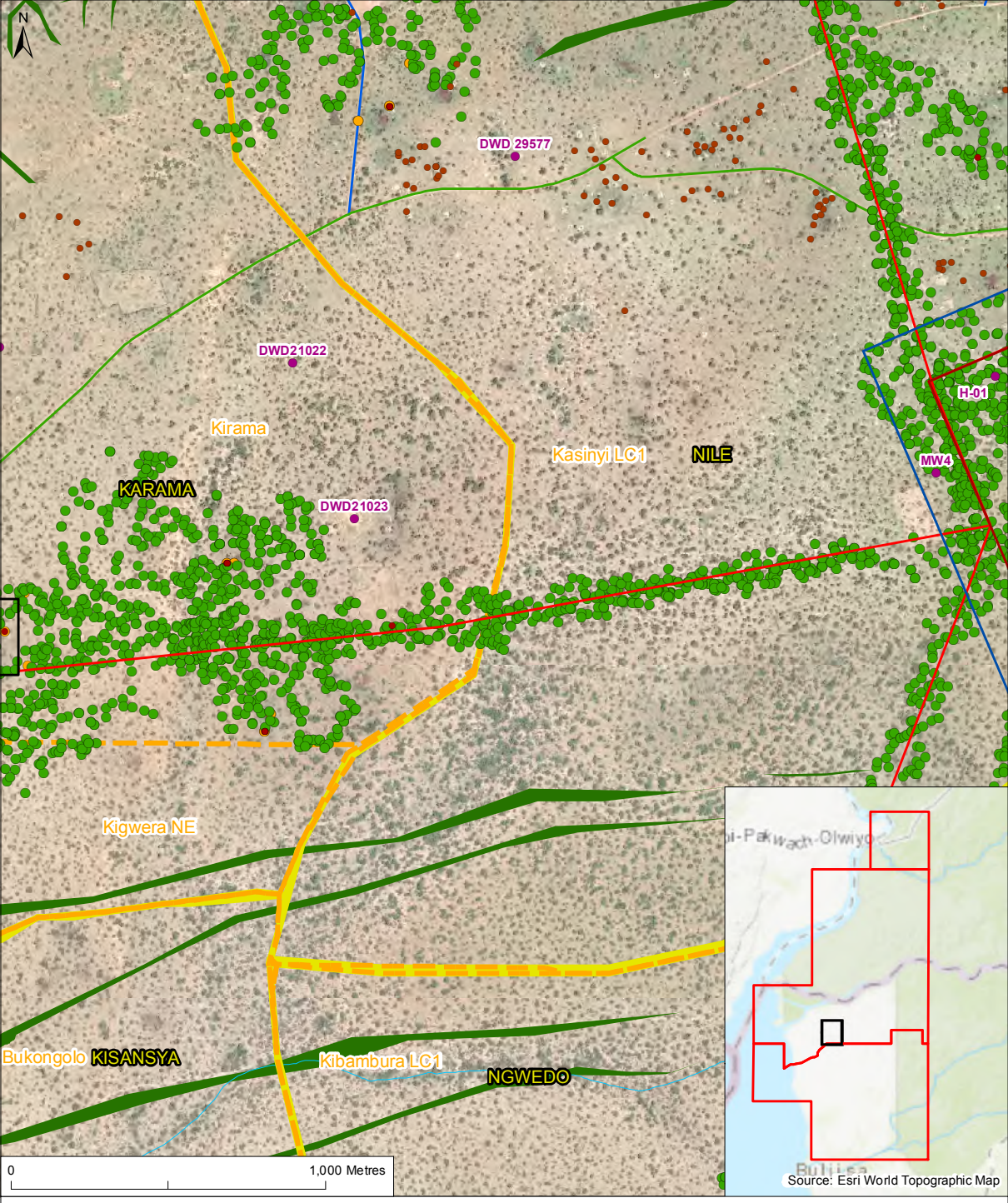
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NGR-05A to CPF

- Wellpad Extent - Maximum
- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

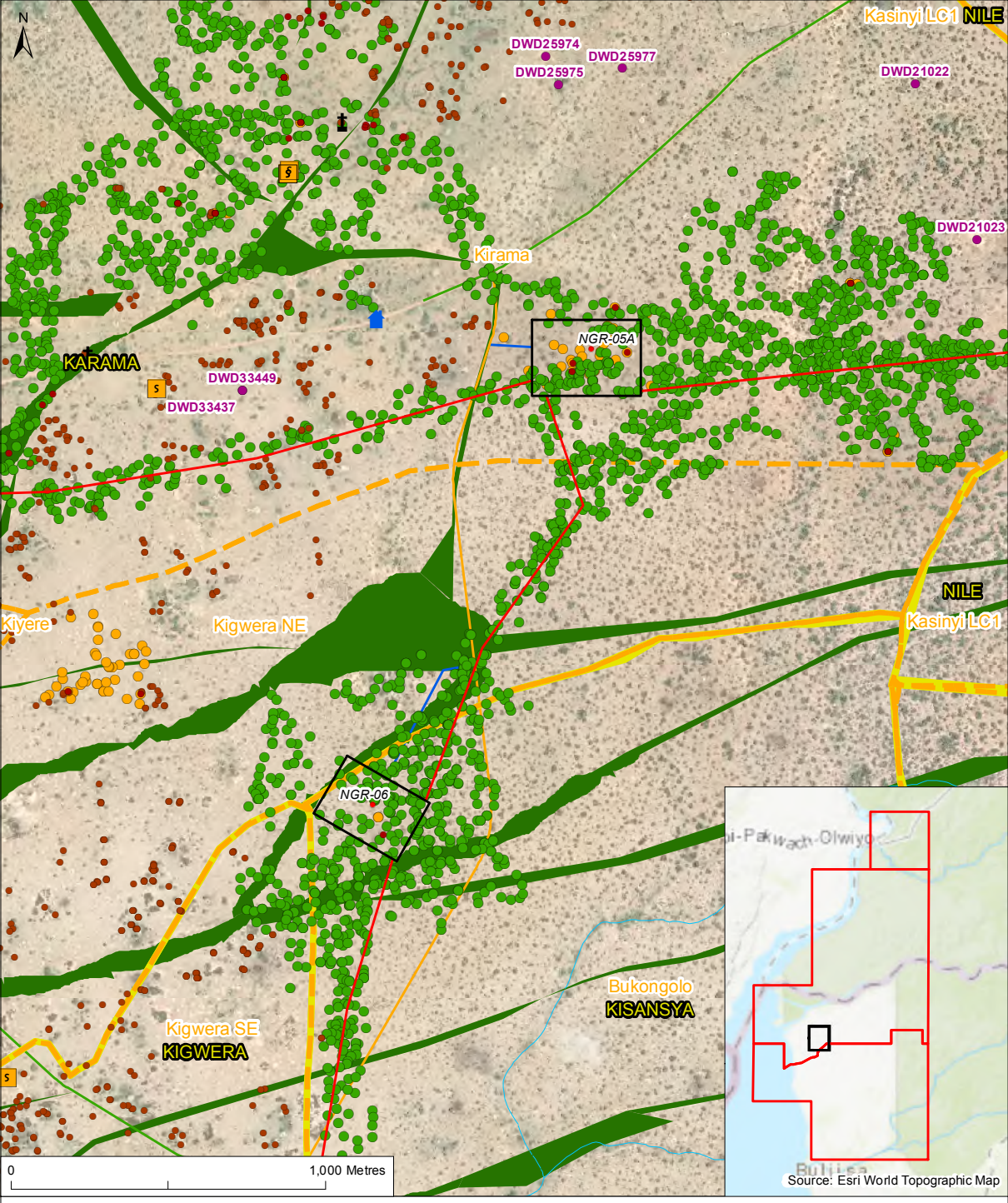
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NGR-06 to NGR-05A

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

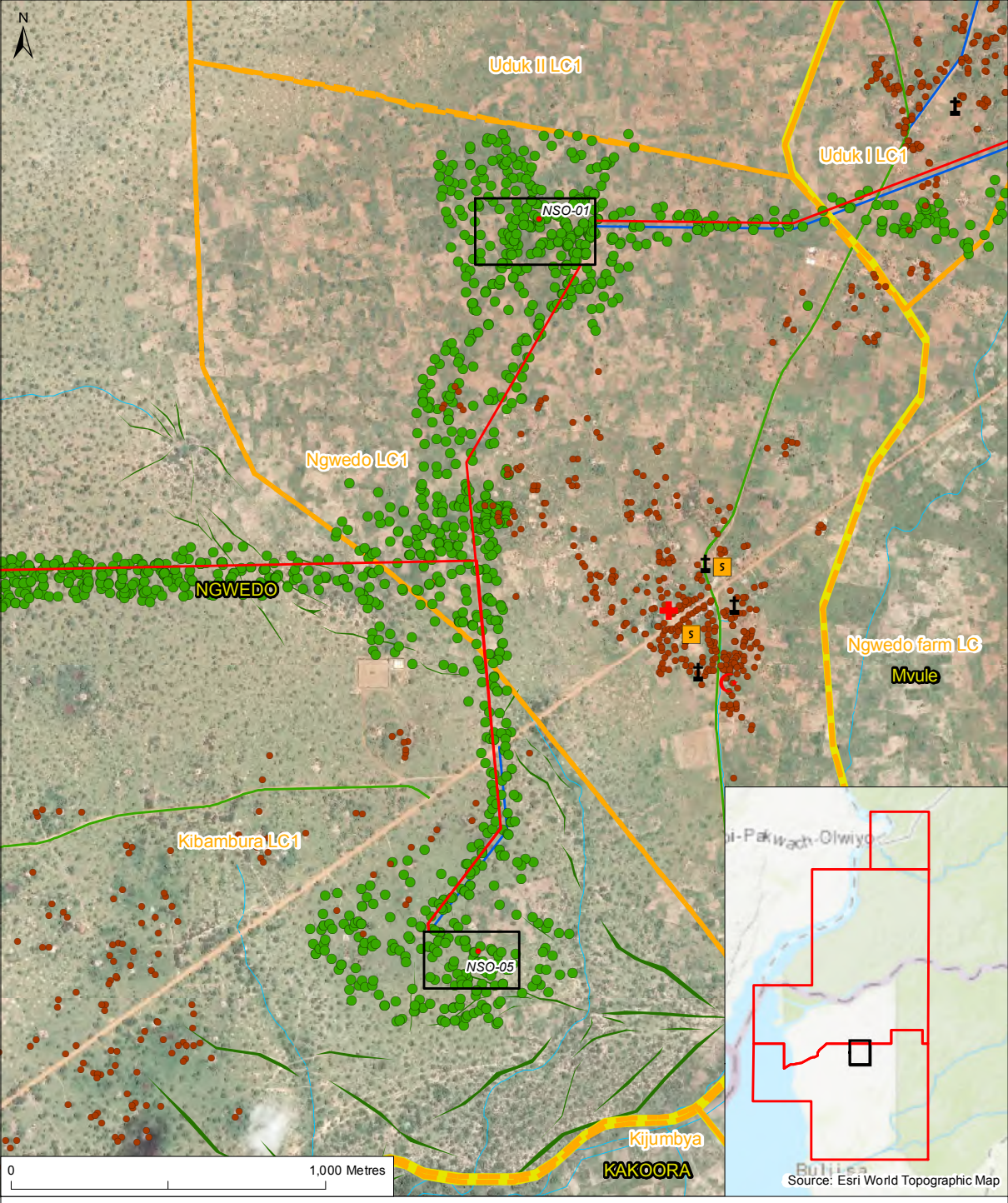
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-01 to NSO-05

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

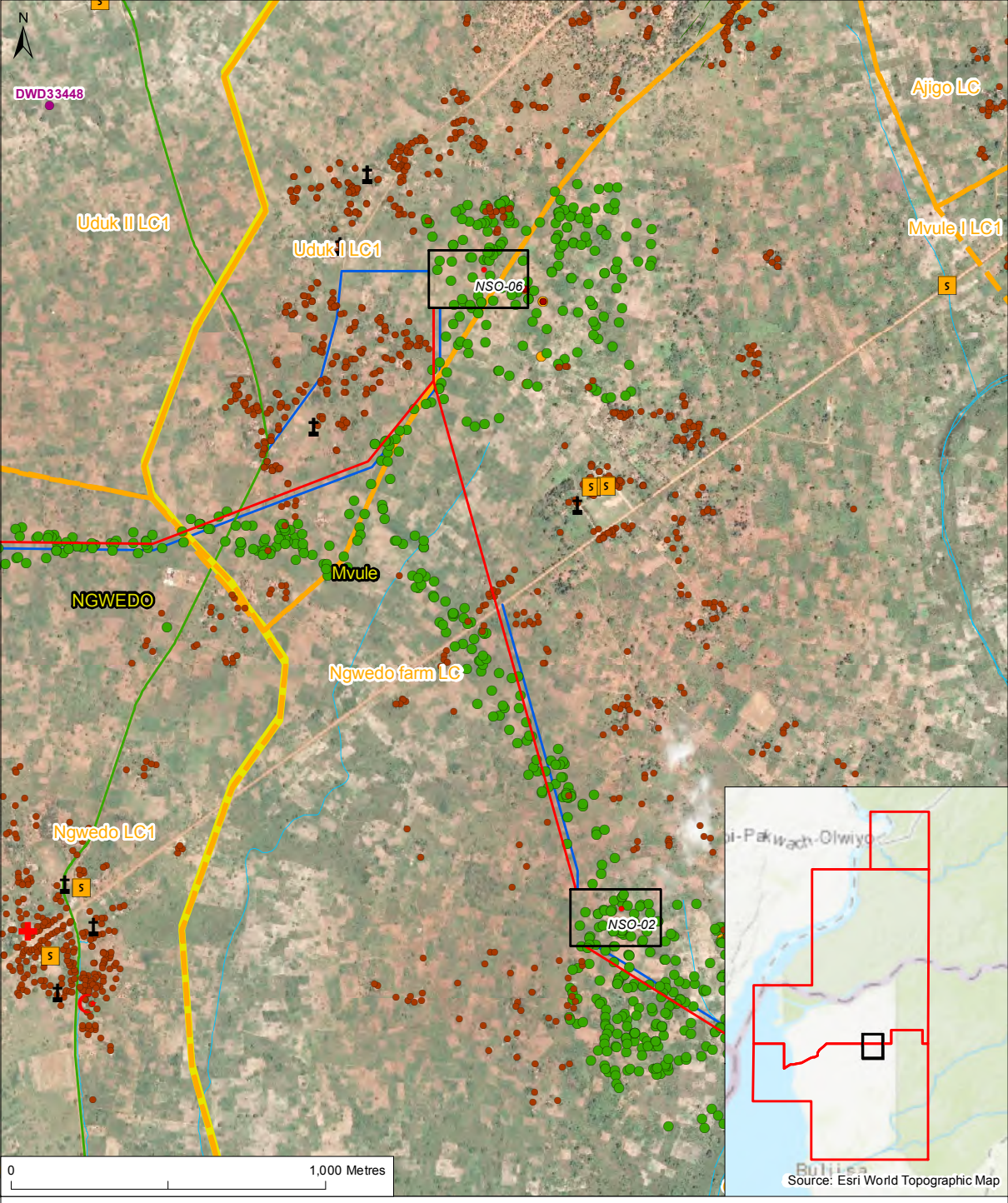
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-02 to NSO-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

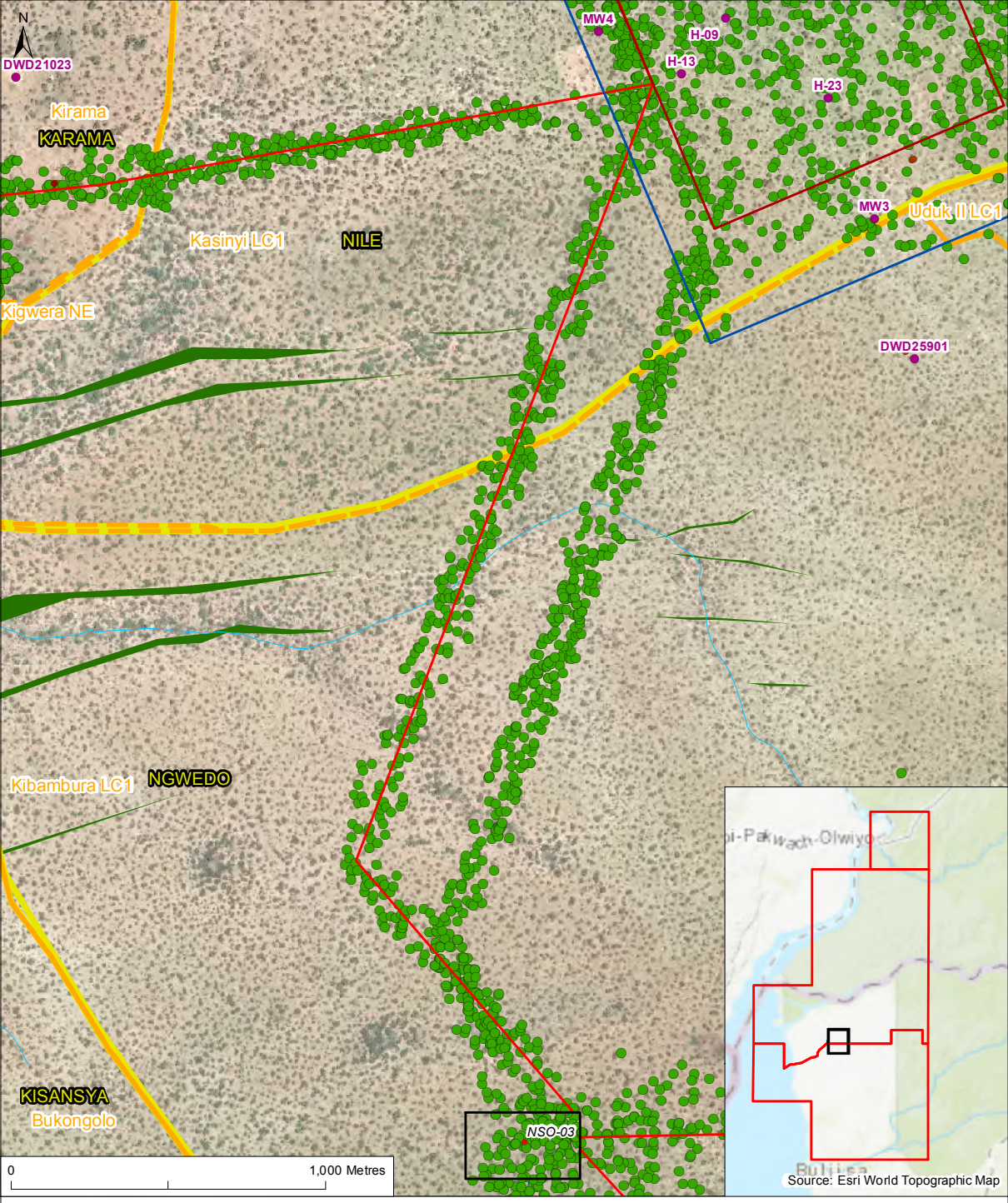
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-03 to CPF

- Wellpad location
- Wellpad Extent - Maximum
- Industrial Area
- CPF
- Production and Injection Network
- Parish
- Village

Main Social Receptors

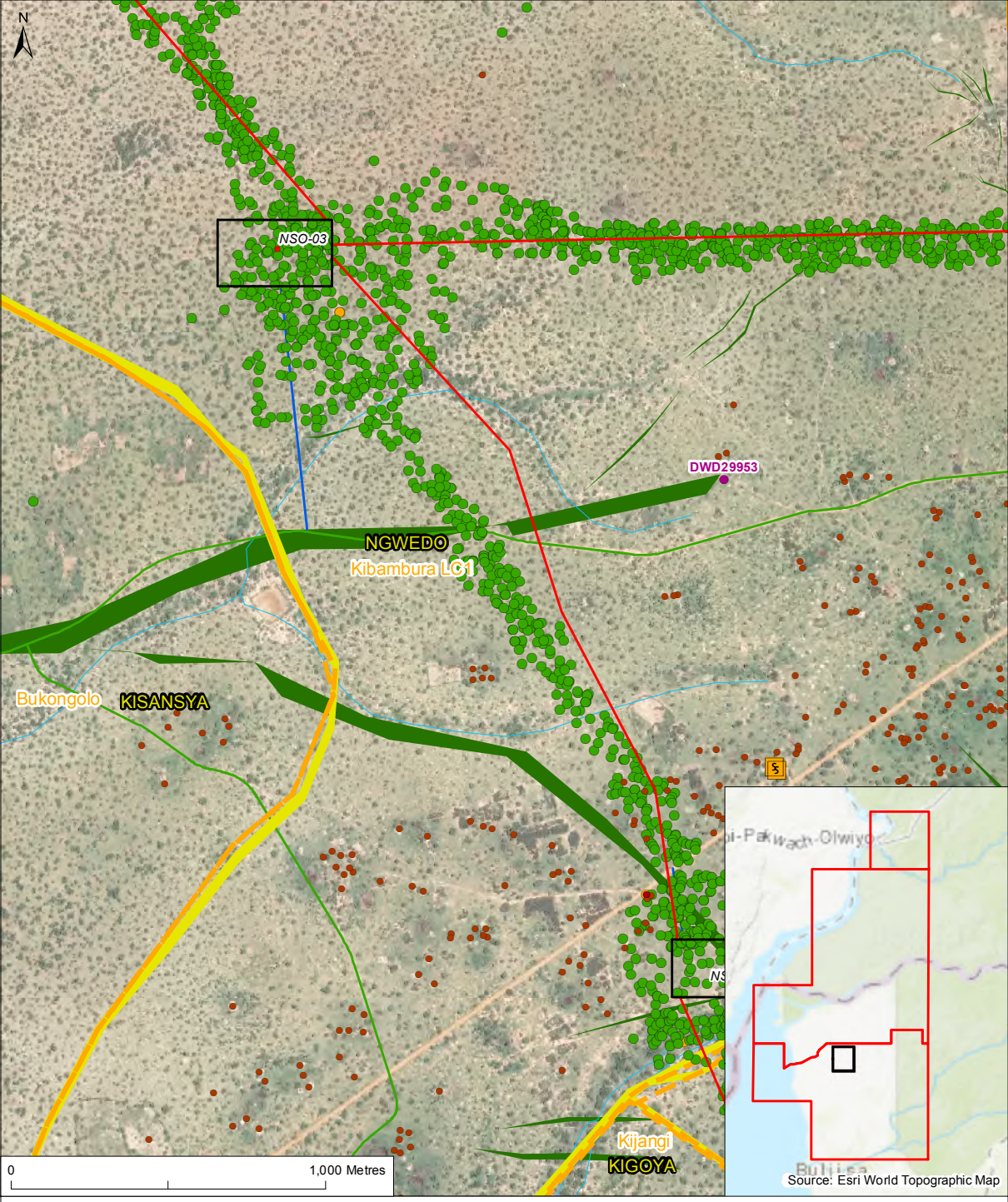
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-04 to NSO-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

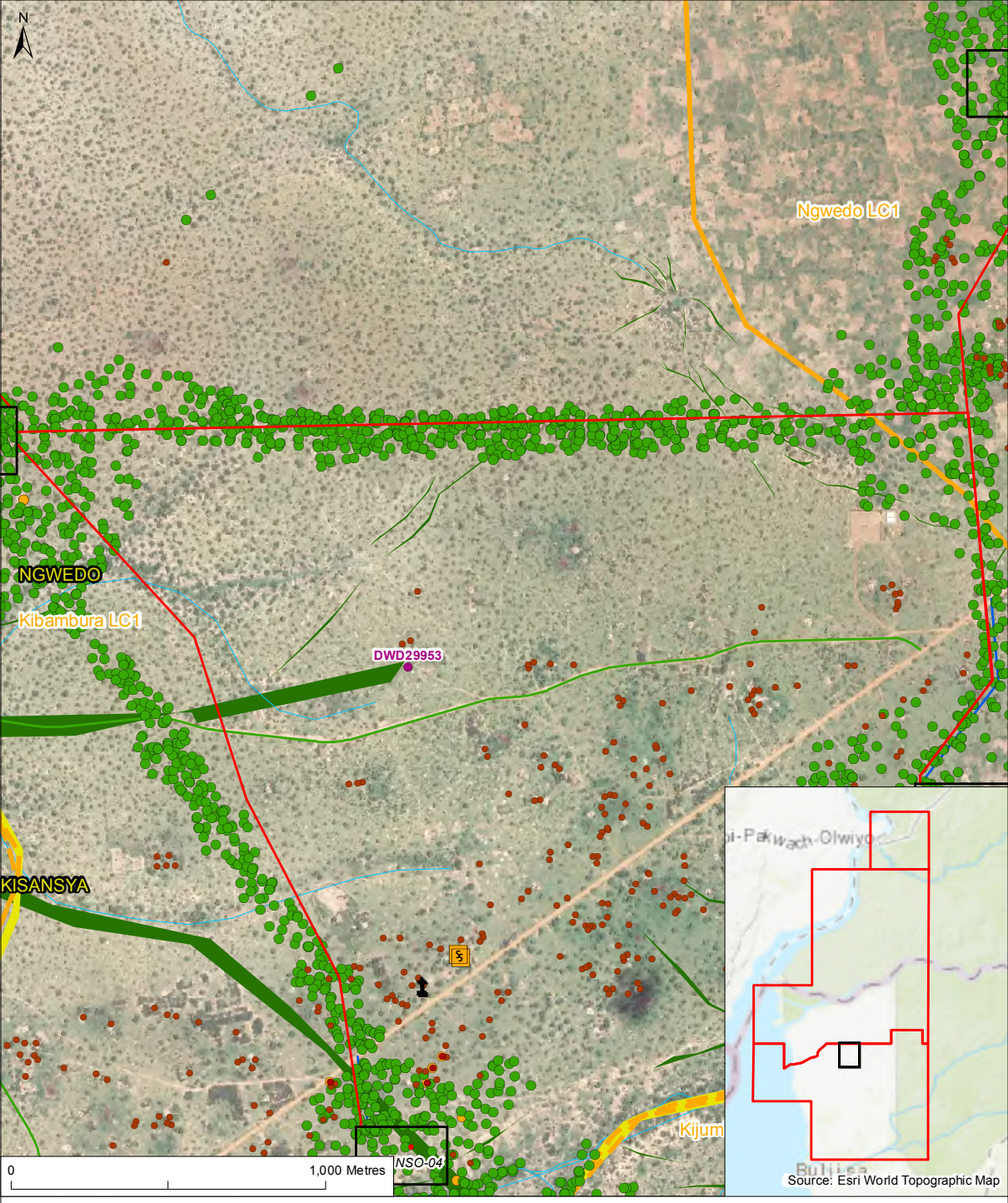
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-05 to NSO-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

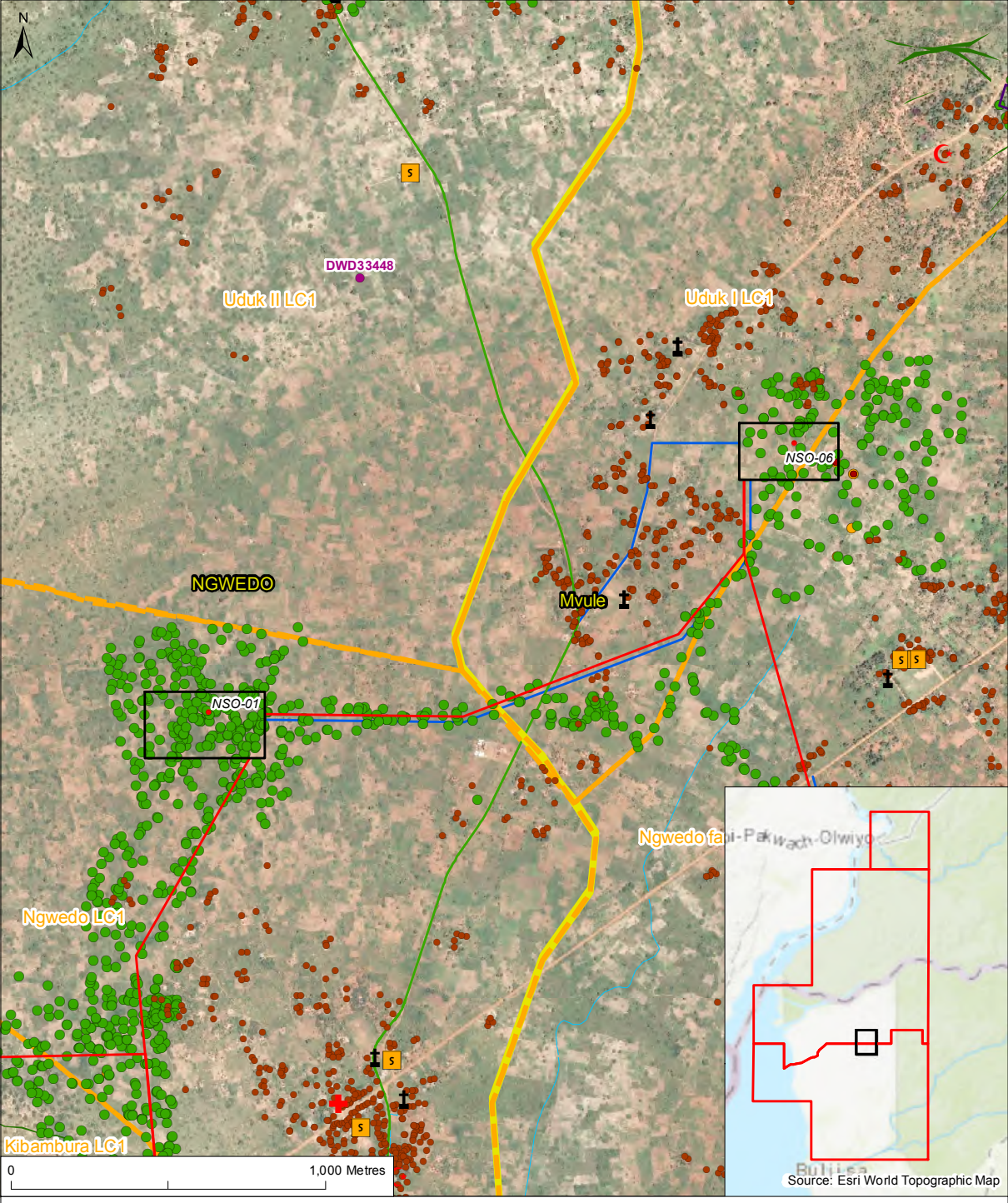
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE NSO-06 to NSO-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

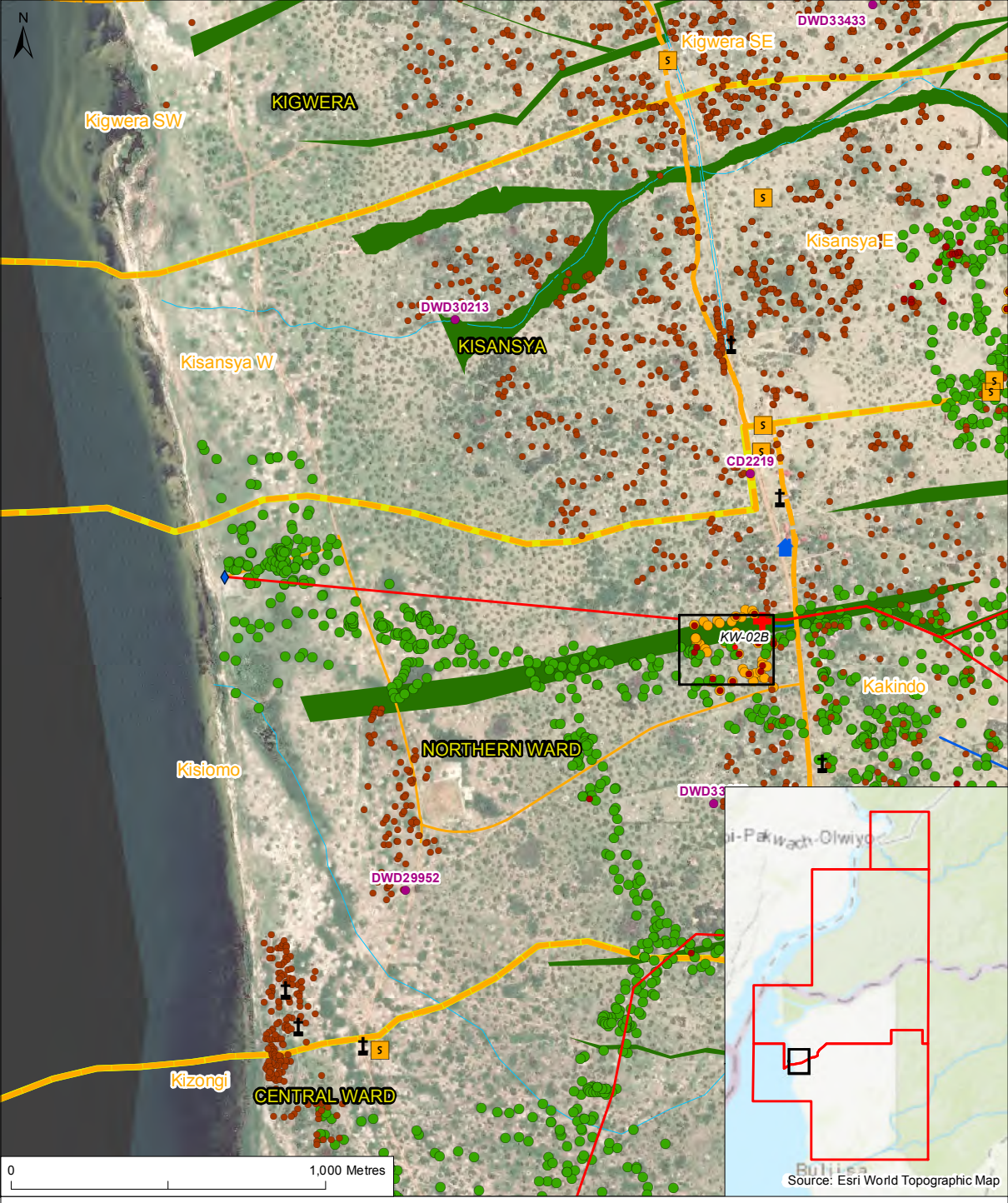
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE Water station to KW-02B

- Wellpad location
- Wellpad Extent - Maximum
- Water Abstraction System
- Production and Injection Network
- Parish
- Village

Main Social Receptors

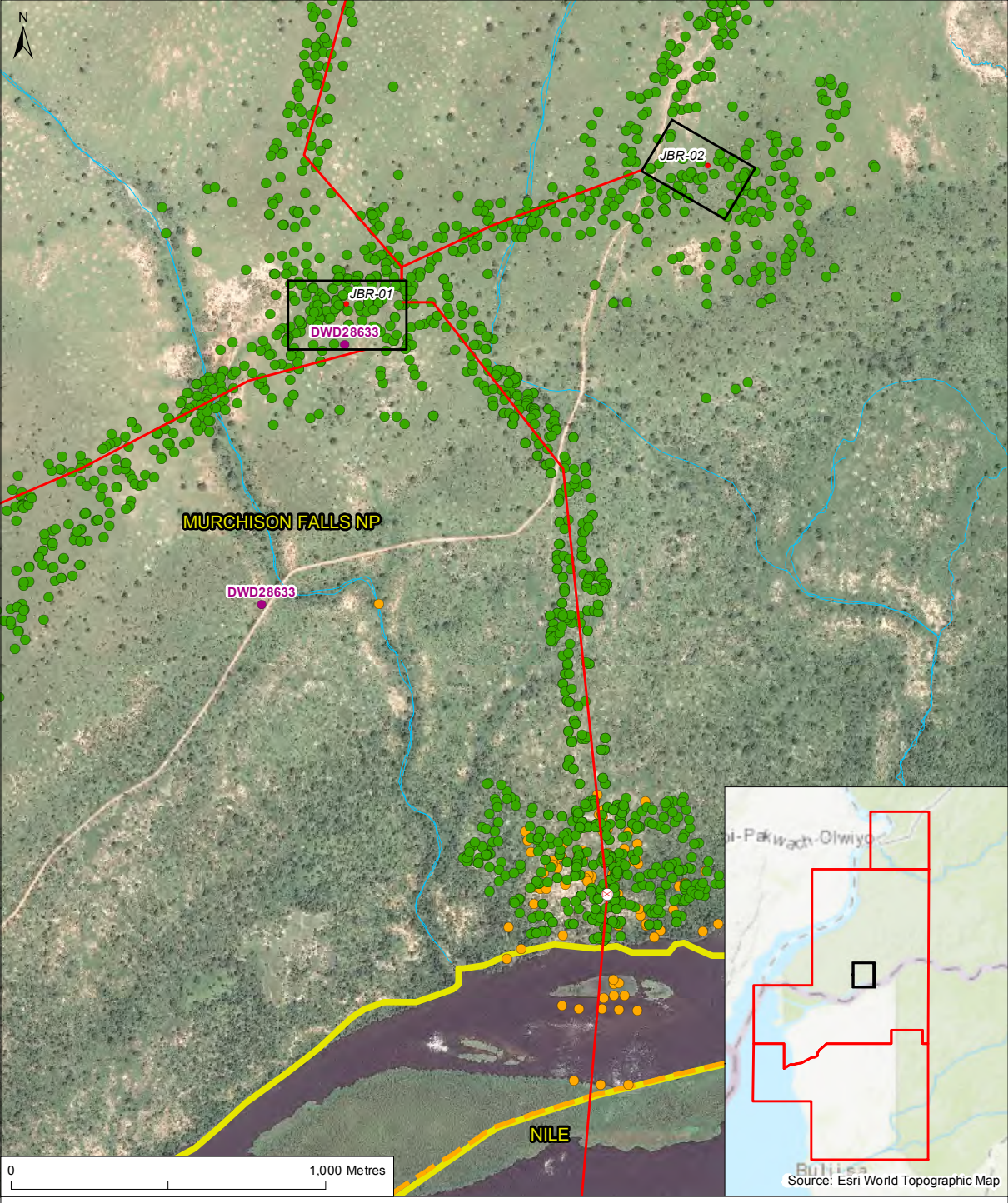
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-01 to NIV (Option 1)

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 1
- Production and Injection Network
- Parish
- Village

Main Social Receptors

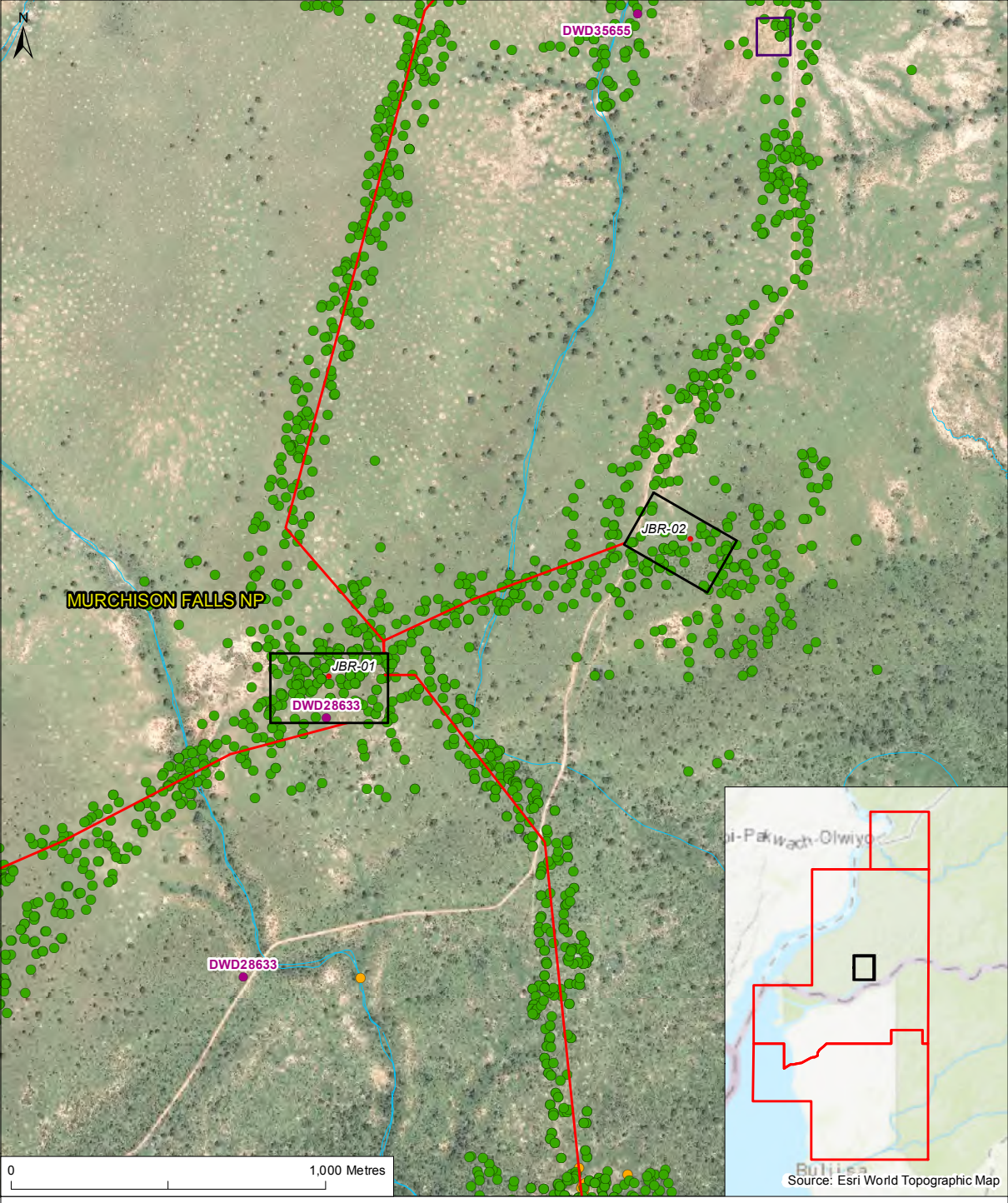
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-02 to JBR-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

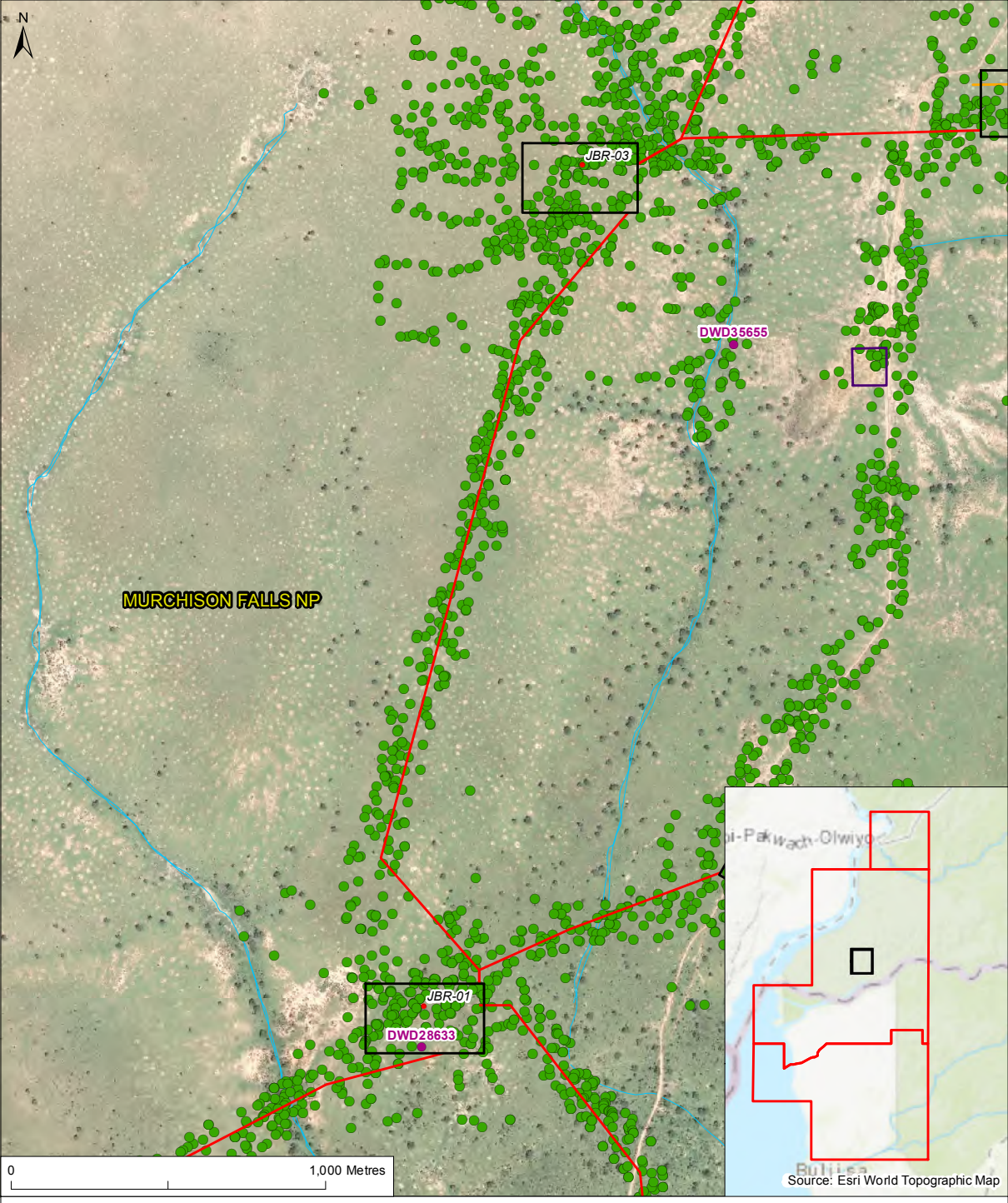
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-03 to JBR-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

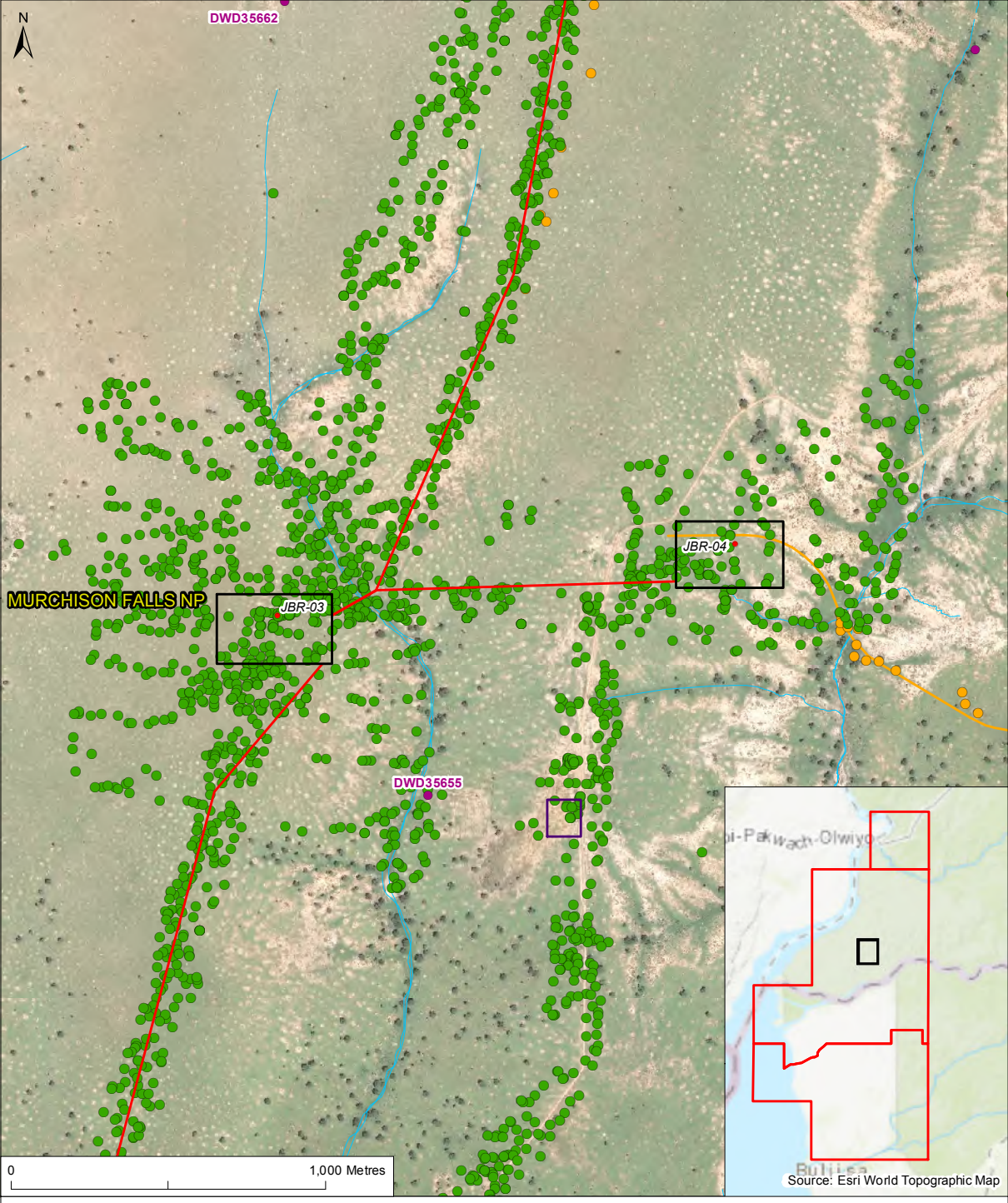
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-04 to JBR-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

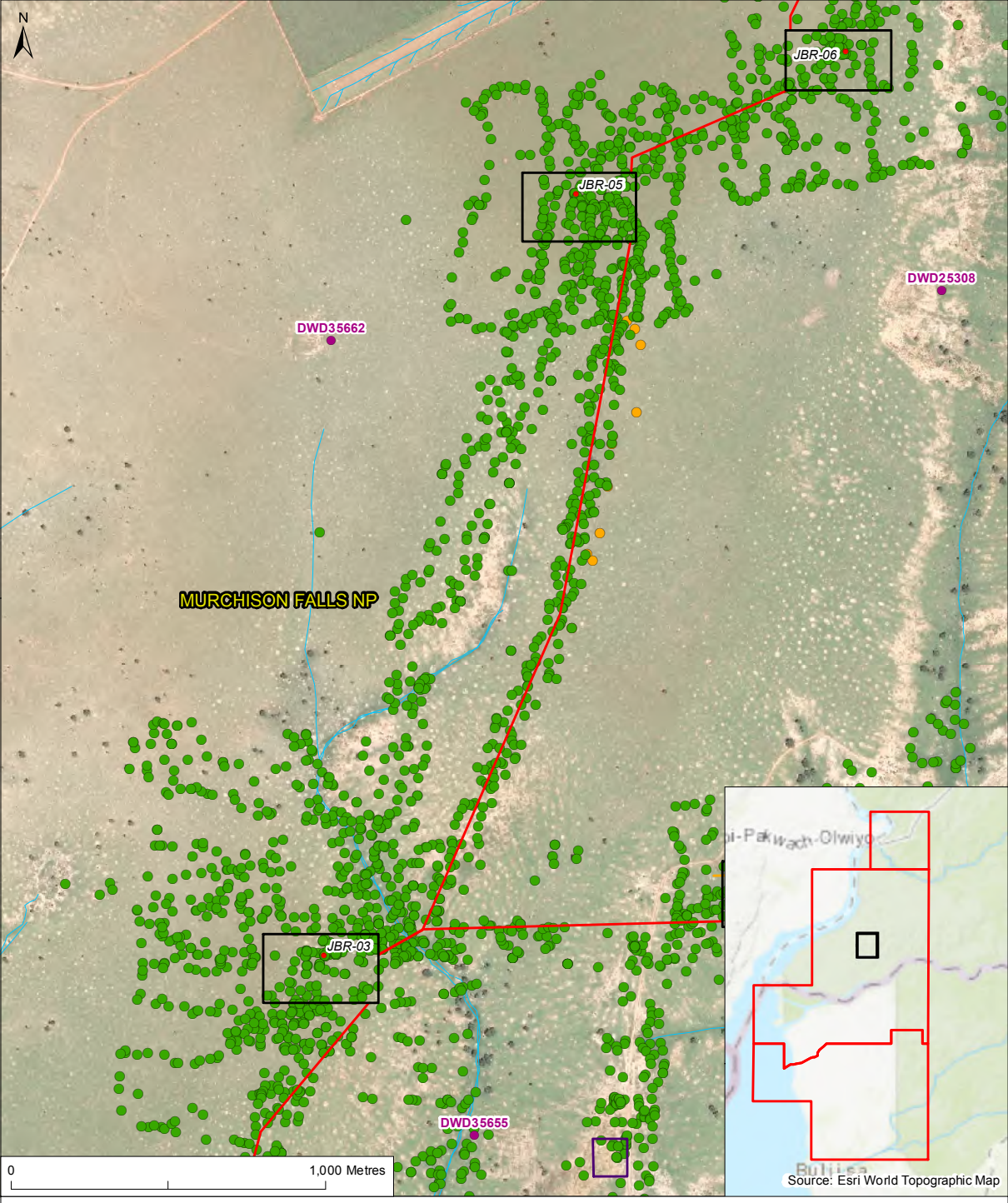
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-05 to JBR-03

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

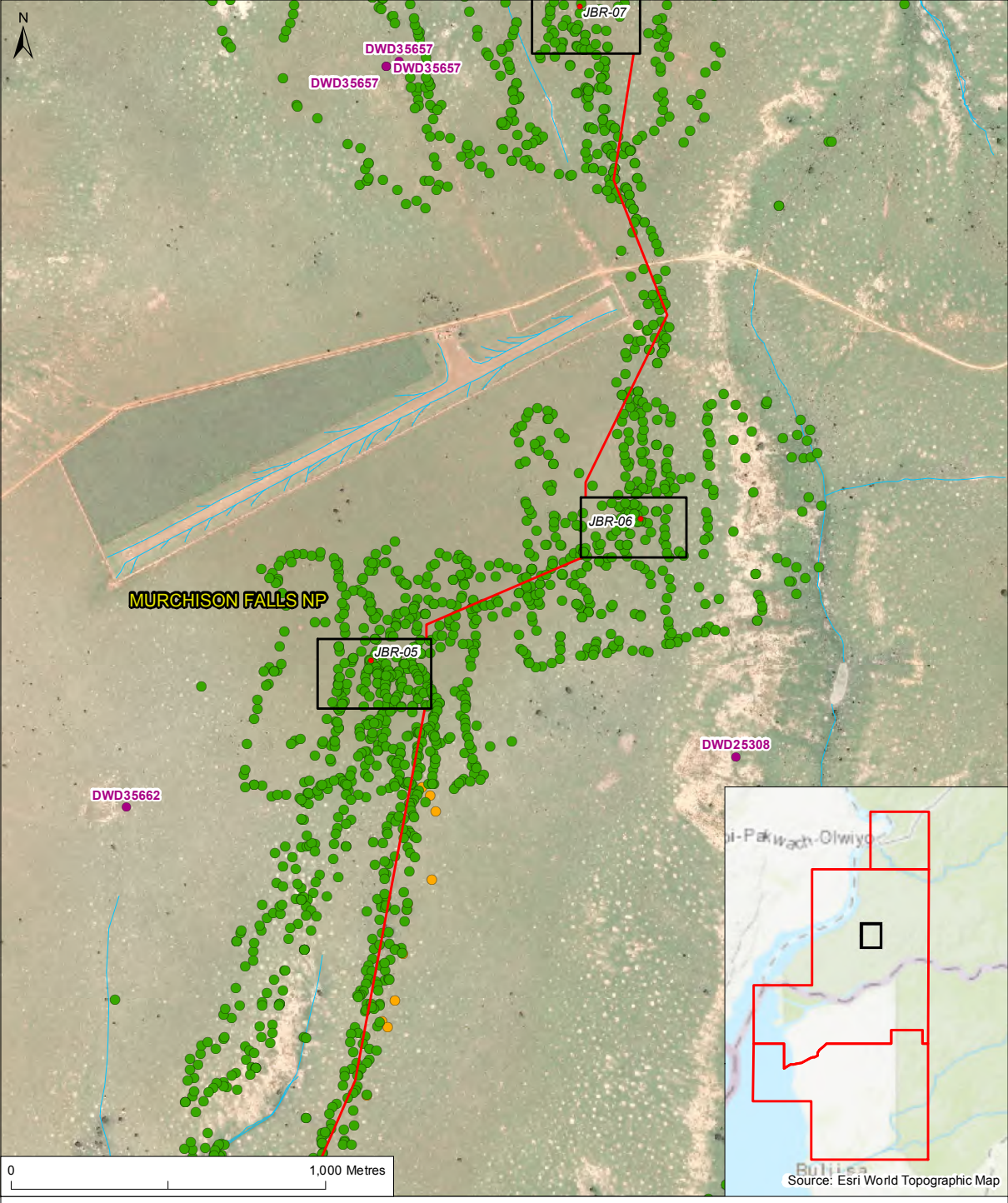
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT AECOM



FACT SHEET - FLOWLINE JBR-06 to JBR-05

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Murram Borrow Pit Location
- Parish
- Village

Main Social Receptors

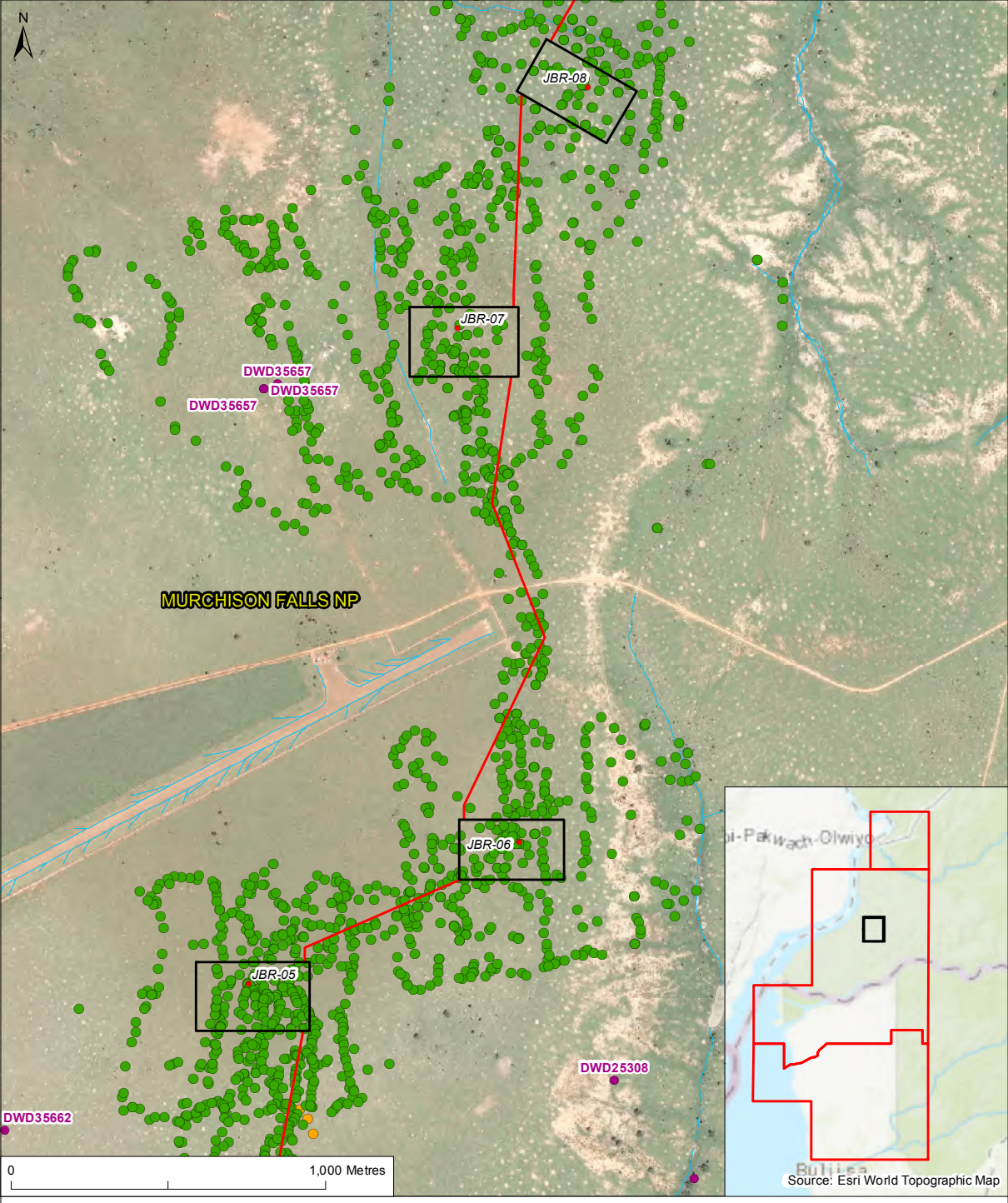
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-07 to JBR-06

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

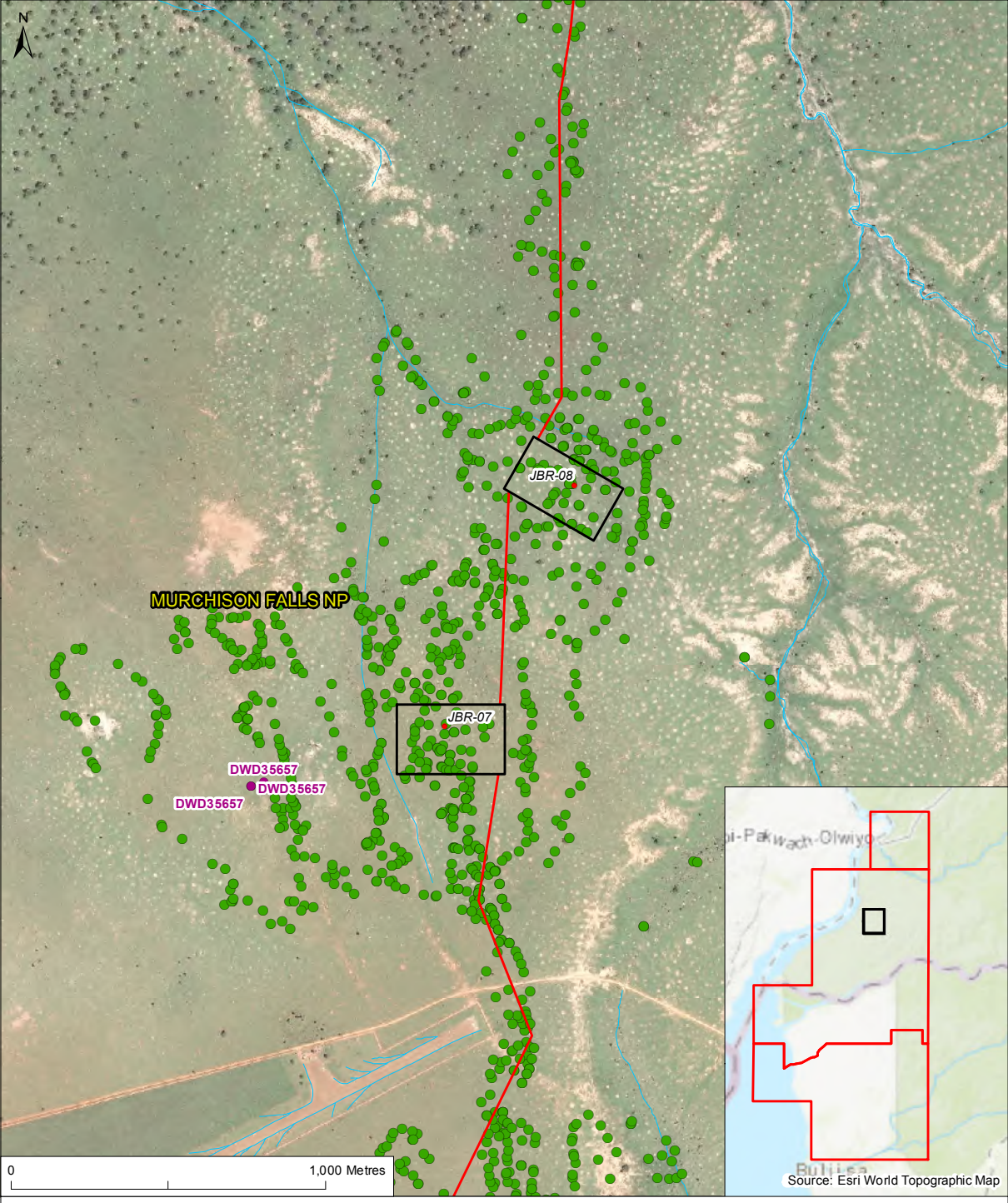
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-08 to JBR-07

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

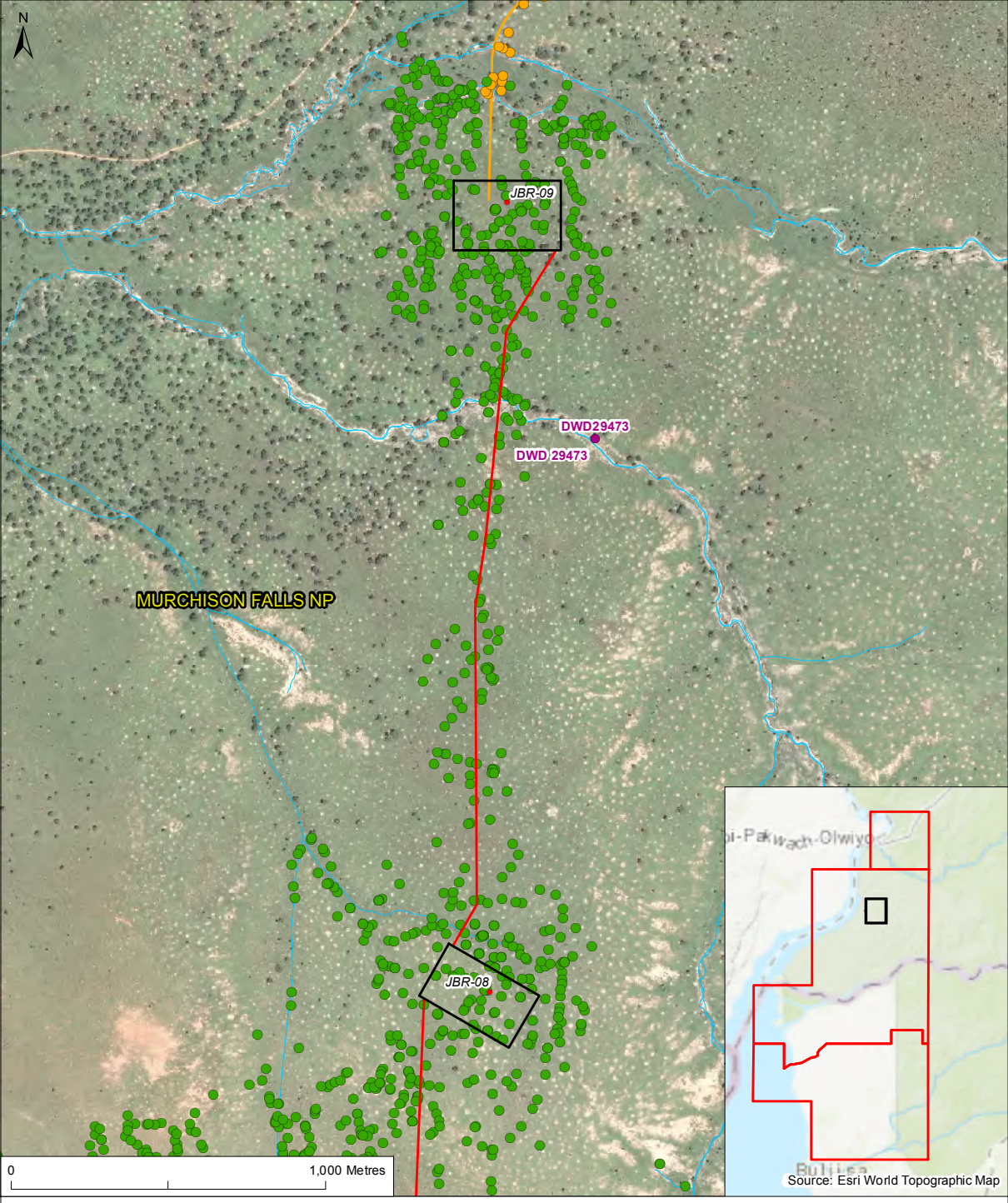
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-09 to JBR-08

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

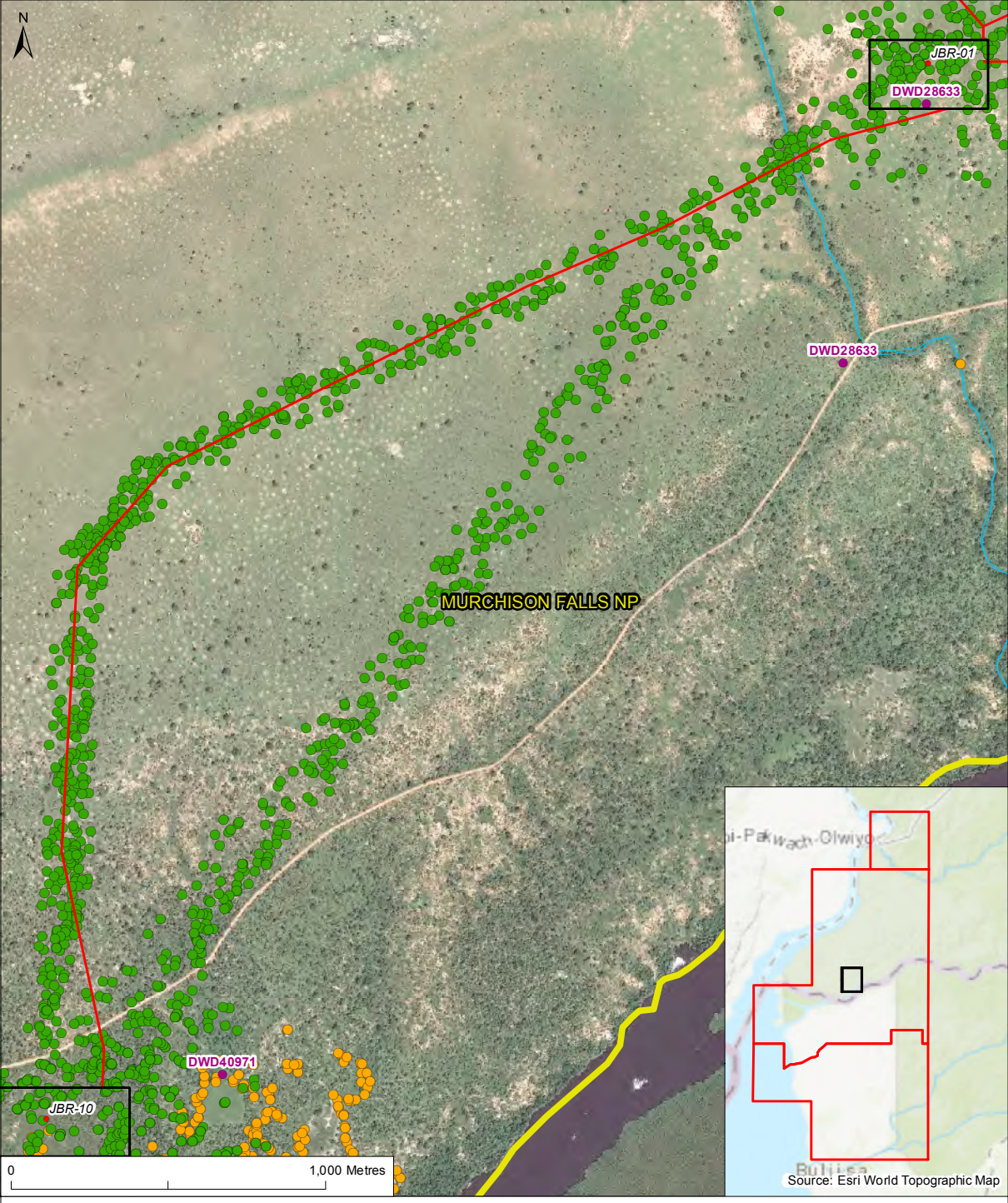
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-10 to JBR-01

- Wellpad location
- Wellpad Extent - Maximum
- Production and Injection Network
- Parish
- Village

Main Social Receptors

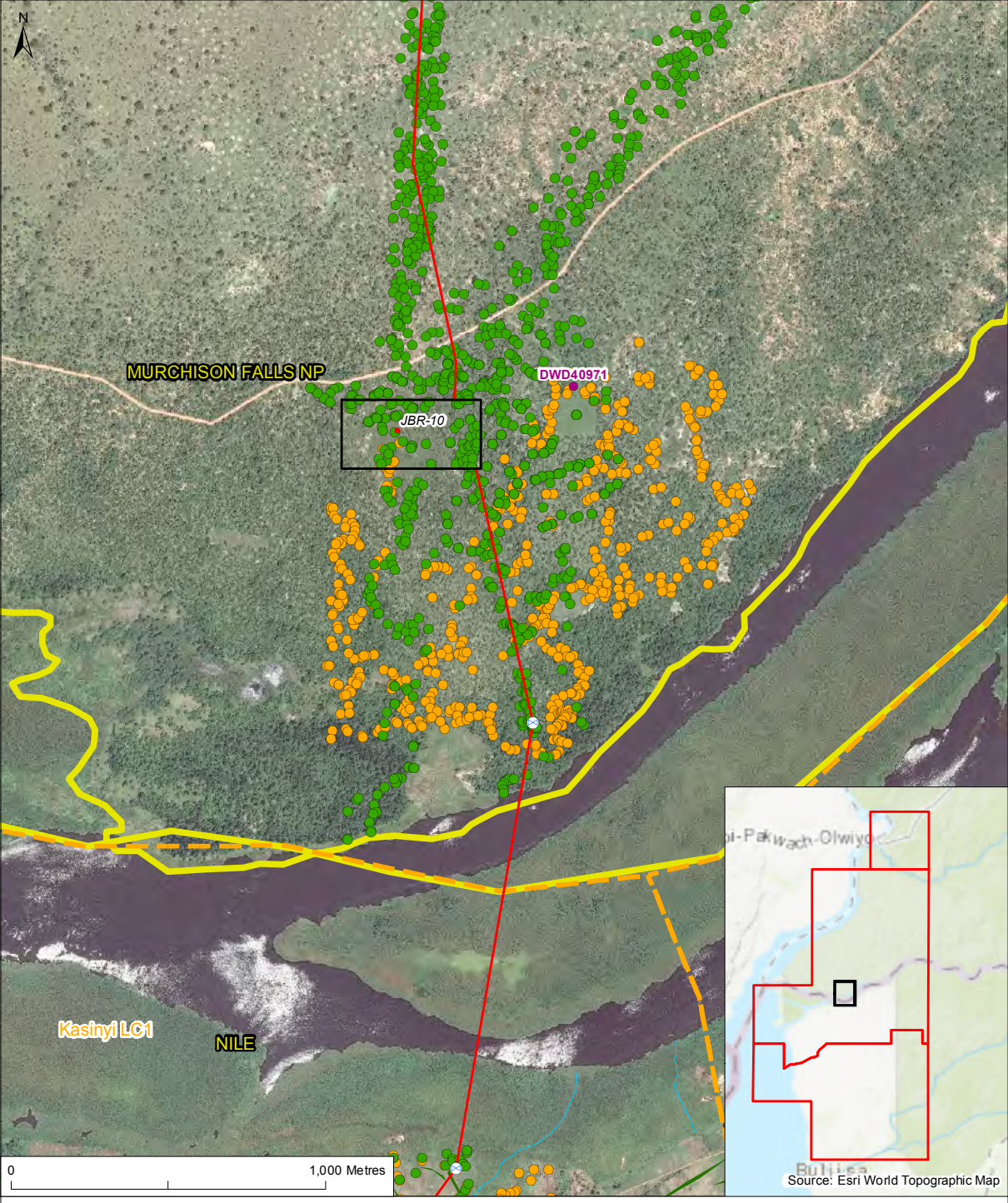
- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM



FACT SHEET - FLOWLINE JBR-10 to NIV (Option 2)

- Wellpad location
- Wellpad Extent - Maximum
- Victoria Nile Pipeline HDD Crossing - Option 2
- Production and Injection Network
- Parish
- Village

Main Social Receptors

- Settlement
- School
- Lodge
- Clinic / Drug Shop / Health Center
- Place of worship
- Place of worship - Mosque

- DWRM / MW Well
- New roads
- Upgraded roads
- Inter field access roads
- Watercourse

- AECOM Biodiversity Surveys (2016- 2018)
- TEPU Biodiversity and Social Surveys (2016-2017)
- Cattle corridor

Drawn: LC Checked: GM Approved: MW Date: 10/05/2018 Scale @ A4 1:20,000 Coordinate Reference System: WGS 1984 UTM Zone 36N

TILENGA PROJECT
AECOM

TILENGA PROJECT ESIA - APPENDIX C: Early Works Project Brief (PB) Executive Summary and Enabling Infrastructure Geotechnical surveys PB Executive Summary

May 2018

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TILENGA EARLY WORKS

PROJECT BRIEF

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ISO 9001:2008 REGISTERED FIRM

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February 2018

AWE is member of International Federation of Consulting Engineers (FIDIC-GAMA)

Uganda. Kenya. Rwanda .USA

Early Works Project Brief – Executive Summary - Re-submission

EXECUTIVE SUMMARY

01. Background

With the target to achieve first oil 2020, GoU awarded production licenses to Total Exploration and Production Uganda B.V. (TEPU) and its two joint venture partners Tullow Uganda Operations Pty Ltd. (TUOP) and CNOOC Uganda Ltd. (CUL) in 2012 to CUL and in 2016 to TEPU and TUOP to develop and operate upstream petroleum facilities in the Albertine Graben.

TEPU has been licensed to develop oil wells in Contract Area 1 (CA1), while TUOP is licensed to develop those in Licence Area 2 (LA2). The Tilenga project is being developed by the Joint Venture (JV) Partners. Tilenga is the project name for the development of petroleum production facilities in CA1 and the Northern part of the LA2 located in Buliisa and Nwoya Districts in Uganda. The name Tilenga is derived from the 2 local names for the Uganda Kob (Antelop), called Til in Acholi and Engabi in Lugungu.

An ESIA for the Tilenga Project is also being undertaken (hereafter referred to as Tilenga ESIA) based on the approved Terms of Reference from NEMA. The Tilenga ESIA will cover all Project components and address potential environmental and social impacts for the life of the Project, from vegetation clearing to decommissioning. The development of the Tilenga Project will be phased. The first implementation phase will be the "Early works" activities to conduct preparatory works such as boundary marking and fencing, vegetation clearing, earthworks and also improve transport infrastructure that will be integral to the development of the Tilenga Project. It will be followed by project facilities construction, commissioning, operations prior to decommissioning.

Resettlement Action Plans (RAPs) to enable land acquisition for the project facilities are also being undertaken.

In line with National Environment Act (NEA), TEPU contracted Air Water Earth (AWE) Ltd. to conduct environmental studies and consultations with respective stakeholders to develop a Project Brief (PB) for Early works in respect to Oil and Gas Development and Production activities in CA1 and LA2.

02. Project Components

The following enabling infrastructure is covered in the PB:

i) Industrial area to locate the Central Processing Facility; construction camp (CC) and support base (CSB); operation camp (OC) and support base (OSB);
ii) Proposed new roads to bypass towns along the route to minimize interference and impact to local communities and also reduce travel time to the Industrial area and other key Project locations;
iii) Proposed road upgrades to enlarge roads to cater for anticipated Project traffic, and also provide suitable drainage on the roads;
iv) Airstrip upgrade to enable handling of expected increased traffic.

Scope of the Project Brief

The PB covers the following activities for the Project:

i) Boundary marking and fencing (Industrial area and airstrip upgrade);
ii) Earthworks including vegetation clearing, top soil removal, levelling, compaction (all components);
iii) Drainage works (Industrial area, airstrip and roads);
iv) Transportation of materials (e.g. murram);
v) Waste management (all components);

The PB is submitted to NEMA, who is responsible for its review and approval.

03. Project Purpose

The purpose of the Project is to undertake preparatory works for enabling infrastructure and facilities (Early works) necessary for Tilenga Project development.

04. Nature of Project according to NEA1995

Under the Third Schedule of the NEA, this Project is categorised under "1(b) – any structure of a scale not in keeping with its surroundings; 3 (b) all roads in scenic, wooded or mountainous areas, (d) airports and airfield; and 9 (l) chemical works and process plants".

05. Project Schedule

In order to meet the timelines for first oil in the year 2020, the early works must take place as soon as possible.

The proposed duration for the various components of the Early works is as follows:

i) Industrial area site preparation – 06 to 09 months;
ii) New Roads – 05 to 07 months;
iii) Upgrade Roads – 04 to 06 months;
iv) Bugungu airstrip – 07 months.

Early works are scheduled to start in the Second Quarter of 2018. Activities at the the above project components will overlap, with some taking place simultaneously. Early works activities at the Industrial area will overlap with the Tilenga construction activities; this will ensure no redundant time at the industrial area.

06. Site Organistion

Early works contractor personnel are planned to be accommodated in the existing Bugungu and Buliisa camps and would commute every day to the work sites. Most of the workers hired from the local communities are expected to reside at their homes and commute to the work sites.

At the Industrial area, the site layout is anticipated to include as a minimum, sanitary facilities, offices, parking yard for heavy equipment and vehicles, warehouse, area to clean/maintain vehicles and equipment, and utilities and power generation as required. The proposed site organisation is temporary for the period of Early works.

07. Project Logistics

Trucks will be required to transport materials to site and waste off the site to designated areas or waste management facilities. Trucks will therefore transport incoming materials such as soil, gravel, fencing material, drainage construction material; as well as remove cleared bush, stripped top soil and excavated earth from drainage channels. An estimated 70 trucks will be required for the Early works, at an average movement of 04 trips per truck per day.

Equipment required will include 04 medium sized Excavator (for drainage works at Industrial area and roads), 05 Graders, 08 Loaders, 06 Bull dozer, 07 Light duty vehicles, 04 Shuttle bus, 03 Water bowser and 04 compaction Rollers,

08. Project Workforce

100 – 500 people will be engaged on site for the duration of the Early works.

09. Project Location

The study area covers the sub counties of Ngwedo, Buliisa, Kigwera and in particular parishes of Nile, Avogera, Mvule, Bugana, Kisansya, Kirama and Kigwera in Buliisa district (Figure-1). A total of 24 villages made up the study scope. The Bugungu airstrip is within Masindi district.

10. Next Phase of Tilenga Project

Completion of the Early works will enable commencement of the next phases of Tilenga Project (upon ESIA approval). Currently the project is in the Front End Engineering Design (FEED) stage, where all necessary technical definition and cost and schedule estimates are being developed to allow the JV Partners to make a recommendation for a Final Investment Decision (FID) expected as early as possible in 2018, and lead to the project execution and construction phase required to produce Uganda's Oil targeted by end 2020.

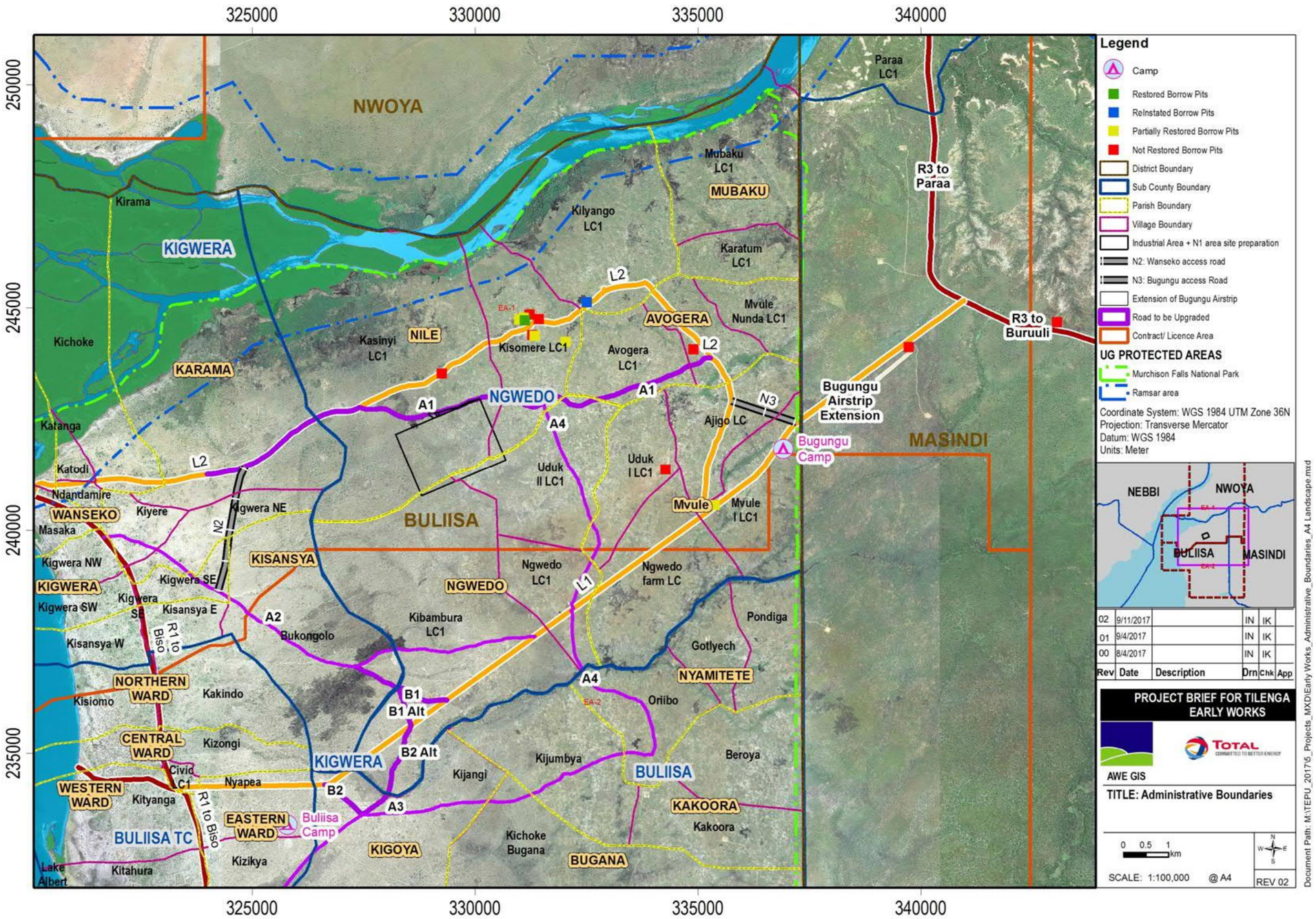

Figure -1: Project location, including the Administrative Boundaries

11. Study methodology

The environmental conditions of the project area of influence (project components and potential receptors) have been assessed by carrying out baseline surveys/studies; which are intended to provide a measure of existing environment and the socio-economic situation against which future changes due to the project implementation can be monitored. The baseline environment studies aid in assessing impacts and developing appropriate monitoring indicators and mitigation measures. Specialised activities included:

i. Air Quality;
ii. Ambient Noise;
iii. Soils and geology;
iv. Water resources;
v. Waste management;
vi. Biodiversity;
vii. Ecosystem services;
viii. Stakeholder consultations;
ix. Socio-economic conditions;
x. Cultural Heritage and Archaeology;
xi. Landscape and Visual Aesthetics.

12. Stakeholder Consultations

Stakeholder consultations were held for the Project, as listed in Table ES 01.

Table ES01: List of stakeholders engaged

Category	Stakeholder
National level institutions	Ministry of Energy and Mineral Development
	Petroleum Authority of Uganda (PAU), in Ministry of Energy & Mineral Development
	Petroleum Exploration, Development and Production Department, in Ministry of Energy & Mineral Development
	National Environment Management Authority (NEMA)
	Directorate of Water Resources Management (DWRM) in Ministry of Water & Environment
	Occupational Health & Safety Department in Ministry of Gender, Labour & Social Development

Category	Stakeholder
	Social Protection Department in the Ministry of Gender, Labour and Social Development
	Gender and Community Development Department in the Ministry of Gender, Labour and Social Development
	Department responsible for museums and monuments in the Ministry Tourism Wildlife and Antiquities
	Department of Land Administration in the Ministry of Lands, Housing and Urban Development
	Department of Urban Development in the Ministry of Lands, Housing and Urban Development
	Uganda Wildlife Authority (UWA)
	Uganda National Roads Authority (UNRA)
	Civil Aviation Authority
Buliisa District Local Government	LC V, Chief Admninistration Officer (CAO), Assistant CAO, Speaker, Community Development Officer (CDO), Environment Officer, Community Liaison Officer,
Sub-counties in the Project Area	LC III, SAS/Chief, Councillors, Sub-accountants in Buliisa, Kigwera, Ngwedo and \Buliisa Town Council
Local Councils	Kasinyi, Kisomere, Kilyango, Avogera, Kamandindi, Uduk I, Ajigo, Ngwedo Central, Kibambura, Gotlyech, Uriibo, Kichoke-Bugana, Kijumbya, Kijangi, Kizikya, Kigwera SE & NE, Bikongoro, Kirama, Kiyere
Civil Society	Civil Society Coalition on oil and gas (CSCO)

13. Potential impacts identified

The potential environmental and social impacts that may arise due to implementation of the various components of the Early works project and proposed mitigation recommendations are discussed in detail in this PB. A summary of impacts and the residual impacts significance is provided in Table ES02.

Table ES02: Residual Impacts

Potential Impact	Impact significance (after mitigation)			
	Industrial area	Roads construction	Airstrip upgrade	Material sourcing
Impact on Air Quality				
Dust Generation	Minor	Minor	Minor	Minor
Exhaust emissions	Minor	Minor	Minor	Minor
Impact on Noise and Vibration	Minor	Minor	Minor	Minor
Impact on Soils and Geology				
Soil erosion	Minor	Minor	Minor	Minor
Soil quality	Minor	Minor	Minor	Minor
Soil compaction	Minor	Minor	Minor	Minor
Impact on Water Resources				
Water quality	Minor	Minor	Minor	Minor
Water quantity	Minor	Minor	Minor	Negligible
Hydrology	Minor	Minor	Minor	Minor
Impact on Biodiversity				
Loss of habitat	Moderate	Minor	Moderate	Minor
Disturbance to fauna	Minor	Minor	Minor	Negligible
Human Wildlife Conflict	Negligible	Negligible	Minor	Minor
Impact on socio-economic conditions				
Benefit to national economy	Benefit	Benefit	Benefit	Benefit
Improvement of road network in Project area	Benefit	Benefit	Benefit	Benefit
Tourism growth from the improved Bugungu airstrip	Benefit	Benefit	Benefit	Benefit
Employment	Benefit	Benefit	Benefit	Benefit
Income from material/equipment suppliers and contractors	Benefit	Benefit	Benefit	Benefit
Involuntary resettlement, physical and consequential displacement	Moderate	Moderate	Not Applicable	Negligible
Impact on food security	Moderate	Moderate	Not Applicable	Negligible
Pressure on social infrastructure and services	Minor	Minor	Not Applicable	Minor
Pressure on available natural resources	Moderate	Moderate	Not Applicable	Moderate
Increase in social tensions / pressure on health and security	Minor	Minor	Not Applicable	Minor
Impact on archaeology and cultural heritage	Minor	Minor	Negligible	Negligible
Impact on landscape and visual	Minor	Minor	Minor	Minor

Potential Impact	Impact significance (after mitigation)			
	Industrial area	Roads construction	Airstrip upgrade	Material sourcing
aesthetics				

Residual impacts are negligible, minor or moderate; the latter being tolerable in consideration of mitigation measures that will minimise the impact to as low as reasonably practicable.

14. Cumulative Impacts

Cumulative impacts are socio-economic and environment effects which result from incremental impact of the project when added to other past, present, and reasonably foreseeable future actions. These will be assessed and included as part of the Tilenga Project ESIA. This PB has only considered cumulative impacts associated with additional road programmes known to take place in parallel to Early works.

15. Environmental and Social Management Plan

TEPU has a Company Management System (CMS) which governs all of its operations. A number of over-arching plans and procedures are in place, or planned to be developed which address environmental and social aspects for the operations programme as a whole. These have been referred to where appropriate in this PB, and form part of the management regime under which the proposed project will be undertaken.

The ESIA process reported in this PB has outlined the need for additional, project-specific mitigation measures to ensure that the project is completed with the minimum adverse environmental and social impact.

The project Environmental and Social Management Plan (ESMP) incorporates both the operations-wide documents and the project-specific measures identified by the PB. The project-specific measures provided in the ESMP are designed to be comprehensive and implementable. The ESMP also includes monitoring measures designed to ensure that compliance with the plans can be checked and recorded during implementation, and assign responsibility for these actions.

16. Conclusion

The Early works for the Tilenga Project are aimed at facilitating the progress of the required infrastructure for the overall Tilenga project development towards meeting the Government of Uganda (GoU) and JV Partners target of first oil in the year 2020. Implementation of the Early works include preparation works at the Industrial area (boundary marking and fencing, earthworks, drainage works), new roads, roads upgrade and Bugungu airstrip upgrade.

The ESMP in this PB has made consideration of the environmental and social safeguards required for the sustainable development and completion of the Early works activities. With the implementation of these safeguards as part of the Early works Project implementation, the potential adverse impacts of these activities will be mitigated to as low as reasonably practicable, and the positive impacts enhanced.

The Tilenga ESIA (ongoing) will cover all Project components and address potential environmental and social impacts for the life of the Project, from vegetation clearing to decommissioning. Resettlement Action Plans are also being developed for the Project. The mitigation measures proposed for the Early works in this PB will be reflected in both RAP and Tilenga ESIA.

This report has been updated as per the concerns from the various stakeholders and NEMA (letter dated 14th December, 2017 with Ref: NEMA/4.5, here attached) in relatation to the earlier submitted Project Brief received by NEMA on 18th September 2017. A reponse matrix was developed in relation to the update.

Geotechnical Project Brief for Enabling Infrastructure – Executive Summary - November 2017

GEOTECHNICAL SURVEYS FOR THE ENABLING INFRASTRUCTURE

PROJECT BRIEF

Conducted for:

Total E&P Uganda

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November 2017

EXECUTIVE SUMMARY

01. Background

In an effort to meet the Government of Uganda (GoU) target of first oil in the year 2020, GoU awarded production licenses to Total Exploration and Production Uganda B.V. (TEPU) and its two joint venture partners; Tullow Uganda Operations Pty Ltd. (TUOP) and CNOOC Uganda Limited (CUL) in 2012 to CUL and in 2016 to TEPU and TUOP to develop and operate upstream petroleum facilities in the Albertine Graben.

TEPU has been licensed to develop oil wells in Contract Area 1 (CA1), while TUOP is licensed to develop those in Licence Area 2 (LA2). The Tilenga project is being developed by the Joint Venture (JV) Partners. Tilenga is the project name for the development of petroleum production facilities in CA1 and the Northern part of the LA2 located in Buliisa and Nwoya Districts in Uganda. The name Tilenga is derived from the 2 local names for the Uganda Kob (Antelop), called Til in Acholi and Engabi in Lugungu.

Before first oil is realised, there is a need for development of upstream facilities, considering the nascence of Uganda's oil industry. The Tilenga upstream facilities to be developed are comprised of:

i) The well pads and the upstream gathering network;
ii) The Industrial area, comprising a Central Processing Facility (CPF), Construction camp (CC) and Support Base (CSB); Operation Camp (OC) and Support Base (OSB);
iii) Nile River crossing to connect the fields in Murchison Falls National Park (MFNP) to the CPF;
iv) A water abstraction facility adjacent to Lake Albert with associated abstraction line;
v) Development of staging area, new roads, upgrade of existing roads, bridges and airstrip; and
vi) Barge crossing on Victoria Nile.

The development of these facilities requires having the required enabling infrastructure in place. The enabling infrastructure scope is the initial phase and involves works that have been identified as critical in supporting construction works. The engineering of the project is currently being undertaken. A thorough and comprehensive geotechnical site investigation for the project facilities is an essential preliminary to the engineering design and construction of the enabling works infrastructure.

In line with National Environment Act (NEA), TEPU contracted Air Water Earth (AWE) Ltd. to conduct environmental studies and consultations with respective stakeholders to develop a Project Brief (PB) for geotechnical site investigations at proposed locations for the enabling infrastructure within CA-1, LA-2 and Masindi District.

02. Geotechnical Survey Techniques

The different geotechnical investigation techniques, will take place during daylight hours. The potential techniques to be used are described as follows:

- Core drilling with sampling
- Standard Penetration Test (SPT)
- Cone Penetration Test (CPT)

- Trial pits

Some clearance of vegetation might be required to access the worksite and within the investigation perimeter. However, there is no need for cutting of trees or dense thickets; in-situ investigations will be designed to avoid such features.

03. Scope of the Project Brief

The PB covers the following activities for the Project activities:

i) Present baseline data on the physical, biological and socio-economic setting of the proposed project area;
ii) Predict and evaluate potential environmental and social impacts as well as benefits likely to result from the proposed project;
iii) Identify feasible and cost-effective mitigation measures for significant impacts identified; and
iv) Facilitate the preparation of an Environmental and Social Management Plan (ESMP) to ensure effective environmental and social management of the project during implementation.

04. Project Purpose

The purpose of the geotechnical survey is:

i) Characterize the nature of the ground and groundwater;
ii) Confirm lithology and thickness of subsurface layers;
iii) Provide physical and geomechanical properties of soils required for design of the infrastructures;
iv) Locate & characterize potential hazards along the planned project infrastructures; and
v) Provide recommendations for the geotechnical design of the infrastructures.

05. Nature of Project according to NEA1995

Under the Third Schedule of the NEA, this Project is categorised under "1(a) – an activity out of character with its surroundings".

06. Project Schedule

The proposed start for geotechnical surveys is during the fourth quarter of 2017 for a duration of two and half months; subject to NEMA approval of the Geotechnical Surveys Project Brief.

07. Site Organisation

Geotechnical survey contractor personnel are planned to be accommodated in the existing Bugungu and Buliisa camps, while most of the workers hired from the local communities are expected to reside at their homes and commute to the work sites.

08. Project Logistics

Equipment required during the geotechnical surveys will include:

i) Geotechnical Drill rig – for Core drilling
ii) Penetrometer – used during the CPT
iii) A flatbed truck – transporting the drill rig and penetrometer
iv) Hydraulic backhoe – to excavating the Trial pits
v) 2 Light Vehicles – for transporting Personnel

vi) One 4*4 truck – transporting drill rig
vii) Water tanker – to delivering water to the survey site

09. Project Workforce

The geotechnical surveys will be undertaken using a small technical team of about 15 people. Thegeotechnical survey personnel will be accomodated at the TEPUBugungu Camp and/or at nearby lodges/guesthouses. Four to five light vehicles will be used per crew for transportation of personnel to and from the survey locations. In the event that casual laborers are required, TEPU's Community Employment Procedures (L2-PRO-SDV-01) will guide the recruitment process and the contractor will be urged to adhere to TEPU'ssystem for social justice regard.

10. Project Location

The geotechnical surveys will be undertaken for enabling infrastructure components located in the Districts of Nwoya, Buliisa and Masindi. Thus the study area covers the sub counties of Ngwedo, Buliisa, Kigwera and in particular parishes of Nile, Avogera, Mvule, Bugana, Kisansya, Kirama and Kigwera in Buliisa district. In Masindi District the study area covers, Bugungu airstrip is within MFNP and the parish of Labongo in Pakanyi Sub County, while in Nwoya District, the study area is within the MFNP. A total of 24 villages made up the baseline study scope. The project components where the geotechnical surveys will be undertaken are illustrated in Figure 1-1

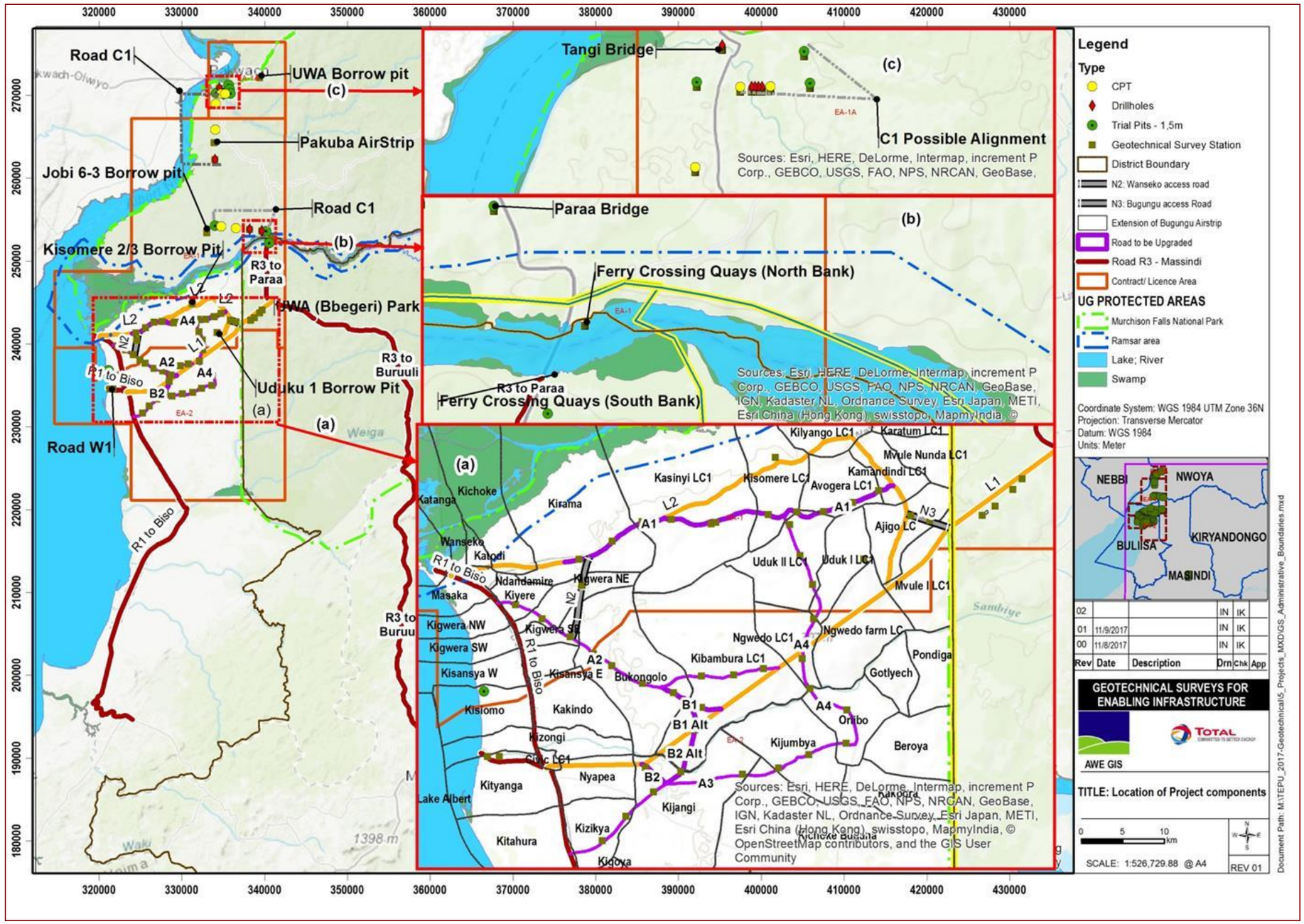

Figure 1-1: Geotechnical Survey locations Nwoya and Buliisa District

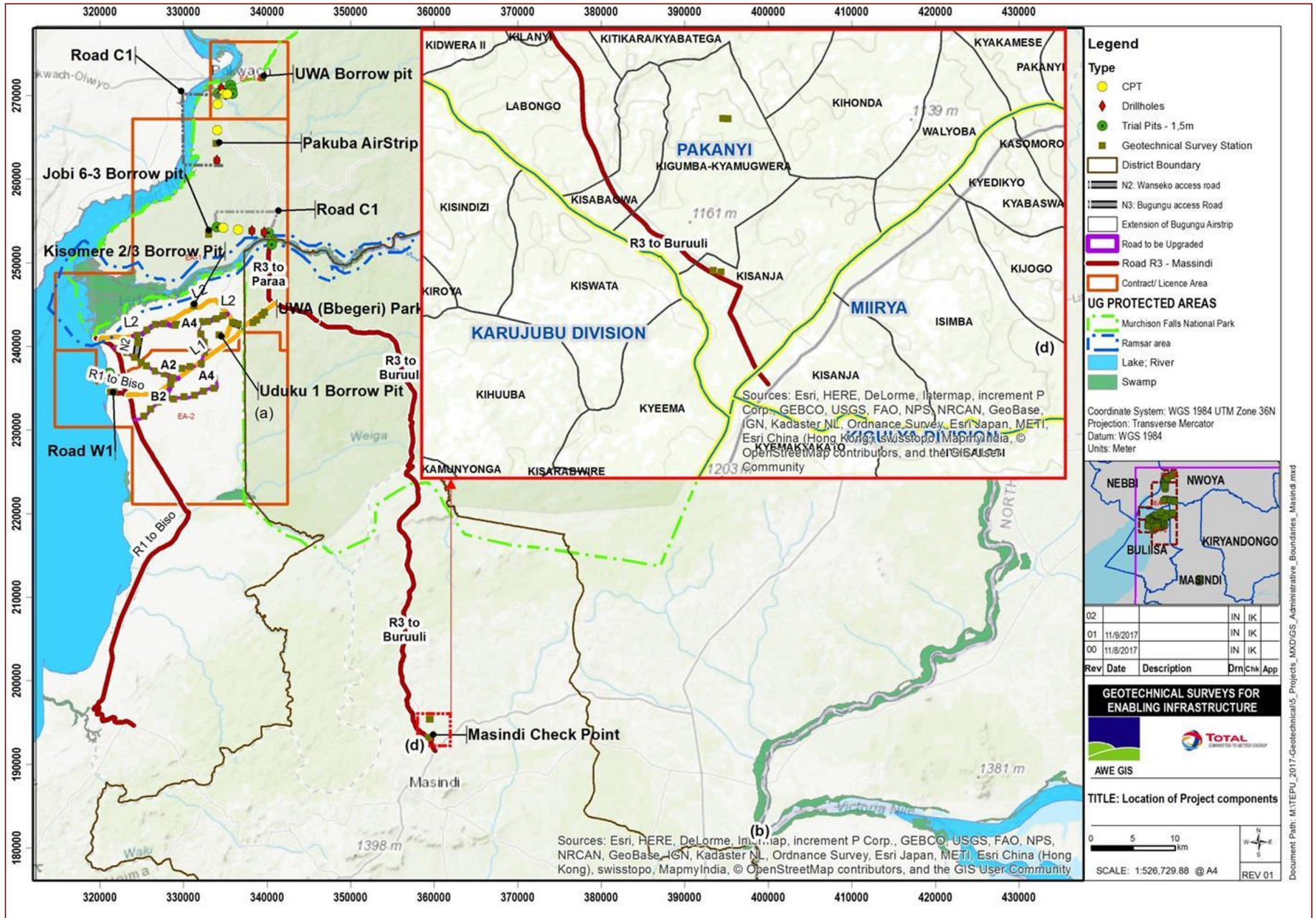

Figure 1-2: Geotechnical Survey locations in Masindi District

11. Study methodology

The environmental conditions of the project area of influence have been assessed by carrying out baseline surveys/studies; which are intended to provide a measure of existing environment and the socio-economic situation against which future changes due to the project implementation can be monitored. The baseline environment studies aid in assessing impacts and developing appropriate monitoring indicators and mitigation measures. Specialised activities included:

i) Air Quality;
ii) Ambient Noise;
iii) Soils and geology;
iv) Water resources;
v) Waste management;
vi) Biodiversity;
vii) Stakeholder consultations;
viii) Socio-economic conditions;
ix) Cultural Heritage and Archaeology; and
x) Landscape and Vibrations.

12. Stakeholder Consultations

Stakeholder consultations were held for the Project, as listed in Table ES 01.

Table ES01: List of stakeholders engaged

Category	Stakeholder
National Level institutions	Directorate of Water Resources Management (DWRM) in Ministry of Water & Environment
	Department responsible for museums and monuments in the Ministry Tourism Wildlife and Antiquities
	Wetlands Management Directorate, Ministry of Water and Environment
	Uganda Wildlife Authority (UWA)
	Uganda National Roads Authority (UNRA)
Buliisa, Nwoya and Masindi District Local Governments	LC V, Chief Administration Officer (CAO), Assistant CAO, Speaker, Community Development Officer (CDO), Environment Officer, Community Liaison Officer,
Sub-counties in the Project Area	LC III Chairman, Subcounty Chief, Councillors, Sub-accountants in Buliisa, Kigwera, Ngwedo and Buliisa Town Council for Buliisa. Pakanyi and Purong sub-counties for Masindi and Nwoya Districts respectively
Local Councils	Kizongi, Kwamugwera and Purongo in Buliisa, Masindi and Mwoya respectively

13. Potential impacts identified

The potential environmental and social impacts that may arise due to implementation of the geotechnical surveys and proposed mitigation recommendations are discussed in detail in this Project Brief. A summary of impacts and the residual impacts significance is provided in Table ES02.

Table ES02: Residual Impacts

Potential Impact	Impact significance (after mitigation)	
	Murchison Falls	Community Areas
Impact on Air Quality		
Dust Generation	Negligible	Negligible
Exhaust emissions	Negligible	Minor
Impact due to Noise	Minor	Minor
Impact due to Vibration	Minor	Minor
Impact on Soils and Geology		
Soil erosion	Minor	Minor
Soil quality	Negligible	Minor
Impact on Water Resources		
Water quality	Minor	Negligible
Water quantity	Negligible	Negligible
Impact on Flora		
Loss of vegetation	Negligible	Negligible
Spread of Invasive species	Moderate	Negligible
Impact on Fauna		
Disturbance to wildlife	Negligible	Negligible
Impact on socio-economic conditions		
Employment and skills training	Benefit	Benefit
Income to geotechnical survey contractors	Benefit	Benefit
Access to land	Minor	Minor
Influx of labour in the area	Minor	Minor
Disruption of land-based livelihoods	Minor	Minor
Impact on archaeology and cultural heritage	Negligible	Negligible
Impact on landscape and visual aesthetics	Minor	Minor

14. Cumulative Impacts

Cumulative impacts are socio-economic and environment effects which result from incremental impact of the project when added to other past, present, and reasonably foreseeable future actions. This PB has considered cumulative impacts associated with ongoing geotechnical surveys by TEPU and Uganda National Roads Authority (UNRA) recently completed for some of the roads in the project area. The assessed cumulative impacts associated with past, proposed and foreseeable future activities proposed in the project area include:

i) Employment and contribution to economic growth;
ii) Water resources impacts (both quality and quantity); and
iii) Noise, vibration and air quality impacts.

15. Environmental and Social Management Plan

The project Environmental and Social Management Plan (ESMP) incorporates both the operations-wide documents and the project-specific measures identified by the PB. The project-specific measures provided in the ESMP are designed to be comprehensive and implementable. The ESMP also includes monitoring measures designed to ensure that compliance with the plans can be checked and recorded during implementation, and assign responsibility for these actions.

TEPU has a Company Management System (CMS), which governs all of its operations. A number of over-arching plans and procedures are in place, or planned to be developed which address environmental and social aspects for the operations programme as a whole. These have been referred to where appropriate in this PB, and form part of the management regime under which the proposed project will be undertaken.

The ESIA process reported in this PB has outlined the need for additional, project-specific mitigation measures to ensure that the project is completed with the minimum adverse environmental and social impact.

16. Conclusion

The geotechnical surveys are aimed at facilitating the design of the required infrastructure for the overall Tilenga project development towards meeting the Government of Uganda (GoU) target of first oil in the year 2020.

The ESMP in this PB has made consideration of the environmental and social safeguards required for the sustainable development and completion of the geotechnical survey activities. With the implementation of these safeguards as part of the geotechnical survey activities, the potential adverse impacts of these activities will be mitigated, and the positive impacts enhanced.