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Sudan Radio Service
Education Development Center

Environmental Review Form for SRS-FM Construction and Operation

A. Applicant information

Organization	Education Development Center	Parent project	Sudan Radio Service (SRS)
Individual contact and title	Jon Newstrom Chief of Party	Address, phone & email	EDC – SRS Hamza Inn, Suite 202, PO Box 425 Juba, Sudan. tel: 0477-260-171 email: jnewstrom@edc.org
Proposed activity (brief description)	Construction and operation of a 2KW FM Station with associated compound and offices	Amount of funding requested (USD)	Total construction cost approx $1mn. Total pre-fabricated component cost (including turnkey FM station) $400K (already procured). USAID funding to station operation approx $200K/year for 1.5 yrs.
Location of proposed activity	7200m^2 plot on the outskirts of Juba, Sudan. (Across from Univ. of Juba housing and SSBL Brewery.)	Start and end date of proposed activity	Construction to commence immediately upon approval of this Env. Review Form & last approx. 4 months. Radio station operation indefinite. Current end date of USAID funding to station operation is 31 Dec 2011.

B. Activities, screening results, and recommended determination

Activities (continue on additional page if necessary)	**Screening result** (Step 3 of instructions)			**Recommended Determinations** (Step 6 of instructions. Complete for all moderate/unknown and high-risk activities)		
	Very Low Risk	High-Risk*	Moderate or unknown risk*	No significant adverse impact	With specified mitigation, no significant adverse impact.	Significant Adverse impact
1. **Ongoing**: Operation of Bureaus in locations other than Juba	X					
2. **Ongoing**: Production of Radio Programs and News	X					
3. **Ongoing**: Broadcast Journalism School	X					
4. **Ongoing**: Training of non state media outlets	X					
5. **Planned**: SRS-FM site planning, preparation & station/compound construction. (includes perimeter security wall, Studios, Broadcast Tower, Pre-Fab Offices, Kitchen, Dining Hall, bore hole (potential), septic system, generators)			X		X	
6. **Planned**: Operation of FM Radio Station and Compound			X		X	
Note: As indicated, items 1-4 are ongoing; they capture the full scope of current SRS activities. While they technically need not be addressed on this form, they are listed here to demonstrate that planned FM station construction and operation are the only SRS activities requiring more detailed environmental review.						

*These screening results require completion of an Environmental Review Report

C. Summary of recommended determinations (check ALL that apply)

	The proposal contains. . .	*(equivalent Regulation 216 terminology)*
☑	Very low risk activities	*categorical exclusion(s)*
☐	After environmental review, activities determined to have **no significant adverse impacts***	*negative determination(s)**
☑	After environmental review, activities determined to have **no significant adverse impacts, given specified mitigation and monitoring***	*negative determination(s) with conditions**
☐	After environmental review, activities determined to have **significant adverse impacts***	*positive determination(s)**

*for these determinations, the form is not complete unless accompanied by Environmental Review Report

D. Certification:

I, the undersigned, certify that:

1. the information on this form is correct and complete
2. the following actions have been and will be taken to assure that the activity complies with environmental requirements established for this Project:

- Those responsible for implementing this activity have received training in environmental review AND training and/or documentation describing essential design elements and best practices for activities of this nature.
- These design elements and best practices will be followed in implementing this activity.
- Any specific mitigation or monitoring measures described in the Environmental Review Report will be implemented in their entirety.
- Compliance with these conditions will be regularly confirmed and documented by on-site inspections during the activity and at its completion.

(Signature) _____ (Date) _____

(Print name) Jon Newstrom, Chief of Party

Note: if screening results for *any activity* are "high risk" or "moderate or unknown risk," this form is not complete unless accompanied by an environmental review report.

BELOW THIS LINE FOR USAID USE ONLY

Clearance record (all clearances mandatory except BEO as noted)

USAID Project Officer ☐ Clearance given ☐ Clearance denied	(print name & title)	(signature)	(date)
USAID MEO ☐ Clearance given ☐ Clearance denied	(print name)	(signature)	(date)
USAID REA ☐ Clearance given ☐ Clearance denied	(print name)	(signature)	(date)
USAID BEO* ☐ Clearance given ☐ Clearance denied	(print name)	(signature)	(date)

* BEO clearance required only for all "high risk" screening results and for determinations of "significant adverse impacts"

Note: if clearance is denied, comments must be provided to applicant (use space below & attach sheets if necessary)

Environmental Review Report for

SRS-FM CONSTRUCTION AND OPERATION (JUBA, SUDAN)

This report accompanies the Environmental Review Form for SRS-FM Construction and Operation.

A. Summary of Proposal

Established in 2003, Sudan Radio Service (SRS) is funded by USAID/Sudan under the Mission's Democracy and Governance sector program and implemented by Education Development Center, Inc. (EDC). SRS' objectives are to(1) inform Sudanese on matters relating to the Comprehensive Peace Agreement (CPA); (2) provide balanced news and information on civic education, health, agriculture, education, culture, and gender; and (3) build the capacity of Sudanese journalists and media partners. These objectives and activities are essential to post-conflict economic and social recovery and development; radio is a critical medium as very low literacy rates in Southern Sudan and lack of distribution infrastructure severely limit the reach of print media.

SSRS currently broadcasts five hours a day, seven days a week to all of Sudan via shortwave radio and worldwide via www.sudanradio.org. SRS currently has its support and production center in Nairobi, a satellite office in Juba, and bureaus in Khartoum, Wau, Malakal, and Damazine, Sudan.

SRS plans to expand its Juba satellite office by constructing a full-service 2000W FM radio station and associated offices on a compound on the outskirts of Juba. The upgraded office and station will become the hub for SRS news-gathering in Sudan, and backstop (and thereby strengthen) the existing bureaus in Khartoum, Wau, Malakal, and Damazine. The FM station will cover the Juba area, broadcasting up to 15 hours/day. Station construction and operation will be USAID-funded. (USAID funding will be supplemented with advertising sales; EDC has additive program income authorization for this purpose). Current USAID funding to SRS expires on 31 December 2011.

Consistent with the requirements of the IEEs governing the USAID/Sudan D&G portfolio, USAID/Sudan has mandated completion of the USAID Africa Bureau Environmental Review Form (ERF) for station/office construction and operation. Both station construction and operation are classified as "moderate or unknown risk activities" according to the screening criteria set out in the ERF. As required by the ERF, this Environmental Review Report (ERR) has therefore been developed to address these two activities.

SRS is prepared to commence construction immediately upon approval of this ERF and associated ERR.

B. Description of Activities

EDC proposes to construct the SRS-FM station, offices and associated infrastructure on a 7200m^2 plot on the southwestern outskirts of Juba. The plot is centered on approximately 4° 48'43.37" N, 31° 33'24.39" E and is located across the road from Univ. of Juba Housing and, slightly more distantly, the Southern Sudan Beverages Limited (SSBL) brewery. SRS has obtained a 30-year lease and development permission on this plot from the government of Central Equatoria. For more detail regarding the plot, see Section C (text description) and section F (photos, map and site plan).

The compound will contain and consist of the following:

- 2000W "turnkey" FM station. This has been built in the US and consists of 4 shipping containers (3 for the studios, 1 for the transmitter) and a 120ft (36.6m) self-supporting broadcast antenna. Concrete pads will be required for each container, and for the transmission tower.
- Gated perimeter wall topped by electric fencing.
- Spec-built (non-prefabricated) office block, canteen/dining hall, security kiosk, and caretaker's house

- Generators and fuel storage sufficient for approx. 6 days
- Septic tank and system
- Water storage tank and internal distribution system. The water source may be a borehole sited on the compound. In this case, and consistent with general practice in the area, a public tap will be provided outside the perimeter wall. Alternately, water may be supplied by the brewery, which pumps and treats water from the Mountain Nile, approx 4.6 km due East (straight-line distance), or by water tanker.)
- No on-site disposal of solid waste is contemplated; solid waste will be removed by a service provider.

These elements are depicted on the attached indicative site plan. While the final site plan will be developed by the general contractor to be engaged to undertake the construction, the indicative plan indicates the compound components and site dimensions.

Site preparation will include grading and terracing.

Of its nature, the site will generate comparatively low volumes of waste water and solid waste without hazardous or infectious components.

C. Environmental Situation & Host Country Environmental Requirements

The approx 102m x 60m plot is centered on 4° 48’43.37” N, 31° 33’24.39” E (+/- 10m). The sketch map in Section F shows the location of the site in relation to the University of Juba housing and the SSBL brewery. This area has been surveyed and planned for industrial and commercial development, with plots and road reserves designated. SRS-FM, the University of Juba housing and the SSBL brewery are early “anchors” in an area that will likely see substantial formal infill development over the next several years, including a large UN compound. In addition to this formal development, comparison of March 2009 satellite imagery with current photos of the site show that substantial informal infill settlement has occurred in the immediate area of the site over the past year.

The current condition of the plot is best described as a moderately disturbed landscape. The plot, which has a staged, shallow slope, retains in part the ground cover typical of the Juba area away from the Mountain Nile (grasses and “scrub” with scattered trees), but has been partially cleared and shows other signs of human activity. The most prominent features of the site are a seasonal stream (channel maximum size approx. 3m wide by 1m deep) that crosses the rear plot towards the rear (see sketch map; Section F) and a number of large, partially buried boulders. The stream follows a generally NNE path for approx 170m before joining another, larger seasonal stream that in turn discharges to the Mountain Nile approx 5km to the east. The stream provides drainage for an area of at least 2 sq km upstream (west and slightly north) of the site.

Juba is in a malarial zone. Satellite imagery indicates that the stream bed along its length retains standing water for at least part of the year, and this is expected to provide mosquito breeding habit.

SRS has secured a broadcast license and, as noted, a 30-yr lease which includes development permission for the land. The only remaining host country regulatory requirement is a building permit. This is s straightforward process which SRS is initiating on 11 February 2009.

D. Evaluation of Activities and Issues with Respect to Environmental Impact Potential & E. Environmental Mitigation Actions

Approach to the analysis, structure of the section & overview of findings. The g*eneral, potential* adverse environmental impacts of SRS-FM station construction and operation were identified by a combination of field experience and by consulting USAID/AFR’s *Environmental Guidelines for Small-Scale Activities in Africa* (EGSSAA; www.encapafrica.org/egssaa.htm), particularly the *construction* chapter. Potential adverse impacts of RF radiation in the context of FM broadcasts were identified by consulting the references listed in Section F.

These potential adverse impacts consists of:

A. Disturbance to original landscape/habitat

B. Diminution or alteration of drainage eco-service provided by the seasonal stream

C. Deterioration of surface or shallow groundwater quality

D. Decrease in deep groundwater quantity

E. Adverse health impacts of contaminated public water provision

F. Increased breeding habitat for disease vectors

G. Offsite landscape and natural resource impacts of materials sourcing

H. Adverse health impacts of Radio Frequency (RF) radiation on SRS-FM Staff and Local Population

Each of these potential adverse impacts was then evaluated in the particular context of the site and against the specifics of planned activities.

This analysis is transparently documented in tables that follow. It determined that certain potential adverse impacts would clearly be non-significant. For all other potential impacts, it identified appropriate mitigation measures that will prevent, with a high level of certainty, any actual significant adverse impact. **No impacts were identified that remained significant after the application of reasonable and attainable mitigation measures.**

To improve clarity, this section combines parts D and E of the standard Environmental Review Report outline. This permits mitigation measures to be presented in immediate juxtaposition to the potential impacts they address. Construction and operation issues were addressed together.

The attached Environmental Mitigation and Monitoring Plan (EMMP) sets out implementation responsibility and monitoring/verification commitments. The EMMP completes the requirements of section E of the EMMP.

A. Potential impact: Disturbance to original landscape/habitat

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
Construction will necessitate clearing, grading, trenching and other activities that will result in near-complete disturbance to the current landscape/habitat within the plot.	The plot size is larger than the nominal 10,000 square foot guidance provided in the ERF for low-impact small-scale construction. However, as described in section C, this landscape is not itself protected nor is the plot adjacent to a protected area. Further, the landscape is already disturbed, and is a single and, in context, small commercial plot within an area planned for—and in fact undergoing—rapid infill settlement and development. These factors strongly diminish the value of maintaining the landscape and habitat of the plot in its baseline condition.	Per analysis at left, development of the plot *per se* cannot be considered a significant environmental impact. Note: This finding does *not* speak to the potential impacts of station construction and operation on local drainage, groundwater quality, and similar issues. These are addressed separately, below.

B. Potential impact: Diminution of or alteration to drainage eco-service provided by the seasonal stream

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
The seasonal stream running through the plot drains an area of at least 2 km^2 to the WNW. Diminution or alteration to this drainage "service" could result in increased upstream pooling & flooding during the rainy season, with associated property damage and increased breeding habitat	As indicated at right, this impact only arises if the drainage "service " provided by the seasonal stream is diminished or altered in some adverse manner. So long as compound design maintains the existing service level and construction is managed without disruption to stream flow, actual adverse impact will be negligible or zero.	Per analysis at left, this potential impact is not significant, so long as the following mitigations are implemented: 1. Total stream capacity cannot be diminished by the development of the compound. (Stream channel on average is 3m x 1m.) 2. The stream must remain substantially in the same channel and cannot, e.g., be re-routed

for disease vectors.		around the property. 3. If construction will result in an interruption to stream flow, provision must be made to provide a temporary bypass. Temporary damming of stream flow is not permissible. 4. Post-construction, the stream bed within the property, including point-of-entry (e.g. via culvert under perimeter wall) must be maintained free of obstructions to flow.

C. Potential impact: Deterioration of surface or shallow groundwater quality.

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
1. Runoff from cleared ground or materials stockpiles during construction could increase stream sediment loads. Alteration to site grade or cover could increase such runoff during the operation phase. 2. Direct discharge of brown or grey water to the stream or a surface soak-away could add contamination to the stream and shallow groundwater. 3. Septic discharge, leakage or spill from septic pump-out has the potential to contaminate shallow groundwater and stream water. 4. Fuel leaks have the potential to contaminate local groundwater (and in the case of a large spill, potentially surface water). 5. Inappropriate off-site dumping of septic pump-out or solid waste could contaminate ground or surface water in the dumping area.	Shallow groundwater and surface water use in the near vicinity to the site are not known with certainty, but given the rapid increase in nearby settlement and the fact that the area is unserved by municipal water or public boreholes, local utilization of surface and/or shallow groundwater must be assumed. This consideration makes any adverse impact on surface or shallow groundwater quality more serious. (Note: SRS's responsibility is not to ADD to contamination via its operations; SRS has no responsibility to address contamination from other sources.) However, experience with small-scale construction and facilities operation demonstrates that issues 1-4 at left can be controlled below the level of significance by basic construction management, sound design, and operating practices. Regarding issue 5 at left, two waste streams will also be exported from the site: septic pump-out and solid waste. It is expected that designated dump locations for these waste streams are already heavily contaminated. The contribution of the SRS streams to this contamination will be marginal and it is beyond the reasonable authority or capability of SRS to address this contamination. However, were the SRS streams to be dumped at non-designated locations, they could be responsible for contaminating new areas.	Per analysis at left, potential adverse impacts on surface or shallow groundwater quality will not be significant, so long as the following mitigations are implemented. (Mitigations correspond directly to same-numbered issues in column one.) 1a. During construction, prevent sediment-heavy run-off from cleared site or material stockpiles to stream with berms, by covering sand/dirt piles, or by locating them so as to prevent run-off to stream. (Only applies if construction occurs during rainy season.) 1b. If construction results in substantially increased slope of any land within 10m of the stream, that slope must be protected with berms, plantings, etc.) 2. No direct gray or brown-water discharge to stream is allowed. All drainage with the exception of storm runoff and water point drainage must be channeled to the septic system. 3a. If septic tank design is a pump-out tank without leach field, assure impermeable tank construction or min 30m separation between tank and stream and nearest shallow well. 3b. If the septic system features a seepage field, the discharge terminus must be at least 30m from the streambed and any shallow well, on or off property. 3c. Septic pump-out point shall feature a concrete apron and drain with return to the septic tank. 4. Concrete aprons with berms or gutters/sumps shall be placed under generators, fuel storage, and fuel pump-in point (if different) sufficient in each case to capture at least a 20 liter spill. 5. Service provider due diligence. SRS shall verify that pump-out and solid waste service provider s use designated dump locations.

D. Potential impact: Decrease in deep groundwater quantity.

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
Borehole abstraction can deplete	Given the small extraction volume anticipated, the borehole's contribution to aquifer depletion will	Per analysis at left, station operation will have no significant adverse impact on deep groundwater

groundwater levels	necessarily be negligible.	quantity.

E. Potential impact: Adverse health impacts of contaminated public water provision

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
Consistent with general practice in the area, if the final SRS station design includes a borehole, SRS intends to provide a public tap outside the perimeter wall. If the water is unsafe, health of users (the local community in the vicinity of the station) could be adversely affected. With respect to water quality, boreholes typically present 2 failure modes: ▪ Arsenic contamination deriving from naturally occurring arsenic compounds in the geologic formations that make up the aquifer. ▪ Fecal coliform or other contamination from surface or shallow groundwater. This may enter the borehole itself via a faulty sanitary seal or be introduced at the tap—e.g. when the ground near the tap is contaminated with livestock excrement.	Long-term arsenic ingestion can result in serious health problems. Observable symptoms of arsenic poisoning include: Thickening and discoloration of the skin; stomach pain, nausea, vomiting; diarrhea; numbness in hands and feet; partial paralysis and blindness. Ingestion of water contaminated with fecal coliform can lead to serious diarrheal disease. For this reason, water that violates the US EPA arsenic standard of 10 ppb or which has fecal coliform detectable in any 100ml sample (WHO standard) cannot be used for consumption. There is currently no way to predict arsenic concentrations in groundwater, and concentrations can vary within an aquifer. As arsenic cannot be removed by boiling or normal filtration, the risk is addressed by not providing groundwater for public consumption if Arsenic concentration exceeds the US EPA health standard of 10 parts per billion. USAID/AFR has adopted a standard protocol for such testing. Fecal coliform contamination can usually be prevented by an adequate sanitary seal and by minimizing sources of surface/groundwater contamination in the immediate area of the borehole *AND* the public water supply point. If contamination does occur, fecal coliform can be removed with appropriate treatment (e.g. chlorination, suitable filtration).	Per analysis at left, this potential impact is not significant, so long as the following mitigations are implemented: 1. If the final station design includes a borehole, SRS will conduct both arsenic & fecal coliform testing initially (after the borehole "stabilizes") and quarterly thereafter for 4 quarters. Arsenic testing must use the Hach Arsenic test kit (www.hach.com). If arsenic is over 10ppb, SRS will not supply borehole water to the public nor use it for consumption/cooking purposes in the compound. If fecal coliform is detectable in any 100ml sample, it must be filtered or treated until non-detectable in a 100ml sample before being provided for public use or used in the compound for cooking/consumption. (Note: this condition satisfies the requirements of USAID/Africa Bureau's Dec. 2003 *Guidelines For Determining the Arsenic Content of Ground Water in USAID-Sponsored Well Programs in Sub-Saharan Africa.)* 2. The borehole must feature a sanitary seal and concrete well apron. 3. Septic pump-out point must be a min of 10m from public water supply point. (As specified by condition C.3a:, above, the septic pump-out point must feature a concrete apron and drain with return to the septic tank.) 4. The public supply point must feature a fence with gate or other barrier that reliably excludes livestock.

F. Potential impact: Increased breeding habitat for disease vectors

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
1. Construction may result in standing water on-site, which readily becomes breeding habitat for mosquitoes and other insect vectors. 2. Poor grading or inadequate or blocked drainage, including around water supply points, can also lead to standing water on the site. 3. If insects are freely able to enter and leave the septic tank, the tank itself can become an insect vector breeding habit and a	Because the Juba area is malarial and because there is increasing settlement in close proximity to the site, any potential increase in vector breeding habitat caused by station construction or operation must be treated seriously. However, experience with small-scale construction and facilities operation demonstrates that issues 1-3 at left can be controlled below the level of significance by basic construction management, sound design, and operating practices. The analysis presented under C, above regarding disposition of septic pump-out and solid waste streams applies equally to this section. Note: Increases in off-site pooling/flooding due to	Per analysis at left, no increase in vector breeding habit will result, so long as the following mitigations are implemented: (Mitigations correspond directly to same-numbered issues in column one.) 1. Construction must be managed so that no standing water on the site persists more than 4 days. 2a. Aprons must be installed and drainage provided at water supply point(s)—no standing water allowed 2b. Site grading and drainage shall be designed and constructed to prevent accumulation of standing water

source of contamination. 4. While no on-site disposal of solid waste is contemplated, open storage of waste awaiting removal can provide breeding habit for mosquitoes and flies, and foraging habitat for rodents. 5. Inappropriate off-site dumping of septic pump-out or solid waste could provide breeding habitat in the dumping area.	alterations in stream flow are addressed above under A.)	2c. Post-construction, drainage systems shall be kept free of obstruction and otherwise maintained in sound condition. 3. Septic vent stack(s) will be screened and the system otherwise sealed. 4. Solid waste being held for collection will be stored in sealed containers at least 10m from water supply points. 5. Service provider due diligence. SRS shall verify that pump-out and solid waste service provider s use designated dump locations. (reproduces mitigation action C.5, above).

G. Offsite landscape and natural resource impacts of materials sourcing

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
Construction requires a set of materials often procured locally: timber, fill, sand and gravel. Unmanaged extraction of these materials can have adverse effects on the environment. For example, stream bed mining of sand or gravel can increase sedimentation and disturb sensitive ecosystems; purchase of timber from unmanaged or illegal concessions helps drive deforestation.)	While SRS has direct control over its general contractor (GC), construction materials are often procured by the GC from sub-vendors. In the case of timber, these sub-vendors are often the terminus of a long and untraceable supply chain. This separation from source both limits the actions that SRS can take to assure environmentally responsible sourcing of these materials and reduces SRS's responsibility for these impacts. (It should also be noted that SRS is a small construction project, and as such its adverse impacts related to materials sourcing should be limited.) However, SRS can and should undertake reasonable due diligence to assure that it does not bear direct responsibility for adverse impacts, and to reduce indirect impacts so far as feasible.	Per analysis at left, no significant adverse impacts from materials sourcing can be attributed to SRS, so long as the following mitigations are implemented: SRS must require its general contractor to certify that it is not extracting fill, sand or gravel from waterways or ecologically sensitive areas, nor is it knowingly purchasing these materials from vendors who do so. SRS must also require its GC to procure chain-of-custody-certified timber, if available in the local market, and otherwise to implement any feasible measures to increase the probability that timber is procured from legal, well-managed sources.

H. Potential impact:
Adverse health impacts of Radio Frequency (RF) radiation on SRS-FM Staff and Local Population

Issue or cause for concern	Analysis	Finding and conditions/mitigation actions
By definition, radio broadcast antennas emit non-ionizing radio-frequency (RF) radiation. High-intensity RF radiation can induce heating in body tissues; it is possible for such heating effects to reach dangerous levels, particularly in organs such as the eyes and testes. The science of other "non-heating" effects is uncertain, with some studies suggesting increased cancer and developmental risks and immunological effects, among others.	The station is designed to meet US RF intensity/exposure standards at ground level in the immediate vicinity of the broadcast antenna. These standards are compatible with international exposure guidelines developed by the International Commission on Non-Ionizing Radiation Protection (ICNIRP, 1998) and the Institute of Electrical and Electronic Engineers (IEEE, 2005). In view of the uncertain science surrounding "non-heating" health effects, these standards embody a margin of safety intended to implement the precautionary principle. As RF field intensity decreases according the inverse-square law, compliance with intensity limits in the immediate vicinity of a non-directional antenna assure compliance at other locations.	Given analysis at left, the finding is that these potential impacts are non-significant, subject to the following conditions. • Access to the antenna will be physically restricted by fence with lockable gate • No work will be allowed on the antenna when live • Any future increase to station power during the period of USAID funding would require demonstration that the RF field strength remains compliant with US and any Sudanese standards.

Additional commentary: Green landscape and building features

While outside the commitments required under this review to address potential adverse environmental impacts of SRS-FM station construction and operations, SRS plans to implement the following green landscape and building features;

- Tree planting on-compound (including planned tree-planting by dignitaries at SRS-FM commissioning ceremony).
- Use of a half-wall design (with mosquito netting) for the dining area
- Shading of fuel tanks to reduce evaporative emissions

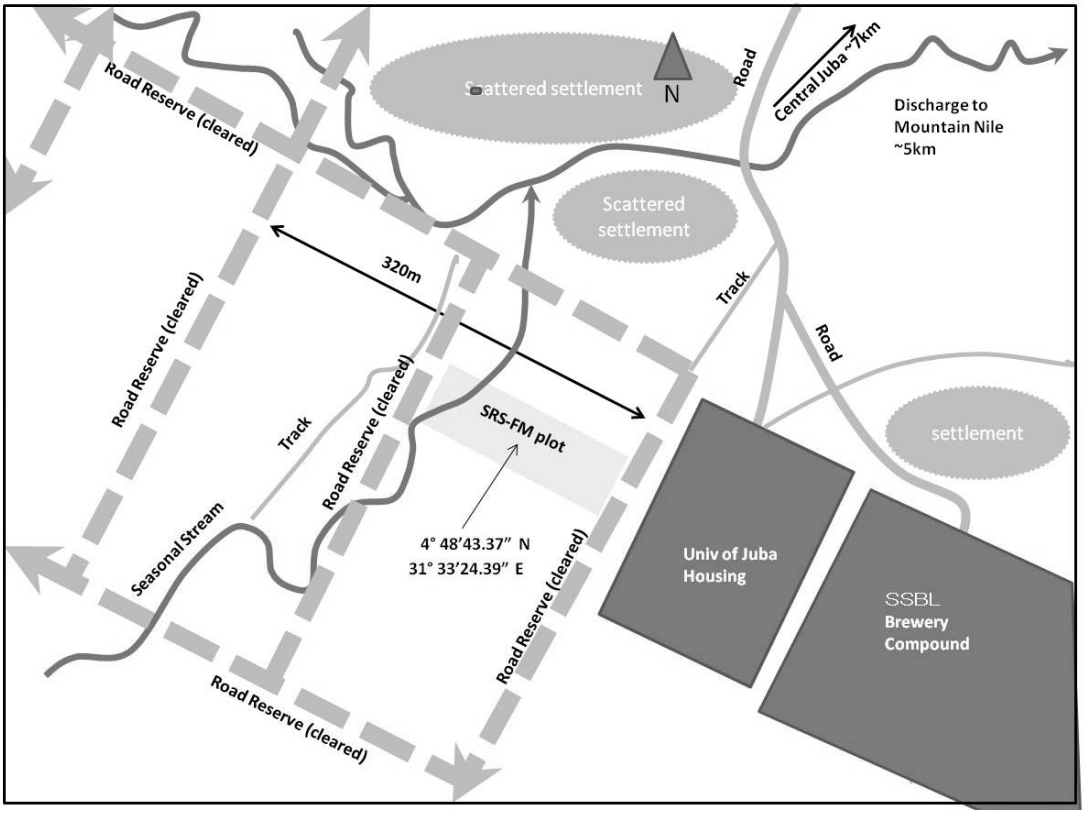
In addition, SRS will consult with its general contractor regarding the suitability of adopting other comfort-enhancing/energy-conserving green building features, including as briefed in the Schools chapter of the EGSSAA. These potentially including but not limited to: use of verandas and cross-ventilation, rainwater harvesting for irrigation of plantings and general cleaning, and supplemental use of wind or solar energy.

F. Other Information.

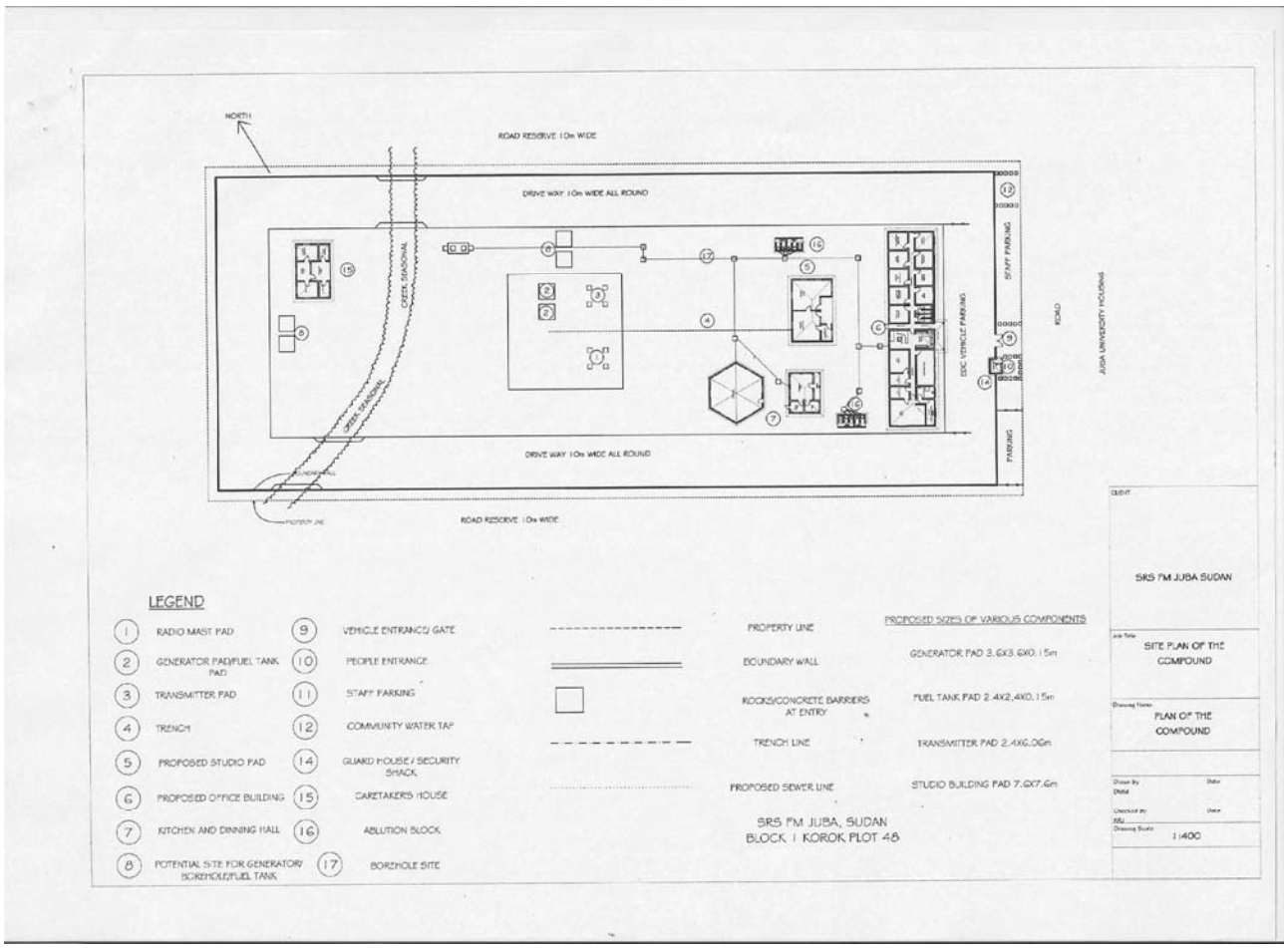
This section contains the following:

- Area sketch map and indicative site plan
- Selected site photos
- References: RF radiation safety and standards

Area sketch map



Indicative site plan



Site photos

View along the short eastern “front” of the plot; Juba University housing are the white structures visible on the other side of the road reserve. Posts mark property line

View of the southern entrance of the stream to the plot. Poles mark the property line.

View from the northwestern corner of the property, looking along the southwest property line. (Man is standing just outside the property.)

RF Radiation Frequency and Standards references

National Radiological Protection Board (UK), 2004. "Advice on limiting exposure to electromagnetic fields (0-300 GHz)" Documents of the NRPB, Vol. 15 No. 2. Available at http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1194947415497

Federal Communications Commission (US), 1999. "Questions and Answers about Biological Effects and Potential Hazards of Radiofrequency Electromagnetic Fields" OET Bulletin 56, 4th Ed. August. Available at http://www.fcc.gov/Bureaus/Engineering_Technology/Documents/bulletins/oet56/oet56e4.pdf

Environmental Mitigation and Monitoring Plan: SRS-FM Construction and Operation

Purpose

This EMMP sets out SRS's approach to (1) assuring compliance with the conditions established in the SRS-FM environmental review report and (2) reporting to USAID on their implementation. It will be the working document that SRS uses to organize and track implementation of and compliance with these conditions. This EMMP completes the requirements for section E of the ERR.

Note: This EMMP reproduces in full all mitigation actions set out the SRS-FM Environmental Review Report (ERR).To facilitate management and implementation, the conditions are re-organized and listed by project component rather than environmental component.

Point of contact and responsible party

The SRS Chief-of-Party is the point of contact and responsible party for the implementation of this EMMP. The Chief-of-Party is Jon Newstrom (jnewstrom@edc.org).

Reporting to USAID

A copy of this EMMP updated to reflect current status will be appended to each SRS quarterly report submitted to USAID.

Implementation of Required Mitigations: Process and Status Tracking

List of initialing authorities:
(provides full names and titles for all individuals whose initials appear in the tables below)

Initials	Name	Title
JN	Jon Newstrom	Chief of Party, SRS
	(entries to be added as necessary)	

A. Compound Design

Compliance process: (1) Compound/station design elements specified by the ERR will be incorporated into the final technical/contract specification that governs the general contractor's work. SRS will verify this for each mandated design element. (2) SRS will verify via field inspection that the final works meet these specifications, requiring remedy or otherwise resolving any non-compliant elements.

Compliance record. The table below lists all design elements mandated by the ERR and will be used to document compliance status.

	Incorporated in final technical specifications		Built-as specified? (confirmed by field inspec.)			Notes (Issues and resolution)
Design requirement	Date Confirmed	Initials	Y/N	Date of inspection	Initials	
STREAM. Total stream capacity cannot be diminished by the development of the compound. (Stream channel on average is 3m x 1m)						
Stream must remain substantially in the same channel						
GRADING, SEPTIC & DRAINAGE. If construction results in substantially increased slope						

of any land within 10m of the stream, that slope must be protected with berms, plantings, etc.)						
Site grading and drainage shall be designed and constructed to prevent accumulation of standing water						
Aprons must be installed and drainage provided at water supply point(s)—no standing water allowed.						
No direct gray or brown-water discharge to stream is allowed. All drainage with the exception of storm runoff and water point drainage must be channeled to the septic system.						
If septic tank design is a pump-out tank without leach field, assure impermeable tank construction or min 30m separation between tank and stream and nearest shallow well.						
If the septic system features a seepage field, the discharge terminus must be at least 30m from the streambed and any shallow well, on or off property.						
Septic vent stack(s) will be screened and the system otherwise sealed. (e.g. access hatch covers must be tight-fitting.)						
Septic pump-out point shall feature a concrete apron and drain with return to the septic tank. Pump-out point must be a minimum of 10m from the public water supply point.						
FUEL & GENERATORS. Concrete aprons with berms or gutters/sumps shall be placed under generators, fuel storage, and fuel pump-in point (if different) sufficient in each case to capture at least a 20 liter spill.						
BOREHOLE & WATER SUPPLY. The borehole must feature a sanitary seal and concrete well apron.						
The public supply point must feature a fence with gate or other barrier that reliably excludes livestock.						
RF SAFETY. Access to the antenna will be physically restricted by fence with lockable gate						

B. Construction management & Materials sourcing

Compliance process: (1) Construction management practices specified by the ERR will be incorporated into the final technical/contract specification that governs the general contractor's work. (2) SRS will verify that each construction management practices is being implemented via at least one field inspection during the construction process. (3) SRS will require remedy or otherwise resolve any deficits identified.

Compliance record. The table below lists all construction management practices mandated by the ERR and will be used to document compliance status.

Construction management/ materials sourcing requirement	Incorporated in final technical specifications		Implemented as specified? (confirmed by field inspection.)			Notes (Issues and resolution)
	Date Confirmed	Initials	Y/N	Date of inspection	Initials	
Stream. If construction will result in an interruption to stream flow, provision must be made to provide a temporary bypass. Temporary damming of stream flow is not permissible.						
Runoff management. During construction, prevent sediment-heavy run-off from cleared site or material						

stockpiles to stream with berms, by covering sand/dirt piles, or by locating them so as to prevent run-off to stream. (Only applies if construction occurs during rainy season.)							
Standing water management. . Construction must be managed so that no standing water on the site persists more than 4 days.							
Fill, sand and gravel. SRS must require its general contractor to certify that it is not extracting fill, sand or gravel from waterways or ecologically sensitive areas, nor is it knowingly purchasing these materials from vendors who do so.							
Timber. SRS must also require its GC to procure chain-of-custody-certified timber, if available in the local market, and otherwise to implement any feasible measures to increase the probability that timber is procured from legal, well-managed sources.							

C. Service provider/contractor due diligence

Compliance process: Prior to engaging any service provider, SRS will confirm that their practices conform to the conditions set out in the ERR.

Compliance record:
The table below lists all such due diligence mandated by the ERR and will be used to document its results.

Service provider due diligence requirement. SRS must confirm that. . .	Date Confirmed	Initials	Short explanation of how confirmed
Septic pump-out service provider uses designated dump locations			
Solid waste disposal provider uses a designated dump locations			

D. Water quality testing (applies if borehole is part of final design)

Compliance process. (1) After borehole stabilization and before any public provision of water, SRS will test for arsenic using the Hach test kit (www.hach.com) and for fecal coliform. These tests will be repeated at 3, 6, 9 and 12 months after borehole stabilization. (2) If at any point an arsenic level in excess of 10ppb is registered, the borehole public tap will be shut down and borehole water not used internally for cooking or consumption. (3) if at any point fecal coliform is detectable in a 100ml sample, water will be treated or filtered and a zero-fecal coliform test result obtained prior to public provision or consumption inside the compound.

Compliance record (Water quality test results and action taken. Date = sample date.)

Scheduled Tests	Arsenic Test		Fecal coliform test			Initials	Action taken
	Date	Reading	Date	Reading	Test kit		
Upon borehole stabilization							
3-month tests							
6-month tests							
9-month tests							
12-month tests							

E. Station/compound general operation, maintenance, and upgrade

Compliance process: (1) PRIOR to station commissioning, station compound operation and maintenance practices specified by the ERR will be incorporated into station management protocols in a manner to be determined by the COP. (2) Implementation will be verified by the COP, in a manner to be determined prior to station commissioning. (3) SRS will remedy or otherwise resolve any deficits identified.

Compliance record. The table below lists the station compound operation and maintenance practices mandated by the ERR and will be used to document (1) how they will be implemented , (2) how verified, and (3) their verification record.

Mandated station operation and maintenance practice	How implemented, including responsible party	How verified	Verification record
The stream bed within the property, including point-of-entry (e.g. via culvert under perimeter wall) must be maintained free of obstructions to flow.			
No work will be allowed on the antenna when live			
Solid waste being held for collection will be stored in sealed containers at least 10m from water supply points.			
Post-construction, drainage systems shall be kept free of obstruction and otherwise maintained in sound condition.			
Any increase to station power during the period of USAID funding would require demonstration that the RF field strength remains compliant with US and any Sudanese standards			

F. Reporting on Green Landscape and Building Features.

This section will be used to report on the adoption of non-compulsory green landscape and green building features in SRS-FM design and construction.

Item	Description