



# Environment and Social Compliance Audit Report

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Project Number: 45125  
September 2011

## KGZ: University of Central Asia

Prepared by: SENES Consultants Limited and University of Central Asia  
for the Asian Development Bank.

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**Asian Development Bank**

**ENVIRONMENTAL AUDIT SITE INSPECTION  
OF THE UNIVERSITY OF CENTRAL ASIA'S  
NARYN CAMPUS DEVELOPMENT**

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## **EXECUTIVE SUMMARY**

### ***Background***

The University of Central Asia (UCA) was established to promote the socio-economic development of Central Asia's mountain societies, while also helping the diverse peoples of the region to draw upon their rich cultural traditions and heritages as assets. UCA consists of three campuses located in Naryn (Kyrgyz Republic), Khorog (Tajikistan), and Tekeli (Kazakhstan).

Since inception, important advances have been made in many aspects of University development including: securing land, developing a facilities plan, selection of architects and planners, designing campus buildings, conducting site investigations and site preparatory works. As part of these initiatives, the UCA has also made significant progress in the evaluation of potential environmental impacts associated with the construction and operation of its facilities. This includes environmental characterization studies and Environmental Impact Assessments (EIAs).

In July of 2011, SENES Consultants Limited (SENES) was retained to develop draft Initial Environmental Examination (IEE) reports and conduct environmental audits of current construction activities at each of the campus sites. The current document serves as the environmental audit report for the Naryn campus.

### ***Audit Overview***

During the period commencing 1 August 2011 to 5 August 2011, a site inspection audit review was undertaken with respect to the existing and potential environmental aspects associated with current and planned works for the establishment of the UCA campuses.

At the time of the audit visits, much of the general site grading at the sites was essentially complete. Activities during the period, while varying slightly in intensity from site to site, generally consisted of:

- minor earthworks such as soil excavation and placement;
- site vegetation related efforts including slope stabilization and on site tree planting, and activities related to ongoing development of the nurseries; and
- construction of the "green wall" around the perimeter of the campus.

In addition to these site activities, each of the sites had skill training programs for development and use of local materials during the construction of the green wall and in preparation for construction of campus facilities. UCA has also established education centres in each of the towns that are being used for both public education and the training in regional site specific skills

in such aspects of concrete formwork, concrete mixing and placement, brick and block laying, general carpentry, mortaring and plastering. Audit observations suggest that these efforts have been meaningful and effective in contributing to the development of the sites to date.

At Naryn, in addition to the above activities, a new road and sidewalk were previously constructed to by-pass the campus grounds. Additional activities include the construction of a demonstration “fast track” housing site to test local supplies and construction techniques.

### ***Naryn Audit Findings and Recommendations***

The site audit found that, in general, the potential impacts associated with the UCA construction activities are limited and relate primarily to potential generation of nuisance dusting and erosion, and potential sediment release to surface waters.

At the time of the visit, dust control was managed through the application of water on surfaces by water trucks. Efforts to minimize site dust in the long-term are underway through enhancement of existing local vegetated areas and by planting of additional vegetation (grasses, shrubs, trees) across the site in both undisturbed and graded areas.

Site-specific erosion control efforts were limited to planting of shrubs and trees to establish new vegetated surfaces and irrigation of existing vegetation to enhance its growth and coverage. While no erosion was noted during the visit, potential exists that in the absence of site-specific construction erosion control measures, exposed surfaces can be eroded during rainfall events. This is an area for potential improvement and the IEE has identified erosion controls that could be applied to mitigate potential erosion from ongoing construction.

### ***Closure***

Consistent with the findings of the IEE, the development of the UCA campus at Naryn will have significant positive short and long term impacts on local socio-economic and environmental conditions. Positive impacts associated with construction efforts include, in addition to employment, occupational training and skills development that will be transferrable. While potential exists for minor impacts during the construction period, no irreversible negative impacts are expected. Positive environmental impacts are expected to include “greening” of the site through vegetation planting and irrigation. Careful use of local materials and aesthetic designs appropriate for the region will ensure that the campus development enhances the local community.

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<b>ATTACHMENT 1: SELECTED NARYN SITE PHOTOGRAPHS</b>	

## **DISCLAIMER**

This audit inspection report presents the findings of SENES Consultants Limited (SENES) review of site conditions based on the site visits of 1 August 2011 through to 5 August 2011 and information provided by the University of Central Asia (UCA) staff during the site visit meetings and within the time constraints, budget, and terms of reference of the assignment. Comments provided reflect SENES' best judgement in light of the information available to it at the time of preparation. Independent studies, confirmation sampling, monitoring and/or intrusive on-site testing, etc. were beyond the instructions and scope of the audit inspection review.

SENES prepared this report using information understood to be factual and correct and shall not be responsible for conditions arising from information or facts which were not fully disclosed by UCA representatives, or for conditions which can only be confirmed through sampling, monitoring or intrusive testing, or through comprehensive and detailed independent assessments.

This report was prepared by SENES for the sole and exclusive use of UCA and lending agencies, and in particular, the Asian Development Bank. Any use of, or reliance or decision based on this report by any third party is the sole and exclusive responsibility of such third party. SENES accepts no responsibility for damages, if any, suffered by any third party as a result of the use of or reliance or decision based on this report.

## **PART A – SITE DESCRIPTION**

### **1.1 INTRODUCTION**

The creation of the University of Central Asia (UCA) is a vision shared by the governments of Kazakhstan, the Kyrgyz Republic and Tajikistan and His Highness the Aga Khan. The objective of the UCA is to foster the economic and social development of Central Asia, with a particular focus on the people located within its vast mountainous regions. This will be achieved through creation of a network of three university campuses, one in each of the member countries, Khorog in Tajikistan, Naryn in the Kyrgyz Republic and Tekeli in Kazakhstan.

Since inception, important advances have been made in many aspects of University development including: securing land, developing a facilities plan, selection of architects and planners, designing campus buildings, conducting site investigations and site preparatory works. As part of these initiatives, UCA has also made significant progress in the evaluation of potential environmental impacts associated with the construction and operation of its facilities. This includes environmental characterization studies, Environmental Impact Assessments (EIAs) and Initial Environmental Examination (IEE) reports which identify conceptual strategies for the monitoring and mitigation of potential impacts that may be caused during the construction and operation of the University.

Each UCA campus will include the following:

- Infrastructure facilities and buildings
  - ✓ Roads
  - ✓ Potable water supply
  - ✓ Water supply for firefighting/irrigation
  - ✓ Wastewater treatment plant
  - ✓ Solid waste management
- Electrical systems
- Power supply and distribution
- Street lighting
- Telecommunications
- Heating systems

The establishment of the University is expected to occur in four phases. In the construction phase (2011-2016), key facilities will be constructed for a Phase I Programme. The Phase I Programme (2017-2022) will involve the commencement of the undergraduate and graduate programs with a smaller student enrolment. Construction for the Phase II Programme is expected to begin in 2022. In the Phase II Programme phase, additional academic programmes will be offered to students. In 2024, construction for the remaining facilities for the Phase III Programme will begin with the Phase III Programme in place by 2029.

At the time of the audit visit, past activities at the site had included installation of perimeter fencing, site and shoreline grading, and the planting of shrubs and trees. Related activities have also included construction of a by-pass road complete with side walk.

## **1.2 NARYN CAMPUS DESCRIPTION & IEE SUMMARY**

The site of UCA's Naryn campus is on the outskirts of Naryn town. Located approximately 350 km southwest of Bishkek at an elevation of 2,200 metres above sea level, the site is characterized by cold winters and cool summers. The site is immediately adjacent to the Naryn River and covers a total area of approximately 335 hectares, with current land use being dominated by agriculture. The following descriptions, as extracted from the SENES Initial Environmental Evaluation (IEE), summarize environmental aspects associated with the development of the Naryn site.

### **1.2.1 Assessment of Potential Environmental Impacts**

The IEE for Naryn concluded that impacts on the physical and biological environment are expected to be localized in nature and, for the most part, transient and reversible. Potential impacts include noise, erosion and dust generation during excavation and earthworks as well as combustion emissions from mobile and stationary sources. Several measures will be taken to reduce these potential impacts including dust suppression techniques, use of appropriate emissions controls and regular maintenance of equipment. Potential impacts to surface waters will be mitigated by a new wastewater treatment plant and solid wastes will be managed under an integrated strategy that minimizes disposal requirements. Environmental performance will be a key factor in the selection of building designs and energy systems. Trees will be planted throughout the campus and measures will be put in place to protect wildlife.

### **1.2.2 Impacts on the Socioeconomic Environment**

The IEE for Naryn concluded that the economic impacts during construction and operation of the campus will be positive and significant. UCA's mission, according to its Charter, is to promote the socio-economic development of the Central Asian region. During the construction phase, there will be significant opportunities for local construction organizations. Positive economic impacts on the region as a result of the university's operations include employment and contracting opportunities for the local population, as well as positive induced impacts. Across all three campuses, UCA is expected to employ almost 1,200 individuals by the first year of operations, including faculty, academic staff, senior management and ancillary staff for housing, food services, housekeeping, travel and transportation, laundry services, shops, security, and general facility maintenance. More than 90% of UCA's staff will be from the Central Asian region.

### **1.2.3 Public Consultations & Disclosure and Grievance Redress Mechanism**

Proactive consultation with local communities has been a key principle in all of UCA's planning. Commencing in 2002, consultations with members of the public were held for all three UCA locations and feedback on the proposed concept was incorporated into the campus plans. Feedback was received on a number of issues including gender-specific needs, public transportation, and the management of meandering flocks in areas surrounding the campuses. A Grievance Redress Mechanism (GRM) will be established through which affected stakeholders can communicate their concerns and receive a response in a timely fashion. Monthly reports on grievances received and their resolution will be provided to UCA's Executive Committee.

### **1.2.4 Environmental Management and Evaluation Framework**

The Environmental Management Plan and the Environmental Monitoring Plan summarize potential environmental impacts as well as the mitigation and monitoring techniques that will be implemented during the construction and operational phases of the University. During the construction phase, impacts will be mitigated through management of construction practices. An environmental inspector will be present to ensure that mitigative measures are in place to minimize noise, dust and erosion. During normal operations, monitoring will be done for stationary combustion sources if appropriate; detailed design and modeling of potential sources will be used in this regard. Treated liquid effluent will be monitored prior to discharge to receiving waters. The frequency of monitoring will be weekly during commissioning and monthly thereafter for the first three year period. Subject to performance, the monitoring period may become quarterly, unless otherwise required by local regulations. Liquid effluent parameters to be monitored include biochemical oxygen demand, suspended solids, total nitrogen, total phosphorus and total coliform.

### **1.2.5 IEE Conclusions and Recommendations**

The development and operation of the University of Central Asia's Naryn campus is not expected to have significant adverse environmental impacts on the physical or biological environments. On the contrary, this project is specifically designed to result in significant positive socioeconomic impacts.

A number of additional environmental studies will be undertaken during the detailed design phase of the project including a waste management study for the campus, detailed analysis for the selection of the final design of the wastewater treatment system, and detailed design of the solid waste management strategy. As part of UCA's Environmental Management Plan, preventative measures will be implemented to mitigate the risk of adverse environmental impacts. The University's Executive Committee will receive environmental and sustainability reports indicating progress being made, issues that may arise, as well as any grievances received.

## **PART B – SUMMARY OF ENVIRONMENTAL LAW**

### **2.1 POLICIES AND APPROVALS IN KYRGYZSTAN**

The Kyrgyz Republic site-specific standards associated with the project have been identified to include:

- SNiP 2.04.03-85 *Sewage – External Networks and Facilities*
- SanPiN 2.1.7.573-96 – *Hygiene Requirements for the Use of Wastewater and their Residues for Irrigation and Fertilization Purposes*
- GOST 17.5.3.06-85 – *Requirements for the Determination of Norms of Stripping of Topsoil in the Course of Performance of Earthworks*
- GOST 17.2.02-78 – *Primary criteria for quality of ambient air in the course of establishing maximum permissible limits*
- GOST 17.2.3.02-78 – *Environmental Protection. Atmosphere*
- GOST 17.5.1.02-78 – *Classification of Dislocated Lands for Re-cultivation*

UCA has indicated its intention to be in compliance with these national requirements during its construction and operation activities.

### **2.2 ADDITIONAL ENVIRONMENTAL CONSIDERATIONS**

In determining the recommended environmental emissions levels, in addition to domestic standards, international standards and best practices were also considered. The IEE for the Naryn campus provides a summary of environmental guidance and practices considered with respect to air and noise emissions and liquid effluents.

Air emissions consider the need to protect the environment from adverse environmental effects as well as the need to prevent poor air quality that could result in irritation, discomfort or illness to workers in accordance with World Health Organization (WHO) Ambient Air Quality Guidelines.

Noise levels to protect workers from adverse impacts associated with high noise levels as well as to minimize disturbances to local residents consider the World Bank Environment Health and Safety (EHS) Guidelines. In accordance with Occupational Health and Safety (OHS) standards, no worker will be exposed to a noise level greater than 85 dB(A) for more than 8 hours per day without hearing protection. The importance of hearing protection will also be emphasized as part of worker OHS training.

Liquid emissions for the wastewater treatment plants will consider best practices and emissions levels used in a number of jurisdictions together with the emissions levels defined in the World Bank EHS Guidelines and the European Union (EU) Directive for urban waste water treatment (91/271/EEC). The EU Directive applies to wastewater from residential settlements and services as well as industrial wastewater and defines requirements that wastewater treatment plants must satisfy prior to discharge.

## **PART C – AUDIT AND SITE EXAMINATION PROCEDURE**

### **3.1 ASSIGNMENT SCOPE AND RETENTION**

In response to the Terms of Reference (ToR) provided to SENES Consultants Limited (SENES) on the 30th June 2011 and clarification on the scope of work by UCA during a teleconference call on 5th July 2011, SENES provided a proposal to develop the Initial Environmental Evaluations and carry out an environmental audit of site activities for the proposed UCA campuses.

By way of a Letter of Intent (LOI) dated 19 July 2011 received from Vasily Detkin of the UCA, SENES was requested to commence with the development of the IEE's and plan for carrying out the implementation of audit site visits. In accordance with the LOI, a contract for the work was provided on 27 July 2011.

This report is associated with the audit inspections. IEE reports were provided under separate cover.

### **3.2 ASSIGNMENT STAFFING**

To carry out the audit in an expeditious manner, SENES provided the services of Mr. G. Wiatzka, P. Eng., a Principal and Vice President of SENES. He is a Civil Engineer with 35 years of environmental, technical and project management experience. His engineering responsibilities have spanned engineering design, specification, management of multi-discipline projects, as well as site supervision and construction management. His environmental experience includes: environmental impact assessments, site assessments, evaluations of "brownfield" redevelopments, environmental audits, due diligence assessments, permitting, and liability assessments, reclamation and decommissioning planning and implementation. He has carried out environmental reviews, audits and due diligence, EMS reviews and financial assessments of numerous (100+) properties for existing and proposed projects in Africa, Asia, Europe, South and North America. He has regional specific experience starting in the Kyrgyz Republic in 1996, has recently worked in Kazakhstan and Mongolia, and has worked on projects in former Soviet States, Romania, and East Germany.

### **3.3 METHODOLOGY**

In executing the assignment, SENES staff confirmed the terms of reference and expectations with UCA staff after the award of the contract and during the course of carrying out the work.

As a first step, a gap assessment was carried out on the information provided by UCA, prior to the development of the IEE. The IEE served to provide a consolidated status of the site, including information on past and present site conditions, and existing and potential environmental impacts associated with the project.

In parallel with the review, a logistics plan, as generally shown below, was developed after several iterations, for carrying out the site visits.

1<sup>st</sup> August - SENES arrive from Canada to Bishkek at 2:15 am, short stay in hotel.

**Fly to Naryn in the Kyrgyz Republic for site visit, return that evening to Bishkek.**

2<sup>nd</sup> August - Fly to Tekeli (Kazakhstan) via Almaty. Return from Tekeli to Almaty and stay overnight.

3<sup>rd</sup> August - Fly from Almaty to Dushanbe, Tajikistan. Stay overnight.

4<sup>th</sup> August - Fly from Dushanbe to Khorog Tajikistan. Stay overnight in Khorog.

5<sup>th</sup> August - Fly return to Dushanbe – changed to drive due to helicopter being unavailable and no seats available on plane.

6<sup>th</sup> August - Fly to Bishkek from Dushanbe. Stay overnight and Sunday (7<sup>th</sup> August).

8<sup>th</sup> August - Depart Bishkek by air for flight to Canada.

### **3.4 INFORMATION REVIEWED**

Prior to carrying out the audit inspections, SENES reviewed information provided by UCA with respect to past and present site conditions and assessment of potential environmental issues of each of the sites.

## **PART D – FINDINGS AND CONCERNS**

### **4.1 SUMMARY OF AUDIT ACTIVITIES**

A site visit was carried out by the author on 1 August 2011 to the Naryn Project site. Travel to Naryn was by ACL helicopter with departure from the Bishkek helipad at about 8:30 am and arrival in Naryn at 9:45 am. Departure from the site was at 3:00 pm. Weather for the flight(s) and during the inspection visit was generally clear and sunny with moderate winds. In addition to SENES, the visit team included UCA members Zakiah Kassam, Vasily Detkin and Azeem Ahmed. On arrival at the site, the team was met by the UCA on-site construction manager, Abdulniez Oliftaev, who guided the team through the site visit.

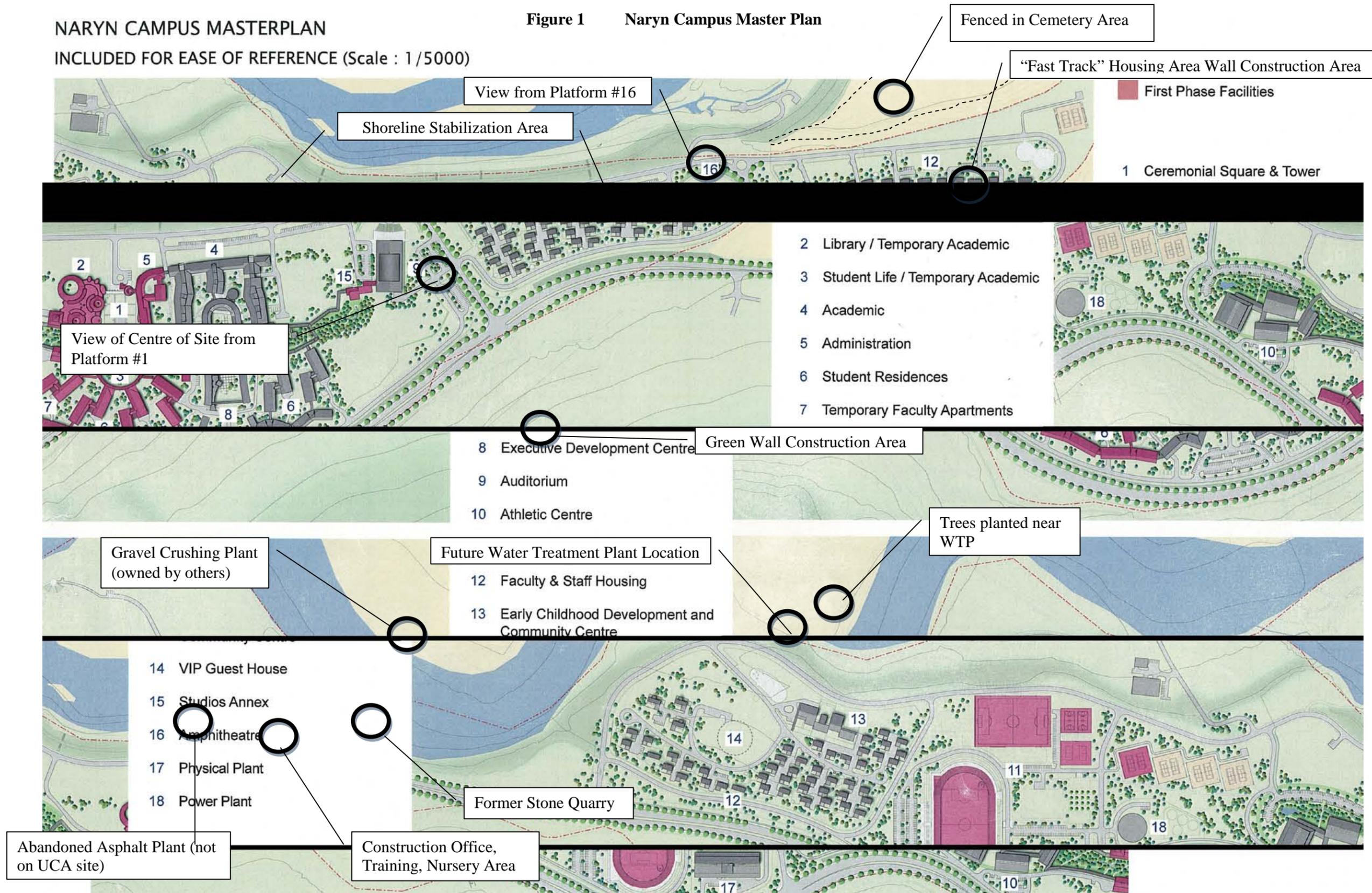
Audit inspection activities included an initial orientation meeting and walkabout at the current site construction office, followed by visits to specific areas of the site, and subsequently followed by a walk through the entire length of the site, from east to west, prior to departure. Construction activities observed at the time of the visit were primarily related to construction of the “green wall” along the roadway as well as work at the “fast track housing area”. Work at the river embankment stabilization area had been recently underway but no activities occurred during the site visit. No dusting was noticed in association with any of the works underway.

At the time of the visit the site was dry with the exception of areas under irrigation. Much of the site is covered with vegetation, which has been enhanced significantly by the planting of shrubs and trees grown by UCA for this purpose. While there was no evidence of surface erosion from the site, the Naryn River shoreline slope stabilization area poses a potential erosion risk until re-vegetation efforts have become established. The temporary soil berm at the top of the slope will, however, deter overland flows from the site proper and, thus, erosion potential is limited to the slope itself.

At the conclusion of the site visit, a tour of the UCA teaching facility in the town of Naryn was carried out during which time the construction training facilities were inspected. Detailed comments on site visit activities and inspection efforts are provided below. Areas discussed in the following sections are shown in Figure 1 Naryn Campus Master Plan (source Arata Isozaki & Associates, 29 March 2011). Photographs of the areas discussed are provided in Attachment 1.

**NARYN CAMPUS MASTERPLAN**  
INCLUDED FOR EASE OF REFERENCE (Scale : 1/5000)

**Figure 1 Naryn Campus Master Plan**



## **4.2 SITE ACTIVITIES AND OBSERVATIONS ON PAST AND CURRENT CONDITIONS**

### **4.2.1 Current Construction Office, Training and Main Nursery**

At commencement of the audit / inspection visit, overall orientation to the proposed project was provided by Vasily Detkin and the local construction manager in the current office building. A tour of the area around the office building focused on the review of the construction training area which includes various wall and walkway stone placement areas. It was noted that to date, about 150 people have received or are in the process of receiving such training. The team subsequently toured the seedling plot and tree and shrub growing areas. It was noted that the vegetation efforts have focussed on collection of seeds and seedlings from local species for growth of plants in support of site landscaping and re-vegetation. UCA reported that they have planted about 17,000 trees and shrubs this past year that cover about 50% of the site and expect to plant an additional 13,000 next year. *The activities associated with the planting of trees and shrubs have minimal environmental impact. Establishment of the vegetation cover will enhance the environmental aspects of the site.*

### **4.2.2 Green Wall Construction Parallel to New Bypass Road**

Since the beginning of April 2011, UCA has constructed about 800 m of “green wall” parallel to the road. The green wall is a rock filled gabion wall intended to act as a “non-obtrusive” long-term fence along the roadside boundary of the university property. The gabions are approximately 2.4 meter high on the outside and will be about 1 meter high on the university property side. Vegetation will be allowed/encouraged to grow on the wall. Filling of these specially designed gabions is by hand-placed rocks. Coarse fill is placed in the core of the gabions and selected river stone is used as external finishing material in the gabion. Coarse materials are brought from the on-site quarry and from the area of the road way that will be along the north side of the site. The excavated source materials are brought to the wall area, at which point coarse stone are hand separated from the soil. The remaining materials will be used for site grading after construction of the wall. The finished stone has been collected and provided by local residents, who collect the stone from areas approved by the local environmental authorities. *Based on the highly manual labour intensive nature of the work, the activities associated with the construction of the green wall itself has little potential for environmental impacts and no issues were observed during the visit.*

### **4.2.3 View of Shoreline Stabilization Work (from Platform #16)**

As a next step in the site inspection, the shoreline stabilization work was viewed from lookout station Platform #16. UCA staff noted that the Naryn River shoreline had been very steep in this area of the site and efforts have been carried out to cut back the slope so as to eliminate the

safety hazard associated with the steep slope and to stabilize it from an environmental perspective. Efforts have included grading and shaping, soil cover placement and planting of trees and shrubs. *While no issues were observed at the time of the visit, this area has the potential for releases by dust and/or runoff from the soil placed on the re-graded slope areas until such time as vegetation is established on the slope.*

#### **4.2.4 View of Centre Portion of the Site (from Platform #1)**

This lookout platform is set up on the former paved roadway that ran through the site area. The road is no longer in use, as a new bypass road has been constructed by the UCA. The existence and use of this former paved road that runs through the length of the campus area during construction will reduce dusting. At the appropriate point in time, the former road will be removed and replaced by new construction features of the campus. Note that the central area of the site is well vegetated due to planting and irrigation efforts of UCA. *No issues were noted at this location.*

#### **4.2.5 Quarry Area at West End of Site (near future Faculty & VIP House)**

A small quarry had been developed at the west end of the UCA campus property in the vicinity of a future faculty housing area. The quarry was used to provide coarse rock fill for the “green wall”. As with other parts of the site, the surficial soils extend between 1 to 2 meters in depth at which point coarse stones are encountered. The quarry has been worked to a depth of about 5 meters. It is no longer in use as it has reached its practical limits given the landscape design for future campus development. *Based on its limited size and location, there are minimal environmental impacts associated with this site. However, from a health and safety perspective, it was noted that no flagging or barriers had been placed around the edge of the area to warn individuals as to the presence of the excavation area.*

#### **4.2.6 Water Treatment Plant Site Area**

The site for the proposed water treatment plant location is on a low lying flat area at the north central portion of the proper. At this time there are no construction works in this area. Parts of this area have been used to successfully plant new trees. *No issues were noted at this location.*

#### **4.2.7 Fast Track Housing Area**

This area at the east end of the campus site was originally anticipated to be an area where multiple housing structures would be erected. However, after construction of foundations, activities at this area have been scaled back to testing of exterior and interior materials at one house only. This is being done in an effort to ensure that construction specifications are

appropriate and suitable for the nature of locally available materials and in keeping with local needs and norms and local constructability. *Activities being carried out in this area represent no potential for environmental impacts if basic housekeeping and clean up of site materials is carried out during the course of the work.*

#### **4.2.8 Graveyard Area**

The area of the graveyard was visited. A new fence has been installed and the area is isolated from UCA activities. *No issues were noted at this location.*

#### **4.2.9 Walk Length of Site**

Starting from the east side of the site, a walking tour was carried out along the length of the site. This provided opportunities for additional views of all site areas and, in particular, the shoreline slope stabilization works and the roadbed excavation/fill area running parallel to the river along the upper edge of the slope stabilization works. It was noted that vegetation in the area of the centre of the site is well established and that most of the area is undisturbed by past activities with the exception of tree planting.

It was noted that excavation for green wall fill materials had occurred along the alignment of the future north perimeter roadway, and that un-used soil materials have been left in place as a one meter high berm parallel the river along the upper slope edge. This has the potential to result in both positive and negative impacts. On the one hand, the berm materials can act as a barrier to overland runoff that could otherwise erode the down gradient shoreline slope. *On the other hand, the bare soils of the berm are themselves potentially vulnerable to wind and water erosion.* At the time of the visit no wind or water erosion was evident.

#### **4.2.10 Other Areas Noted:**

***Former Asphalt Plant to West of Site*** – A former asphalt plant is located immediately to the west of the existing construction office. This facility does not belong to the UCA and is not active. Given this, any potential environmental issues associated with facility are outside the scope of UCA’s purview and outside the scope of the audit.

***Gravel Crushing Plant*** – A crushing plant is located on the property at its western end in the vicinity of the current office. The plant is operated by a third party in support of non-UCA related road work. Dust is said to be generated from its operations and UCA has stated this is a nuisance issue when it occurs. UCA wants these operations removed, but has thus far had no co-operation from the operator. UCA is hoping that the operator will cease to operate and/or remove the crushing plant once the road work is completed.

## **PART E – CORRECTIVE ACTION PLAN**

### **5.1 SUMMARY OF OBSERVATIONS AND FINDINGS**

The site audit found that, in general, the potential impacts associated with the UCA construction activities are limited and relate primarily to potential generation of nuisance dusting and erosion, and potential sediment release to surface waters.

At the time of the visit, dust control was managed through the application of water on surfaces by water trucks. Efforts to minimize dust in the long-term are underway through enhancement of existing local vegetated areas and by planting of additional vegetation (grasses, shrubs, trees) across the site in both undisturbed and graded areas.

Site-specific erosion control efforts were limited to planting of shrubs and trees to establish new vegetated surfaces and irrigation of existing vegetation to enhance its growth and coverage. While no erosion was noted during the visit, potential exists that, in the absence of site-specific construction erosion control measures, exposed surfaces may be eroded during rainfall events. This is an area for potential improvement and the IEE has identified erosion controls that could be applied to mitigate potential erosion during construction.

### **5.2 RECOMMENDED ACTIONS**

The IEE has identified the following erosion mitigation measures associated with construction activities. These measures include following standard operational practices to minimize and control potential erosion by wind and water:

- *Controls* - When carrying out earthworks or vegetation clearing activities in the vicinity of a drainage course or a body of water, silt fences, floating silt curtains and/or containment berms will be used, as appropriate, to prevent the release of sediment into water. (Note examples of erosion control products are provided under separate cover for the UCA file and records.)
- *Scheduling* - Areas subject to potential erosion will remain open for the minimum period necessary to implement the required work. In addition, work will be avoided during wet and rainy periods in areas where erosion poses a problem.
- *Material management* - Material stockpiles will be managed to prevent sediment from entering any water body.

- *Re-vegetation* - Where possible, planting disturbed areas, preferably with native trees, shrubs or grasses, and covering such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

Moving forward, the application of the above noted practices for localized erosion control at site-specific construction locations should be effective in mitigating potential issues associated with these construction activities. In addition, as recent re-vegetation efforts take hold and become established at the site, potential dust and erosion impacts of wind and water will be significantly reduced.

It is recommended that a second audit be carried out once Phase I construction efforts are underway to assess and confirm that the dust and erosion control practices are being effectively implemented during that phase of the program.

**ATTACHMENT 1**

**SELECTED NARYN SITE PHOTOGRAPHS**

