















Environmental and Social Impact Assessment

D6-I of the E-bus Demonstration Project

Task 6 - Environmental and Social Impact Assessment (ESIA)

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Abbreviation List

| Acrony | Term | | | |
|------------|---|--|--|--|
| AC | Alternating Current | | | |
| ANSI | American National Standards Institute | | | |
| ВС | Black Carbon | | | |
| BMS | Battery Management System | | | |
| С | Celsius | | | |
| Capex | Capital Expenses | | | |
| CAPM AS | Central Agency for Public Mobilization and Statistics | | | |
| CCTV | Closed Circuit Television | | | |
| CDA | Civil Defense Authority | | | |
| CDM | Clean Development Mechanism | | | |
| CIBSE | Charted Institution of Building Services Engineers | | | |
| CNG | Compressed Natural Gas | | | |
| СО | Carbon monoxide | | | |
| CPOs | Charging point operators | | | |
| CSS | Combined Charging System | | | |
| СТА | Cairo transport authority | | | |
| DC/C | Decommissioning and Construction | | | |
| DSTA | Double Steel Tape Armored | | | |
| E-bus | Electric bus | | | |
| ECEPS E | Electrical Power Systems Engineering | | | |
| EDC | Electrical Distribution Company | | | |
| EEHC | Egyptian Electricity Holding Company | | | |
| EGP | Egyptian Pound | | | |
| EHS | Environmental, Health and Safety | | | |
| EIA | Environmental Impact Assessment | | | |
| EMC | Electromagnetic Compatibility | | | |
| EMU | Environmental Management Unit | | | |
| EoL | End of Life | | | |
| ER | Environmental Register | | | |
| ESCP | Environmental and Social Commitment Plan | | | |
| ESF | Environmental And Social Framework | | | |
| ESG | Environmental, Social and Gender | | | |
| ESIA | Environmental and Social Impact Assessment | | | |
| ESMF | Environmental and Social Management Framework | | | |













| Acrony m | Term |
|-------------|---|
| ESMP | Environmental and Social Management Plan |
| ESS | Environmental and Social Standards |
| EV | Electric Vehicles |
| EV-CS | Electric vehicle charging station |
| F° | Fahrenheit |
| F | Frequency |
| FGDs | Focus Group Discussions |
| FM | Factory Mutual |
| GBV | Gender Based Violence |
| GC | Greater Cairo |
| GCCC | Greater Cairo Air Pollution Management and Climate Change Project |
| GDP | Gross Domestic Product |
| GHG | Greenhouse Gases |
| GIS | Geographic Information System |
| GIS | Gas Insulated Switchgear |
| GM | Grievance Mechanism |
| GoE | Government of Egypt |
| GPR | Ground Penetrating Radar |
| GRM | Grievance Redress Mechanism |
| GRS | Grievance Redress Service |
| HAZM AT | Hazardous Waste and Material Management Plan |
| HDPE | High Density Polyethylene |
| HR | Human Resources |
| HSE | Health and Safety Executive |
| HVAC | Heating, Ventilation, and Air Conditioning |
| ID | Identity Card |
| IEC | International Electrotechnical Commission |
| IEEE | Institute of Electrical and Electronics Engineers |
| IFC | International Finance Corporation |
| ILO | International Labor Organization |
| IPCC | Intergovernmental Panel on Climate Change |
| IPVSS | IP Video Surveillance System |
| JIN | Just-In-Time |
| kg | Kilogram |
| km | Kilometer |
| KV | Kilovolt |













| Acrony | Term | |
|------------------------|---|--|
| KWh | Kilo Watt hour | |
| L*W* | Length*Width*Height | |
| LAN | Local Area Network | |
| LED | Light Emitting Diode | |
| LFP | Lithium Iron Phosphate | |
| LMP | Labor Management Procedures | |
| LTO | Lithium-Titanate-Oxide | |
| MCA | Multi Criteria Analysis | |
| MDB | Main Distribution Board | |
| MEP | Mechanical, Electrical, and Plumbing | |
| MoE | Ministry of Environment | |
| МОНР | Ministry of Health and Population | |
| MoLD | Ministry of Local Development | |
| MoT | Ministry of Transport | |
| MSDS | Materials Safety Data Sheets | |
| MV/LV | Medium Voltage/Low Voltage | |
| NCM Li-ion / NMC | Nickel Cobalt Manganese Lithium-ion | |
| NFPA | National Fire Protection Association | |
| NGO | Nongovernmental Organization | |
| No. | Number | |
| NOx | Nitrogen Oxides | |
| NVRs | Network Video Recorders | |
| O&M | Operation and Maintenance | |
| O/M | Operation and Maintenance | |
| осс | Operation Control Center | |
| Орех | Operating Expenses | |
| OSH | Occupational Safety and Health | |
| OSHA | Occupational Safety and Health Administration | |
| PCU | Project Coordination Unit | |
| PMI0 | Particulate Matter with a diameter of 10 microns or less | |
| PM2.5 | Particulate Matter with a diameter of 2.5 microns or less | |
| PMSM | Permanent Magnet Synchronous Motor | |
| PPE | Personal Protective Equipment | |
| PRV | pressure reducing valves | |
| PVC | Polyvinyl Chloride | |













| Acrony | Term | |
|------------|--|--|
| RMU | Ring Main Unit | |
| RTU | Remote Terminal Unit | |
| S | Severity | |
| SEA | Sexual Exploitation and Abuse | |
| SEP | Stakeholder Engagement Plan | |
| SH | Sexual Harassment | |
| SMP | Safety Management Plan | |
| SOx | Sulfur Oxides | |
| SPCC | Spill Prevention, Control, and Countermeasure | |
| SST | Setec Shaker Transport for Cairo Consortium (Consultant) | |
| TfC | Transport for Cairo | |
| TFT | Thin-film-transistor | |
| TIUs | Technical Implementation Units | |
| TOR | Terms of Reference | |
| TTMP | Temporary Traffic Management Plan | |
| UL | Underwriters Laboratories | |
| UNES CO | United Nations Educational, Scientific and Cultural Organization | |
| UNFC CC | United Nations Framework Convention on Climate Change | |
| UPS | Uninterruptible Power Supply | |
| VFD | Variable Frequency Drives | |
| VSD | Variable Speed Drive | |
| WB | World Bank | |
| WBG | World Bank Group | |
| WBG EHS | World Bank Group Environmental, Health and Safety | |
| WDR | Wide Dynamic Range | |
| WHO | World Health Organization | |
| WMP | Waste Management Plan | |
| WMR A | Waste Management Regulatory Authority | |
| WU | Wheelchairs users | |

ESIA Team

| Name | Positions |
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الملخص التنفيذي

تواجه محافظة القاهرة على مدى السنوات الأخيرة تحديات كبيرة في مجال النقل العام، يأتي على رأسها الازدحام المروري المستمر، وارتفاع مستويات تلوث الهواء إلي مستويات مُقلقة، حيث تساهم حافلات النقل العامة، التي تعمل في الغالب بوقود الديزل منخفض الجودة بشكلٍ كبير في تلوث الهواء، مما يتسبب في حدوث تداعيات صحية خطيرة. حيث يسعى نحو مليوني شخص سنويًا للحصول على علاج طبي لمشاكل الجهاز التنفسي المرتبطة بتلوث الهواء. بالإضافة إلى ذلك، يتسبب تلوث الهواء في تكاليف اقتصادية كبيرة تتحملها الدولة، تعادل حوالي 1,4٪ من الناتج المحلي الإجمالي لمصر سنويًا. لذلك، تأتي أهمية تطوير قطاع النقل العام لمعالجة هذه المشكلات الملحة.

واستجابةً لهذه التحديات، وافق البنك الدولي في سبتمبر 2020 على تمويل مشروع إدارة تلوث الهواء وتغير المناخ في القاهرة الكبرى، الذي يضم المكون الثالث "المشروع الاسترشادي للحافلات الكهربائية"، والذي يتضمن أستبدال 75 من الحافلات التي تعمل بالديزل/ الغاز الطبيعي بحافلات كهربائية يقدر عددها ب98 حافلة لتأدية نفس خدمات الحافلات المستبدلة، كما يتضمن تحديث جراج الأميرية في منطقة السواح لاستيعاب أسطول الحافلات الكهربائية الجديد

يمثل مشروع الحافلات الكهربائية خطوة استراتيجية نحو نظام نقل عام أكثر استدامة وكفاءة في القاهرة الكبرى، مع التركيز بشكل رئيسي على تقليل انبعاثات غازات الاحتباس الحراري وتلوث الهواء، وتخفيف الازدحام المروري، وتحسن/حماية الصحة العامة. وهذا الهدف يتماشى مع الرؤية الوطنية والعالمية للعمل المناخي، بما في ذلك رؤية مصر 2030، والالتزامات الدولية بموجب اتفاقية باريس، والجهود العالمية الأوسع لمكافحة تغير المناخ وتعزيز التنمية المستدامة.

أهداف المشروع

يهدف مشروع الحافلات الكهربائية إلى تحسين جودة الهواء وتقليل الانبعاثات من خلال شراء وتشغيل عدد من الحافلات الكهربائية حيث يهدف المشروع إلى استبدال 75 حافلة تعمل بالديزل والغاز الطبيعي بحافلات كهربائية. وللحفاظ على نفس مستوى الخدمة والأداء الذي تقدمه الحافلات الحالية، يحتاج المشروع إلى 98 حافلة كهربائية. كما يشمل المشروع تطوير جراج الأميرية في منطقة السواح ليستوعب أسطول الحافلات الكهربائية الجديد

موقع المشروع

موقع الجراج

تم اختيار إحدى جراجات هيئة النقل العام ليكون المحور المركزي لتشغيل وصيانة أسطول الحافلات الكهربائية المستقبلية، وهو جراج الأميرية بحى السواح. يقع جراج الأميرية بالمنطقة الشمالية بمحافظة القاهرة، وتبلغ مساحته الإجمالية 26,844 مترًا مربعًا. ويعتبر طريق السواح وطريق المصانع هما الطريقين الرئيسين للوصول إلى الجراج، وتقع بوابة الدخول الرئيسية وبوابة الطوارئ على شارع "السواح" وتوجد بوابة ثالثة عند طريق المصانع.

ونظراً أن جراج الأميرية تابع لهيئة النقل العام، فلا توجد حاجة لحيازة أراضي لاستيعاب مشروع الحافلات الكهربائية.

يقع الجراج في منطقة تضم أحياء سكنية وتجارية وصناعية متنوعة. وبفضل قربه من الطرق الرئيسية، يمكن للحافلات الكهربائية الانطلاق بسهولة وفعالية دون التأثير بالسلب على حركة سكان المنطقة، مما يسهل دمج الحافلات الكهربائية الجديدة في نظام النقل العام الحالي.

مسارات الحافلات

قام الاستشاري بدراسة أحد عشر (11) مسار للحافلات الحالية التي يخدمها جراج الأميرية والتي تم الحصول عليها من قبل هيئة النقل العام. بناءً على معايير اختيار الطرق الموضحة بمزيد من التفصيل في دراسة تقييم الأثر البيئي والاجتماعي المعدة للمشروع، تم اختيار خمسة (5) مسارات لاستبدال حافلاتها التي تعمل بوقود الديزل/الغاز الطبيعي بالحافلات الكهربائية.

وفيما يلي المسارات المختارة:

- الإباجية الأميرية
- الأميرية المنيب
- محطة أحمد حلمي المسلة الجديدة (المطرية)
 - العمر انية الجديدة قسم الحدائق
 - الزاوية الحمراء مساكن زينهم

وكجزء من التحول نحو الاستدامة، تم تحديد مرحلة انتقالية أولية، حيث سيتم شراء عدد من الحافلات الكهربائية نظيفة وصديقة للبيئة وموفرة للطاقة لتحل محل 75 حافلة تعمل بوقود الديزل/الغاز الطبيعي حاليًا في المسارات الخمسة المختارة لتحقيق التشغيل اليومي للطرق. حيث يقدر عدد الحافلات الكهربائية المطلوبة لتعويض هذا العدد من حافلات الوقود ب 98 حافلة كهربائية.

وتوضح الأشكال التالية موقع الجراج ومسارات الحافلات الكهربائية المختارة السابق ذكرهم.













شكل 1: موقع جراج الأميرية







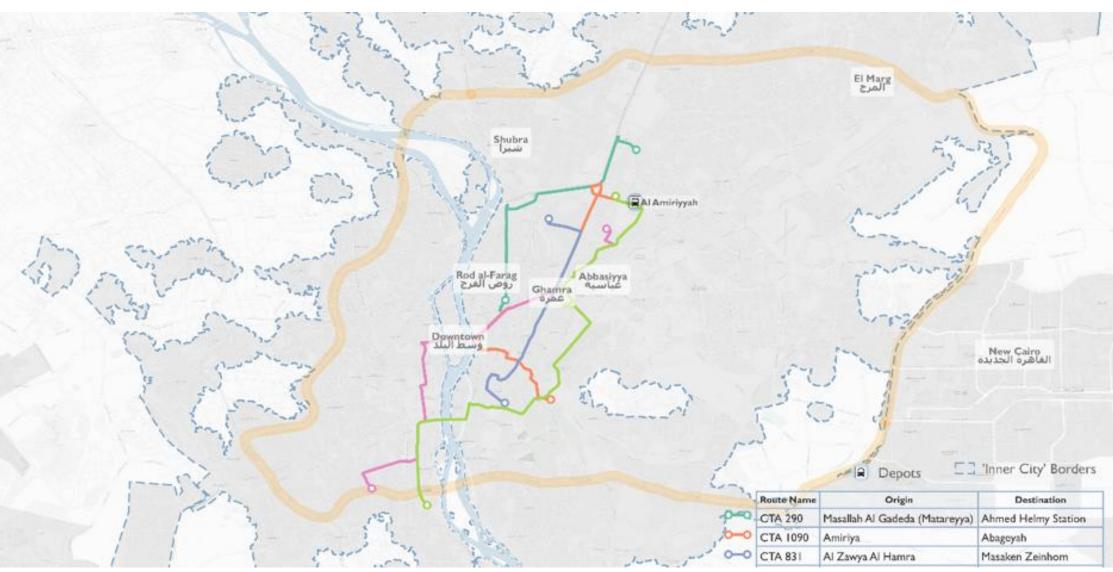








شكل 2: مسارات الخطوط الخمسة













مكونات المشروع

يتكون المشروع الإسترشادي للحافلات الكهربائية من ثلاث مكونات رئيسية كما هو موضح أدناه:

- اختيار وتجهيز جراج في نطاق القاهرة الكبرى، بما في ذلك تركيب محطات شحن في الجراج الحالي وبناء مرافق جديدة لاستيعاب بنية الشحن التحتية وورش الصيانة الخاصة بالحافلات الكهربائية.
- اختيار مسارات الحافلات الكهربائية الجديدة: تم دراسة عدد من الخطوط التي تخدم الجراج المختار واختيارها لتشغيل الحافلات الكهربائية واستبدال حافلات الديزل والغاز الطبيعي على تلك المسارات.
- توريد الحافلات الكهربائية والشواحن: يتضمن المشروع شراء أسطول من الحافلات الكهربائية حيث يقدر عددها ب 98 حافلة كهربائية بمواصفات معينة لتحل محل 75 حافلة تعمل بوقود الديزل/الغاز الطبيعي التقليدية في نظام النقل العام بأحد الجراجات بالقاهرة الكبرى.

الإطار القانوني

يخضع المشروع الحالي للقوانين والسياسات الوطنية والدولية، حيث يجب أن تتوافق مكونات المشروع المقترح مع المتطلبات الوطنية والدولية. إذا كان هناك اختلاف بين المعايير المحلية ومعايير مجموعة البنك الدولي، فسيتم اعتماد المعايير الأكثر صرامة.

بالاضافة إلى ذلك، تشمل دراسة تقييم الأثار البيئية والاجتماعية للمشروع الإطار القانوني والتنظيمي لهذا المشروع القوانين المصرية المعمول بها وجميع التعديلات واللوانح التنفيذية اللاحقة ومعايير مجموعة البنك الدولي ذات الصلة. تمت مناقشة المواد والمعايير ذات الصلة بالمشروع، وكذلك السلطات المسؤولة عن تنفيذ القانون وعقوبات المخالفات بدراسة تقييم الأثار البيئية والاجتماعية للمشروع. كما تلتزم وحدة إدارة المشروع بكل المعايير المحلية والدولية.

بعض القوانين والمعايير التي تنطبق على المشروع:

- قانون البيئة رقم 4 لسنة 1994 والمعدل بالقانون 2009/9 و2015/105 اللوائح التنفيذية المعدلة.
- قانون العمل رقم 137 لسنة 1981 المعدل بالقرار رقم 12 لسنة 2003 والمعروف أيضًا باسم قانون العمل الموحد.
 - قانون المرور رقم 66 لسنة 1973، المعدل بالقانون رقم 121 لسنة 2008 للتخطيط لحركة المرور.
 - قانون رقم 202 لسنة 2020 بشأن تنظيم جهاز ادارة المخلفات ولائحته التنفيذية 722 لسنة 2022.
- قرار وزير الاسكان والمرافق والمجتمعات العمرانية رقم 44 لسنة 2000 الخاص بتعديل اللائحة التنفيذية للقانون رقم 93 لسنة 1962 في شأن صرف المخلفات السائلة.
 - المعاهدات الدولية
- معايير البنك الدولي البيئية والاجتماعية (ESSs) ذات الصلة بمشروع حافلات النقل الكهربائي هي كالتالي: المعيار ESS1، المعيار ESS2، المعيار ESS3، المعيار ESS1، المعيار ESS6، المعيار ESS8، والمعيار ESS10.
 - قانون العمل رقم 137 لسنة 1981 المعدل بقرار 12 لسنة 2003 والمعروف بقانون العمل الموحد.

الأثار البيئية والاجتماعية الإيجابية والسلبية المحتملة للمشروع

أ) الأثار أثناء مرحلة تطوير واعادة تأهيل الجراج:

تتضمن الآثار الايجابية الرئيسية المتوقعة ما يلي:

- توفير فرص عمل جديدة مباشرة وغير مباشرة للعمالة المحلية والعمالة الوافدة.
- تحسين البيئة من خلال إزالة مصادر التلوث الحالية بالجراج مثل محطة الوقود وورش الصيانة، ومعادلة وردم أو استخراج خزانات الديزل بعد تفريغها. وقد افادت شركة مصر للبترول أن 90% من الحالات المشابهة لخزانات الديزل تحت الأرض يتم تحييدها ودفنها باستخدام الرمال. بالإضافة إلى إزالة المضخات لتجنب تسرب الوقود وتلوث التربة والمياه الجوفية. علاوة على ذلك، إيقاف تشغيل نظام غسيل الحافلات الحالي ذو التكنولوجيا القديمة جدًا والذي يستهلك كميات كبيرة من المياه مما يسبب هدر الموارد.
 - يوفر المشروع الفرص لمقدمي الخدمات الغذائية وخدمات التنظيف، مما يزيد من النشاط الاقتصادي في المنطقة.
 - وتتضمن <u>ا**لمخاطر والآثار السلبية**</u> الرئيسية المتوقعة للمشروع خلال مرحلة الانشاء ما يلى:
- جودة الهواء: يمكن أن تؤدي انبعاثات أول أكسيد الكربون(CO) ، الجسيمات العالقة (PM) ، الهيدروكربونات(HC) ، ثاني أكسيد الكبريت (SO₂) والغبار الناتج عن أعمال الحفر والهدم ومناولة المواد إلى تأثيرات مؤقتة تؤثر على العمال والسكان القريبين.









- الضوضاء والاهتزازات: الضوضاء الناتجة عن الآلات والمحولات وأنشطة البناء، إلى جانب الاهتزازات الناتجة عن المعدات الثقيلة وأعمال الدك والحفر، قد تسبب اضطرابات محتملة للعمال والسكان المجاورين والأنشطة التجارية.
- التربة والجيولوجيا والطوبوغرافيا: هناك خطر من تلوث التربة بسبب تسرب محتمل من خزانات الديزل المدفونة، بالإضافة إلى مخاطر سوء التخلص من النفايات وسوء التعامل مع المواد الكيميائية، كما قد يؤدي تعرض التربة للأمطار والرياح إلى حدوث تعرية.
- المسطحات المائية والمياه الجوفية: هناك احتمال لتلوث المياه الجوفية نتيجة تسرب الوقود أو المواد الكيميائية، أو بسبب التخلص غير السليم من مياه الصرف الصحى.
 - كفاءة الموارد والتلوث:

مواصلت for Cairo

- زيادة استهلاك الطاقة والمياه.
- استخدام مواد البناء مثل الأسفات، الخرسانة، الكابلات، المضخات، والرمل المستخدم في تحييد خزانات الديزل. إنتاج نفايات خطرة وغير خطرة، مثل خزانات الديزل والزيوت ومخلفات البناء.
 - مخاطر سوء إدارة النفايات مما يؤدي إلى التلوث والمخاطر الصحية العامة.
 - مخاطر الكوارث الطبيعية / حالات الطوارئ:
 - تأثيرات الأمطار الغزيرة وموجات الحر على العمال والمعدات.
 - مخاطر الحرائق الكهربائية، تسرب الوقود، وتعطل المعدات.
 - خطر الانفجار بسبب خزانات الديزل المدفونة في حالة عدم التعامل معها بشكل صحيح.
 - الصحة والسلامة المهنية:
 - التعرض للغبار، الضوضاء، الحرارة، والمواد الخطرة.
 - مخاطر الحفر، العمل على ارتفاعات، والمخاطر الكهربائية.
 - المخاطر النفسية مثل الإجهاد والتعب.
 - الحوادث الناجمة عن نقص التدريب والإجراءات الوقائية.
- إعادة توزيع القوى العاملة: سيتم نقل جميع العاملين في هيئة النقل العام بالقاهرة من جراج الاميرية إلى الجراجات المجاورة، مما قد يؤدي إلى مخاطر اجتماعية
- صحة وسلامة المجتمع: زيادة حركة المركبات الثقيلة قد تؤدي إلى حوادث مرورية، كما أن الوصول غير المصرح به إلى موقع البناء (مثل الأطفال أو السكان غير المدركين للمخاطر) قد يشكل خطراً، بالإضافة إلى مخاطر الانفجار بسبب بقايا الوقود في خزانات الديزل المدفونة.
- التدفق المؤقت للعمالة: قد يؤدي إلى ضغط على الموارد المحلية مثل الإسكان والطعام والرعاية الصحية، بالإضافة إلى مخاطر أمنية ونزاعات اجتماعية محتملة.
- عمالة الأطفال: هناك خطر توظيف الأطفال من قبل المقاولين الفرعيين أو مقدمي الخدمات، مما قد يؤدي إلى تعرضهم لظروف عمل غير آمنة وتعطيل تعليمهم.
- العنف القائم على النوع الاجتماعي (GBV) والاستغلال والانتهاك الجنسي: (SEA-SH) زيادة مخاطر التحرش والاستغلال والتمييز، مما يجعل النساء أكثر عرضة للمخاطر داخل مكان العمل والمجتمع المحيط.
- السلامة المرورية: زيادة حركة المركبات الثقيلة تؤدي إلى ازدحام مروري، مما يزيد من مخاطر الحوادث التي تشمل المشاة والمركبات الأخرى

ب) الأثار أثناء مرحلة التشغيل:

ب-1) تشغيل الجراج:

- و تحسين البيئة: إزالة مصادر التلوث مثل محطات الوقود وخزانات الديزل.
- تحسین حالة التربة: تقلیل مخاطر تلوث التربة من خلال إزالة مرافق معالجة وتخزین الوقود.
- الحفاظ على الموارد الطبيعية (المياه): تطبيق تكنولوجيا غسيل الحافلات الموفرة للمياه مع إعادة تدوير تصل إلى 70٪ من المياه المستخدمة.
 - التقدم التكنولوجي: تركيب معدات صيانة وتشغيل متقدمة.
 - إعادة تأهيل عمال الجراج وهيئة النقل العام.

ب-2) تشغيل الحافلات الكهربائية:

• تقليل انبعاثات الغازات الدفيئة.











- تحسين جودة الهواء.
- تقليل الضوضاء المرورية.
 - تحسين تدفق المرور.
 - تحسين جودة الخدمة.
- إعادة تأهيل عمال وسائقي هيئة النقل العام
- تشجيع سوق السيار ات/الحافلات الكهر بائية.
 - تحقيق وفورات اقتصادية.

التأثيرات السلبية:

أ- تشغيل الجراج:

- تلوث التربة: مخاطر من تسرب الزيوت وإدارة النفايات غير السليمة.
 - زيادة استهلاك الكهرباء: ارتفاع كبير في أستهلاك الكهرباء.
- توليد نفايات خطرة: نفايات متوقعة تشمل الأسلاك الكهربائية والزيوت وملفات المحولات، والبطاريات، ومواد التشحيم.
 - تعرض الجراج لمخاطر الفيضانات والحرائق.
 - تولد الحمأة: نتيجة عمليات معالجة المياه الناتجة عن غسيل الحافلات.
 - مخاطر صحية وسلامة: التعرض للصدمات الكهربائية، والمواد الخطرة، والإصابات الجسدية.

ب- تشغيل الحافلات الكهربائية:

- انبعاثات الغبار من سير الحافلات الكهربائية على الطرق.
- ارتفاع الطلب على الكهرباء نتيجة الشحن المتكرر للحافلات.
- زيادة استهلاك البطاريات وتأكل الإطارات نتيجة لموجات الطقس الحارة.
 - توليد النفايات والخردة.
 - تعرض الحافلات لمخاطر الفيضانات والحرائق.
 - مخاطر صحية وسلامة: التعامل مع أنظمة كهربائية ذات جهد عال.

بدائل المشروع

تم دراسة عدد من البدائل الخاصة بتنفيذ المشروع المقترح والموضحة كالتالي:

عدم اتخاذ أي إجراء

لن يستفيد سكان القاهرة الكبرى من نظام نقل مستدام وفعال وآمن، وسيستمرون في مواجهة مخاطر حوادث المرور ونظام نقل عام غير أمن عكس ما توفره الحافلات الكهربائية من نظم مراقبة وأمان وتدريب السائقين على القيادة الأمنة والوقوف في الأماكن المحددة. كما سيظل الاعتماد على السيارات الخاصة، مما يزيد من الضغط على الطرق، ويرفع مستويات التلوث وانبعاثات غازات الاحتباس الحراري، ويزيد من تكاليف التنقل.

سيظل هناك 75 اتوبيس يعمل بوقود الديزل/الغاز الطبيعي يصدر عنها انبعاثات تلوث هواء القاهرة ، وتتولد عنها انبعاثات الغازات الدفيئة، وتزيد من مستويات الضوضاء، وتزداد المخاطر المتعلقة بالسلامة والأمان، وتتقلص الفوائد الاجتماعية والاقتصادية، وتزداد المخاطر الصحية بسبب تلوث الهواء

بناءا على ما سبق، فأن المشروع يهدف إلى تحسين هذا الوضع بتوفير نظام نقل عام يعتمد على حافلات كهربائية تعمل بكفاءة وبأمان أعلى، مما يقلل من حوادث المرور بفضل تكنولوجيا أكثر تطوراً وتحسين إدارة النقل العام لتكون أكثر أماناً واستدامة.

ب) بدائل تكنولوجيا الحافلات

تم اختيار الحافلات الكهربائية لأنها تقدم مزايا عديدة مقارنة بالخيارات الأخرى. فهي لا تنتج العادم، وتقلل بشكل كبير من انبعاثات الغازات الدفيئة على مدى دورة حياتها، ولا تصدر ضوضاء مثل الحافلات التي تعمل بوقود الديزل/الغاز الطبيعي. ورغم أرتفاع تكلفة شراء الحافلات الكهربائية، إلا أنها توفر تكاليف تشغيل أقل على المدى الطويل بسبب التوفير في الوقود والصيانة. بالإضافة إلى ذلك، تساهم الحافلات الكهربائية في تحسين جودة الهواء والصحة العامة، مما يجعلها خيارًا أكثر استدامة وصديقًا للبيئة.

ت) بدائل البطاريات













تم تحليل ثلاثة أنواع رئيسية من البطاريات المستخدمة في الحافلات الكهربائية: فوسفات الحديد الليثيوم (LFP) ، ليثيوم تيتانات (LTO)، ونيكل مانجنيز كوبالت ليثيوم أيون(NMC).

تمت مقارنة هذه البطاريات بناءً على وقت الشحن، سيناريوهات الاستخدام، التأثير البيئي، والتكلفة، حيث حصلت بطارياتLFPعلى على أعلى تقييم بفضل دورة حياتها الطويلة واستقرارها الحراري وتكلفتها المعتدلة. تم اختيار سيناريو البطارية بسعة 380 كيلوواط ساعة لكفاءتها العالية. كما تمت دراسة بدائل التخلص من البطاريات بانتهاء عمرها، وأفضل خيار هو إ**عادة تدويرها من قبل المصنعين أو** إعادتها للمورد.

ث) بدائل المسارات والجراجات

تم تنفيذ تحليل متعدد المعايير لتحديد أفضل المسارات والجراجات لإدخال الحافلات الكهربائية في شبكة النقل بالقاهرة. بعد تحليل البيانات، والتحليل الفني والاجتماعي والبيئي والسياسي، والمسوحات الميدانية، تم اختيار جراج الأميرية كأفضل خيار. هذا الاختيار نابع من وقوع الجراج داخل كتلة سكنية وخدمية كثيفة، مما يعني أن المشروع سيخدم أكبر عدد من المواطنين من فئات عمرية مختلفة. بالإضافة إلى ذلك، المسارات التي تم اختيارها ذات كثافة مرورية عالية، وبالتالي سيحقق المشروع خفضًا كبيرًا في الانبعاثات

ج) تخطيط الجراج

تم اقترح ودراسة بدائل لمخططات الجراج، يهدف كل منها إلى تعزيز شروط التشغيل والصيانة. بالإضافة إلى ذلك، يهدف التخطيط المقترح إلى استيعاب عدد أكبر من أسطول الحافلات الكهربائية مستقبلي من خلال توفير مساحة متاحة لتوريد إضافي للحافلات الكهربائية، إذا لزم الأمر.

ح) بدائل طرق إيقاف التشغيل:

يوجد في الجراج أربع خزانات ديزل تحت الأرض، كل منها بسعة 35 متر مكعب، مملوكة لشركة مصر للبترول. تم اقتراح السيناريوهين التاليين للتعامل مع هذه الخزانات:

السيناريو الأول معادلة الأس الهيدروجيني، وصيانة الخزانات تحت الأرض

في هذا السيناريو، سيتم تحييد وتنظيف خزانات الديزل تحت الأرض بشكل شامل حيث سيتم ملؤها بالرمل النظيف من الداخل. كما سيتم ملء غرفة الخزان العلوية بالرمل والخرسانة للحد من المخاطر البيئية. وستظل الخزانات تحت الأرض لتقليل الاضطراب في الموقع مع ضمان السلامة البيئية. هذا النهج يهدف إلى تقليل كمية النفايات الخطرة الناتجة عن إزالة هذه الخزانات والتربة الملوثة.

السيناريو الثاني: معادلة الأس الهيدروجيني، واستخراج، ونقل الخزانات

يتضمن هذا السيناريو تحييد خزانات الديزل تحت الأرض ثم استخراجها من الموقع. سيتم إزالة الخزانات بعناية ونقلها إلى منشآت مخصصة للتخلص منها أو إعادة تدويرها بشكل صحيح. يركز هذا المنهج على الإزالة الكاملة للخزانات ويشمل تطهير التربة لمعالجة أي مخاوف بيئية متبقية من التسريبات. هذا النهج يوفر مساحة لإعادة تطوير الموقع أو استخدامات أخرى، لكنه يولد كمية كبيرة من النفايات الخطرة (تربة ملوثة) تتطلب التخلص الآمن في مدافن النفايات الخطرة. بالإضافة إلى ذلك، ستتطلب هذه الطريقة الحصول على موافقة الدفاع المدني مما يزيد من مدة الاضطراب في الموقع.

بناءً على المقارنة والتقييم، يُعتبر السيناريو الأول: تحييد وصيانة الخزانات تحت الأرض الخيار الموصى به بسبب تكلفته المنخفضة، وتقليل إنتاج النفايات، والمدة الأقصر، وانخفاض مخاطر السلامة.

خطة الإدارة والرصد البيئي والاجتماعي

تم وضع خطة الإدارة البيئية والاجتماعية لضمان الامتثال لمتطلبات التشريعات واللوائح والمعايير البيئية الوطنية والدولية المعمول بها ذات الصلة من خلال تنفيذ مجموعة من تدابير التخفيف، فضلاً عن الإدارة السليمة لجميع الأثار البيئية والاجتماعية الهامة والتحسين المستمر في الأداء البيئي والاجتماعي للمشروع.

تلخص الخطة تدابير التخفيف المقترحة وتناقش تدابير المراقبة والإدارة الأولية والمستمرة للتأثيرات الكبيرة للمشروع المقترح أثناء مرحلة الانشاء والتشغيل للجراج والحافلات الكهربائية. سيتم ضمان الامتثال لمتطلبات خطة الإدارة البيئية والاجتماعيةً.

وقد تم تحديد خمسة عناصر كحجر الأساس لخطة فعالة كما يلى:

- الأهداف والغايات البيئية: تحديد مجموعة من الأهداف والغايات التي يجب تحقيقها، ومؤشرات لقياس الأداء البيئي للنظام، والتى تغطيها الأهداف والغايات البيئية والاجتماعية.
- السياسة البيئية والاجتماعية: صياغة سياسة بيئية واجتماعية من قبل الإدارة العليا، والتي تضمن جوانب السياسة البيئية و الاجتماعية.
- الإدارة البيئية والاجتماعية: تعيين فريق إدارة بيئية واجتماعية لضمان التنفيذ الفعال لجميع تدابير الإدارة البيئية والاجتماعية المقترحة.









- الرصد البيئي والاجتماعي: وضع خطة لرصد المؤشرات والمعايير البيئية والاجتماعية، على النحو المبين في خطة الرصد البيئي والاجتماعي.
 - السجل البيئي: الاحتفاظ بسجل بيئي لضمان الامتثال للمتطلبات القانونية الوطنية، المشمولة في السجل البيئي.

التخطيط للاستجابة للطوارئ ووضع خطط الطوارئ.

سلامة وصحة العمال.

إشراك المجتمع.

آلية التظلمات (GRM)

تم إعداد وثيقة مستقلة لآلية النظلمات (GRM) لهذا المشروع، تتضمن الخطوات الرئيسية لآلية النظلمات، والقدرات التنظيمية والمؤسسية، وتنفيذ الآلية، بالإضافة إلى عمليات المتابعة والتقييم. تغطي آلية النظلمات الشكاوى المتعلقة بـ:

- التحرش الجنسى،
- الأشخاص ذوي الإعاقة،
 - التشغيل.

التشاور مع الجهات المعنية

قد تضمن التشاور المجتمعي -بالإضافة إلى الاجتماعات الشهرية لفريق البحث والهيئة ووحدة تنسيق المشروع- الأنشطة التالية مع الأطراف المختلفة على النحو التالي:

- 15 مقابلة جماعية مع السيدات والرجال والشباب في 5 مناطق محيطة بخطوط الأميرية
 - مقابلة مع 7 أفراد من ذوى الاحتياجات الخاصة
 - استطلاع رأي الركاب بناء على عينة مكونة من 583 فردا من 29 منطقة
 - 15 اجتماع مع المسئولين بالهيئة والعاملين بجراج الأميرية
 - مقابلات مع السائقين من الهيئة

وقد أجمع الحاضرون في اللقاءات المختلفة أن جماعات الركاب الهشة الأولى بالرعاية والاهتمام باحتياجاتهم في التصميم والتشغيل هي:

- الفئات ذوي الدخول المنخفضة
- السيدات من كل الفئات العمرية
- السيدات المرافقات لأشخاص تابعة
- الأشخاص ذوى الإعاقات بمختلف أنواعها
 - كبار السن من الجنسين

عُقدت جلسة التشاور المجتمعي في فندق تريومف بلازا، هليوبوليس، في 17 يوليو 2024، بحضور حوالي 46 مشاركاً. تم إبلاغ الضيوف بموعد ومكان الجلسة قبل أسبوعين على الأقل من تاريخ الاجتماع، حيث تم إرسال الدعوات من قبل المكتب الاستشاري بالتعاون مع وحدة تنسيق المشروع عبر الواتساب والبريد الإلكتروني والمكالمات الهاتفية.

كان الهدف من الجلسة عرض نتائج دراسة تقييم الأثر البيئي والاجتماعي مع التركيز على التأثيرات البيئية والاجتماعية الناتجة عن المشروع وطرق تخفيف الآثار السلبية وتعظيم الفوائد الإيجابية والتأكد من رضا الأطراف المعنية عن التدابير المتخذة لتقليل التأثيرات البيئية والاجتماعية.

خلال الجلسة، تم عرض الأفكار التالية:

- غسيل الحافلات باستخدام الطاقة الشمسية: لم يتم تضمين هذه الفكرة في الدراسة، ولكنها تتماشى مع الأهداف البيئية للمشروع.
 تم تصميم المرفق بحيث يسمح بدمج أنظمة الطاقة المتجددة في المستقبل، ولكن بسبب القيود المالية واللوجستية، فإن تطبيق نظام غسيل يعمل بالطاقة الشمسية في هذه المرحلة غير ممكن.
- تشغيل المرفق بالطاقة الشمسية: تعترف دراسة تقييم الأثر البيئي والاجتماعي بفوائد تشغيل المرفق بالطاقة الشمسية، وتم بالفعل دمج الأساسات والتجهيزات اللازمة لتركيب الألواح الشمسية مستقبلاً. ومع ذلك، نظرًا للمساحة الكبيرة المطلوبة (حوالي 100,000 م²) والتكلفة العالية لتشغيل الحافلات بالكهرباء الشمسية بالكامل، فلن تكون الطاقة الشمسية المصدر الرئيسي للطاقة في هذه المرحلة.













- تحويل الحافلات القديمة من الديزل إلى الكهرباء: تم در اسة جدوى إعادة تأهيل الحافلات القديمة، ولكن تبين أن شراء حافلات كهربائية جديدة يعد خيارًا أكثر كفاءة من حيث التكلفة، والأداء التشغيلي، والتوافق التكنولوجي.
- اختيار نموذج الحافلات وفقًا لظروف الطرق: تمت دراسة اختيار نموذج الحافلات بعناية لضمان ملاءمته لظروف الطرق في القاهرة. وقد تم اقتراح التواصل مع هيئة الأبحاث العسكرية للمساعدة في تحديد المواصفات المثلى للحافلات لتتحمل ظروف التشغيل المحلية.
- نظام إدارة الأسطول والتطبيقات الذكية: لا تشمل دراسة تقييم الأثر البيئي والاجتماعي نظام إدارة الأسطول، ولكن لدى هيئة النقل العام استراتيجية خاصة بها، كما يتضمن مستند المناقصة شرطًا بأن تكون الحافلات مزودة بنظام مراقبة وتتبع.
- نظام التذاكر: تعمل هيئة النقل العام حاليًا على تنفيذ نظام التذاكر المدفوعة مسبقًا، وتم توظيف استشاري متخصص في هذا المجال. لم يتم تضمين هذا النظام في الدراسة حيث يتم إدارته في إطار مبادرة منفصلة.
- تدريب سائقي الحافلات الكهربائية والعاملين: تؤكد الدراسة على أهمية برامج التدريب للعاملين والسائقين، والتي تشمل التدريب الفني والسلامة، خاصة فيما يتعلق بأنظمة الجهد العالي، والاستجابة للطوارئ، وقيادة الحافلات بأسلوب موفر للطاقة.
- إعادة توزيع العمالة: يتطلب التحول من الحافلات العاملة بالديزل والغاز الطبيعي إلى الحافلات الكهربائية خطة لإعادة توزيع العمالة. وقد تم الإشارة إلى هذا الأمر في الدراسة ضمن التخطيط لقوة العمل لضمان تقليل التأثيرات الاجتماعية السلبية وتعظيم الاستفادة من العمالة الحالية.
- انقطاع الكهرباء وأمن الطاقة: تم تناول مخاوف انقطاع الكهرباء في دراسة الجدوى، والتي أكدت أن تشغيل الحافلات الكهربائية سيكون من الأولويات القومية مثل نظام المترو، مما يضمن الحد الأدنى من التأثر بانقطاع الكهرباء. وقد تم النظر في إمكانية حدوث انقطاع لمدة تصل إلى ساعة واحدة، مع وضع خطط بديلة للتعامل مع هذه الحالة ز

شارك معظم الحاضرين بفعالية في الجلسة وقدموا أفكاراً مثمرة للنقاش. كما تم توزيع استبيانات على المشاركين عند وصولهم لتقديم













Executive Summary

Introduction

In recent years, Cairo Governorate has faced significant challenges in the realm of public transportation, primarily due to persistent traffic congestion and alarming levels of air pollution. Public buses, which predominantly run on low-quality diesel fuel, are major contributors to air pollution, leading to severe health consequences. Annually, around two million people seek medical treatment for respiratory issues linked to air pollution. Furthermore, air pollution imposes substantial economic costs on the state, accounting for approximately 1.4% of Egypt's GDP each year. This underscores the critical importance of developing the public transportation sector to address these urgent issues.

In response to these challenges, the World Bank approved funding for the Greater Cairo Air Pollution and Climate Change Management Project in September 2020. This project includes a pilot initiative under its third component: the "Electric Bus Project," which aims to introduce electric buses and upgrade Al-Ameriyah Depot in the Al-Sawah area to accommodate this new electric bus fleet.

The electric bus project represents a strategic step towards a more sustainable and efficient public transportation system in Greater Cairo, with a primary focus on reducing greenhouse gas emissions and air pollution, alleviating traffic congestion, and protecting public health. This goal aligns with national and global climate action visions, including Egypt's Vision 2030, international commitments under the Paris Agreement, and broader global efforts to combat climate change and promote sustainable development.

Project Objectives

The Electric Bus Project aims to improve air quality and reduce emissions by purchasing and operating electric buses to replace the 75 existing diesel and natural gas buses. To maintain the same level of service and performance as the current fleet, it is estimated that 98 electric buses are required. The project also includes the retrofitting and development of the Al-Ameriyah Depot in the Al-Sawah area to accommodate the new electric bus fleet.

Project Location

Depot Location

One of the Public Transport Authority's depots, the Al-Ameriyah Depot in the Al-Sawah district, has been selected as the central hub for the operation and maintenance of the future electric bus fleet. The Al-Ameriyah Depot is located in the northern region of Cairo Governorate, with a total area of 26,844 square meters. The main access routes to the depot are Al-Sawah Road and Al-Masaneh Road, with the main entrance located on Al-Sawah Street and another gate on Al-Masaneh Road.

Since the Al-Ameriyah Depot is owned by the Public Transport Authority, there is no need to acquire additional land to accommodate the electric bus project. The depot is situated in an area with a mix of residential, commercial, and industrial zones. Its proximity to major roads allows the electric buses to be easily and efficiently deployed without negatively impacting local residents, facilitating the integration of the new electric buses into the existing public transport system.

As part of the transition towards sustainability, an initial phase with the selected five (5) routes will see the procurement of clean, environmentally friendly, and energy-efficient electric buses to replace the current 75 diesel/natural gas buses on these routes. Thus, to ensure the daily operation of the routes the 75 diesel/natural gas buses shall be replaced by 98 e-buses to maintain the same equivalent service levels.

The following figures illustrate the location of the depot and the selected electric bus routes.















Figure 0-1 Depot Location and surrounding activities

Bus Routes

The consultant studied eleven (11) current bus routes serviced by the Al-Ameriyah Depot.

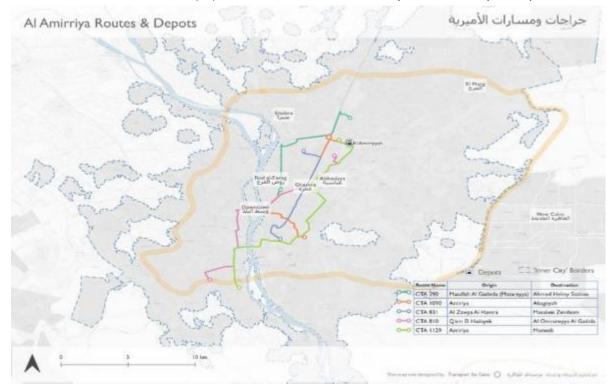


Figure 0-2 The five (5) selected routes













The data was provided by the Public Transport Authority. Based on route selection criteria detailed further in the project's Environmental and Social Impact Assessment (ESIA), five (5) routes were selected for replacing their diesel and natural gas buses with electric buses.

The selected routes are as follows:

- Abageyah Al-Ameriyah
- Al-Ameriyah Moneeb
- Ahmed Helmy Station Masallah Al Gadeda (Matariyah)
- Al Omraneya Al Gadida Qism El Hadeyek
- Al Zawya Al Hamra Masakin Zeinhom

Project Components

The Electric Bus Project consists of three main components, as outlined below:

- Selection and Preparation of a Depot: This involves choosing and equipping a depot within Greater Cairo, including the installation of charging stations at the existing depot and the construction of new facilities to accommodate the charging infrastructure and maintenance workshops specifically for electric buses.
- Route Selection: Several bus routes serviced by the selected depot were studied and chosen for the operation of electric buses, replacing diesel and natural gas buses on these routes.
- Procurement of Electric Buses and Chargers: The project includes the purchase of a fleet of 98 electric buses with specific technical specifications to replace the traditional diesel and natural gas buses in the public transport system at one of the depots in Greater Cairo in order to maintain the same level of service and performance as the current 75 CNG/ diesel buses, it is estimated that 98 electric buses are required.

Legal Framework

The current project is subject to both national and international laws, standards and policies, and the components of the proposed project must comply with these national and international requirements. In cases where there is a discrepancy between local standards and World Bank Group standards, stricter standards will be adopted.

Additionally, the project's Environmental and Social Impact Assessment (ESIA) includes the legal and regulatory framework for this project, covering applicable Egyptian laws and all subsequent amendments and executive regulations, as well as relevant World Bank Group standards. The ESIA discusses the project-related materials and standards, the authorities responsible for law enforcement, and the penalties for violations. The Project Coordination Unit (PCU) is committed to adhering to all local and international standards.

The following illustrates some of the laws and standards applicable to the project:

- Environment Law No. 4/1994 amended by Laws No. 9/2009 and 105/2015, and its amended Executive Regulations by Decrees No. 1095/2011, 710/2012, and the Prime Minister Decree No. 964/2015, Decree No. 618, 1963 of 2017 and amended ER no 2466/2024. This law controls the potential environmental impacts of the proposed project
- Labor Law No. 137 of 1981, as amended by Decree No. 12 of 2003, also known as the Unified Labor Law.
- Public Cleanliness Law No. 38/1967 amended by Law No. 31/1976 and its executive regulations issued by the Ministry of Housing by Decree No. 134/1968 dealing with solid waste to regulate the collection and disposal of construction and operation waste and maintaining the cleanliness of roads and public properties.
- Law No. 93/1962 amended by Decree No. 44/2000 concerning sewage disposal on domestic wastewater network and its implementing regulations.













- Law No. 202/2020 and its Executive Regulation No. 722/2022 on regulating waste management (policies and commitments related to waste management hierarchy implementation and establishing the Waste Management Regulatory Authority (WMRA) and its mandates where Articles 15, 16,20,31, 33,34, 38 for municipal waste and articles 58,60 and 61 for hazardous waste.
- The following WB ESSs are relevant to E-bus demonstration project (ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8 and ESS10.

Potential Environmental and Social Impacts of the Project

Impacts During Decommissioning and Construction:

I Positive Impacts:

- Job Creation: New direct and indirect employment opportunities for local and migrant workers.
- Environmental Improvement: The project will enhance environmental conditions by removing current pollution sources at the depot, such as the fueling station and maintenance workshops. Diesel tanks will be either neutralized and buried or neutralized and extracted. However, it was reported by Misr Petroleum that 90% of similar cases, underground diesel storage tanks are neutralized and buried using sand. Fuel pumps will be removed to avoid potential spills. Additionally, decommissioning of the current washing area of very old technology that consumes large amounts of water, causing a waste of resources.
- Economic Activity: The project will stimulate economic activity in the area, providing opportunities for service providers, such as food vendors and cleaning services.

Negative Impacts:

- Air Quality: Gaseous emissions from machinery, vehicles, and transformers, including CO2, NOx, CO, PM, HC, and SO2 and Dust emissions due to excavation, demolition, and material handling. could lead to temporary impact affecting workers and nearby residents.
- Noise and Vibration: Noise from machinery, transformers, and construction activities. And vibration from heavy equipment, pile driving, and excavation could lead to potential disturbance to workers, nearby residents, and businesses.
- Soil, Geology, and Topography: Potential soil contamination from underground diesel tanks. Risks of improper waste disposal and chemical handling and Soil erosion from exposure to rain and wind.
- Water Bodies and Groundwater: Potential groundwater contamination from fuel/chemical spills and wastewater discharge.
- Resource Efficiency and Pollution:
 - Increased energy and water consumption.
 - Use of asphalt, concrete, cables, pumps, and sand for neutralizing diesel tanks.
 - Hazardous and non-hazardous waste generation (e.g., diesel tanks, oils, construction debris).
 - Risk of mismanagement causes pollution and public health hazards.
- Natural Disaster Risk / Emergency Situations:
 - Heavy rains and heat waves affecting workers and equipment.
 - Risks of electrical fires, fuel spills, and equipment malfunctions.
 - Risk of explosion from underground diesel tanks if not properly handled.
- Occupational Health and Safety
 - Exposure to dust, noise, heat, and hazardous materials.
 - Risks from excavation, working at heights, and electrical hazards.
 - Psychological hazards from stress and fatigue.
 - Accidents due to lack of proper training, safety inspections, and protective measures.
- Labor Force Relocation: CTA will relocate all workers to nearby depots which may lead to significant social risks if managed properly.













- Community Health and Safety: Increased heavy vehicle movement leading to traffic accidents, risks from unauthorized access to the site (e.g., children, unaware residents), And explosion risks from fuel residues in underground tanks.
- Temporary Labor Influx: Pressure on local resources (e.g., housing, food, healthcare) and potential security concerns and conflicts.
- Child Labor: Risk of child labor under subcontractors or service providers leads to exposure to unsafe working conditions and disruption of education.
- Gender-Based Violence (GBV) and SEA-SH: Increased risk of harassment, exploitation, and discrimination and vulnerability of women in the workplace and surrounding community.
- Road Safety: Increased heavy vehicle movement leading to traffic congestion which leads to higher risk of accidents involving pedestrians and other vehicles.

I Positive Impacts:

a) Operation of the Depot

- Environmental Improvement: Elimination of pollution sources like fueling stations and diesel storage tanks at the depot.
- Soil Condition Improvement: Reduce soil contamination risks through removal of fuel handling and storage facilities.
- Water Conservation: Implementation of water-efficient bus-washing technology, with 70% wastewater recycling.
- Technological Advancement: Installation of advanced maintenance and operational equipment.
- Job Creations.

b) Operation of Electric Buses

- Reduction in Greenhouse Gas Emissions.
- Improved Ambient Air Quality.
- Reduced Traffic Noise.
- Traffic Flow Optimization.
- Improvement of Quality of Life (service quality).
- Rehabilitation of CTA Workers and Drivers.
- Market Expansion by encouraging the electric cars/buses market.
- Economic Savings.

Negative Impacts:

a) Operation of The Depot:

- **Soil Contamination:** Risks from accidental spills or leakage of lubricants, improper waste management, and leaks from the wastewater network inside the depot.
- Increased Electricity Consumption: Significant rise in electricity demand (up to 14 MVA) due to depot operations.
- Hazardous Waste Generation: Expected waste includes wires, transformer coils, spills, batteries, lubricants, and cleaning agents.
- The depot is exposed to risks from hot waves and/or heavy rains, which could disrupt operations.
- **Sludge Generation:** Resulting from the e-buses washing wastewater treatment processes.
- **Health and Safety Risks:** Risks include exposure to electric shocks, hazardous substances, physical injuries, ergonomic issues, and accidents related to bus operations and maintenance.

c) Operation of E-buses:

- Significant rise in electricity demand anticipated due to the frequent charging of e-buses.
- Potential increase in battery energy consumption leading to more frequent recharging, as well as accelerated tire wear requiring replacements.
- Generation of waste and scrap, including broken/unused parts, tires, spare parts, wastewater from sewage network failures, and municipal solid waste.













 Health and Safety Risks: Handling high-voltage electrical systems and battery management introduces specific risks, such as electric shocks and battery-related incidents.

Project Alternatives

Several alternatives were considered for the implementation of the proposed project, as detailed below:

No Project:

Impact on Residents: Residents of Greater Cairo would not benefit from a sustainable, efficient, and safe public transport system. They would continue facing traffic accidents and relying on an unsafe public transport system, unlike the benefits provided by electric buses, such as enhanced safety features, driver training for safe driving, and designated stopping areas. Continued reliance on private cars would increase road congestion, pollution, greenhouse gas emissions, and transportation costs.

Environmental Impact: Seventy-five diesel and CNG -powered buses would continue contributing to air pollution in Cairo, emitting greenhouse gases, increasing noise levels, and posing greater safety risks. The social and economic benefits would be diminished, and health risks from air pollution would increase.

Based on the above, the new electric bus project aims to improve this situation by offering a public transport system with efficient and safer electric buses, reducing traffic accidents with more advanced technology and better management for a safer and more sustainable public transport system.

Bus Technology Alternatives:

Electric Buses: Electric buses were chosen due to their significant advantages over other options. They produce no exhaust emissions, greatly reduce greenhouse gas emissions over their lifecycle, and are much quieter than diesel or natural gas buses. While the initial purchase cost is higher, electric buses offer lower long-term operating costs due to savings on fuel and maintenance. Additionally, electric buses contribute to improved air quality and public health, making them a more sustainable and environmentally friendly option for urban transportation.

Battery Alternatives:

Battery Analysis: Three main types of batteries used in electric buses were analyzed: Lithium Iron Phosphate (LFP), Lithium Titanate (LTO), and Nickel Manganese Cobalt (NMC) Lithium-Ion batteries. These batteries were compared based on charging time, usage scenarios, environmental impact, and cost. LFP batteries received the highest rating due to their long lifecycle, thermal stability, and moderate cost. The 380-kWh battery scenario was selected for its high efficiency. Disposal alternatives for end-of-life batteries were also considered, with the best option being recycling by manufacturers or returning them to suppliers.

Route and Depot Alternatives:

Multi-Criteria Analysis: A multi-criteria analysis was conducted to identify the best routes and depots for introducing electric buses into Cairo's transport network. After analyzing data, technical, social, and environmental factors, and conducting field surveys, the Ameriyah Depot was selected as the best option. This choice was based on its location within a densely populated residential and service area, meaning the project would serve the largest number of citizens from various age groups. Additionally, the selected routes have high traffic density, ensuring that the project would significantly reduce emissions and pollutants.

Depot Layout Planning:

Layout Alternatives: Various depot layout plans were proposed and studied, each aiming to enhance operational and maintenance conditions. The proposed layout also accommodates future expansion of the electric bus fleet by providing available space for additional electric buses if necessary. Please refer to appendix M for the Deport Layout.













a) Decommissioning Alternatives

The depot contains four (4) underground diesel tanks, each with a capacity of 35 m³, owned by Misr Petroleum Company. The following two scenarios have been proposed for handling these tanks:

i Scenario I: Neutralize and Maintain Underground Tanks

In this scenario, the underground diesel tanks would undergo a thorough neutralization and cleaning process as they will be filled with clean sand from the inside. The above-ground tank room will be filled with sand and concrete, to mitigate environmental risks. The tanks would remain underground. This approach aims to minimize disruption to the site while ensuring environmental safety. Additionally, this will reduce the amount of hazardous waste generated by removing these tanks and the contaminated soil.

ii Scenario 2: Neutralize, Extract, and Transport Tanks

This scenario involves neutralizing the underground diesel tanks and then extracting them from the site. The tanks would be carefully removed and transported to designated facilities for proper disposal or recycling. This method prioritizes the complete removal of the underground diesel tanks and includes soil decontamination to address any residual environmental concerns from oil spills or leaks. This approach creates space for potential redevelopment or alternative land use but is expected to generate a large amount of hazardous waste (contaminated soil) that will require safe disposal in a hazardous landfill. Additionally, Civil Defense approval will be required for this method, which will maximize site disruption duration.

Based on Comparison and the scoring, Scenario I: Neutralize and Maintain Underground Tanks is the recommended option due to its lower cost, reduced waste generation, shorter duration, and lower safety risks.

Environmental and Social Management and Monitoring Plan

An Environmental and Social Management Plan (ESMP) has been developed to ensure compliance with applicable national and international environmental regulations and standards. This plan involves implementing a range of mitigation measures and effectively managing all significant environmental and social impacts, as well as continuously improving the project's environmental and social performance.

The plan summarizes the proposed mitigation measures and discusses the initial and ongoing monitoring and management of significant impacts during the construction and operational phases of the depot and electric buses. Compliance with the ESMP requirements will be ensured.

The plan identifies foundational elements for an effective ESMP as follows:

- Environmental Objectives and Goals: Define a set of objectives and goals to be achieved, including
 indicators to measure the environmental performance of the system, covering both environmental
 and social goals.
- Environmental and Social Policy: Formulate an environmental and social policy by senior management that encompasses the environmental and social policy aspects.
- Environmental and Social Management: Appoint an Environmental and Social Management Team to ensure effective implementation of all proposed environmental and social management measures.
- Environmental and Social Monitoring: Develop a plan for monitoring environmental and social indicators and standards, as outlined in the Environmental and Social Monitoring Plan.
- Environmental Record: Maintain an environmental record to ensure compliance with national legal requirements, as included in the environmental record.
- Workers Health and Safety: Develop and implement measures to ensure the health, safety, and well-being of all workers. This includes providing adequate training, personal protective equipment (PPE), and safe working conditions in compliance with relevant health and safety regulations.
- Community Engagement: Establish a strategy for engaging with the local community, ensuring their involvement and addressing their concerns throughout the project's lifecycle. This includes transparent communication, feedback mechanisms, and addressing community grievances promptly.













Emergency Response and Contingency Planning: Create a comprehensive plan for responding to emergencies, such as accidents, spills, or natural disasters. This plan should include clear procedures, roles, and responsibilities to minimize risks and ensure swift action to protect people, property, and the environment.

Grievance Mechanism (GRM):

A stand-alone document for the Grievance Redress Mechanism GRM was developed for this project to include the main steps of the GRM, organizational and institutional capacity, implementation of the GRM, and monitoring and evaluation of the mechanism. The GRM covers complaints related to i) sexual harassment, ii) persons with disabilities, and iii) operation.

Stakeholder Consultation

The community consultation included, in addition to the monthly meetings of the research team, the authority, and the project coordination unit, the following activities with various parties:

- 15 Groups' Interviews: Conducted with men, women, and youth in 5 areas surrounding the Ameriyah Routes.
- Interview with 7 Individuals with Disabilities.
- Passenger Survey: Conducted with a sample of 583 individuals from 29 areas.
- 15 Meetings: Held with officials from the authority and employees at the Ameriyah depot.
- Interviews with Bus Drivers: From the Cairo Transport Authority (CTA).

Participants in the various meetings agreed that priority should be given to the needs of vulnerable passenger groups in the design and operation of the project:

- Low-income Groups
- Women of All Ages
- Women Accompanying Dependents
- Individuals with Various Disabilities
- Elderly of Both Genders

The public consultation session was physically held on July 17th, 2024, at Triumph Plaza Hotel, Heliopolis. About 46 participants attended.

Guests were informed of the date and venue of the public consultation session at least two weeks prior to the meeting date. Invitations were sent by the Consultant in cooperation with the PCU via WhatsApp, e-mails and phone calls.

The aim of the session is to present the results of the ESIA study, with a focus on the environmental and social impacts resulting from the project, methods of mitigating negative impacts, maximizing the benefit from the positive effects, and ensuring that the parties involved are satisfied with the measures to reduce environmental and social impacts and management plan.

The following ideas were presented during the public consultation session:

- Car Washing Using Solar Power: While not initially included in the ESIA, the concept of solar-powered car washing aligns with sustainability goals. The design of the depot allows for future renewable energy integration, but due to financial and logistical constraints, the immediate implementation of a solar-powered system is not feasible.
- Depot Operation on Solar Energy: The ESIA acknowledges the environmental benefits of operating the depot on solar energy, and provisions have been incorporated into the design to accommodate future solar panel installations. However, due to the extensive space (100,000 m²) and high cost required to power the entire fleet, solar energy will not be used as the primary power source at this stage.













- Retrofitting Old Diesel Buses to Electric Buses: While retrofitting existing diesel buses into electric buses was explored as an option, the feasibility study concluded that procurement of new electric buses would be more efficient in terms of cost, operational reliability, and technological compatibility.
- Bus Model Selection for Path Conditions: The selection of the bus model has been carefully considered to ensure suitability for Cairo's road conditions and routes. It has been suggested to engage with the Armed Forces Research Authority to further refine bus specifications to withstand local operating conditions.
- Fleet Management System and Mobile Application: The ESIA does not include a fleet management system, but the CTA has its own strategy, and the bidding package ensures that buses will have a monitoring system.
- Ticketing System: The CTA is currently working on a prepaid ticketing system and has hired a consultant for its implementation. This was not included in the ESIA, as it is managed under a separate initiative.
- Training of E-Bus Drivers and Workers: The ESIA highlights the importance of training programs
 for drivers and depot workers. This includes technical and safety training, particularly on highvoltage systems, emergency response, and energy-efficient driving practices.
- Repositioning of Workers: The transition from diesel and natural gas buses to electric buses
 necessitates a repositioning plan for workers. This is acknowledged in the ESIA as part of labor
 force planning to ensure minimal social disruption and optimal workforce utilization.
- Electricity Cuts and Energy Security: Concerns about electricity shortages were addressed in the feasibility study, which confirmed that e-bus operations would be prioritized similarly to the metro system, ensuring minimal disruption. The study considered potential power outages (up to I hour), with contingency plans in place.

Most of the attendees actively participated in the session and came up with fruitful ideas for discussion. Moreover, surveys were given to the participants upon their arrival to fill in with their feedback/questions.













I Introduction

I.I Report Objective & Content

This report is designed to fulfill the requirements of the Terms of Reference, for developing an ESIA , as per Appendix A: E-bus Specifications that contains a table which describes which chapters of the report address the various requirements of the Contract.

ESIA

ESIA Baseline assessment for the selected routes (all modes on the selected routes will be performed, including socio-economic aspects, ambient air quality and environmental assessment at an ex-ante level, potential risks and impacts, proposed mitigation measures, management plan, budget estimates for implementation)

1.2 Appendix A: E-bus Specifications Background

This document is the Environmental and Social Impact Assessment (ESIA) for the Electric Bus Demonstration Project (e-Bus Demo), a subproject under the Greater Cairo Climate Change Project (GCCC).

The GCCC, financed by the World Bank, addresses air quality and climate change in Greater Cairo.

The e-Bus Demo promotes electric buses to reduce diesel pollution, providing insights for scalable e-mobility.

This ESIA aligns with the Environmental and Social Management Framework (ESMF) that was prepared for GCCC project (August 2020 available here) and covers bus procurement, depot retrofitting, and route selection under GCCC Component 3, "Vehicle Emission Reduction."

The sub project consists mainly of three (3) main components as presented below:

- **E-Bus Procurement:** The e-Bus Demo involves acquiring electric buses to replace diesel buses in the public transport system at a selected depot in Greater Cairo.
- Depot Retrofitting: The e-Bus Demo includes upgrading one existing bus depot in Greater
 Cairo by installing charging stations and retrofitting facilities for e-bus maintenance and charging.
- Route Selection: Routes serving the selected depot will be studied and chosen to operate ebuses, replacing diesel buses.

1.3 Scope of ESIA

The ESIA assesses the environmental and social impacts of the e-Bus Demo under the GCCC Project. The scope includes:

- **E-Bus Specifications:** Assessment of the E&S requirements considered in the specifications of the electric buses, chargers, and charging stations.
- Depot Selection and Retrofitting: Including any required decommissioning, construction and operation activities
- Route Selection: Analysis of routes for e-bus operation.

The administrative Building revamping is out of the scope of the project.

The ESIA identifies and evaluates impacts from decommissioning, construction, and operation, proposing measures to avoid, minimize, mitigate and manage significant impacts to acceptable levels (as defined by the Egyptian law and the applicable WB Environmental and Social Standards (ESS)).

1.4 Project Proponent

The proposed project is state-led with funding provided from the WB to implement the Electric Bus (e-Bus) Demonstration Project.













The state-led entities are formed of partnership between the Ministry of Environment (MoE) and Cairo Transportation Authority (CTA). The Project implementation phases will be managed by staff formed from representatives of the above entities (Project Coordination Unit (PCU) and technical implementation unit (TIU)).

1.5 Methodology

The ESIA has been developed based on the following methodology:

- Conducting field visits to the depots identified by the CTA to develop full site understanding and to identify relevant environmental and social issues.
- Conducting comprehensive literature review to review e-Bus Demo and GCCC Project documents from CTA, applicable standards, and relevant online data.
- Participating in the detailed design document of the selected depot and the e-bus specs. Consultations with the SST Consortium were carried out to ensure incorporating all the environmental, social and gender and Occupational Health and Safety aspects in the depot design and the e-bus specs. The ESIA reflects the updates of the e-Bus Demo components corresponding to latest depot design (layout) issued on 20th of December 2024, the e-bus routes selected on 18th of April 2024, and the latest e-bus specs on 14th of May 2024.
- Participating in the setting of the selection criteria of the depot design alternatives, e-bus specs alternatives and the routes selection alternatives and assessing these alternatives from the environmental, social and gender and Occupational health and safety perspectives. For more details, please refer to, Appendix A E-bus specs. The selected depot location and design, routes and e-bus specs options from the alternatives chapter were described in detail in chapter 03.
- This ESIA was developed to cover the Project implementation phases.
- The baseline chapter was based on primary and secondary data Primary data included ambient air and noise measurements, focus groups' discussion, surveys, etc. Baseline components such as receptors identification and ambient air and noise measurements were reflected in the impact assessment chapter.
- Study of the relevant documents on national framework, World Bank Environmental and Social Framework (ESF) and Environmental and Social Standards (ESSs), legal and administrative framework and their review, particularly on environmental aspects, health and safety requirements, and social aspects.
- Identification and prediction of all related environmental, social and gender and Occupational Health and Safety impacts of the identified project activities on the surrounding environment in the area of influence and their relevancy to the World Bank ESSs.
- Scoping of the most significant impacts and suggesting mitigation measures in order to reduce/eliminate the negative impacts and enhance the positive impacts.
- Development of Environmental and Social Management Plan (ESMP) for all project phases.

Stakeholder engagement activities included:

- Field visits and observation
- Surveys conducted with diverse beneficiary groups, including women, men, mothers, the elderly, and people with disabilities, to gather insights into their specific transportation needs and preferences.
- Meetings and surveys held with bus drivers to understand their requirements and feedback for enhancing the efficiency and effectiveness of the transportation system.
- Organizing Public Consultation Meeting with different stakeholders and parties involved to present the results of the ESIA.













2 Project Background and Description

2. I Project Background

The GCCC project, approved by the World Bank in 2020, aims to address air pollution and transportation challenges in Cairo, aligning with Egypt's Vision 2030 and its Paris Agreement commitments.

The ESIA for the Electric Bus (e-Bus) Demonstration Project, component 3 of the Greater Cairo Air Pollution Management and Climate Change Project (GCCC), focuses on assessing the environmental and social impacts of integrating electric buses into Cairo's public transport system to replace the 75 existing diesel and natural gas buses. However, to maintain the same level of service and performance as the current fleet, it is estimated that 98 electric buses are required based on the battery capacity and the operating hours. The e-bus Demo project also includes the retrofitting and rehabilitation of the Al-Ameriyah Depot in the Al-Sawah area, Cairo Governorate to accommodate the new electric bus fleet.

The ESIA is the assessment of the retrofitting of Al-Ameriyah Depot and electric bus specifications and operations. The project aims to reduce greenhouse gas emissions, traffic congestion, and air pollution while improving public health.

The retrofitting of Al-Ameriyah Depot, located in the Sawah district, will accommodate up to 110 electric buses, and all diesel / natural gas bus activities will be decommissioned before construction begins. The proposed E-buses will feature at least 370 kWh lithium ferrous phosphate (LFP) batteries, suitable for local operational demands. Through this subcomponent, Cairo's public transport system will be on track toward transitioning towards a fully electric fleet on selected routes, contributing to both local and global climate action.

2.2 Project Components

The Electric Bus (e-Bus) Demonstration Project consists mainly of 3 main components as presented below:

A Depot Selection and Retrofitting of one of the existing diesel bus depots in Greater Cairo including installation of charging stations at the bus depot and/or construction of new facilities to accommodate the charging infrastructure and maintenance workshops for the electric buses.

Routes' Selection: A number of routes serving the selected depot will be studied and chosen for the e-bus operation and replacing the diesel buses.

Electric Bus (e-bus) and Chargers Procurement: The project involves the acquisition of a fleet of electric buses with certain specifications including Environmental, Social and gender and Occupational Health and Safety measures to replace traditional diesel buses in the public transport system in one of the depots in Greater Cairo.

2.3 Project Time Plan

Table 2-I shows the estimated timeline for implementing the Electric Bus (e-Bus) Demonstration Project with its components. The start dates and durations are based on the latest E-Bus Demo Workplan vI5 issued December 2024.













Table 2-1 Project Time Plan highlighting Key Phases: Decommissioning, Construction, Testing, and Operation

| Phase | Task | Start Date | Duration | Key Milestone |
|---|---|----------------------------|---|--|
| Decommissioning Existing Structures | 9 | | - | Notification issued |
| | Site preparation and initial decommissioning | Q3 2025 | 2 months: | Site ready for retrofitting |
| Construction | Civil construction period | From Contract Notification | 06 - 12 months | Civil works completed |
| | Tie-in connection with Electricity Distribution Company | | Tied into grid by end of MEP installations | Electrical tie-in operational |
| | Mechanical, Electrical, Plumbing (MEP) installations | Ends wih Civil Works | 2 months | MEP systems installed |
| | Maintenance equipment installation and testing | Validated Design Date | 08 - 14 months (from Contract Notification) | Maintenance systems installed and tested |
| | Installation of chargers | Q3 2025 | I months | Chargers operational |
| Testing, Commissioning, Operation Start | Depot retrofitting testing and commissioning | Q3 2025 | I month | Depot systems tested and commissioned |
| | Interface testing with E-bus contractor | Q3 2025 | 2 weeks | Interfaces operational |
| | Fleet commissioning and route deployment | Q4 2026 | 6 months | E-bus fleet fully operational on selected routes |

2.4 Project Description

As mentioned in Section 2.2 E-bus demonstration project consists mainly of 3 main components (Depot – Routes – E-Bus)

2.4.1 Component (I): Depot Selection and Design

I Depot Location and Area (Depot selection and Retrofitting)

The Al-Ameriyah Depot, located in Sawah District, Northern Cairo Governorate, serves as the central hub for the e-Bus Demo. This area has been selected to ensure efficient operations by minimizing travel distance to service areas. Accessible via Al Sawah and Al Masanea roads, the depot spans 26,844 m².

It is owned by CTA and occupies a total land area of 26,844 m2. Thus, there is no need for any land acquisition to accommodate the E-bus Project.

Surrounded by urban, commercial, industrial, and residential zones, it integrates seamlessly into Greater Cairo's transport network while minimizing disruptions. The depot lies at 30°52'35.45"E and 29°56'12.36"N.

¹ The duration is estimated based on oral CTA communication. No written duration was included by the CTA in the Decommission Plan drafty issued to SST on 2024-10-28.









30°06'14.5" N

30°06'15.7"N

30°06'21.0"N

30°06'19.6"N

Latitude





Longitude

31°17'55.2" E

31°17'51.0"E

31°17'52.6"E

31°17'57.5"E



Table 2-2 Depot Coordinates

The depot approximate coordinates2 are as shown in Table 2-2.

The depot is surrounded by areas of distinct and well-defined land use:

| From | the | West | and | sharing | borders | is | the | "Bisco | Misr" |
|--------|------|--------|-----|----------|---------|----|-----|--------|-------|
| factor | y, a | sweets | mar | nufactur | er. | | | | |

| From the East and sharing borders is "Al Sawah" CTA depot. Further to the east is "Matariyah" | |
|---|--|
| Depot. | |

- From the North there is Sanofi pharmaceuticals factory.
- From the South located a highly dense residential blocks, with mixed use.

The neighborhood in general is complex. Nearby is the "Qobba" presidential palace, residential blocks, military establishments and factories all within a 1-kilometer radius from the depot. The area is well serviced by utilities.

The Al-Ameriyah Depot has multiple gates for entry and exit, catering to buses, workers, and emergency scenarios.

■ The main entrance on Al Sawah Road is divided into two sections: one designated for buses and another for workers/pedestrians. The bus section comprises two lanes—one for entry and another for exit—ensuring smooth traffic flow. (See (1) 'Main Entrance & Exit' on Map)

There is an emergency gate on Al Sawah Street to facilitate access during critical situations. (See (3) 'Emergency gate' on Map). There is a third, entry on Al Masanea Street in the north. These gates follow a circuitous route and are normally locked shut and closed for use. Figure 2-1 below highlights the specific locations of all gates, with arrows illustrating the routes leading to and from the depot.



Figure 2-1 Depot Location and surrounding activities / * Masane Exit is normally closed, and barely under use. It is shown only for illustrative purposes

² Obtained from Google maps. However, this should be provided by the CTA for accuracy













2.4.1.2 Current Depot Description

Al-Ameriyah depot's total area is 26,844 m² and accommodates a fleet of approximately 158 buses; 108 are in operation on eleven (11) routes. The current depot includes the following:

- Administrative building consists of five (5) floors with an emergency gate for pedestrians, which is out of this ESIA scope.
- Fueling area: This area is equipped with two (2) shaded fueling stations, complete with service pits for easy access to the underside of buses. As reported by Misr Petroleum Co. there are four (4) underground diesel tanks that were installed to store diesel fuel each of 35000 liters capacity. These tanks are owned by Misr Petroleum Company.
- Bus wash station: A dedicated area for washing buses, ensuring that vehicles are clean for service.
- Oil change area: This area includes service pits covered by canopies, designed for efficient oil changes and minor undercarriage maintenance.
- Long-term immobilization area: A shaded area designated for buses that require extended maintenance periods.
- Short-term immobilization area: Similar to the long-term area, but intended for buses that need quicker, more routine maintenance interventions. This area also includes service pits and is covered by canopies.
- Maintenance workshops: One (I) floor building located near the oil change area, these include facilities for engine repair and oil maintenance, reinforcing the depot's capability to handle comprehensive mechanical works.
- Spare parts storage: one (I) floor building of multiple storage rooms for keeping a ready supply of spare parts, essential for the timely maintenance of buses.
- Multi-trade maintenance workshop: This area houses workshops for various maintenance needs such as battery servicing, pneumatics, and bodywork.
- No defined bus parking area: Currently, there is no designated area with marked grounds for bus parking, which could be considered for future improvements to optimize space and organization.
- Police building: A five-story building housing police offices (outside the project and ESIA scope).
- Mechanical and electrical rooms: These rooms contain the main electrical and mechanical equipment serving the depot such as (Ring main unit, Transformer, electrical panels, fire pumps, etc.)
- One (1) existing firefighting water tank compartment with capacity of 50m³
- About (33) toilets distributed along the depot where 31 for males and 2 for females.
- Four gates: Two (2) gates located at Al Sawah road; one main entrance gate to the depot, one emergency gate, and the other two (2) gates located at the backyard of the depot in the extension area at Al Masaneh road.

The following figure presents the current depot design (subject to minor evolutions as the Depot Design is on-going in parallel).













Figure 2-2 Al-Ameriyah depot current design (the existing depot layout)

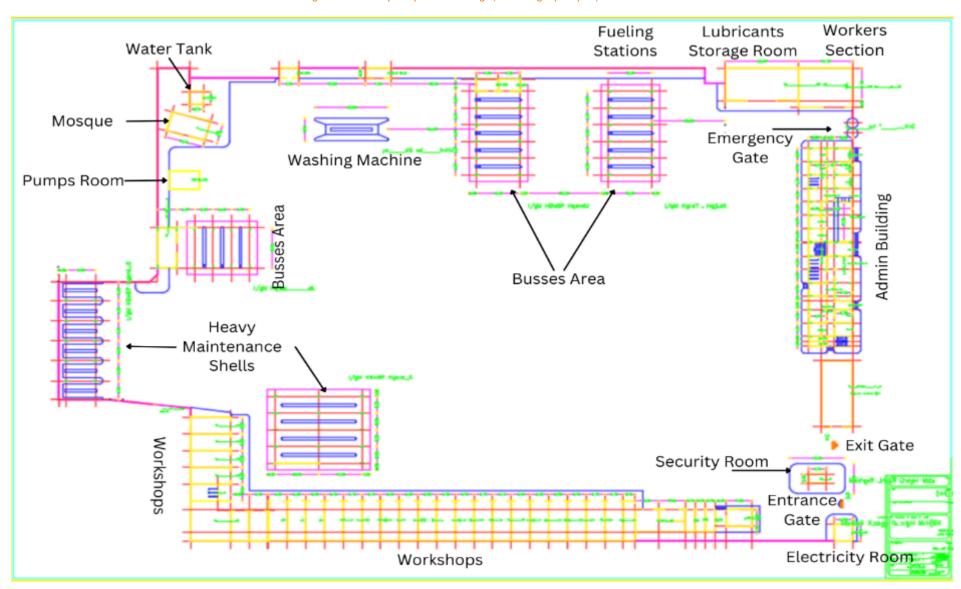


















Figure 2-6 Water from Washing Machine



Figure 2-10 Eastern Wall of Bus Shade



Figure 2-4 Bus Shades



Figure 2-9 Washing Machine



Figure 2-5 Maintenance Workshops



Figure 2-8 Fueling Station



Figure 2-3 Northern Wall Workers Section



Figure 2-7 Electrical Technical Room















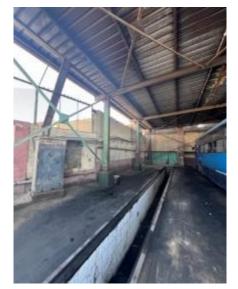


Figure 2-11 Maintenance Area



Figure 2-12 Fueling Station and Bus Shades



Figure 2-13: Admin Building

a) Current Electrical Works

To support the depot's operations, the following electrical infrastructure is in place:

- Transformers and Distribution: The depot is equipped with one 500 KVA oil-type transformer (which will be removed after the construction work is over) and a main distribution board (MDB) that distributes power to various depot loads.
- Interface with Electrical Distribution Company: A medium voltage Ring Main Unit (RMU) serves as the interface with the electrical distribution company, ensuring reliable power supply.
- Emergency Power Supply: A 75 KVA emergency diesel generator with 2.5 m³ diesel tank is installed to power critical loads during outages, including the administrative building, police buildings, entrance gate, fire pumps, and diesel dispensers.

Figure 2-14 shows clouded drawings showing the location of the generator storage tank.

b) Fire Fighting Works

The fire safety systems currently in place at the depot need significant upgrades to meet safety standards and operational requirements.















- Fire Pumps: The existing fire pumps are not Underwriters Laboratories (UL) and Factory Mutual (FM) approved, and their flow rate and head specifications are unclear, which could affect their effectiveness in an emergency. The only existing pump was the fire pump and it is electrical pump.
- Fire Fighting Pipes: The main firefighting pipes are currently 75 mm in diameter, which does not meet the code requirement of at least 150 mm, indicating a need for system enhancement.
- Fire Fighting Water Tank: One (I) existing underground firefighting tank of capacity of 50 m3, which is insufficient according to code requirements and needs to be increased with extra 230 m3 tank which will be split into two (2) rooms; one room to provide water for the domestic use and the other for the firefighting.
- Electrical Room Safety: The main electrical room lacks an automatic fire suppression system, posing
 a significant risk in case of electrical fires and needs immediate attention to mitigate potential
 hazards.





Figure 2-14 Clouded Drawings Showing the Location of the Generator Storage Tank (Layout Design 2024-12-20). Entry checkpoin Existing Tie-in point local Blectrical room: TRe-in local & Substation Pei: Administrtative building: Out of scope Legend: Substation ∞ Charging sone with sheds \subseteq Room ---g zone with shades T I = 3 $I \square$ деглег воош T $\Box\Box$ dupervision To the ī į водумогк Charging zone with shades T□ ig Radiatora Charging 2 Melding Pipework Naintenance are Btore (B) $\Box\Box$ Ivniv Garpentry Oppolatery NGF Painting virsusuuuustuu Blacksmithing Hand Washing Area Nashing Machine Electricity T Precision Works BuilliM Ձսյսսոլ Batteries Tirea Storage locals Norage locals Norage locals Norage locals ਧੂ Storage local gaid sougu saurem (E) (E)















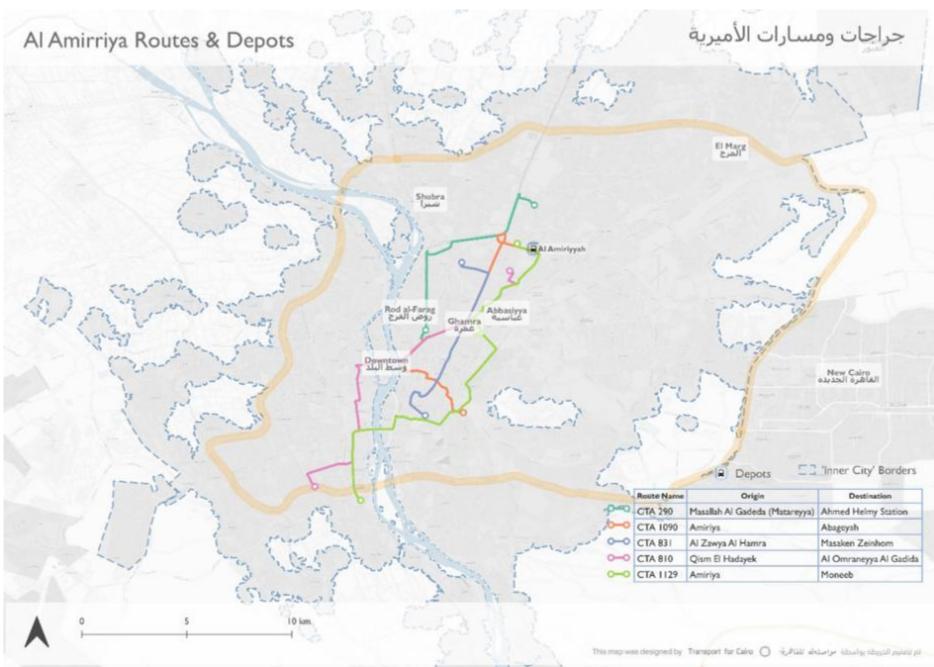
2.4.2 Component (II): Routes Selection

The Consultant has studied the eleven (II) routes that are served by Al-Ameriyah Depot as shared by the CTA. Based on the depot selection criteria described in more detail in the alternatives chapter (section 5.4), five (5) routes have been selected to replace their diesel buses with e-buses.

The average speed (commercial speed) for e-buses on all the five (5) selected routes will be between 15-17 km/h.

Appendix B shows the selected routes full information.

Figure 2-15 The five (5) selected routes















2.4.3 Component (III): Bus Fleet

As part of the transition towards sustainability, an initial transition phase with the five (5) selected routes have been identified for electrification as shown in the table below.

Table 2-3 Transition of Al-Ameriyah Depot bus fleet from diesel to e-buses

| \cdot . | | | | |
|--|--|-----------------------------------|--|--|
| Routes Number | Existing Diesel and Natural Gas Fleet3 | Estimated E-buses fleet (370 kWh) | | |
| 290 | 15 | 28 | | |
| 1090 | 15 | 20 | | |
| 831 | 15 | 7 | | |
| 810 | 15 | 15 | | |
| 1129 | 15 | 28 | | |
| Total fleet From Al- Ameriyah Depot | 75 | 98 | | |

98 clean, environmentally friendly and energy-saving electric buses are needed to replace the currently **75** diesel/CNG buses operating in the **5** selected routes as to fulfill the roads everyday operation. Where good, conditioned diesel and natural gas buses will be operated from other depots and others will be scrapped.

Appendix A includes E-bus Specifications" which followed the Environmental, Social and Gender considerations (Appendix C)

The following presents the main specs of the e-bus (vehicle):

I Main Body of the E-Buses

The current diesel bus specs dimensions of 1.2 *2.5* 3.4 m (L*W*H) which make buses with minimum capacity for 80 passengers with 32 passengers' seats, giving more room for standing passengers, and for wheelchairs and baby strollers.

The vehicle will be equipped with two (2) doors which are designed to swing inward operated by an electro-pneumatic system and controlled from the driver's station. The two (2) doors will be located on the right side of the vehicle as follows:

- The Ist door will be located at the front, before the front wheel.
- The 2nd door will be located at the rear, after the rear wheel.

The platform in front of it will be at least one space for users in wheelchairs (WU) this space will be equipped with:

- A totem for securely positioning wheelchairs, which can be back-facing.
- External and internal request buttons for the ramp, piezo-electric, sensitive, and illuminated in blue with a dedicated regulatory pictogram.
- Wheelchair areas will be equipped with foldable seats to maximize accessibility and ensure efficient space utilization. The vehicle can accommodate wheelchairs comfortably, allowing for the foldable seats to be used when the space is not occupied by wheelchair users.

The chassis of the buses will be designed to withstand the rigors of daily operation, with advanced anticorrosion protection and durable assembly ensuring a lifespan of up to 20 years without the need for preventive maintenance. The chassis will be constructed with aluminum or steel profiles.

The buses feature a resistant design to high-pressure washing, facilitating easy cleaning and maintenance, while also ensuring reliable starting in all climatic conditions, or the onboard systems, Additionally, prewiring for the OSS (Operation Support System) has been included. Three-point safety belts will be installed for the driver, promoting safe operation and the electric buses will have a ground clearance between 25 and 40 cm, which is consistent with current market offerings from various manufacturers.

-

³ Data presented was provided by the CTA team













These buses will feature a low-floor configuration without interior steps, ensuring enhanced accessibility for people with reduced mobility (PRM). Additionally, the e-buses are equipped with a "kneeling" function, allowing the bus to lower on one side to make boarding and alighting easier for passengers where it lowers the bus a few cm below the driving height.

As reported by CTA the chassis at the end life will be sold as scrap via auction to be recycled or used in different purposes.

For more information about bus specs see **Appendix A E-Bus Specs**.

I Chargers and Charging System (Batteries)

The average expected daily operation hours for the future e-buses are approximately 18 hours per bus.

With a maximum speed limited to **80 km/h.**, the e-buses will prioritize safety while providing efficient transportation within urban environments. The e-buses will be powered by **Lithium-ion Iron Phosphate** batteries, which has a nominal operating temperature around 25°C and can go up to 35°C (in nominal condition). With BTMS (Battery Thermal Management System) isolates the battery module if the temperature exceeds 50°C to ensure safety and prevent performance / lifespan degradation, Additionally with LFP has a minimum battery capacity of **370 kWh**, the e-buses will cover a daily range of **300 km** (a maximum of 18 hours of operation) after a slow and semi-rapid charge cycle, It is expected that the batteries will maintain up to 80% of their design capacity by the end of their eight-year lifespan, ensuring operational efficiency throughout this period.

Charging the e-buses will be facilitated through Combo 2 Combined Charging System (CSS) plugs, compliant with international standards ISO 15118 and IEC 61851, located on the right rear face of the bus for convenient access. The charge management system ensures a full recharge within a **maximum of 4 hours** during night, with built-in protection against short circuits, overload, excessive discharge, overheating, and water ingress, ensuring the safety and longevity of the battery system.

Additionally, the charging plug will be protected by an electromagnetically locked hatch, with safety measures to prevent vehicle operation if the hatch is open.

Moreover, the electric buses will be equipped with advanced engine systems designed to ensure optimal performance, efficiency, and safety in Cairo's challenging climate conditions especially in the very hot weather during summer season. These engines feature interchangeability of components, facilitating ease of maintenance and repair. They utilize insulating materials suitable for international standards, ensuring reliability and safety.

Powered by air condition (AC) synchronous, induction motor, or Permanent Magnet Synchronous Motor (PMSM), the buses will deliver a maximum power output of at least 200kW and a maximum torque of not less than 1000 Nm, providing ample power for smooth acceleration and performance. Engine protection will meet IP 65 standards, ensuring resistance to pollution and splash water tightness. Additionally, a sophisticated monitoring system will prevent engine overheating, enhancing safety and reliability. Integrated fire detection systems in the engine compartment, along with optional automatic extinguishing systems, further enhance safety measures. The e-buses also feature air production systems and pneumatic suspension, essential for comfort and performance in Cairo's hot climate, with features such as air purifiers, pneumatic suspension protection, and load leveling systems. The battery system will include 12V batteries mounted on a sliding trolley, with standardized connectors for easy and secure replacement, ensuring reliable operation and efficient performance of the electric buses in Cairo's urban environment.

2 Other Internal Bus Specifications

The electric buses are designed to provide passengers with a modern and comfortable travel experience, incorporating various advanced features and amenities. The passenger area lighting utilizes Light-emitting diode (LED) technology, offering efficient and uniform illumination while minimizing stray reflections on the windshield for enhanced visibility. A comprehensive passenger information system will be integrated into the e-buses, featuring LED electronic destination signs at the front, side, and rear to display route information and line numbers clearly. Thin film transistor (TFT) screens will be installed throughout the e-bus interior, providing dynamic information to passengers during their journey.













Additionally, a high-quality public address system with strategically distributed speakers ensures clear communication throughout the passenger compartment and driver's cabin, facilitating announcements and emergency notifications.

Moreover, for passenger safety and convenience, an emergency call button will be easily accessible next to the dashboard, allowing passengers to request assistance when needed. Finally, efficient ventilation systems will be installed to ensure continuous air renewal and demisting, maintaining a comfortable and healthy environment for passengers and drivers alike.

2.5 Project Implementation Phases

As the Al-Ameriyah depot transitions to accommodate an all-electric bus fleet, significant changes are required to adapt existing infrastructure and introduce new facilities that align with the operational needs of electric vehicles. These changes not only reflect a shift in the type of vehicles serviced but also embody a broader commitment to sustainability and technological advancement.

The project entails significant infrastructure modifications and additions, beginning with decommissioning activities related to diesel bus operations and followed by retrofitting the depot for electric buses (e-buses).

The activities during each phase of the project are illustrated below.

The following figure presents the new design of the Al-Ameriyah depot.

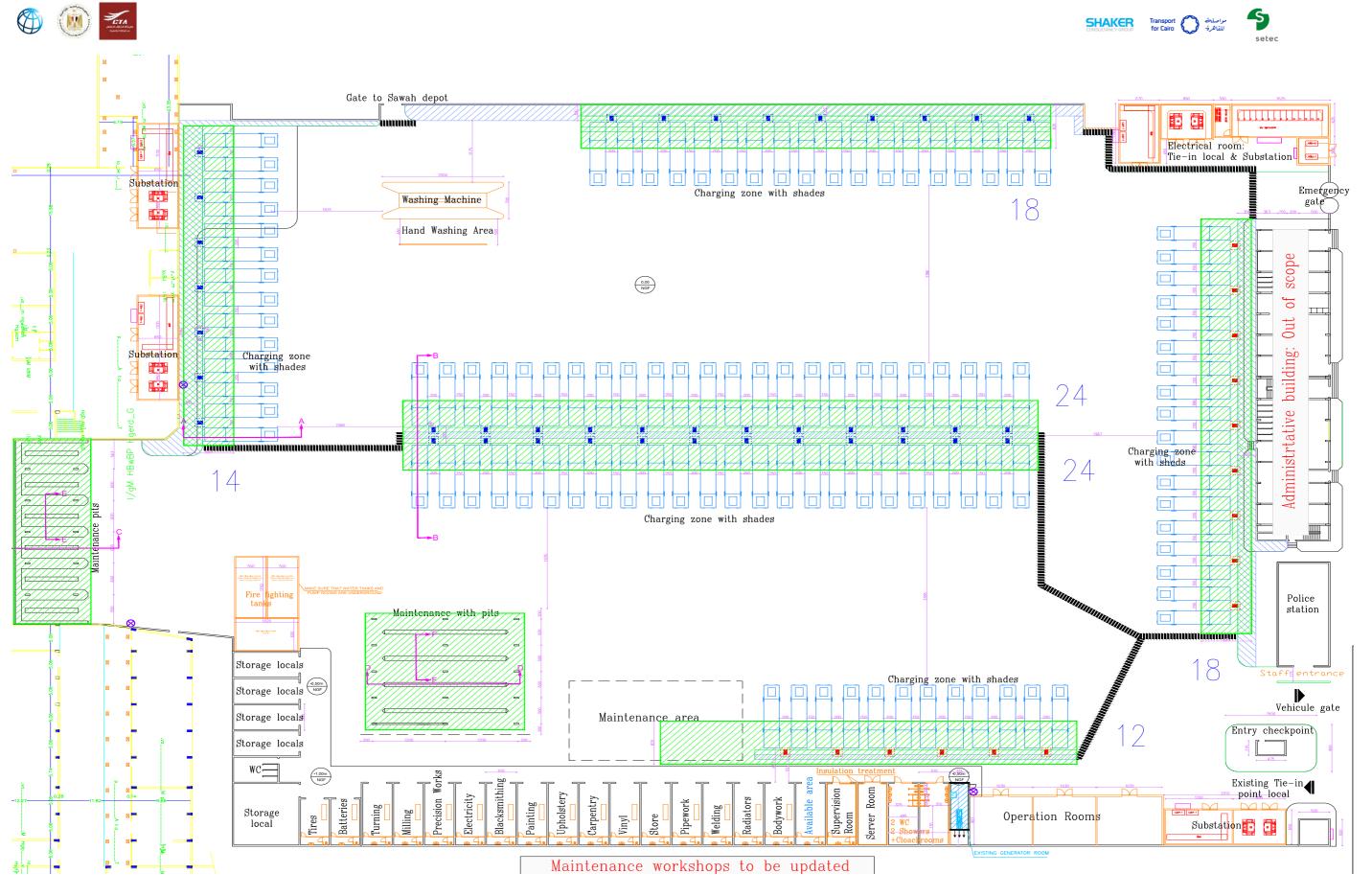


Figure 2-16 Updated Al-Ameriyah Depot Layout (2024-12-20)















Table 2-4 Total area of the depot

| Function Length (m) Width (m) Surface (m² | | | | | |
|--|-------|-------|------|--|--|
| | | | | | |
| Electrical room -Tie In | 35 | 12 | 420 | | |
| Stabling area -18 buses | 77,4 | 13,5 | 1045 | | |
| Washing machine | 20 | 7 | 140 | | |
| Stabling area -14 buses | 13,5 | 62 | 837 | | |
| Electrical room | 7 | 40,2 | 281 | | |
| Maintenance area | 12 | 41,13 | 494 | | |
| Pit area | 28 | 24 | 672 | | |
| Workshop + WC & showers + storage locals | | | 1790 | | |
| Stabling area - 12 buses | 53,2 | 14,25 | 758 | | |
| Electrical room (storage rooms, substation, existing tie-in) | 57,05 | ~8 | 483 | | |
| Entrance & Access control zone | 15 | 9 | 246 | | |
| Administrative building + security | 12,25 | 83,5 | 1023 | | |
| Stabling area - 18 buses | 12,25 | 63,6 | 779 | | |
| Stabling area - 48 buses | 105 | 28 | 2940 | | |
| Total (A) | 11907 | | | | |
| Pedestrian zone & traffic b | 14544 | | | | |
| Total depot area (A | 26451 | | | | |

2.5.1 Depot Decommissioning Phase

Prior to Depot retrofitting / construction, the Depot will be decommissioned by CTA, which mentioned an approximate necessary duration of 3 months (2 months of preparation and I month of equipment removal and decommissioning). This decommissioning period will include the treatment of Misr Petroleum Tanks (removal or cleaning and sand filling according to the final solution decided by Misr Petroleum and CTA).

I Decommissioning Activities

Bus Wash Station: Replace the existing wash area with a tunnel wash system and a high-pressure wash zone. This new setup is designed to efficiently handle the cleaning needs of electric buses, which may have different maintenance requirements compared to diesel buses.

Fueling Area Removal: The existing diesel fueling station and its accompanying underground diesel tanks shall be addressed based on the decision made by Misr Petroleum Company. Currently, the fueling station will be removed; however, no decision has been taken regarding the underground diesel tanks (to the date of submission the ESIA study and the final decision will be taken after sending an official request by the CTA when the depot retrofitting started).

The two possible scenarios for the decommissioning of the diesel fuel tanks are presented below:

• Scenario I: In-Place Burial - If the decision is made to bury the tanks in place, they will be filled with clean sand to ensure environmental safety. The above-ground tank room will be similarly filled with sand and concrete, with all necessary safety precautions in place, including the presence of a Health, Safety, and Environment (HSE) representative and fire extinguishers.















• **Scenario 2**: Tanks Removal - Alternatively, if the decision is made to remove the tanks, they will be neutralized by filling with sand and extracted from the site. This process will be conducted in compliance with all relevant safety and environmental standards.

It was reported by Misr Petroleum that 90% of similar cases, underground diesel storage tanks are neutralized and buried using sand. In both scenarios, the procedures will be carried out under strict supervision from Misr Petroleum Co. to ensure adherence to environmental and safety regulations.

The analysis of disposal methods for underground diesel storage tanks, is covered in Section 5.5 (Alternatives Chapter) of the ESIA. This section provides a comparative analysis of both scenarios, evaluating their environmental and safety implications. Based on this assessment, a recommended approach is provided to ensure minimal environmental disruption

- Oil Change and Maintenance Areas: The oil change zone and maintenance workshops focused on engine oil and diesel engine repairs shall be eliminated. These services are irrelevant to electric buses, which do not require oil changes or traditional engine maintenance.
- Transformers and Distribution: The depot is equipped with one 500 KVA oil-type transformer that will be removed after the construction work is over.
- Removal of the existing 50 m³ firefighting water tank as it doesn't' follow standards and replacing it with one new 230 m³ combined firefighting and domestic water tank
- Remove the entire concrete platform and redo a platform consistent with the electric e-bus load.
- Decommission of some of the existing buildings including, the fire pump room, oil storage, diesel service station, the mosque and the toilets in the depot yard, total area to be decommissioned is 1000m³, while site levelling is (8100 m²).

I Workforce

Table 2-5 Workforce During Decommissioning Phase

About 1154 people will be employed during the decommissioning phase as the number of workforce is shown in **Error! Reference source not found.** The workforce will include supervisors, engineers, skilled and unskilled laborers. For the semiskilled and unskilled workers, the Contractor might employ people from the communities which live around the project area as a way of making sure that the

| Workforce | Number |
|---|--------|
| Supervisors /Engineers | 15 |
| Labours (skilled, semi-skilled and unskilled) | 91 |
| Security/guards | 9 |

project benefits the community members in the project area. Some of the unskilled labor force is expected to be day-labor; thus, the contractor will prepare a local hiring plan, which primarily relies on engagement with the local labor office; additional entities include community liaison desks, or through local Nongovernmental organizations (NGOs), local advertisements. During decommissioning and construction, if it will not be allowed for the workers to use utilities of the administrative building, the contractor shall be the responsible for providing temporary utilities like mobile toilets.

Additionally, the provision of labor facilities, including mobile toilets, changing rooms, and safe drinking water, aligns with the Labor Management Procedures (LMP) for the GCCC project will be the responsibility of the contractor. The contractor is required to develop and sign a code of conduct that includes measures to prevent sexual exploitation and abuse (SEA) and sexual harassment (SH), ensure proper worker accommodation, and implement the project grievance mechanism, including anonymous channels. while a penalty system will be enforced for non-compliance, ensuring adherence to labor and occupational health and safety (OHS) standards.

2 Resources and Inputs

Water

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⁴ Estimated based on similar activities













Water will be used by the workers for domestic use, cleaning, dust suppression and soil compaction. Water will be mainly provided from the city water and will be the Contractor's responsibility. Expected about 6 m³/days will be consumed by the workers for domestic use.

Fuel

Fueling of trucks / machinery will be performed outside the site by the contractors from the nearest fuel station. While storage tank for the diesel generator will be refueled on-site from fueling vehicles.

Electricity

The electricity needed for lighting and operating electrical equipment during decommissioning will be provided through the existing electrical network at the depot.

Raw Materials

Raw materials such as concrete, steel, and wood required for site leveling activities and sand that will be used for neutralizing the diesel tanks to prevent environmental hazards will be provided from the local market through construction subcontractors.

2.5.2 Depot Construction and Retrofitting Phase

Pursuant to the decommissioning phase, the Depot retrofitting works (including preparation works and testing and commissioning) are planned to span over approximately 18 months.

I Construction Activities

- Electric Bus Charging and Parking Zones: Four new areas will be established for the charging and parking of electric buses. These zones will be equipped with state-of-the-art charging stations to ensure efficient energy management and quick turnaround times for bus servicing. Constructing four (4) new bus charging areas, with a total of fifty-five (55) DC fast chargers with a capacity of 300 kilowatts per charger. Each charger can serve two buses.
- Water Supply Improvements: One new underground water tank of total capacity 230 m3 will combine firefighting and domestic water. This single underground system offers several strategic advantages, particularly in addressing the unique challenges of urban and resource-constrained environments like those in Egypt. This design maximizes land utilization by consolidating storage needs into a single tank, which is particularly beneficial in urban areas with limited space. It also ensures enhanced fire safety by providing a larger, readily accessible water reserve during emergencies, with dedicated pump systems ensuring rapid and efficient water delivery to firefighting systems. Additionally, the subterranean design protects water quality by shielding it from environmental factors like sunlight, contaminants, and temperature fluctuations, while integrated circulation and chlorine dosing systems maintain optimal water quality. This approach reduces initial infrastructure investment and ongoing maintenance costs, making it a cost-effective and efficient solution. The tank will be divided into two sections, with 60% dedicated to firefighting and 40% to domestic use. To prevent contamination, a system will be implemented where, after a certain water level is reached, the domestic water pump will stop functioning, ensuring only the firefighting pump remains operational. It will be equipped with circulating pumps and a system to maintain free residual chlorine levels between 0.5 PPM to 0.8 PPM, ensuring water quality and safety,
 - Additionally, installation of new pumps for the combined underground water tanks where the system consists of:
 - One Horizontal Spit case Electrical Firefighting Pump with estimated Flow Rate 750 GPM.
 (Working)
 - One Horizontal Spit case Diesel Firefighting Pump with estimated Flow Rate 750 GPM. (Stand-by)
 - One vertical multistage Jockey Pump with estimated Flow Rate 25 GPM. (Make-up water)

New Building (MV/LV Technical Room):

 Construction of Medium Voltage/Low Voltage (MV/LV) Technical Room, including civil works (524m²).

⁵ According to the World Health Organization (WHO), the amount of water needed for an individual is estimated at approximately 50-100 liters per day to ensure that most basic needs are met.















- Installation of Heating, Ventilation, and Air Conditioning (HVAC) system.
- Installation of Mechanical, Electrical, and Plumbing (MEP) systems for lighting and electrical components.
- Fire Detection and Fire Fighting system installation.

a) Electrical Equipment:

- Procurement and installation of MV Cells (2 units).
- Installation of MV/LV Dry Type Transformers (6 units, 2.5MVA each) for bus charging.
- Installation of LV Switchboard (6 units).
- Installation of Chargers sub-distribution panels (9 units).
- Installation of LV Cables.
- Installation of MV/LV Transformers (2 units, 1000kVA each) for auxiliary systems inside and outside the main depot building.
- Procurement of Spare Parts for charging infrastructure.

b) E-bus Stabling Area:

- Construction of Stabling Shed Infrastructure (5250m²).
- Installation of infrastructure to support chargers (35 units).
- Installation of lighting and maintenance sockets (5250m²).

c) Roads and Utilities:

- Excavation and installation of multi tubular trench and cable ducts at depth of 2 m (1500m).
- Installation of Manholes at depth of 1200 mm (50 units).
- Drainage system installation .
- Asphalt surfacing (15000m²).

d) Heavy Maintenance Equipment:

- Installation of drainage and water connection for Washing Machine location (1 unit).
- Procurement and installation of Washing Machine (1 unit).
- Installation of Mobile chargers (3 units).
- Installation of heavy maintenance equipment, including lifting columns and hoists.

e) Extra Low Voltage Equipment:

- Installation of Depot Closed-Circuit Television (CCTV) coverage for e-bus CCTV (25 units).
- Provision of Depot Wifi coverage.

f) Operation Control Center:

- Upgrade of Operation Control Center (OCC) Room (150m²).
- Procurement and installation of OCC Room Furniture.
- Installation of HVAC system for OCC Room.
- Provision of Depot Wifi coverage.

During construction, the design will incorporate provisions for future solar panel installation. This includes building foundations, slabs, walls, support massifs, retaining walls, metallic frameworks, and roofing, all engineered to support the additional loads from rooftop solar panels and charging equipment. Rainwater disposal systems will also be integrated.

Retrofitting Activities

- Facilitate future readiness for solar panel installation, major structural work includes the construction of foundations, slabs, walls, support massifs, retaining walls, metallic frameworks, and roofing. This work incorporates systems for rainwater disposal and is designed to support the necessary loads for rooftop solar panels and associated charging equipment. These conservative measures ensure that the structure can accommodate solar panels without requiring significant modifications later.
- Electric Bus Charging and Parking Zones: Four new areas shall be established for the charging and parking of electric buses. These zones shall be equipped with state-of-the-art charging stations to













ensure efficient energy management and quick turnaround times for bus servicing. Constructing four (4) new bus charging areas with a total of fifty-five (55) DC fast chargers with a capacity of **300 kilowatts per charger**. Each charger can serve two buses.

g) Enhanced Infrastructure Networks:

- Electrical Network: The total load required to operate the project is about "14 MVA" at Medium Voltage switchgear level. The depot will be fed by two (2) ring main units receiving the tie-in cables from Electric distribution company EDC and one (1) medium voltage switchgear of 11 KV, dry type transformers, low voltage distribution boards as described in more details below.
- Ring Main Units: Two new Ring Main Units (RMU) shall be installed to receive tie-in cables from the Electricity Distribution Company (EDC), enhancing the depot's power intake capabilities. The RMU will be Gas Insulated Switchgear (GIS) type. Each Ring Main Unit will comprise of three (3) motorized three poles load break switches rated 630A, LLKV for the incoming feeders' cables and No. (1) three poles load break switches rated 630A for the outgoing cable connected to the switchgear with RTU (monitor + control).
- Medium voltages switchgear (MVSG): Installation of 11 KV MVSG to receive cables from the two ring main units and to distribute the power among the transformers. The 11KV MVSG will consist of a single bus-bar, metal clad, indoor type integrated unit incorporating enclosures for circuit breaker units (Vacuum type), draw out type, current and voltage transformers and auxiliary wiring. The 11KV MVSG will be equipped with the necessary protection, control devices and instruments. The control supply for the protection system will be Direct Current (DC). The MVSG will be completed with Remote Terminal Unit (RTU). The MVSG will consist of 14 cells as follows:
- Two (2) cells for circuit breakers receiving the two (2) incoming (TIKV) feeders from the Ring Main Units (RMU).
- Two (2) cells for the bus coupler and cable riser.
- Eight (8) cells for circuit breakers feeding the outgoing transformers.
- Two (2) cells spare for future loads.
- Medium voltage Cables (11KV): The incoming medium voltage cables to the 11KV RMU will be as per EDC requirements, and will be aluminum conductor, XLPE/DSTA/PVC,12/22(24KV) insulation class level. All medium voltage cables used between the 11KV RMU and the 11 KV MVS will be (3x500) mm², copper conductor, XLPE/DSTA/PVC, 12/22 (24KV) insulation class level.
- All medium voltage cables used between the MVS, and transformers will be (3x240) mm², aluminum conductor, XLPE/DSTA/PVC, 12/22 (24KV) insulation class level.
- Electrical Substations: Four electrical substations (SS-1, SS-2, SS-3, SS-4) compromising the transformers and electrical panels will be constructed to feed the chargers and the various loads of the depot as outlined in the Low Voltage riser diagram. This setup ensures a stable and reliable power supply to all charging stations.
- Transformers: Six (6) transformers (2.5 MVA each) for bus charging, two (2) per each substation (SS-I, SS-2, SS-3). Additionally, two (2) MV/LV Transformers (1000kVA each) for auxiliaries (substation SS-4). All transformers will be dry type (IP-23) complete with enclosure and provided with forced ventilation fans for 40% increased capacity.
- Existing 75 KVA emergency diesel generator will be replaced with a **new 250 kVA standby diesel; generator** with above ground diesel tank with capacity of 2.5 m³. It will be used as a back-up for lighting and security lighting inside and outside the depot area in case of power outage.

Parking Control

Install car parking control equipment to manage and optimize parking space usage effectively.

Lighting Fixtures

- The lighting design and Light Emitting Diode (LED) lamp selection shall be based on achieving recommended illumination levels taking into consideration proper color rendering, and temperatures for each task minimum and glare as per Charted Institution of Building Services Engineers (CIBSE) recommendation.
- All functional areas such as back of house parking areas, office spaces and technical rooms shall be prepared by electrical designers.













- Lighting for mechanical and service areas, pump area and other similar areas with high ceiling shall be of industrial high bay luminaires equipped with LED lamps and lower ceiling heights shall be illuminated with waterproof luminaires equipped with LED lamps.
- In general, LED luminaries shall be used in all areas with L70 lamp life of minimum 50,000 hours.
- Lighting fixtures used in each type of space shall be determined based on the functional requirements of the space as well as the architectural considerations
- Lighting fixtures shall be standard products of reputable manufacturers.
- The driver for the luminaire equipped with LED lamps shall be a high frequency Solid-state, high-power factor.
- The protection class of all lighting fixtures shall be specified in accordance with the location where they are installed.
- The parking area shall be illuminated by using High masts, and outdoor flood light.
- All indoor lighting fixtures shall be controlled via local switches or push buttons.
- All parking areas high mast shall be controlled by photocell, timer and push button also selector switch shall be provided for manual / automatic operation.

Domestic and Fire Fighting Water Network:

- Water Supply Improvements: A new underground water tank of capacity of 230 m³ will be installed. It will combine firefighting and domestic water supply which is illustrated above in section 2.5.2.1.2
- Fire Fighting Enhancements:
- The project shall be protected by Fire Standpipe System and shall be served through water tanks and Firefighting Pump set.
- 150mm Firefighting tie-in pipe only shall be provided for the administrative building firefighting network. However, for the firefighting network inside this building it shall be done by other.
- The project shall be provided with fire department connections (Siamese connections).
- Main Electrical rooms, MDB rooms, M.V switchgear and Battery room, shall be protected by automatic CO2 fire suppression system.
- All Main and Distribution Electrical panels shall be protected By CO2 Fire-search Extinguishers
- ERW black steel schedule 40 shall be used for above-ground Fire Fighting water networks. In addition to High-density polyethylene (HDPE PN16) shall be used for under-ground Fire Fighting water networks.
- Galvanized steel shall be used for Fire Fighting drain network.

Appendix D includes all firefighting specs

I Storm Water:

- Storm water from all roof areas shall be collected by gravity and shall be free discharged to the sewage network.
- Storm water from site layout shall be collected by trenches and area drains and discharged to the sewage network.

2 Safety and Surveillance:

- a comprehensive fire detection and alarm system, structured cabling system for communications, active data network equipment for operational connectivity will be implemented, and an IP video surveillance system to enhance security and monitoring.
- An Intelligent Addressable Fire Alarm System will be provided to cover the depot closed areas, in addition to manual call stations in the depot open areas. The Fire Alarm Control Panel will be provided with Backup Batteries and Battery Chargers to maintain the full operation of the entire fire alarm system as per National Fire Protection Association (NFPA) requirements.
- The Fire Alarm Control Panel will have addressable data communication circuits to provide connection with the addressable devices. No more than 80% of the available addressable loop or audio power amplifiers capacities will be used to enable future addition of any field devices.













- The System will achieve continuous supervision of all Devices (Detectors, Manual Call Point, Alarm Sounders...etc. Additionally, all Fire Alarm System Cables and all related system interfaces will be Fire Resistant Cables according to BS-6387, Categories C, W & Z.
- The Fire Alarm Control Panel will be located in the Main Control Room in the existing Admin. Building.

3 IP Video Surveillance System (IPVSS)

- The system shall be capable of providing cameras monitoring, control and storage capabilities for the critical areas in the depot. The system shall be user friendly allows for training of non-technical personnel to effectively operate and administrate the system; a Security Monitor and control room shall accommodate the operators, workstations and monitors and shall be located in Main Control Room in existing Admin. Building.
- System NVRs/ Storage Servers shall be installed in the Main Telecom. Room at existing Admin. Building.
- The Operator Workstations and Video Walls of IP Video Surveillance System shall be located at the main control room at the existing administrative building.
- All Cameras at entrances and outdoor cameras changing in light conditions will be equipped with Wide Dynamic Range (WDR) functionality for automatic adjustment to compensate for changing lighting (sunlight) conditions, Recommended Wide Dynamic Range is 120 dB or higher.
- The system Storage shall be calculated based on the following:
- Camera Specifications: All cameras will have a native resolution, 25 frames per second, storage for 21 days and 24 hours, and 25% spare capacity.
- System Components: The system includes fixed indoor/outdoor dome cameras, network video recorders (NVRs), a PC operator workstation for monitoring and control, control keyboards/keypads, and video wall screens.
- Coverage Areas: The IP-CCTV system, aligned with MOI requirements, will monitor depot outdoor areas, EV chargers' zones, entrances/exits, the main telecom room, and the main control room.

4 Workforce

Table 2-6 Workforce During Construction Phase

The Labor Management Procedures (<u>LMP</u>) will be applied throughout the construction phase to ensure compliance with labor standards and worker protections, About 500 people6 will be employed during the construction phase. The workforce will include supervisors, skilled and unskilled laborers as shown in Table 2-6 Workforce During Construction Phase. For the semiskilled and unskilled

| Job | Number |
|---|--------|
| Supervisors/Engineers | 75 |
| Labours (skilled, semi- skilled and unskilled) | 416 |
| Security/guards | 9 |

workers, the Contractor might employ people from the communities which live around the project area as a way of making sure that the project benefits the people community members in the project area.

I Resources and Inputs

a) Water

Water will be used by the workers for domestic use.

- Water will be needed for construction purposes such as dust suppression, and general site maintenance.
- The installation of the firefighting and domestic water supply system will require water for testing and commissioning.

⁶ Estimated based on similar activities, and to be confirmed by the future Contractors













Water will be mainly provided from the city water and will be the Contractor's responsibility.
 Expected about 25 m³/day7 will be consumed by the workers for domestic use.

b) Fuel

Fueling of trucks / machinery will be performed outside the site by the contractors from the nearest fuel station.

c) Electricity

The electricity needed for lighting and operating electrical equipment during construction will be provided through the existing electrical network at the depot.

d) Construction Materials

Various construction materials such as concrete, steel, asphalt, and building components will be supplied by the contractor. Electrical equipment, including Medium Voltage (MV) cells, transformers, switchboards, chargers and spare parts will be supplied by the contractor.

2.5.3 Operation and Maintenance Phase

I Activities

a) Bus Operations:

- Daily deployment and operation of electric buses on the 5 selected routes detailed in section 2.4.2.
- Regular bus inspections and maintenance checks to ensure safe and efficient operation.
- Scheduling and coordination of bus drivers and routes to optimize passenger service.

b) Charging Infrastructure:

- Monitoring and maintenance of charging infrastructure to ensure reliable charging for electric buses.
- Routine checks and repairs of charging stations and associated equipment.
- Management of charging schedules to minimize downtime and maximize bus availability.

c) Washing Facilities:

- Regular Bus Washing: Electric buses will undergo a thorough washing every night, following their daily check-up and maintenance activities. This regular cleaning ensures the buses maintain their cleanliness and appearance
- Water Filtration and Recycling: To minimize water consumption and adhere to environmental regulations, the washing process will utilize a sophisticated water filtration and recycling system. The system includes a settling tank (25 m³), hydrocarbon separator tank (15 l/s), biological reactor vessel (25 m³), recycled water lifting tank (25 m³), and a rainwater tank (120 m³). This system will treat and recycle the water used during washing, reducing the need for fresh water.
- Supply Provision: Adequate water and detergent supplies will be maintained for the bus washing activities to ensure consistent availability for daily operations.
- System Maintenance: Regular maintenance of washing machines, the industrial water treatment plant, and drainage systems will be conducted to ensure they are functioning optimally and comply with the necessary environmental standards.

Official Use Only

⁷ According to the World Health Organization (WHO), the amount of water needed for an individual is estimated at approximately 50-100 liters per day to ensure that most basic needs are met.











Figure 2-17 Scheme of principle of water recycling

d) Maintenance and Repairs:

- Scheduled maintenance of electric buses to address wear and tear, ensure battery performance, and other mechanical issues.
- Emergency repairs and troubleshooting of e-bus components as needed.
- Procurement and management of spare parts inventory for bus maintenance.

e) Workforce

Table 2-7 - Expected Workforce

| Position | Total ⁸ |
|------------|--------------------|
| Managers | 5 |
| Mid-level | 185 |
| Conductors | 220 |
| Drivers | 306 |
| Engineers | 4 |
| Workers | 298 |
| Services | 61 |
| Total | 1079 |

The working hours and shifts will stay the same as they exist. as the depot operates for three shifts; each shift for 8 hours including a maintenance shift. According to CTA, there is a minor maintenance routine every week (seventh day of the week) and a major maintenance routine every two weeks (fifteenth day of the month); bus washing takes place every night between 12 am and 5 am.

I Resources and Inputs

⁸ The current workforce in the depot will not change as reported by the CTA. However, during the PC session it was mentioned that there will be labor force relocation as drivers and conductors working on routes rather than the 5 selected routes related to the project will have to go to other depots or change their jobs as what happened to the drivers in COP 27 in Sharm el sheikh as they were trained in MCV and proved themselves during their work.













a) Water

Water will mainly be used by the workers for domestic use and will be used in e-bus washing. The expected water required for domestic use is 32 m³/day9 and that in the e-bus washing is 0.15 m³/bus/wash/day (150 l/bus/wash/day). Where the first wash will be from the water network and then will be from the recycle treated wastewater in addition to back up from the water network as needed. Additionally, water will be provided once for the firewater tank of capacity 230 m³.

Water will be provided via the public water network.

b) Electricity

The electricity needed for lighting, powering equipment, and operating facilities and devices as well as charging the e-buses will be provided through the electrical network that will be implemented at the depot. The depot will be fed by two (2) ring main units receiving the tie-in cables from Electric distribution company (EDC) and one (1) medium voltage switchgear of 11 KV, dry type transformers, low voltage distribution boards. The maximum required power will be 14 MVA.

c) Chemicals

Chemicals used during the operation phase will include:

- Cleaning Agents: Used for regular washing of buses to maintain cleanliness and hygiene. Including detergents, soaps, and specialized cleaning solutions.
- **Refrigerants:** Using of refrigerants that are environmentally safe for the air conditioning (AC), as Egypt is a party to the **Montreal Protocol** on Substances that Deplete the Ozone Layer

d) Spare Parts

Spare parts necessary for the operation phase will include:

- **Mechanical Spare Parts:** Essential for the maintenance and repair of bus components. Include items like brake pads, filters, belts, and other mechanical parts.
- **Electrical Spare Parts:** Necessary for the maintenance of the bus's electrical systems. Include fuses, relays, wires, and other electrical components.
- **Battery Spare Parts:** Used for the maintenance and replacement of bus batteries. Include battery cells, connectors, and related components.
- Charging Infrastructure Spare Parts: Essential for the upkeep of the electric bus charging stations. Include chargers, cables, connectors, and other electrical materials required for charging infrastructure maintenance

Official Use Only

⁹ According to the World Health Organization (WHO), the amount of water needed for an individual is estimated at approximately 50-100 liters per day to ensure that most basic needs are met.













3 Policy, Legal and Administrative Framework

The current project is subject to national and international laws and policies. This chapter lists national laws and regulations and international policies applicable to the project, identifies gaps between national legal framework and WB guidelines and standards, and presents the implementation arrangement for the project.

The proposed project components must comply with both national and international requirements. If there is a difference between local and WBG standards, more stringent standards will be adopted. The project must also comply with the instrument developed specifically for the implementation of this project. This mainly includes the Stakeholder Engagement Plan (SEP), the Labor Management Procedures, and Environmental and Social Framework (ESMF).

Gap analysis for key environmental, social and gender issues concerns: Egyptian laws and WB Policies were conducted in the Environmental and Social Impact Assessment Framework (ESMF) of the Greater Cairo Air Pollution Management and Climate Change Project and disclosed on EEAA website. See section 3.3.2 in The Greater Cairo Air Pollution Management and Climate Change Project Environmental and Social Management Framework (ESMF), available online <a href="https://example.com/here-environmental-environme

Note: All specifics such as legal limits and regulations pertaining to the project are all included in Appendix F.

3.1 National Legal Framework

The Ministry of Environment, Egyptian Environmental Affairs Agency (EEAA) issued, in 2009, general guidelines for Environmental Impact Assessment (EIA) preparation. In accordance with these guidelines, the projects are classified into three categories according to the severity of the potential environmental impacts and place of residence of the establishment and its proximity to the residential areas.

As per the updated projects' classification list issued by EEAA, in 2023 by the decree number 518/2023, this project is classified as category "C" as defined by Egyptian requirements. Category "C" projects require developing a full EIA study including a public consultation event.

The governing environmental laws applicable to the scope of this project are:

- Environment Law No. 4/1994 amended by Laws No. 9/2009 and 105/2015, and its amended Executive Regulations by Decrees No. 1095/2011, 710/2012, and the Prime Minister Decree No. 964/2015, Decree No. 618, 1963 of 2017 and amended Executive Regulations (ER) no 2466/2024. This law controls the potential environmental impacts of the proposed project
- Public Cleanliness Law No. 38/1967 amended by Law No. 31/1976 and its Executive Regulations issued by the Ministry of Housing by Decree No. 134/1968 dealing with solid waste to regulate the collection and disposal of construction and operation waste and maintaining the cleanliness of roads and public properties.
- Law No. 93/1962 amended by Decree No. 44/2000 concerning disposal of liquid waste on domestic wastewater network and its implementing regulations.
- Waste Management Law 202/2020 and its Executive Regulations issued by Prime Ministerial Decree No. 722/2022 in February 22,2022.

In accordance with Article No. (2) of the Waste Management Law 202/2020, the units of integrated municipal waste management in the competent administrative authority established under the accompanying law will authorize the cleaning funds of the local administration units established under Article No. (8) of Law No. 38/1967 in the general cleanliness matter. The Executive Regulation (ER) dealt with 4 chapters consisting of 56 articles detailing the articles of the law and specifying (defining) the requirements, standards and technical specifications for them as well as frameworks for coordination between the competent and effective authorities through a clear statement of roles and responsibilities among all. In addition to setting the standard operating procedures and the steps that the licensee for dealing with waste must follow and setting specific time frames for them.

The following articles are applicable to the project:













- Articles 15-16: The generator or waste carrier shall bear the cost of integrated waste management in a healthy and environmentally safe manner, as determined by the executive regulations of this law.
- Article 20: Open burning of waste is prohibited.
- Article 38: It is prohibited to throw, sort, or treat municipal waste except in designated places in accordance with the procedures specified by the executive regulations of this law.
- Article 55: It is prohibited to consume hazardous materials and wastes except after obtaining the authority's approval with a license from the competent administrative authority. Persons licensed to handle hazardous materials or waste are prohibited from abandoning or delivering them except in designated places and persons authorized to do so.
- Article 56: The owner of the facility or the person responsible for its management, whose activities produce hazardous waste in accordance with the provisions of this law, must keep a record of these wastes and how to dispose them and contracting with competent authorities to manage the process of handling and safe disposal of this waste.
- Article 58: Use empty packages of hazardous materials or use products resulting from their recycling except in accordance with the requirements specified by the Executive Regulations of this

The Decree No. 722/2022 also includes the following annexes applicable to the project:

- Annex (7): Register form for hazardous materials and waste
- Annex (8): Requirements and standards for remediation of contaminated soil
- Annex (9): Terms of use of empty containers
- Annex (10): Requirements and standards for the disposal of hazardous materials and waste
- Annex (11): Requirements and standards for tools and supplies for hazardous materials and waste segregation, collection, transporting and storing such as hazardous healthcare waste and other hazardous waste.
- Annex (13): Industrial waste register form
- Annex (17): Hazardous waste tracking form

Other regulations pertinent to solid and hazardous waste management:

- Law159/1953 regulates the cleanliness of fields, roads and streets as well as organization of collection and transport of waste.
- Laws 106/1976 and 101/1996 allow local governments to include the management of construction and decommissioning waste in the permits required for construction activities
- Law 140/1956 regarding occupation of public roads
- Law 84/1968 regarding public roads
- Codes of Practice of Infrastructure Works
- Egyptian Code 102: Designing and Implementing Pipelines for Drinking Water and Wastewater Networks.
- Egyptian code for rural and urban road works (ECP-2008) for roads and hydrological and hydraulic design.
- Traffic Planning and Diversions
- Traffic Law 66/1973, amended by Law 121/2008 traffic planning
- Law 140/1956 on the utilization and blockage of public roads
- Law 84/1968 concerning public roads
- Work Environment and Operational Health and Safety
- Law No. 4/1994 amended ER no 2466/2024; articles 43 45 related to workplace emissions, noise levels, heat stress, ventilation and workers' protection
- Law No. 12/2003 on Labor and Workforce Safety

Other laws and decrees relevant to occupational health and safety provisions consist of:

■ Decree No. 126/2003 replacing Decree No. 75/1993 defining procedures and forms for the notification of work-related accidents, injuries, fatalities and diseases.













- Decree No. 134/2003 replacing Decree No. 116/1991 defining the types of establishments covered,
 OSH services and committees, and related OSH training institutions.
- Decree No. 155/2003 identifies works, occupations and industries prohibited for women workers,
- Decree No.211/2003 identifies the safety limits, requirements, and necessary precautions to prevent physical, mechanical, biological, chemical, and environmental hazards, and to ensure a secure working environment.
- Law No. 137/1981: Labor and Workforce Safety,
- Law No. 79/1975 as amended by Law No. 25/1977 defining the Social (and Health) Insurance
- Law No. 12/1996 enacts the Child Law according to Law No. 12/2003

Minister of Manpower Decree No. 48/1967 for implementing the social insurance law No. 79/1975, requires employers to inform their employees that they are dealing with hazardous waste; accordingly, every worker is required to follow protective measures and observe safety precautions set by the employer. The establishment is authorized to take disciplinary action against a worker who does not follow the safety precautions as prescribed (article 218 of the law, article 57 of Law No. 79/1975, and Decree No. 48/1967).

More details about applicable labor legislation: occupational health and safety can be found in the project's Labor Management Procedures (LMP) / Government of Egypt/ Ministry of Environment / Greater Cairo Air Pollution Management and Climate Change Project (available here). 10

3.2 The Relevant International Treaties Signed by Egypt

Egypt has signed and ratified a number of international conventions that oblige the country to preserve environmental resources.

- United Nations Convention on Climate Change (New York 1992). The Convention covers measures to control greenhouse gas emissions from various sources, including transportation
- United Nations Framework Convention on Climate Change and the Kyoto Protocol (Kyoto, 1997)
- Convention on the Protection of the Ozone Layer (Vienna 1985)
- Convention on the Prevention and Control of Occupational Hazards caused by Carcinogenic Substances (Geneva, 1974)
- Convention on the Protection of Workers from Occupational Hazards in the Work Environment due to Air Pollution, Noise and Vibration (Geneva 1977)
- ILO: Basic labor standards to be followed during project implementation. Egypt has been a member
 of the International Labor Organization (ILO) since 1936 and has signed 64 conventions that
 regulate labor standards and working conditions. In 1988 Egypt ratified the Occupational Safety and
 Health Convention of 1979 (No. 152)
- Consultation, participation and public disclosure: Aarhus regulation promotes transparency of environmental information and involvement of project stakeholders. The consultation identifies and manages any public concern at an early stage. The Regulations include provisions for public disclosure of key project information: such as non-technical summary and environmental impact assessment.

3.3 World Bank Requirements

The World Bank requires that the projects it finances be compliant with both the country's national standards as well as environmental and social framework (ESF) requirements. Therefore, in addition to the national laws and regulations, the project components must comply with the World Bank (WB) Environmental and Social Standards (ESS).

The World Bank Group Environmental, Health and Safety (WBG EHS) General Guidelines, as well as the relevant Infrastructure Sector Guidelines (i.e., Water and Sanitation and Electric Power

https://documents1.worldbank.org/curated/en/583541596080184788/pdf/Labor-Management-Procedures-Egypt-Greater-Cairo-Air-Pollution-Management-and-Climate-Change-Project-P172548.pdf













Transmission and Distribution, Telecommunications), available at www.ifc.org/EHSguidelines, are considered.

3.3.1 World Bank Environmental and Social Standards (ESSs)

The WB has identified 10 environmental and social standards (ESS) that should be complied with in its financed projects.

The following ESSs are applicable to the Greater Cairo Air Pollution and Climate Change Management (GCCC) Project. They have been assessed in relevance to the E-bus demonstration project (ESS1, ESS2, ESS3, ESS4, ESS5, ESS6, ESS8 and ESS10):

I ESS I: Assessment and Management of Environmental and Social Risks and Impacts

ESSI is relevant to GCCC project and also for this subcomponent under the study "E-bus demonstration Project" due to the environmental and social risks and impacts associated with the project activities.

2 ESS 2: Labor and Working Conditions

ESS2 is relevant to GCCC project and also for this subcomponent under the study "E-bus demonstration Project" due to the need for workers and occupational health and safety impacts associated with the nature of project activities as well as the other risk related to the hiring procedures and the labor working conditions which are all addressed under the developed Electric Bus (e-Bus) Demonstration Project.

3 ESS 3: Resource Efficiency and Pollution Prevention and Management

ESS3 is relevant to GCCC project and also for this subcomponent under the study "E-bus demonstration Project" due to activities involving consumption of resources and generation of waste and emissions.

4 ESS4: Community Health and Safety

ESS4 is relevant to GCCC project and also for this subcomponent under the study "E-bus demonstration Project" due to possible risks and impacts on the community health and safety from the project activities.

5 ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement

ESS5 is applicable to GCCC project; however, it is not applicable to this subcomponent under the study "E-bus demonstration Project" since all the potential depot locations and routes are already either existing, operating and/or owned by the Cairo Transport Authority (CTA).

6 ESS 6: Biodiversity Conservation and Sustainable Management of Living Natural Resources

ESS6 is not relevant to GCCC project and not relevant for this subcomponent under the study "E-bus demonstration Project" unless possible risks and impacts on the street cats & dogs from project activities. However, there are no valuable or threatened species found in the project's surrounding.

7 ESS 8: Cultural Heritage

ESS8 is relevant to the GCCC project due to possible chance of finding physical cultural heritage because of excavation works. However, it's very unlikely that there will be any archaeological sites in the sub-component 3 of the GCCC area as the depot is currently existing for a long time and based on the general understanding of the region's cultural heritage distribution, which suggest that the project area has a low likelihood of containing undiscovered cultural heritage sites. Additionally, no deep exaction activities are expected.

8 ESS 10: Stakeholder Engagement and Information Disclosure

ESS10 is relevant to GCCC project and also for this subcomponent under the study "E-bus demonstration Project" due to the involvement of various stakeholders and complex implications of













the project. Relevant stakeholders include governmental entities such as the CTA and the PCU as well as local communities (Greater Cairo residents that use public transportation for commuting and those surrounding the depot location). More details regarding the Project Relevant Stakeholders can be found in Chapter 8 "Stakeholders Consultations and Public Disclosure" and the Project's Consultation Report (Appendix E includes Consultation Strategy Plan and Report).

3.3.2 World Bank Environmental, Health and Safety (EHS) Guidelines

The general World Bank Environmental, Health, and Safety Guidelines (available at www.ifc.org/EHSguidelines) will be followed to ensure that all infrastructure components, including their construction and operation activities comply with the Environmental, Health and Safety (EHS) standards and requirements of the WB. Specific environmental health and safety guidelines will also be followed including the following:

- Water and Sanitation
- Electric Power Transmission and Distribution
- Telecommunications

3.3.3 World Bank Good Practice Note

9 World Bank Good Practice Note on SEA/SH:

Addressing Sexual Exploitation and Abuse and Sexual Harassment (SEA/SH) in Investment Project Financing involving Major Civil Works.

This Good Practice Note (GPN) discusses three (3) key issues, among others, that involve project preparation and implementation as follows:

- Identification and assessment of risks of SEA/SH, including social and capacity assessments. This should be carried out during project preparation. The fact that SEA/SH risk assessment is a continuous process and should take place throughout the project life cycle has to be well-understood, since SEA/SH is a potential occurrence at any moment.
- Addressing the identified risks through the identification and implementation of appropriate SEA/SH risk mitigation and monitoring measures.
- Responding to any reported Gender Based Violence (GBV) allegations in a survivor-centric approach, proposing referral mechanisms to appropriate service providers, regardless of its relevance to the project. This is achieved through effective monitoring and evaluation mechanisms, which meet the World Bank's requirements on SEA/SH.

10 World Bank Good Practice Note on Road Safety:

Addressing road safety is a critical concern in projects involving significant construction and operational activities, especially those affecting public transportation systems like the E-Bus Demonstration Project.

Key considerations of this Good Practice Note are:

- Conducting a comprehensive road safety risk assessment at the outset of the project, covering all
 phases, including decommissioning, construction, and operation of e-buses.
- The project design should incorporate road safety considerations, such as the layout of bus depots to minimize interaction between buses and other vehicles. This includes ensuring that e-buses are equipped with advanced safety features like cameras, collision-avoidance systems, and clear signage for pedestrians and other road users.
- A comprehensive Traffic Management Plan (TMP) should be developed, addressing the safe movement of construction vehicles and ensuring minimal disruption to traffic.
- A robust road safety monitoring system must be implemented to track compliance with road safety standards throughout the project. This includes regular inspections, audits, and the use of safety performance indicators.
- Even after the construction phase, the road safety measures must continue to be applied during the operational phase of the e-buses. Regular safety audits, traffic assessments, and continuous monitoring of bus routes should be undertaken.













3.4 Electrical Installations Codes and Standards

The following Regulations, Codes, and Standards will be followed in the design of the electrical installations:

- Egyptian Electrical Code.
- British Standard, Regulations for electrical installations IET wiring regulations, 18th Edition issued by the Institution of Electrical Engineers were not in contradiction with the local codes.
- EEE guides issued by the institute of electrical and electronic engineers.
- CIBSE British "code of interior lighting" issued by the (Chartered Institution of Building Services Engineers).
- IEC Standards, issued by the International Electro-Technical Commission.
- All applicable parts of National Fire Protection Association (NFPA) will be used throughout the project, particularly any electrical materials subject to fire hazard and NFPA-70 (national electrical code), to prevent hazard to life and property, to minimize damage to the system and its components and to limit the extent and duration of service interruption whenever abnormalities occur on any part of the system.

Table 3-1 List of Standards for Main Electrical System Components

| Equipment | Standard & specification |
|------------------------------------|---------------------------------------|
| Medium Voltage Switchgear | IEC 62271-1 |
| Medium Voltage Circuit Breakers | IEC 62271-100 |
| Medium voltage cables | IEC 60502 |
| Dry-Type Distribution transformers | IEC 60076 |
| Low-voltage switchgear | IEC 61439-1&2 |
| Capacitors - Low-voltage | IEC 60831-1&2 |
| Circuit Breakers | IEC 60947-2 |
| Contactors and Motor Starters | IEC 60947-4 |
| Low Voltage Cables | IEC 60502-I |
| Fire Resistant Cables | BS 7846 (Category F2 for life safety) |
| Cable Trays | BS EN 1461 & IEC 61537 |
| Conduits (PVC) | BS 4607 &IEC 61386-21 |
| Conduits (IMC) | UL 1242 & ANSI C80.6 |
| Conduits (EMT) | UL 797 & ANSI C80.3 |
| Conduits (RSC) | UL 6 or BS 4568-1 & ANSI C80.1 |
| Switch Dis-connectors | IEC 60947-3 |
| Sockets | IEC 60884-1 |
| Lighting Fixtures | IEC 60598 |
| Safety/Exit Lighting | BS 5266 |
| Switches | IEC 60669-1 |
| Uninterruptible Power Supply | BS EN 62040 & EN 62040 |
| Earthing (Grounding) | IEC 60364-1, 51, 4-41, 5-55 & BS 7430 |
| Lightning | BS-EN62305-1, 2, 3 & 4 |













Chargers typically adhere to standards and guidelines that prioritize aspects like safety, energy efficiency, and performance rather than having specific environmental requirements outlined in standards such as IEC 62430. These standards ensure that chargers operate safely, reliably, and efficiently, addressing criteria such as electrical safety, compatibility with power sources, and electromagnetic compatibility (EMC).

Additionally, for the electrical safety provisions of electrical vehicles (EV) Charging Stations shall follow the following standards:

- **IEC 61851-1:2017**: Standard for electric vehicle conductive charging system Part 1: general requirements,
- IEC 61851-23:2014: Electric vehicle conductive charging system Part 23: DC electric vehicle charging station,
- EC 61851-24:2014: Electric vehicle conductive charging system Part 24: Digital communication between DC EV charging station and an electric vehicle for control of DC charging; and
- ISO 17409:2020: Electrically propelled road vehicles- Conductive power transfer Safety Requirements

3.5 Fire-Fighting Codes and Standards

Firefighting systems will be designed in accordance with NFPA and the requirements of local civil defense, and fire AHJs of the Project buildings. Additionally, firefighting systems will conform to the technical guidelines requirements and design criteria of latest editions of the applicable codes and standards listed in the table below.

Table 3-2 Firefighting applicable codes and standards

| Code/Standard | Full Definition |
|---------------|--|
| NFPA | National Fire Protection Association |
| ASME | American Society of Mechanical Engineers |
| ASTM | American Society of testing materials |
| AWWA | American Water Works Association |
| ANSI | American National Standard Institute |
| FM | Factory Mutual |
| UL | Underwriters Laboratories Inc. |
| EPC | Egyptian Firefighting Code |

3.6 Required Approval and Permits and their Associated Administrative Authorities

The following presents the approval and permits required for the infrastructure and their associated administrative authorities:

- Approval of Civil Defense Authority (CDA) on firefighting network design that will be implemented in the depot.
- The Electricity Distribution Company (EDC) will be responsible for providing the tie-in to the project, upon request from the Landowner (CTA), and at a cost paid by the Project.
- The Electricity Distribution Company will be responsible for the approval of the internal design of the electricity network.
- Approval of Al-Ameriyah district and Waste Management Regulatory Authority (WMRA) to dispose of waste generated during construction and operation (identification of certified landfills).
- Approval from the traffic department should be obtained by the contractor prior to the construction preparation
- EEAA environmental approval
- Construction license













4 Environmental and Social Baseline

The main objective of studying the baseline environment is to acquire a comprehensive background on the project site and the study area before starting the project construction and operation activities.

The baseline chapter includes three types of environments: the physical, biological and socio-economic environment. All three of them have been described in this chapter using various information sources. The Consultant relied on primary and secondary data. Secondary sources included many published reports, research and studies, including climatic data from the climate charts provided by Meteoblue are based on weather model simulations for the years 2022 and 2023, as they are the most recent and expressive.

Primary sources included a number of site visits to Al-Ameriyah Depot, baseline measurements (ambient air quality and noise levels), surveys conducted with diverse beneficiary groups, including women, men, mothers, the elderly, and people with disabilities, to gather insights into their specific transportation needs and preferences. Additionally, meetings and surveys were held with bus drivers to understand their requirements and feedback for enhancing the efficiency and effectiveness of the transportation system.

4.1 The Project site

Al-Ameriyah Depot occupies an area of 26,844 m² in Al-Sawah district, Cairo. The main access roads to the depot location are Al Sawah road and Al Masanae road.

Surrounding the depot are mixed urban and industrial zones, with residential areas nearby. The location provides easy access to major transportation arteries, supporting the seamless integration of the electric bus fleet into the existing transport network while minimizing disruptions to local communities. The depot is located at longitude of 30°52'35.45"E and latitude of 29°56'12.36"N.

The depot approximate coordinates 11 are as shown in the following table.

 Latitude
 Longitude

 30°06'14.5" N
 31°17'55.2" E

 30°06'15.7"N
 31°17'51.0"E

 30°06'21.0"N
 31°17'52.6"E

 30°06'19.6"N
 31°17'57.5"E

Table 4-1 Depot Coordinates

Al-Ameriyah Depot is surrounding by the following:

- From the West and sharing borders is the "Bisco Misr" factory, sweets manufacturer.
- From the East and sharing borders is "Al Sawah" CTA depot.
- From the North there is Sanofi pharmaceuticals factory.
- From the South, there is a highly dense residential block.

The neighborhood in general is complex. Nearby is the "Qobba" presidential palace, residential blocks, military establishments and factories all within a 1-kilometer radius from the depot. The area is well serviced by utilities.

The depot has one entry gate and one exit gate: one morning gate for normal operation, and another emergency gate.

The depot location and its surrounding activities are presented in section 1.

-

¹¹ Obtained from Google maps.













4.2 Soil Properties

Al-Ameriyah Depot soil is covered all over with concrete layer.

During the site visits conducted by the Consultant, oil spills were observed along the depot site. Additionally, due to the presence of four (4) diesel storage tanks placed underground, soil is expected to be contaminated. Thus, a soil decontamination plan shall be developed by Misr Petroleum after removing the contaminated soil from oil spills/leaks to eliminate any residual environmental concerns and create space for potential redevelopment or alternative land use.

The type of soil beneath the concrete layer is currently unknown and will be determined by the contractor during the decommissioning phase through geotechnical investigations.



Figure 4-1 Current land in the depot









4.3 Climate Conditions

The following sections show more details about temperature, rain, wind, humidity and solar radiation in the project area.

MeteoBlue's climate charts are based on simulations of 2023 weather models and are the most expressive of novelties. They give good indications of typical climate patterns and predictable conditions.

4.3.1 Temperature

The project area is characterized by a warm climate and hot summer (between April and October) and warm winter (between November and May).

The meteorological data was collected from the Cairo Airport Meteorological Station, the closest one to the project area, Environment Report (Geography and Climate), 2021, issued by CAPMAS, and as shown in the table below.

Meteorological Oct No Jan. Feb Mar Apr May Jul. Aug Sep Dec Jun. **Elements** ٧. Average **Daily** 21.4 22 23.7 29.3 35.4 34 35.5 37.4 33.3 29.7 26 19.5 Max.Temperature (°C) Average **Daily** 12.7 11.2 13.0 15.3 20.9 22.6 24.5 26.7 23.0 20.0 18.0 12.8 **Minimum** Temperature (°C) **Average Daily** 60 60 52 45 43 51 53 55 57 57 58 60 **Relative Humidity** (%) Average **Monthly** 0.4 9.2 0 0 0 0 0 0 0 0 4 0.5 Rainfall (mm)

Table 4-2 Climate monthly averages (Cairo Airport Meteorological Station)

The average monthly temperature reaches its maximum in August (38°C maximum-21°C minimum) and its lowest value in January (21°C maximum) and lowest minimum (8°C).

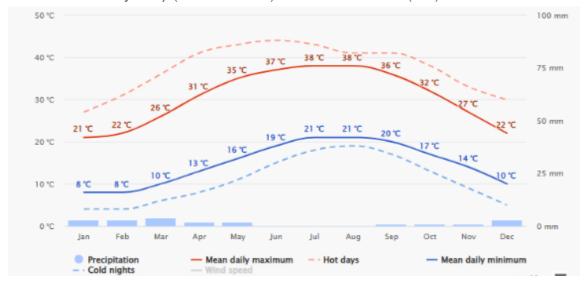


Figure 4-2 Average monthly temperatures and rainfall throughout the year (METEOBLUE) $\,$













4.3.2 Rainfall

The amount of annual rainfall in the vicinity of the project is small, reaching approximately 35 mm in March. The following figure shows the average monthly rainfall values over 2023 for the region.

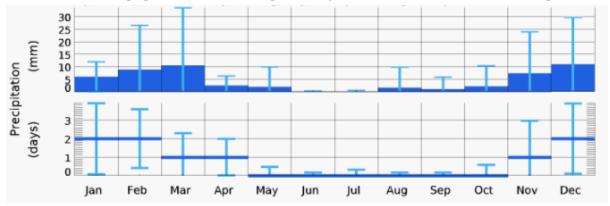
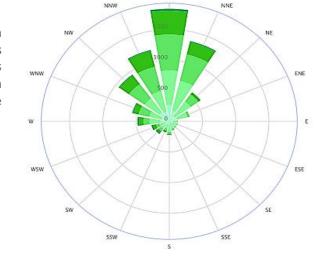


Figure 4-3 Average monthly rainfall values over 2023.

4.3.3 Wind

The direction of the wind varies throughout the year with different seasons. The following figures show the wind-roses and the wind speeds over the months of 2023. Wind roses represent the frequency of wind gusts (column length) from a particular direction, while the colors and width of the column represent the wind speed in knots.

Figure 4-4 (Right) Wind Rose in the project area







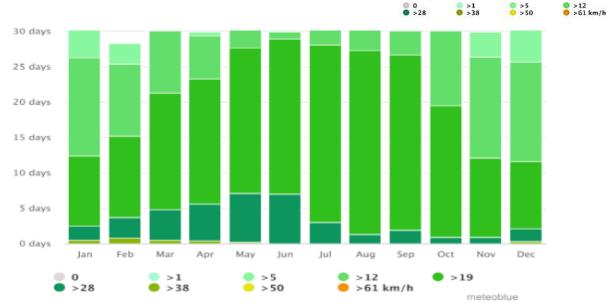


Figure 4-6 Distribution of wind speed (Cairo Airport Meteorological Station)









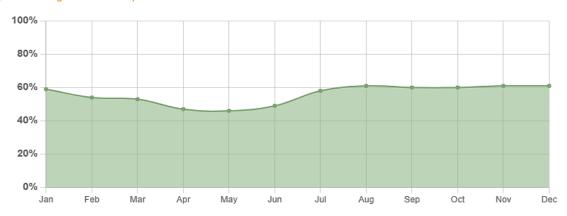




4.3.4 Humidity

The average relative humidity in the project area ranges between 45% in May and 60% in December, with an annual average of 60%. The following figure shows the relative humidity of the project area for each month.

Figure 4-7 Average relative humidity



4.3.5 Solar Radiation

The solar radiation in the project area is high, increasing during the summer months and decreasing during the winter months. The following figure shows the average hourly profile ofc the solar radiation Wh/m² for each month.

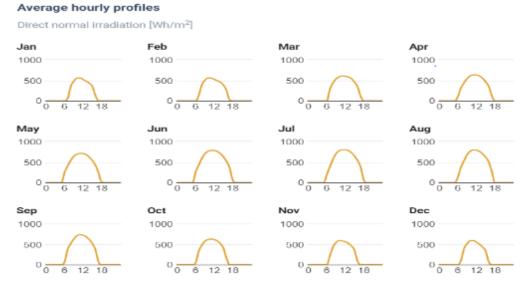


Figure 4-8 Average hourly solar radiation Source: globalsolaratlas.info















4.4 Ambient Air Quality and Noise Levels at the Depot Site

Baseline including ambient air quality and noise levels measurements were carried out on the 4^{th} , 5^{th} and 6^{th} May¹², 2024 by Plus Green Environmental Solutions in three selected locations which have been chosen based on the following criteria

- Point I: Located at the beginning of the depot next to the administration building, likely chosen to assess the baseline environmental conditions in the vicinity of the main operational hub within the depot.
- Point 2: Positioned at the end of the depot, selected to capture environmental data from another critical operational area within the depot, providing a comprehensive view of conditions across the site
- Point 3: Situated outside the depot near a residential area. This point was likely selected to monitor
 potential impacts of depot operations on the surrounding community, particularly in terms of air
 quality and noise levels

Areas within and near the depot that are sensitive to operational emissions or noise might have been prioritized to provide data that could inform mitigation strategies. These locations were likely selected to give a well-rounded assessment of environmental conditions, both within the depot and in areas where the community might be impacted.

Locations of the selected points are shown in the following table.

Coordinates Location Description Latitude (N) Longitude (E) Point I At the beginning of the depot next to the administration 30°06'20"N 31°17'54"E building Point 2 At the end of the depot 30°06'15"N 31°17'55"E 30°06'19"N 31°17'59"E Point 3 Outside the depot near the residential area

Table 4-3 Measurements Locations

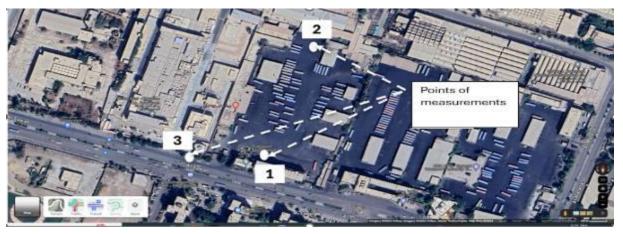


Figure 4-9 Measurements' Locations

Appendix F include the detailed baseline measurements analysis report including ambient air quality and noise levels.

¹² The baseline measurements were conducted on Saturday and two national holidays.













4.4.1 Ambient Air Quality

It was observed from the measurements analysis report that the three (3) parameters exceeded the national and the WB limits at Point (I). These parameters are **average PMIO**, **Average PM2.5** and **average T.S.P.**

Regarding the elevated pollutant concentration at Point I, Point I is positioned directly in the path of the wind (Down Wind) and is surrounded by buildings, creating a confined environment that significantly amplifies the concentration of dust particles. In contrast, point 2 is located in the opposite direction of the wind (Up Wind), where the presence of surrounding buildings acts as a barrier, effectively mitigating the dust concentration compared to Point I. Point 3, however, is situated in an open street area, where the absence of buildings means there is no significant influence on dust concentration, allowing it to disperse more freely This can be shown using the location map and wind rose.

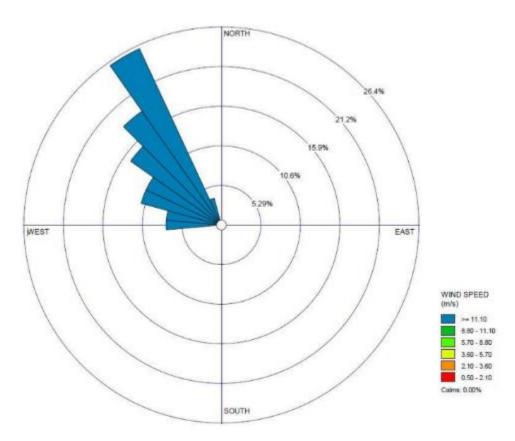


Figure 4-10 Wind Rose of Al-Amirya

It should be noted that the ambient gases, including sulfur dioxide, carbon monoxide, and nitrogen dioxide, were measured over an 8-hour period, with the one-hour average subsequently calculated from these measurements. In contrast, particulate matter (PM10) was collected over the same 8-hour duration, after which the dust was weighed on the filter to determine the daily average. This approach aligns with the standards mentioned in Annex No. (5) of the Executive Regulations of the Egyptian Environmental Law.

The following table presents one-hour average results for 8 hours continuous measurements (11AM-6PM for point 1 and 10AM-5PM for pints 2 and 3) of the ambient air quality measurements conducted in the three (3) selected locations and their compliance with the national and WB limits.















Table 4-4 Results of ambient air measurements and permissible maximum limits

| Measured | Average SO2 (µg/m³) | Average CO (mg/m³) | Average NO (µg/m³) | Average NO2 (µg/m³) | Average NOx (µg/m³) | Average O3 (µg/m³) | Average PM10 (µg/m³) | Average PM2.5 (µg/m³) | Average T.S.P (µg/m³) |
|-------------------------------|---------------------|-------------------------|--------------------|---------------------------|---------------------------|--------------------|----------------------------|-----------------------------|--------------------------|
| Point I | 165.51 | 1.26 | 26.56 | 52.95 | 26.56 | 75.49 | 520.5 | 514.9 | 529.7 |
| Point 2 | 124.78 | 1.24 | 7.51 | 21.45 | 32.94 | 76.15 | 136.1 | 70.1 | 195.56 |
| Point 3 | 53.95 | 1.6 | 14.69 | 24.69 | 46.02 | 83.77 | 116.1 | 72.1 | 182.56 |
| National Limits | 300 | 30 (mg/m ³) | | 300 | | 180 | 150 | 80 | 230 |
| WB (EU- WHO) Guidelines | 350 | | | 200 | | | 150 | 75 | |















4.4.2 Noise Intensity

The measurements mainly included the Equivalent continuous noise level (LAeq). Peak sound pressure level (LCpeak). LAFmax, LAFmin and were compared with the maximum limits mentioned in Annex (7) for safe noise levels stated in the amended executive regulations of Law No. 4/1994 and the amended regulation of 710/2012 and amended ER no 2466/2024. and compared with the maximum WB limits.

The noise levels were monitored for a duration of 8 hours during the day. This approach was taken to reflect the typical daytime environmental conditions, in accordance with the relevant standards and permissible limits for equivalent noise levels as outlined in Table No. (3) of Appendix No. (7) to the Executive Regulations of the Environmental Law.

The following table presents the results of the noise level measurements conducted at the three (3) selected locations, showing that while the levels are compliant with national limits, they exceed the World Bank (WB) thresholds.

Sound Level Equivalent & Percentile Recordings in dBA for 8 Hours (Day time) Measured LAeq **LAFmax** LAFmin **LC**peak Point I 83.44 52.63 101.26 66.50 Point 2 60.11 78.85 50.86 104.58 Point 3 63.20 92.65 52.60 108.93 **National Permissible Limits for** 70 (Residential area with roads more than 12 m) - daytime WB General EHS Guidelines (Residential) - daytime

Table 4-5 Noise Intensity Measurement

Based on the environmental monitoring and measurements performed for ambient air and noise, the results showed compliance with all national and World Bank guidelines, except for dust (TSP, PM10, & PM2.5) at point I (highlighted in red) and noise levels at the 3 points, where the dust levels exceeded both the national and the World Bank limits, and the noise levels found to be exceeding the WB limits only.

4.4.3 Green House Gases, Black Carbon and PM2.5

The Consultant utilized the emissions measurements report conducted for the public transport modes in Cairo, Egypt in 2017 by EEAA" in calculating the Black Carbon (BC) emissions, PM10, PM2.5 and GHG emissions for the diesel/natural gas buses on the five (5) selected routes. Calculations were based on the types/models of the buses provided by the CTA. Appendix G includes the detailed measurements' report on Public Transport Modes in Cairo, Egypt in 2017 by EEAA.

Based on the calculations conducted, the following presents the emissions generated from the current fleet of the five (5) selected routes:

- PM2.5 emissions = 0.22 ton/year
- BC emissions =0.16 ton/year based on calculations using the following relation:

Black Carbon/ PM2.5= 0.74

While for the Green House Gases (GHG) were 4525.61-ton CO2 equivalent/year













4.5 Access Roads

The depot could be accessed via two main roads; Al Sawah road which is paved, has width of 15.3 m and 2 lanes and Al Masaneh road which is paved, has width of 12 m with only one lane.

4.6 Surface Water

The nearest surface water body, "Ismailia Canal" that comes out from the Nile River to the project site is located about 1.6 km northwest of the project site. Thus, <u>no impact is expected on it from the project activities.</u>

4.7 Groundwater

Groundwater¹³ ¹⁴: In general, the depot is situated within the Nile Delta aquifer system, which forms the primary groundwater reservoir in the region. This quaternary aquifer is highly productive and consists predominantly of sand and gravel layers interbedded with clay. It is generally semi-confined, with unconfined conditions near the Nile or other surface water systems. The depth to groundwater in this aquifer typically ranges between 10 to 50 meters below ground level. However, in areas closer to the Nile River, groundwater levels can be shallower, sometimes less than 5 meters below the surface. Thus, the Consultant recommends that the construction contractor to conduct investigation to know the groundwater depth in the depot site before any construction activities.

4.8 Ecological Characteristics

The Consultant conducted field visits to the depot site and found that the area is mixed urban and industrial zones that lies inside the city and is not considered environmentally insensitive in terms of ecological life, and no flora or fauna was observed inside the depot. Additionally, no important or endangered/rare flora and/or fauna were reported in the depot area. Thus, **impact is expected to be low from the project activities on the ecological life.**

4.9 Protected Areas

The depot site does not have nature reserve areas, public parks, or areas of ecological importance. Thus, no impact is expected on it from the project activities.

¹³ Hydrogeological Map of Cairo RIGW 1989

¹⁴ El-Sayed, S. (2018) Study of Groundwater in Northeast Cairo Area, Egypt. Journal of Geoscience and Environment Protection, 6, 229-251.















4.10 Socio-economic Environment

4.10.1 Methodology and Approach

The social assessment in this report builds on secondary and primary data sources, as well as quantitative and qualitative information. The main focus of this assessment is inclusion of gender and passengers with reduced mobility. Various consultation sessions with different stakeholders helped to arrive at specific concerns, recommendations, actions, protocols and specifications to observe during fleet procurement and operational design-stages that will improve the experience of women in public transport, particularly their personal safety. In line with the gender-related considerations, consultation with persons with disabilities and passengers accompanying persons with limited mobility or disabilities helped to address concerns, and design considerations for passengers with reduced mobility including senior citizens, passengers traveling with minors, pregnant women, and passengers with physical disabilities.

I Data Sources

Secondary Data Sources

- All project documents and manuals provided by GCCC and the WB;
- Formal and informal documents provided by CTA;
- CAPMAS census for population and housing conditions 2018; and
- KMZ and layout of buildings files were shared among the consultants' team.

Primary Data Sources

- Passengers' surveys carried out by TFC. Passenger interviews were conducted in a street-intercept method in selected zones surrounding the I4 surveyed CTA routes. 29 zones were selected across the GCR with 583 surveys collected from all zones;
- A total of 15 Focus Group Discussions (FGDs) with passengers in 5 areas along Al-Ameriyah routes i.e., El Daher (5 lines); Hadeyk Al Qobba (4 lines); Al Waily (3 lines); Al Azbakeya (3 lines); and Heliopolis (2 lines). Groups were limited to a maximum of 8 participants to be able to focus on the groups' concerns in detail. The total number of male groups in each area is 5, another 5 with females, 3 with young men, and 2 with ladies/girls (a total of 120 participants);
- One FGD with persons with disabilities (a total of 7 participants); and
- 15 Key Informant Interviews (KIIs) with CTA officers and Al-Ameriyah Depot staff, e.g., CTA central depart., CTA planning dept., CTA training depart., depot manager, depot observers, engineering depart., public relation depart., human resources depart., drivers, and deputy head of workers' syndicate.

2 Data Analysis

Quantitative survey data was entered in excel sheets to produce simple tables and graphs. Transcripts of different KIIs and FGDs were organized in a corresponding spread sheet by type of group, overarching themes, and subthemes. The corresponding spread sheets were used to conduct thematic analysis for qualitative data to find and interpret main patterns and meanings from FGDs transcripts.

4.10.2 District

I Administrative Jurisdiction

Al-Ameriyah District is located in the Northern Area of Cairo Governorate. It is bordered by Al Matariyah District from the North, Hadeyek Al Qobba from the South, Al Zawya Al Hamra from the West, and Al Zatoon from the East. The district comprises 8 sub-districts (Sheyakha), namely: Al Kafassin, Shaheen, Marsa Khalil, Al-Ameriyah Al Shamalya, Al Ameriyah Al Ganoubya, Nasser, Monshaeet Al Qobba Al Gadida, and Gad Al Mawla. The district is in general complex containing areas of distinct and well-defined land use.















Figure 4-11 Al Ameriyah District

4.10.3 Socio-economic Characteristics

I Population

According to CAPMAS population census 2018, total population Al-Ameriyah District is calculated at 152,554 capita; total number of households is calculated at 42,798 with average household size of 3.6 members. Male/female ratio is calculated at 50.71/49.29; where about 30.1% never married (or under the age of marriage), 59.7% are married, and 10.2% are divorced or widowed.

2 Education

Almost half (49.2%) of population of Al-Ameriyah 6+ were enrolled in education and completed, a bit more than a quarter (27.1%) is currently enrolled, 5.7% were enrolled and dropped out, and another 18% were never enrolled in formal education. Subsequently, the illiteracy rate of population 6+ is calculated at 15.8%, 6.8% can read and write, 0.6% completed illiteracy classes, and 0.3% completed cognitive education classes. About 17.6% completed basic education (primary and preparatory schooling), and another 37.3% have completed a level of secondary education (general, Azhar, technical, and post-secondary), while 21% have a university degree and about 0.6% have a post university degree (high diploma, Master, and PhD)¹⁵.

3 Housing Conditions

A total of 58.1% of total households in Al-Ameriyah live in owned units, 25.5% in old rent units, 9.4% in new rent, 5.8% in units donated by the family, and only 1.2% live in employment-housing units. Official statistics¹⁶, indicate that 97.6% of households live in an apartment. The crowdedness rate is calculated at 1.05 persons per room. Almost 97.9% of households have a private bathroom and kitchen. All households are connected to the public water network (99.8% inside the house and 0.2% inside the building), and 99.91% to the public sewage network. A total of 99.95% use public electricity for lighting; about 93.4% use natural gas as cooking fuel, while 6.4% use bottled gas, and 0.2% use electricity or solar energy or kerosene.

4.10.4 Al-Ameriyah Depot capacity and Operation

The depot capacity is 225 buses, and the number of allocated buses is 158. During consultation sessions, the depot manager stated that the scheduled number of operating buses is only 108 out of 158 due to shortage of operational staff, e.g., drivers and conductors.

¹⁵ CAPMAS. General Census for Population, Housing and Facilities. (2017).

¹⁶ CAPMAS. Bulletin of Housing in Egypt 2018/2019. https://censusinfo.capmas.gov.eg/Metadata-en-v4.2/index.php/catalog/413/overview (2020).













Table 4-6 Selected routes of buses of Al-Ameriyah depot

| Line No | Alignment | Length of | Allocate | ed buses | Bus round | Average | No of | Average/ | Mean/ bus | Mean/ |
|---------|--|----------------|----------|----------|-----------|---------------------|---------------------|--------------|-----------|----------------|
| | | route in km | Morning | Evening | in minute | frequency in minute | passengers / day | daily km/bus | stops | speed/ hour |
| 1090 | Masakin El Ameriyah-El Abageyah | 16.500 | 11 | H | 150 | 14 | 8475 | 255 | 44 | 15 |
| 1129 | El Ameriyah- El Moneeb | 24.600 | 16 | 13 | 164 | 20 | 8065 | 345 | 46 | 16 |
| 290 | Masakin El Ameriyah- Ahmed Helmy | 20.500 | 15 | H | 130 | 18 | 7338 | 340 | 31 | 14 |
| 810 | Qism El Hadeyek- El Omraneya | 20.250 | 15 | H | 168 | 34 | 5696 | 245 | 41 | 17 |
| 83 I | El Zawya- Hadeyek Zeinhom | 14.500 | 7 | 4 | 130 | 51 | 1851 | 250 | 32 | 17 |













The depot operates for three shifts; each shift for 8 hours including a maintenance shift. According to CTA, there is a minor maintenance routine every week (seventh day of the week) and a major maintenance routine every two weeks (fifteenth day of the month); bus washing takes place every night between 12 am and 5 am.

According to CTA, all buses operating on the routes are very old, as manufacturing dates vary between 2004-2014¹⁷. During various consultation sessions, it was clearly confirmed that Al-Ameriyah Depot will be fully dedicated to e-buses. Therefore, CTA is aiming at a best practice for this pilot project to encourage the WB for a second batch of e-buses in the future.

I Current Labor Force

a) Composition of Labor Force

The Head of Al-Ameriyah Depot reported a total of 1,079 employees.

- Females constitute a very low percentage (0.83%, 9 females). These females are mainly in midlevel administrative roles, except for one employed as a workshop operator.
- Persons with disabilities represent 4.36% of the workforce, aligning with the Egyptian labor law quota (5%). Among them, 17 males and two (2) females work in mid-level administrative roles, two (2) males are employed as conductors and in workshops, and (5 males) are engaged in service roles. This totals 21 males and 1 female (2 males work as conductors and in the depot workshops (total of 21 males and one female (operator/telephone switch) in non-administrative roles.

Position **Employees** Employees with disabilities Total **Males Females Males Females** 5 5 **Managers** Mid-level 160 185 6 17 2 Conductors 218 2 220 306 306 **Drivers Engineers** 4 Workers 277 20 298 Services 56 5 61 Total 1026 44 3 1079 6

Table 4-7 Composition of labor force at Al-Ameriyah Depot

The low percentage of females' participation in CTA in general and in Al-Ameriyah Depot in specific and all other CTA depots was repeatedly discussed during consultation meetings. It was over and over explained that the nature of work and working shifts (very early in the morning and very late in the evening) does not suit Egyptian females and culture. When discussing the participation of females in operation, it was tremendously refused and defended.

b) Labor Force Relocation During Decommissioning and Commissioning Phase The relocation of labor force during commissioning phase is not a physical relocation per se. CTA confirmed that all employees, admins, engineers, technicians, drivers, conductors, and service workers will be transferred to the neighboring garages, namely: Al Sawah and Al Matariyah. Buses are supposed to operate on the same existing routes but from the neighboring depots during decommissioning instead. This matter should not imply any significant social risks if well managed timely ahead of evacuation and decommissioning. Passengers will not be affected in this regard.

¹⁷ More detailed information on the manufacturing details of operating buses is presented in Environmental section.













c) Labor Force Repositioning During Operation and Maintenance Phase

Engineers, technicians, and drivers will need to be repositioned to conform with the shift from fuel or diesel buses to e-buses. Technical capacity building and training needs are covered in a stand-alone document under Appendix I.

However, FGDs reveals the following as general considerations for drivers and conductors' capacity building:

Control unneeded/unplanned/sudden bus stops;

- Instruct drivers to stop in stations close to the sidewalk/pavement;
- Introduce a system for cash change;
- Conductors should be able to drive in case of any emergency happens to drivers;
- Prepare and train drivers and conductors on different contingencies and emergencies;

Provide personal skills (general behavior modification, humanitarian approach to deal with elderly and persons with disabilities, stress management ...etc.);

- Apply medical check-ups and random drug tests;
- Train drivers effectively on the new e-bus because it is different than old buses; and Train drivers, conductors, and workers on basic first aid principles.

The FGD with **persons with disabilities** was very useful in drawing attention to the importance of community behavioral change and the urgent need to adapt a set of community behavioral change campaigns and workshops to raise the awareness of community members in Egypt towards persons with disabilities. It was explained to them during the meeting that the GCCC project includes a component for behavioral change and that the team will get back to them for further discussion on this topic and welcomes their cooperation in the design of messages and material. Perceived concerns related to community behavioral change can be summarized as follows:

Bus drivers and conductors:

- Bus drivers are mostly impatient to wait until persons with limited mobility can get into and out of the bus; Some drivers do not stop intentionally when they see persons with disabilities waiting to take the bus; Bus drivers and conductors need to learn basics of sign language to be able to communicate with people with hearing and speaking disabilities; Conductors as well as bus drivers need to be educated about the "comprehensive services card" to accept it from passengers without forcing them to pay a ticket or harass them; and conductors must accept to see a hanging/pendant "comprehensive services card" without asking to see to card itself, especially with persons with amputated arm(s) or hand(s). Disrespect of passengers to preserve spaces and seat allocated for people with limited mobility (elderly, pregnant women, and persons with limited mobility or disabilities); passengers on stations or inside the bus ignore any support or even mercy that should be provided to persons with disabilities; and
- Inside the bus, no one would stand up for someone with reduced mobility (pregnant, seniors, persons with disabilities ... etc.).

ii Community members

- Impatience of car drivers on the road, when the bus drivers need time until a person with limited mobility gets in or out of the bus;
- Females with all kinds of disabilities are more frequently subject to physical/sexual harassment, especially if they need any support in moving;
- Awareness raising about persons with disabilities is highly required, as some people do not respect that people are different;
- Introduce types of wide range of disabilities to the public

2 Depot Facilities

The administrative building falls at the southmost edge of the depot. The building includes the clinic complex and the mosques; both (being located in the administrative building) are not included in the scope of depot retrofitting design. So, during decommissioning and construction, if it will not be













allowed for the workers to use utilities of the administrative building, the contractor shall be the responsible for providing temporary utilities like mobile toilets.

a) Clinic Complex

- Infrastructure: A clinic complex close to the mosque. The complex comprises 2 praxis rooms, a relatively large waiting area, a small pharmacy, and a toilet. The praxis' rooms are moderate in size, but poorly furnished and equipped. During site visits, the toilet was closed; only the prayers' washing area (wudu') was open. To meet the international standards, the clinic complex will need painting, improvement of medical furniture (examination bed), expansion of medical equipment and first aid facilities for acute cases, upgrade of toilet, and installation of at least one more toilet in the complex.
- Medical staff: During ongoing consultation with the CTA, it was made clear that there is at least one doctor or nurse daily for one shift (8 hours). At the time of the inspection visit (10/01/23), a mid-weekday (Wednesday) and during working hours (10 00 to 14 30), there were neither doctors nor nurses in the medical complex. It is highly recommended to ensure that at least one doctor or one nurse is operating for at least 18 hours (2 shifts) per day around the week.
- Pharmacy: During the same inspection visit, the pharmacy was also closed and could not be assessed. It is highly recommended to ensure that the pharmacy is operating for at least 18 hours (2 shifts) per day around the week, and to establish a mini first aid unit with sufficient equipment and medication around the clock for life threatening emergencies.
- Equipped ambulance: There is no ambulance in the depot, nor in the neighboring depots (El Sawah and El Matariyah). The importance of having at least one ambulance in this area when discussed with CTA staff, was completely rejected the idea. It was confirmed that minor emergencies are treated in the clinic, while emergent and acute cases are transferred to the closest general hospital (Al Matareyah Educational Hospital) which includes an emergency unit, while steady or chronic cases can always go to CTA Hospital in Ramses under the coverage of CTA health insurance system.

b) Hygiene Amenities

- Toilets: according to CTA informal documents ¹⁸, there is a total of 33 toilets, 31 for males and only 2 for females. Two toilets are located in the managers' office, eight in the mosque, seven in the oil ducts, four in the laydown area, ten in the second and third floor of the administrative building (8 for males and 2 for females), one in the operation room, and one in the clinic complex. Only one female toilet in the admin building was investigated; it was muddy/not clean and flush was not fully functioning. It is therefore recommended to fully upgrade the currently existing toilets, establish a cleanness and maintenance plan for toilets, and ensure that the plan is fully implemented. It is proposed to hang a list in each toilet to present shifts of housekeeping, name of workers, and signature of supervisor(s); while underachievement of cleanness shall be punished by management. Clean water, soap, and toilet paper shall also be provided and checked within this plan.
- **Showers** There are 22 shower cabins inside the above-mentioned toilets; 2 in the managers' offices, 8 in the mosque, 7 in the oil ducts, 4 in the laydown area, and one in the operation room. However, CTA confirmed that upgraded depots include a separate toilet and shower for each workshop, and this will be considered in the retrofitting design.
- Changing rooms and lockers There are 2 large changing rooms; one close to the mosque and one in the area of the oil ducts. As for lockers, there are 8 personal lockers in the workshop area. Because no more oil will be used in the depot, the changing room in the area of oil ducts will be reallocated and upgraded in the retrofitting design.

3 Social Services

c) Social and Health Insurance

The Ministry of Social Solidarity governs the social network scheme for all governmental and public employees. In addition to that, there are solidarity funds in each institution to provide extra support

¹⁸ Numbers mentioned in this paragraph were verified and updated with head of Al-Ameriyah Garage.













to employees and workers. These include extra pension funds, recreation facilities, medical health services, and other financial support as per internal regulation of the institution. CTA provides the conventional services stipulated by the Egyptian law, regulations of Ministry of Social Solidarity, and pertinent syndicates. Such services were discussed in various consultation meetings and were cross-checked with drivers and depot observers in Al-Ameriyah Depot.

d) Medical Checkups and Drug Tests

There are basic medical check-ups for chronic diseases and random or ad-hoc drug tests, especially for bus drivers. The CTA confirmed that both types of tests are undertaken on a regular basis for all staff members. The medical commission is the entity in charge of assessing whether drivers are eligible for driving or not. Those not eligible will have to stop driving and can provide other in-house services, except driving buses. It was verbally explained that medical check-ups are very important to assess the general health condition and fitness of drivers in specific; this is considered as a safety measure for the drivers on one hand and passengers on the other hand.

As for drug tests, these are conducted ad-hoc for drivers in the operation room before the shifts; therefore, no schedules are announced. However, it was confirmed during consultation meetings with CTA staff that any driver who tests positive for drugs for the first time will be halted from driving for 3 months and is put under monitoring until he tests negative over a steady period of time; any driver if tested positive for a second time, will be dismissed for good from CTA. Worth mentioning here is the fact that participants of FGDs pointed to the importance of drug tests for all drivers and conductors during operation hours.

e) Cafeterias and Sheltered Areas

There is one big cafeteria in the entrance of Al-Ameriyah Depot. During the validation field (15.05.2024), the cafeteria was found closed and it was stated that it has been closed for many years. There is only a tea corner and poorly covered spaces in the garage. An adequate cafeteria or canteen and adequate resting areas should be made available for employees and workers inside the garage to supply hygienic food and beverages or allow personnel to eat or drink or rest when needed.

Though, CTA confirmed that hot meals are provided to operating workers during the month of Ramadan at Iftar time. Food supplements/boxes are distributed to all drivers, conductors, workers and service workers once during the month of Ramadan; these are mainly provided by the Armed Forces.

f) Capacity Building

CTA provided a single page presenting 3-days training provided to workers between Ist of October 2022 to 23rd of March 2023 in 25 garages around Greater Cairo Region. The table indicates that a total of 7 workers were trained during this period in the area of electric lighting, bus break repair, Mercedes electronic injection, firefighting, oil works, and bus polish (2 workers).

It was made clear during consultation meetings that all the trainings are provided in-house through the technical training center under CTA general directorate of training centers. A separate document "Capacity Building Needs" has been prepared under (Appendix I) "Technical Capacity Needs and Training needs and Procurement Package".

g) Safety measures

During consultation sessions with observers and engineering department, officers emphasized the need for signboards for workers inside the depot on fires, emergency management plan, and safety tools; increase number of fire-fighting equipment; provide all kinds of safety tools on regular basis, especially inside dangerous workshops (blacksmithing... etc.); training on fire-fighting equipment, and first aid; increase lighting systems at night; and provide a fire-fighting line in the depot. Further details are presented in the occupational health and safety section.

4 Workers' Rights

a) Effective Internal Grievance Mechanism

During discussions with depot observers and head of engineering department (3 interviews), it was made clear that they have the channels to complain whenever they want. The process starts by trying













to solve the problem on a friendly basis first, and it usually works. If a problem is not solved, it gets elevated to the next higher level of management. In all cases, the head of department is the person responsible to elevate the grievance to the higher/highest level as needed. On the other hand, CTA when asked about anonymous complaints, they saw it neither needed nor effective for solving a specific problem for an "unknown complainer". According to CTA staff, most internal grievances are related to the settlement of employment status, restarting work after termination due to high absenteeism (more than 30 days), change of shifts, getting leaves/vacations, desire for professional designation, and complaints from foremen/direct managers. It was also confirmed that almost all grievances are settled before being elevated to the legal affairs department.

The Grievance Mechanism established for the project is in full compliance with the Labor Management Procedures (LMP), ensuring that all workers, including direct, contracted, and primary supply workers, have accessible, transparent, and effective channels to report grievances. The GM aligns with the LMP's principles by providing confidential, anonymous, and gender-sensitive complaint mechanisms, addressing issues such as working conditions, wages, discrimination, and workplace harassment, including SEA/SH-related grievances.

A stand-alone document has been prepared in the ESIA to design a functional anonymous complaint mechanism to be easily accessible by e-bus demonstration route(s)/corridor(s) users.

b) Right to Protest

CTA confirms that all workers have the right to protest within the Egyptian law. In addition, they can contact the workers' syndicate at any point of time. During consultation sessions with drivers (2 drivers) and garage observers, and deputy head of workers' syndicate, such information was confirmed. However, because workers understand that protests are national safety risks, they never undergo such protests. Instead, they resolve their complaints or demands through the depot management. It is rarely the case that the workers syndicate is officially involved. In addition, CTA drivers have an interactive public Facebook page "breathing space for CTA workers" where they can spell out and interpret concerns related to their work.

c) Equal Opportunities

In general terms, CTA provides equal opportunities for females in administrative positions, especially in the mid-or high-level management. No quantitative data was provided to proof; however, field visits and consultation activities with heads of departments showed that many of them are females. The case might be different inside CTA depots in general and Al-Ameriyah Depot in particular, where females are mainly employed in administrative positions, as discussed above. As for equal opportunities for people with disabilities, CTA confirmed that they comply with the 5% stipulated by the Egyptian Law.

4.11 Sensitive Receptors

Sensitive receptors are people or groups that may have a significantly increased sensitivity or exposure to contaminants by virtue of their age and health, e.g., low-income groups, females, persons with disabilities, persons with limited mobility/elderly. Special consideration should be given to those groups to 1) achieve a socially-sound pilot project, and 2) ensure improved passengers' satisfaction during monitoring and evaluation activities for the e-bus project.

4.11.1 Low-income Groups

All participants confirmed cost of service as a major concern; therefore, cost of fares is topmost priority for low-income passengers.

A closer look at the selected routes indicates that almost all areas covered by these routes are comparatively middle and working class, being mostly located in old Cairo. The implication of these coverage areas will be directly related to the affordability of passengers, willingness to pay, and personal preferences. Passengers' perceptions of current and future (e-bus) operation, and respective proactive measures reflect alarming concern about service fares.

FGDs and passengers' surveys clearly showed that affordable cost of service fare is a main concern to all followed by comfort inside buses, speed of transportation mean, and short time of journey; except













for girls and women who prioritized personal physical/sexual safety, security, and comfort of ride over cost of ticket. In other words, participants of FGDs when asked about aspects if made available would encourage them to use CTA buses, they pointed to roominess, spaces/seats for elderly and females, affordable fares, specified entrance and exit doors, spaces for baggage/belongings, allocation of main stations, elimination of street vendors, and punctual timings of rides (respectively).

When asked about main concerns of introducing CTA E-buses, the first concern was the cost of fares followed by unequal distribution of e-buses along different routes, insufficient battery charge, and elimination of some passengers who might not afford the ticket cost. Then again when asked about main requirements to use e-buses, they mentioned affordable cost and monthly passes at the first place followed by comfort of seats, limitation of passengers to number of seats to avoid crowdedness inside the bus, clarity of bus route, adherence to official bus stops, monitoring cameras, air conditioning, and internet (respectively). The key conclusion derived from discussions is that all participants prefer to use e-buses and believe the service is much better and cleaner than current buses in all aspects, but they also assume that fares might be higher or unaffordable to them.

During consultation activities, CTA staff and FGD participants indicated that current fares for Internal Combustion Engine (ICE) buses (diesel/natural gas) are unified at EGP 6 for any destination, while diesel and e-buses charge EGP 11.5 for two destinations on the same route. CTA is planning to expand routes to three destinations, allowing passengers traveling shorter distances to pay less than those on longer journeys. However, since the consultations and before report submission, fares increased twice—first by EGP 1 and later by EGP 2.

4.11.2 Young and Old Females

A study on gender equity in Greater Cairo's public transport system¹⁹ points to a number of challenges faced by women, including irregular service, overcrowding, and constant risk of sexual harassment. Over 80% of women surveyed face harassment at some stage of their journey, including the walk to the stops, the wait for the vehicle, the boarding process, and the ride itself. A lack of adequate services and the resultant overcrowding heightens the risk of harassment. Survey findings point to the diversity of trips taken by women, reflecting women's childcare and household responsibilities. Women with disabilities face unique challenges due to the lack of access in stops and vehicles, poor last mile connectivity, and overcrowding that makes it difficult to board vehicles.

Focus group and survey participants in the study stressed the importance of safe spaces throughout the journey, with 90% of women surveyed in favour of dedicated sections for women on road-based public transport vehicles, mirroring women's carriages in Cairo's metro system. Participants called for expanded public transport fleets to address overcrowding and improve reliability. Complaint redress systems are needed to ensure that perpetrators are brought to justice. Safe, universally accessible sidewalks with adequate lighting and shop fronts that offer an "eye on the street" effect are needed to improve security during the walk to public transport stops and stations.

In the social assessment of the e-bus, all participants of FGDs were asked to address specific concerns about challenges facing women during rides of public transportation as perceived or witnessed by themselves. All participants agreed on general concerns facing women, in specific:

- Seats are not sufficient for all bus passengers, uncomfortable, and packed.
- Due to crowdedness inside buses, women face different forms of physical harassment and insults:
- Lack of seats allocated for women and also lack of specified partitions for women;
- Lack of separate entrance and exit doors in buses to eliminate physical contact and touching; Extra challenges for women associated by children, elderly, persons with disabilities, and luggage or carriages;
- Misbehavior of some passengers, e.g., shouting, verbal insults, and altercations;

¹⁹ Meshwary, A study about women's experience in Greater Cairo's public transportation system, a study prepared by Amira Badran, Salma Mousallem and Yasmine Sabek, UN Habitat; Carolyne Mimano, Christopher Kost, Mariam Sorour, and Nour El Deeb, ITDP, Cairo, May 2021.













- Injuries caused by sudden bus stops and sometimes moving while doors are still open; and
- Theft of personal belongings inside the bus.

4.11.3 Persons with Disabilities

Transportation is essential for people of all ages and backgrounds to live a fulfilling and satisfying life. Public transport can facilitate access to the community and improve social participation and integration. However, people with disabilities may encounter barriers throughout the entire travel chain, which can affect their satisfaction. These barriers may be perceived depending on the nature of the disability. Few studies have identified such barriers and facilitators experienced by people with disabilities.

A study on accessibility of transport for persons with disabilities in Egypt²⁰ pointed clearly in regard to public transportation to socio-economic policies and infrastructural development policies. The article emphasized that though efforts and consideration of the governmental policies to support persons with disabilities, particularly in the sector of public transportation; many people are still deprived from decent access to public transportation. Addressing Cairo, as an example, there is still a lack of bus stops enhancement, e.g., accessible sidewalks and accessible metro stations that should be developed to meet the needs of persons with disabilities. Whereas the government has already planned to develop smart transport in the New Administrative Capital, the main part of Greater Cairo still requires more attention, especially in geographical areas where many underprivileged citizens live. The article has listed a number of policy recommendations to address the lack of accessibility of transportation in Egypt and complement existing efforts.

In the social assessment for the e-bus project, all participants of FGDs were asked to address specific concerns about limitations of people with disabilities during rides of public transportation as perceived or witnessed by themselves. All participants agreed general concerns facing women, in specific:

- Difficulty in access, e.g., ascending to and descending from bus, especially when persons with disabilities are not accompanied;
- Bus drivers sometimes do not stop for pick-up when persons with disabilities are waiting on the station/stop of the bus;
- Lack of seats allocated for persons with disabilities and/or deficit of commitment to allocated seats; and
- Lack of space inside buses for wheelchairs.

4.11.4 Elderly Persons

Focus Group Discussion (FGDs) included a few elderly participants (60+) within the men's and women's groups. A dedicated group for elderly individuals was not made possible. However, participants in all groups were asked to discuss challenges and constraints facing elderly persons in public transport buses, based on their own experiences or observations. Key concerns mirrored those of individuals with limited mobility, including high bus stairs, insufficient seating for elderly passengers, and inadequate space for wheelchair users

4.11.5 Conclusions

All participants have agreed on a number of challenges that face them during using CTA buses, as follows:

I Discomfort mainly due:

- Difficulty in ascending and descending buses (first step is too high for passengers, especially if having dependent persons or any luggage with them);
- Lumpen condition of bus seats (old and tight);
- Crowdedness, especially if causing any physical touching;
- Noise; and

²⁰ Accessibility of Transport for persons with disabilities in Egypt, an article prepared by Ahmed Hamdy under Alternative Policy Solutions, a non-partisan, public policy research project at the American University in Cairo, April 2022.

 $https:\!//aps.aucegypt.edu/en/articles/781/accessibility-of-transport-for-persons-with-disabilities$















Mobile vendors inside the bus.

2 Unsafety mainly due:

- Lack of separate doors for bus entry and exit (the back door is not functioning most of the time);
- Drivers drive very quickly in an unsafe way that threats children's and elderly safety;
- Drivers sometimes do not fully stop when passengers are ascending and descending buses;
- Poor condition of stations and roads near the station:
- Buses stop too much and suddenly;
- Sexual harassment against women along all ages;
- No space for bags or any baggage;
- Lack of sufficient lighting inside buses;
- Exposure to thefts; and
- Exposure to bad manners (indecent talks and/or swearwords).

Challenges for young population include more specific aspects, such as:

- Bus drivers do not stop on the side of the road;
- Discomfort of vehicles and seats;
- Irregularity of buses;
- Crowdedness; and
- Conductors do not give the cash change back.

Challenges for persons with reduced mobility/disabilities include the following:

- The cost of living with a disability is five time higher than basic living services and costs of normal persons;
- Buses allocated for persons with limited mobility or disabilities in Egypt²¹ are very limited; though being very useful to help persons to get into and out of the bus;
- Unsafety because impatience of drivers to move before they completely get into and out of the bus:

Sudden stops imply high risk on all passengers and causes heavy injuries, not only for person with disabilities, but also for infants, elderly, and pregnant women (most of participants in the group might travel with their children or parents);

- Participants with reduced mobility have requested CTA to admit the "comprehensive services card" to exempt them from paying 50% of fare (as per law 10/2018); sometimes they are asked to pay or full fare if bus conductors did not recognize the card; and
- Drivers do not stop at the stations allocated for persons with disabilities.

Within the passenger survey for the E-bus project, respondents when asked to rate each issue regarding public transport modes survey respondents were using, most respondents stated that "their trip taking too long" is a major problem. Also reported frequently as a major problem, is the number of transfers and the trip being too expensive for them. Seeing that "trip is uncomfortable" and "trip doesn't take me to my exact destination" are reported as top two in the "somewhat a problem" ranking, it can be argued that users need more direct, comfortable services. This can be achieved by examining people's geographic travel patterns on a micro level and cross-comparing with the existing public transport network. Also integrated ticketing can lower expenses and the burden of transfers for the users.

Cost is the top consideration for users followed by journey time and accessibility, where accessibility is defined as "transport services proximity to origin and/or destination". It's confirmed through different questions that affordability and travel time are the top priorities for users in the GCR. However, when asked to prioritize three considerations only, it's apparent from that women prioritize personal security over other attributes. Accessibility is the second top priority for women. The

²¹ Buses with three doors that slope to the right side to facilitate entry and exit of people with limited mobility capacity; the door in the middle is allocated for persons with disabilities and mobility restrictions.













surrounding environment and the physical effort needed during the access and egress of services, especially if there are children or heavy objects carried, can have more effect on women users.

There is a noticeable similarity between males and females' perceptions on women's challenges in PT. Sexual harassment and lack of seating/discomfort are the top two choices for both genders. However, there is a small discrepancy between the third biggest challenge where males assumed it to be "Travelling with bags, children, or elders" whereas women chose "Crime" over the former with a small margin. This shows that in terms of the broader "security" aspect, it is "sexual harassment" that is considered as top risk by women, followed by crime.

4.11.6 Recommendations

Based on the findings of the FGDs and main considerations pointed to by participants in all groups as well as subgroups, following recommendations have been approved. These include recommendations for technical bus specification, stations and roads, operation, fares, capacity building needs for drivers, behavioral change.

I Technical Bus Specifications:

Considerations and recommendation of participants in FGDs was presented in Appendix C and was widely discussed with CTA, PCU, and TIU to I) approve and consider different points of view of bus specification, and 2) include specifications in the bidding document. As a result of consultations with CTA, all considerations and recommendations of bus users were embedded in the specifications of the e-bus.

Main recommendations by all participants include:

- Narrow down bus steps;
- Comfortable seats:
- Decent space inside the bus "not packed";
- Provide enough spaces for luggage and carriage;
- Use alarm buttons and cameras to control physical/sexual harassment and thefts inside buses (emergency buttons);
- Establish speed control/limit system;
- Install alarm ring before buses move or stop; and
- Provide handles to help passengers to lean on, especially during sudden movement and stops.

Main recommendations by women, including those pregnant or accompanied by children/girls include:

- Provide special spaces for strollers and baby baggage;
- Specify seats for pregnant women and/or women with infants;
- Afford enough space between seats;
- Allow separators between seats/sections;
- Air conditioning;
- Easy to open windows;
- Use fire-fighting extinguishers
- Use waste baskets inside the bus;
- Special buses for school pupils and university students;
- Ensure an effective mechanism for grievances to enable following up on the complaint;
- Apply sudden inspection on drivers during operation; and
- Use visual and speaking signboards inside the bus.

Special recommendation by men include:

- Allow and enforce special seats for women and elderly; and
- Prohibit street vendors from inflowing into buses.

Special recommendation by elderly include:

- Specify and prioritize seats for elderly; and
- Allow time for safe entry and exit of the bus.

Special recommendation by persons with disabilities:













Several recommendations were raised within all FGDs regarding persons with disabilities, these include:

- Narrow down steps;
- Install easy-to-use ramps for wheelchairs;
- Allocate comfortable seats;
- Provide special spaces inside the bus for wheelchairs;
- Use visual and specking signboards for persons with different disabilities; and
- Develop a mechanism or support system to provide needed assistance for passengers with special needs.

FGD with persons with disabilities pointed to number of specifications for each type of disability as follows:

- Speaking announcements for people with sight disabilities;
- Alarm button for people hearing and speaking disabilities to draw drivers and controllers' attention that they need to descend and need the driver to properly stop for them;
- Have a written route on the bus to help people with hearing disabilities to know the direction;
- Provide Braille maps of routes in station to help people with visual disabilities with directions;
- Install hydraulic ramps for persons with mobility disability (not only for wheelchairs only, but for persons using crutch(s) as well); and
- Apply international standards and specifications in bus design as is without modification, especially for ramps' specs.

During FGD with persons with disabilities at National Council for Persons with Disabilities (NCPD), they confirmed main findings derived from FGDs, but elaborated in more detail on the following:

- Special spaces for persons with disabilities like Mwasalat Misr and the airport bus is needed to be available in all buses;
- Allocate seats for elderly or persons with disabilities and make it obvious and clear to all
 passengers using different kinds of signs inside the bus; and
- Use belts for wheelchairs inside the bus.

2 Stations and Roads

This aspect is out of the scope of the ToR of this assignment, but it might be useful to be put into consideration for CTA in the future. Participants of FGDs recommended the following:

- Upgrade stations and provide seats and shade for passengers;
- Rehabilitate pavement to enable using lower bus step; and
- Upgrade roads and lighting to improve safety, especially at night.

3 Operation Logistics

This aspect is out of the scope of the ToR of this assignment, but it might be useful to be put into consideration for further WB projects with CTA, or for CTA operation management for the e-bus project. Participants of FGDs recommended the following:

- Arrange distribution of e-buses versus old buses on the same stations to ensure equality of access to e-buses:
- Organize bus frequency for different types of buses on the same route to avoid prolonged waiting time for either those who prefer to ride e-bus or those who avoid it due to financial reasons;

To ensure that cameras work properly;

- Establish monitoring systems for bus routes and stops;
- Monitor and evaluate passengers' satisfaction in general, and regarding service fare in specific;
- Launch a grievance channel for e-bus complaints, including cost of service.
- Employ an announced/published time plan for buses;
- Use display maps to allow passengers to plan their rides; and
- Apply separate doors for entry and exit.

4 Fares













Recommendations are meant to consider passengers' demands and in specific low-income groups. Main recommendations emphasize the following:

- Establish round-tickets for buses and other means of transportation (metro, monorail... etc.);
- Introduce yearly and bi-annual abonnements for passengers;
- Apply different fairs according to distance (like the metro system);
- Use ticket machines (because sometimes the driver himself is conducting tickets, which is unsafe and time-consuming).
- Exempt passengers with disabilities from any fares upon showing their "Integrated Services' Card²²";
- Exempt elderly (age 60+) from 50% of bus fare upon date of birth shown in their personal IDs;
 and
- Exempt school students of different educational institutions from 50% of bus fees upon showing their student IDs.

I Capacity Building of Drivers and Conductors

Participants of FGDs highlighted the following:

- Control unneeded/unplanned/sudden bus stops;
- Instruct drivers to stop in stations close to the sidewalk/pavement;
- Introduce a system for cash change;
- Conductors should be able to drive in case of any emergency happens to drivers;
- Prepare and train drivers and conductors on different contingencies, and especially minor repairs;
- Provide personal skills (general behavior modification, humanitarian approach to deal with elderly and persons with disabilities, stress management ...etc.);
- Apply medical check-ups and random drug tests on regular basis (every three months);
- Train drivers and conductors on the new e-bus because it is different than old buses
- Train drivers on defensive driving; and
- Train drivers, conductors, and workers on basic first aid principles.

5 Societal Behavioral Change

It is highly recommended that the GCCC project, in its behavioral change component, include a sub-component focused on behavioral change towards persons with disabilities, alongside other environmental aspects related to climate change. This recommendation was reinforced during consultation activities. Additionally, raising awareness about the right to a safe environment for women in public transport is another critical issue to address.

The table below shows the social requirements and how this is considered in the design

_

²² This card system is launched by the Ministry of Social Solidarity to help provide Egyptian citizens with disabilities access to services across various sectors, including health, education, rehabilitation, work, and transportation. (CAPMAS statistics show that 2.7% of Egyptians have a severe disability, which many public and private spaces mostly don't account for. The ministry aims to register 2.7 million people with disabilities to the integrated card system by 2023).













Table 4-8 Social Requirements and Design

| Requirement | uirements and Design Design Considerations |
|---|---|
| Requirement | Design Considerations |
| Provision of high number of vehicles on the same line to avoid crowdedness | Install a passenger counting system to monitor and manage capacity. |
| Special places inside the vehicles for women and elderly | Include clearly marked areas with signs and symbols for women and elderly passengers. |
| Vehicles with lower / more comfortable steps | Design buses with low and wide steps for easy boarding. |
| Comfortable seats | Install cushioned, ergonomic seats for passenger comfort. |
| More room for strollers and baby baggage | Provide spaces for strollers and baby bags. |
| Use alarm buttons and cameras to control physical/sexual harassment & thefts inside the buses (emergency buttons) | Equip buses with emergency buttons and surveillance cameras. |
| Establish speed control /limit system | Include a speed limiter system to ensure safe driving. |
| Install alarm ring before buses move of stop | Use audible alarms (white noise) to notify passengers when buses start or stop. |
| Allocate seats for the elderly, persons with disabilities, pregnant women, and women with infants | Have priority seating areas labeled with clear signs for the elderly, persons with disabilities, pregnant women, and women with infants |
| Airconditioning | Provide air conditioning, heating systems, and proper ventilation for passenger comfort. |
| Easy maneuverable windows | Install easily operable and durable windows. |
| Provide fire extinguishers for use | Place accessible fire extinguishers in the bus. |
| Use waste baskets inside the bus | Design interiors to include waste bins and prevent litter accumulation. |
| Use visual and speaking signboards inside the bus | Install visual screens and audio systems for passenger information and announcements. |
| Allow time for safe entry and exit of the bus | Provide drivers with cameras for better visibility and |
| Training programs to: (for drivers) to drive safely; make a full stop in each station; deal with PRM | training on braking systems for safe operations. Implement operational support systems and advanced braking mechanisms. |
| Provide special spaces inside the bus for wheelchairs | Create designated spaces with support bars for wheelchair users. |
| Use visual and speaking signboards for persons with different disabilities | Install systems for visual and audible announcements to assist passengers with disabilities. |
| Develop a mechanism or support system to provide needed assistance for passengers with special needs | Include stop buttons that alert drivers and staff to assist passengers with special needs. |
| Install hydraulic ramps for persons with mobility disability (not only for wheelchairs only, but for persons using crutch(s) as well) (Apply international standards and specifications in bus design as is without modification, especially for ramps' specs) | Provide ramps compliant with international accessibility standards |















| Use belts for wheelchairs inside the bus | Equip wheelchair spaces with safety belts and support bars for stability. | | | |
|---|---|--|--|--|
| Employ an announced/published time plan for buses | Use audio systems to announce and display time schedules. | | | |
| Use display maps to allow passengers to plan their rides | Install digital screens to show route maps and travel planning information. | | | |
| Use ticket machines | Include self-service ticketing machines inside buses. | | | |
| Instruct drivers to stop in stations close to the sidewalk/pavement | Provide buses with mechanisms to ensure proper alignment with sidewalks for safer boarding and exiting. | | | |













5 Analysis of Project Alternatives

The analysis of the project alternatives forms an integral part of the ESIA study as it helps determining the optimum technical, economic and political options with maximized positive environmental, social and gender impacts and reduced or mitigated negative impacts. This analysis evaluates whether there are viable alternatives to the proposed development which can fulfill the same function while minimizing, reducing if not eliminating the negative environmental, social and gender impacts to meet the national and international standards and requirements.

As discussed in Chapter 2, section 2.2, the Electric Bus (e-Bus) Demonstration Project consists mainly of 3 main components as presented below:

- A Depot Selection and Retrofitting of one of the existing diesel bus depots in Greater Cairo including installation of charging stations at the bus depot and/or construction of new facilities to accommodate the charging infrastructure and maintenance workshops for the electric buses.
- Routes Selection: A number of routes serving the selected depot will be studied and chosen for the e-bus operation and replacing the diesel buses.
- Electric Bus (e-bus) and Chargers Procurement: The project involves the acquisition of a fleet of
 electric buses with certain specifications to replace traditional diesel buses in the public
 transport system in one of the depots in Greater Cairo.

For the selection to be optimum in serving the Project's aim of enhancing the air quality in Greater Cairo, the selection process involved analyzing all the existing and potential depots' locations, bus routes within Greater Cairo and e-bus specs as well as the diesel buses that will be replaced. This was done to ensure the maximum technical, economic, environmental, social and gender benefits within the Project's context. As part of the project's prefeasibility study, multi-criteria analysis (MCA) was performed in order to select the depot location, the e-bus routes and the e-bus specs as well as the diesel buses that will be replaced that will form the best fit for the project purposes.

5.1 No Project Alternative

Without the E-bus project, passengers will not benefit from a sustainable, efficient, advanced, and safer transport system. The urban population, which is continuously growing, will continue to endure traffic congestion, risks of traffic accidents, and unreliable public transport systems.

If a reliable and improved public transport system, such as the E-bus project, is not introduced, private passenger cars will remain the dominant mode of transportation. This reliance on private cars will further strain existing road capacity, increase pollution levels and greenhouse gas emissions, and escalate the overall cost of mobility. The E-bus services will be designed for efficiency, with buses operating on dedicated lanes and improved infrastructure. Ultimately, the absence of dedicated E-bus infrastructure would result in no improvement in the quality of public transport services, leading to adverse impacts on quality of life and the environment. The current sub-standard level of service in the public transport system would persist.

A situational analysis showing how having the E-bus System in place versus the No Project, Alternative is summarized in the following table.

Environmental Improving air quality as a result of eliminating emissions (GHG, BC and PM2.5) generated from the diesel buses.

Solution Project Alternative

Air quality remains poor with continued reliance on private vehicles, old and more polluting diesel buses, and other transport means of high BC and PM2.5 emissions.

Continued GHG emissions

private vehicles and older

contribute to climate change.

Table 5-1 No project alternative analysis

from

buses













| Category | E-Bus Alternative | No Project Alternative | | |
|----------|--|--|--|--|
| | Lower noise levels compared to diesel buses, enhancing the urban environment. | Higher noise levels due to increased traffic congestion and continued use of diesel buses. | | |
| Social | Reduced travel time for commuters due to improved transit efficiency with electric buses by reducing the number of vehicles (possible model shift) as it is expected that some of cars and taxis riders will shift to ride the electric bus. | vehicles. | | |
| | Enhanced comfort for passengers with cleaner, quieter, and more modern buses. | Decreased comfort with older buses and increased overcrowding due to limited public transit options. | | |
| | Improved safety with modern electric buses equipped with advanced safety features. | Higher safety risks associated with older vehicles and congested road conditions. | | |
| | Socio-economic benefits include job creation, improved access to transportation, and reduced economic burden on individuals. | Limited socio-economic benefits due to continued reliance on private vehicles and lack of investment in public transit infrastructure. | | |
| | Positive impacts on public health through reduced exposure to air pollution. | Negative impacts on public health due to increased air pollution and associated health risks. | | |

5.2 Bus Technology Alternative

Most common buses operate on diesel fuel that generate Hydrocarbons, Carbon monoxide, Carbon Dioxide, BC, and PM2.5 emissions. Advanced models are equipped with Diesel Particulate Filters (DPF) and Selective Catalytic Reduction (SCR) Technology. There are other more advanced technologies compared to diesel buses that operate on natural gas, diesel-electric (Hybrid), and the proposed technology (electric buses).

An overview of the characteristics of different bus technologies and the advantages/disadvantages of each is presented in the table below. Alternatives were given scores; where (4) is the highest and best score and (1) is the lowest score.

Table 5-2 Alternative Bus Technologies

| Points of | Bus Type | | | | | | | |
|------------------|---|---------------------------|--|----------------|--|------------------------|--|------------------------|
| Comparison | Electric | | Diesel | | Natural Gas | | Diesel-Electric (Hybrid) | |
| Air Pollution | Zero tailpipe emissions; significantly lower particulate matter and NOx emissions compared to all types of buses. | | The highest particulate matter and NOx emissions compared to all other types of buses. | | Lower particulate matter and NOx emissions compared to diesel buses. | | Lower particulate matter and NOx emissions compared to diesel buses. | |
| | Score | 4 | Score | I | Score | 2 | Score | 3 |
| GHG Emissions | Zero emission significan | direct s; tly lower | The lifecycle emissions | highest GHG | Lower GHG | lifecycle emissions | Lower GHG | lifecycle emissions |















| Points of | Bus Type | | | | | | | |
|-----------------------|--|----|---|--------------------------------|---|---------------------------|---|-------------------|
| Comparison | Electric | | Diesel | | Natural | Gas | Diesel-E (Hybrid | |
| | lifecycle GHG emissions compared to all types of buses. | | compared to all types of buses. | | compared to diesel buses. | | compared to diesel buses. | |
| | Score | 4 | Score | 1 | Score | 2 | Score | 3 |
| Noise | Quieter operation compared to all types of buses. | | Higher levels of to electr | noise compared ic buses. | Similar levels to buses. | noise o diesel | Similar levels t buses. | noise o diesel |
| | Score | 4 | Score | I | Score | I | Score | I |
| Fuel Consumption | No fuel consumption; relies on electricity. | | Higher fuel consumption compared to all types of buses. | | Lower consump compare diesel bu | d to | Lower consump compare diesel an gas buses | d to d natural |
| | Score | 4 | Score | I | Score | 2 | Score | 3 |
| Cost | Initial purchase cost is high compared to other types while the operating costs over time due to lower fuel and maintenance costs are lower than other types | | purchase cost; higher operating costs due to fuel and maintenance expenses. | | Higher purchase moderate operating due to le expenses | e g costs ower fuel | Higher purchase moderate operating due to le expenses | e costs |
| | Score | 2 | Score | 4 | Score | 3 | Score | I |
| Overall advantages | Zero emissions, lower operating costs, quieter operation. | | ng infrastructure, | | compare | domestic | compare | mproved |
| | Score | 4 | Score | 1 | Score | 3 | Score | 2 |
| Overall disadvantages | Higher initial purchase cost, reliance on charging infrastructure. | | Higher emissions, higher operating costs, noisier operation. | | High purchase | initial cost. | Higher purchase complexidual systems. | |
| | Score | 4 | Score | I | Score | 3 | Score | 2 |
| Total Score | | 26 | | 10 | | 16 | | 14 |

Electric buses have been chosen as the preferred technology due to their numerous advantages over other alternatives. They offer zero tailpipe emissions, significantly lower lifecycle GHG emissions, and quieter operation compared to traditional diesel buses. While electric buses may have a higher initial purchase cost, they offer lower operating costs over time due to savings on fuel and maintenance. Additionally, electric buses contribute to improved air quality and public health, making them a more sustainable and environmentally friendly option for urban transit systems.













5.3 Batteries Alternative

5.3.1 Types of Batteries and their Capacities

The following was concluded from the selection process of the type of batteries and capacities:

Table 5-3 Comparison between the different types of batteries^{23 24 25}

| Feature | Lithium Phosphat | Ferrous e (LFP) | Lithium-T (LTO) | itanate | | Manganese ithium-lon |
|---|----------------------|--------------------|--|---------|---|-------------------------|
| Charging Time | Moderate (1-2 hours) | | Very Fast (10-20 minutes) | | Moderate (I-2 hours) | |
| | Score | 2 | Score | 3 | Score | I |
| Use Cases Electric vehicles, gric storage | | ehicles, grid | Heavy-duty applications, fast charging | | Consumer electronics, electric vehicles | |
| | Score | 3 | Score | I | Score | 2 |
| Environmental Impact | Less toxic | materials | Less toxic materials | | Contains mo | ore toxic |
| | Score | 3 | Score | 2 | Score | I |
| Cost | Moderate | cost | High cost | | Moderate to high cost | |
| | Score | 3 | Score | I | Score | 2 |
| Total Score | | П | | 7 | | 6 |

LFP batteries offer a longer lifecycle with more charge/discharge cycles and enhanced thermal stability, which prevents breakdown at higher temperatures which is a critical factor in warmer climates like Cairo's. Additionally, LFP batteries are more cost-effective over time due to their durability and lower maintenance requirements. These characteristics make LFP batteries a superior choice for electric buses in environments with high temperatures and the need for reliable, long-term performance.

For the energy assessment, we considered two scenarios based on battery autonomy: one with a 315-kWh battery and the other with a 380-kWh battery. However, the 380-kWh scenario was chosen due to its superior efficiency and alignment with the current offerings of industry manufacturers.

5.3.2 Batteries Disposal Alternatives

The batteries' average life span is 8 years 100,000 miles, after that the batteries are considered as type of hazardous waste; mainly, e-waste. Thus, the disposal of batteries must be managed and handled in an environmentally safe and proper manner.

Taking into account that the performance of batteries starts to reduce over time to reach 80% after around 8 years. Accordingly, batteries that have reached end of life (EoL) should be disposed as per the following alternatives:

- First, e-buses with less battery capacity can be used on bus routes with less demanding daily mileage, in a process of progressive electrification of the bus fleet.
- Then, batteries can be used (after checking) in other applications, 2nd life scenario, such as stationary storage on buildings to store solar panels energy













- Recycled by vehicle manufacturers / sent back to the supplier
- Disposed by qualified renewable resources companies.
- Disposed through a license hazardous waste contractor as hazardous waste contractors do recycle to extract the valuable materials

However, the best scenario was found to be recycling by vehicle manufacturers / sending back to the supplier due to the manufacturers' expertise in safely managing hazardous materials, recovering valuable resources, and ensuring compliance with environmental regulations, in this approach, the ebus supplier is fully responsible for battery replacement and disposal, eliminating the need for on-site temporary storage of traction batteries at the depot. Replaced batteries will be directly transferred to the supplier's local service point, which is also responsible for their end-of-life treatment, However, if needed, traction batteries can be temporarily stored in the air-conditioned battery rooms at the depot, in addition to auxiliary batteries (12V), before being sent to the supplier. Additionally, using the batteries in a second life scenario and then sending to the supplier may limit the number of bidders.

5.4 Depot and Routes Alternatives

Multi Criteria Analysis (MCA) was implemented to make a fact-based assessment of the best routes and depots in Cairo's transport network for this pilot project for electric buses deployment.

The analysis was achieved through utilizing the most recent available data. Data sources included data received from the World Bank, the CTA, air emissions data from published EEAA air quality monthly reports and existing Geographic Information System (GIS) data from Transport for Cairo (TfC) database.

Based on the ranking summary of the preliminary selected depots proposed by the CTA at the early stage of the project, it was concluded that Badr Land and Imbaba depot were the highest ranked options along the other depots.

6.4.1 Routes Scenarios

With regards to the selection of the 5 routes, it was based on mainly technical considerations and not many E&S considerations, as the consultant did not find major differences between those routes from the E&S perspective. Moreover, it was agreed with GCCC as part of Contract Amendment #3, there is no need to re-perform the Stated Preference Surveys and Focus Group Discussions for Al-Ameriyah Depot in the analysis.

6.4.2 Depot Location Scenarios

I Badr Land Scenario

The development of a depot in Badr involves comprehensive design and construction activities, including procurement and supervision, which falls outside the current project scope, budget, and timeline.

I Imbaba Depot Scenario

Although it was highly recommended for its existing infrastructure and strategic location, it was rejected due to political concerns regarding potential relocation.

Accordingly, the CTA proposed four (4) different depots from those studied earlier. The new four (4) depots were Al-Ameriyah, Al-Matariyah, Al-Basatin, and Helwan. CTA confirmed that those depots will be eligible for this implementation project due to sovereign decision involving a potential relocation of all other depots outside of Cairo.

2 Distribution of Buses among the 4 Depots Scenario

The CTA proposed distributing the e-buses among the four (4) depots, namely Al-Ameriyah, Al-Matariyah, Al-Basatin and Helwan, as an alternative solution. However, this option was deemed unfeasible due to budgetary constraints.

Due to its placement within a densely populated residential and service area. With this strategic positioning ensures that the project will serve a large number of citizens across various age groups,













maximizing its impact and accessibility, Al-Ameriyah Depot and routes have been selected for the project implementation.

5.5 Decommissioning Alternatives

As previously mentioned, the depot contains four (4) underground diesel tanks, each with a capacity of 35 m³, owned by Misr Petroleum Company. The following two scenarios have been proposed for handling these tanks:

5.5.1 Scenario 1: Neutralize and Maintain Underground Tanks

In this scenario, the underground diesel tanks would undergo a thorough neutralization and cleaning process as they will be filled with clean sand from the inside. The above-ground tank room will be filled with sand and concrete, to mitigate environmental risks. The tanks would remain underground. This approach aims to minimize disruption to the site while ensuring environmental safety. Additionally, this will reduce the amount of hazardous waste generated by removing these tanks and the contaminated soil.

5.5.2 Scenario 2: Neutralize, Extract, and Transport Tanks

This scenario involves neutralizing the underground diesel tanks and then extracting them from the site. The tanks would be carefully removed and transported to designated facilities for proper disposal or recycling. This method prioritizes the complete removal of the underground diesel tanks and includes soil decontamination to address any residual environmental concerns from oil spills or leaks. This approach creates space for potential redevelopment or alternative land use but is expected to generate a large amount of hazardous waste (contaminated soil) that will require safe disposal in a hazardous landfill such as El Nasriah Center, Alexandria Governorate. Additionally, Civil Defense approval will be required for this method, which will maximize site disruption duration.

Below is a comparison between both scenarios across various parameters:

Table 5-4 Scenarios I and 2 for dealing with the underground diesel tanks

| Table 5-4 Scenarios Taind 2 for dealing with the underground dieser tainks | | | | | |
|--|--|---------------------------|--|--------------------|--|
| Parameter | Scenario I: I Maintain | Neutralize and | Scenario 2: Neu and Transport | ıtralize, Extract, | |
| CAPEX | Lower initial CAPI labor and materials | EX due to reduced s costs | Higher initial CAPEX due to excavation, transport, and disposal costs | | |
| | Score | 2 | Score | I | |
| Amount of Waste | Minimal waste ge clean sand | enerated, primarily | Significant hazardous waste generated (contaminated soil) | | |
| Generated | Score | 2 | Score | I | |
| Safety | Lower risk due to of existing tanks | minimal disruption | Higher safety risks due to extraction and transport activities | | |
| | Score | 2 | Score | I | |
| Duration | Shorter duration removed | as tanks are not | Longer duration due to extraction and soil decontamination processes. | | |
| | Score | 2 | Score | I | |
| Approvals from Authorities Needed | Minimal approvals required | | Requires extensive approvals from Civil Defense and environmental authorities. | | |
| Needed | Score | 2 | Score | I | |
| Environmental Impact | Limited impact a | as tanks remains | Greater potential impact due to soil disturbance and transport activities | | |













| Parameter | Scenario I: I Maintain | Neutralize and | Scenario 2: Neutralize, Extract, and Transport | | |
|-----------------------|--------------------------------------|-----------------------|---|---|--|
| | Score | 2 | Score | I | |
| Future Site Usability | Limited flexibility for tanks remain | or future site use as | Greater flexibility for redevelopment or alternative land use | | |
| | Score | I | Score | 2 | |
| Total Score | 13 | | 8 | | |

5.5.3 Recommendation:

Based on the scoring, Scenario I: Neutralize and Maintain Underground Tanks is the recommended option due to its lower cost, reduced waste generation, shorter duration, and lower safety risks. Moreover, it was reported by Misr Petroleum that 90% of similar cases, underground diesel storage tanks are neutralized and buried using sand.

5.6 Depot Layout Alternatives

5.6.1 Selected Depot Layout – As Agreed with the CTA

The Consultant added some recommendations for practical practices regarding the depot layout suggested by the CTA as follows:

• Add the necessary electrical rooms.

| Electrical locals | 4 each local has 2 transformers |
|--------------------------|---|
| Surface area (per local) | ~131m² |
| Zone implantation | One in northwest, in a CTA workshop |
| | One in northeast, next to the emergency issue |
| | One in southeast, next to the entrance |

- Reduce bus charging activities in front of the maintenance shops, and next to the entrance/exit areas.
- Add the firefighting and domestic water tank.

The following figure presents the final selected and agreed on depot layout with the CTA. However, this chosen layout «final version» might be subject to some small adjustments. This may be subject to minor evolutions, notably during the Design phase with the Contractor.













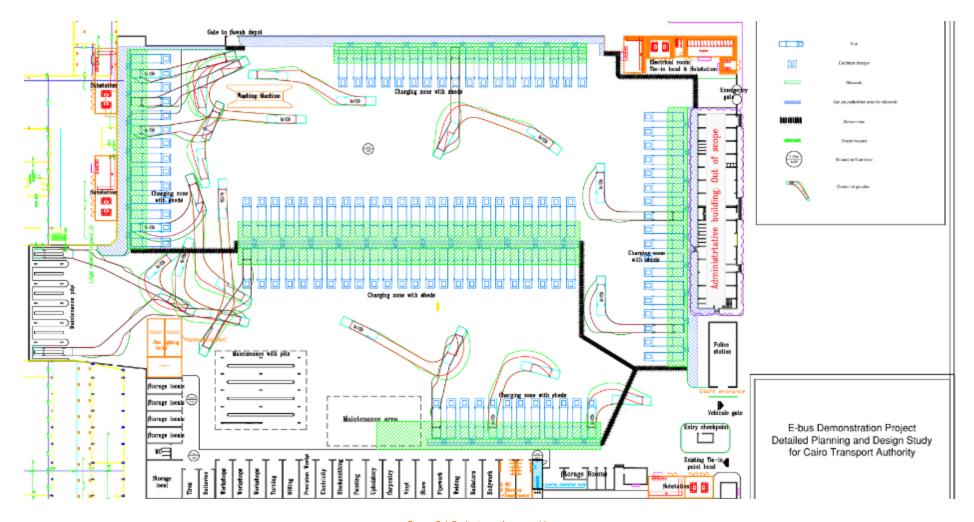


Figure 5-1 Preliminary Approved Layout







Identification and Assessment of the Potential Environmental, 6 Social and Gender Impacts

6.1 Overview

The impact assessment is categorized according to the WB ESSs and considers risks and direct and indirect impacts on ES receptors. The classification of ES receptors according to WB ESS and associated risks and impacts are presented in the table below.

Table 6-I Classification of ES receptors according to WB ESS and associated risks and impacts

| WB ES | S | ES Receptors | Direct and Indirect Risks and Impacts on ES Receptors |
|-------|---|--|--|
| ESSI | Assessment and Management of Environmental and Social Risks and Impacts | Environmental and social aspects that are listed in the triggered ESS. | Environmental and social risks and impacts associated with each stage of the project implementation as listed in the triggered ESS. |
| ESS2 | Labor and Working Conditions | All project workers. | Direct impact: Occupational Health and Safety (OHS) hazards (electrocution, falls, etc.) Exposure to increased levels of noise and vibration Exposure to gaseous and particle emissions Heat related ailments: extreme hot temperature Risks: Complaints from workers Child labor (onsite and across supply chain of material procurement) Gender Based Violence (GBV) Spread of transmissible diseases (as COVID-19, Monkey-Pox) |
| ESS3 | Resource Efficiency and Pollution Prevention and Management | Ambient air quality Noise and vibration Soil integrity Groundwater | Direct impact: Degradation of ambient air quality Direct impacts: high levels of noise and vibration Direct Impact: Degradation of soil integrity: contamination, physical structure due to general works Indirect impact: Soil contamination can lead to impact groundwater quality and any future land use. Minor impact is anticipated on the |
| | | Groundwater | groundwater quality due to potential soil contamination. |







| WB ESS | | ES Receptors | Direct and Indirect Risks and Impacts on ES Receptors | | |
|--------|---|---|---|--|--|
| | | Surface water | No impact is anticipated on the surface water quality as clarified in the baseline chapter (4), section 4.6. | | |
| | | Water availability | Direct impact: Service rupture leading to inefficient resource use. | | |
| | | | Indirect impacts: complaints from surrounding communities. | | |
| ESS4 | Community Health and Safety | Community | Direct impact: Increased levels of noise and vibrations, degradation in ambient air quality, Traffic congestion and road safety risk during all phases of the project | | |
| ESS6 | Biodiversity Conservation and Sustainable Management of Living Natural Resources | Ecological life | No impact: There are no important or endangered flora and fauna recorded within the project site, as clarified in chapter (4), section 4.8 | | |
| ESS8 | Cultural heritage | Direct impact: Chance finds | | | |
| ESS10 | Stakeholder Engagement and Information Disclosure | Depot workers, NCPD, passengers in 5 areas along Al- Ameriyah routes | Direct Impact: Relocation of labor force and operation malfunction | | |

6.2 Methodology for Impact Assessment

The impacts were assessed on the basis of:

- EEAA General Guidelines for Environmental Impact Assessment (EIA), issued in 2009
- National laws and regulations
- National codes and standards for design
- WB Good practice notes
- WB ESS
- WBG EHS General Guidelines

The legislative context of the assessments undertaken is provided in Chapter 3.

Qualitative assessment of impacts and risks on each receptor under each project component and phase was based on:

Describing e-bus demonstration project's components and activities throughout the decommissioning, construction, and operation and maintenance phases

- Identifying the national and international requirements applicable to the project.
- Baseline identification of sensitive receptors
- Expert judgment/experience and stakeholder consultations
- Rating the impacts using evaluation matrix that follows rating method for severity and frequency of impacts as illustrated in the following section.







6.2.1 **Evaluation Matrix**

A simple rating method has been applied to identify the significance of the impacts. Each impact was given a rank for severity (S) and frequency of occurrence (F). Ranks for severity and frequency were given on a scale from 1 to 5, as shown in the tables below.

Table 6-2 Scale used in Severity Ranking of Impacts

| ν | | | | | | |
|--|-------|----------|-------|--------------|--|--|
| I | 2 | 3 | 4 | 5 | | |
| Insignificant | Minor | Moderate | Major | Catastrophic | | |
| Table 6-3 Scale used in Frequency Ranking of Impacts | | | | | | |

| I | 2 | 3 | 4 | 5 |
|------|----------|----------|--------|----------------|
| Rare | Unlikely | Possible | Likely | Almost certain |

To determine the severity rank, four parameters were considered, as follows:

- Scale: How widespread will the impact be? Considerations can include e.g., area affected by land pollution impact, number of people affected by health impact, etc.
- Difficulty in changing the impact: How difficult will it be to reverse or mitigate the impact? Considerations can include e.g. availability of technology to change impact, level of complexity of available technology, capacity to apply available technology, existence of constraints to change impact, etc.
- Cost of changing the impact: How much will it cost to change the impact? Cost in relation to the means of change considered in the above parameter.
- Effect on public image: To what degree does the impact affect the public image of the enterprise (positively for positive impacts and negatively for negative impacts)?

Similarly, for the frequency rank, two parameters are considered:

- **Probability:** What is the probability of occurrence of the impact?
- **Duration:** How long will the impact last?

The risk level category is determined by multiplying the frequency rating times the severity rating. The table below shows the significance ranking matrix.

Risk Risk Level Score **Category** Frequency of Scenario Low I to 4 5 to 10 **Moderate** 11 to 18 Substantial **Unlikely Possible** Likely Rare (1) Almost Certain (5) **(2)** (3) **(4)** 19 to 25 **Catastrophic** Moderate Moderate Substantial **(5) Severity** Major (4) Moderate Substantial Substantial Low

Table 6-4 Significance ranking matrix







| Risk Score | Risk Level Category | | | | | |
|---------------|------------------------|-----------------------|----------|----------|-------------|--------------------|
| I to 4 | Low | Frequency of Scenario | | | | |
| 5 to 10 | Moderate | | | | | |
| 11 to 18 | Substantial | Rare (I) | Rare (I) | | Likely | Almost Certain (5) |
| 19 to 25 | High | | (2) | (3) | (4) | (0) |
| | Moderate (3) | Low | Moderate | Moderate | Substantial | Substantial |
| | Minor (2) | Low | Low | Moderate | Moderate | Moderate |
| | Insignificant (1) | Low | Low | Low | Low | Moderate |

6.3 Identified Positive Impacts

6.3.1 Positive Impacts During Decommissioning and Construction Phase

I Job Creation

Several employment opportunities will be provided. During the decommissioning phase, about 115²⁶ people will be employed. The workforce will include supervisors, engineers, skilled and unskilled laborers. For the semiskilled and unskilled workers, the Contractor might employ people from the communities which live around the project area as a way of making sure that the project benefits the people community members in the project area. Some of the unskilled labor force is expected to be day-labor; thus, the contractor will prepare a local hiring plan, which primarily relies on engagement with the local labor office; additional entities include community liaison desks, or through local Nongovernmental organizations (NGOs), local advertisements.

During the construction phase, about 500 ²⁷ people will be employed. The workforce will include supervisors, skilled and unskilled laborers. For the semiskilled and unskilled workers, the Contractor might employ people from the communities which live around the project area as a way of making sure that the project benefits the people community members in the project area. Workers will be trained and increase their experience and know-how of infrastructure projects.

2 Environmental Rehabilitation

- The removal and elimination of the current fueling station, oil transformer and the diesel buses maintenance workshops inside the workshop will contribute to environmental rehabilitation by remedying existing pollution sources and preventing further contamination of the site.
- Additionally, the neutralizing of the underground four (4) diesel tanks will eliminate hazards associated with fuel storage, by eliminating the spills/leaks risk to soil and groundwater leading to their contamination.
- Moreover, the decommissioning of the current washing area of very old technology that consumes large amounts of water, causing a waste of resources and replacing with new buses washing technology will lead to water conservation and better used water treatment and recycling.

²⁶ Estimated based on similar activities

²⁷ Estimated based on similar activities. To be confirmed with the Contractors at later stage







3 Provision of Market for Supply of Material

Providing indirect opportunities by increasing the economic activities through the following supply chain:

- Providing a market for materials suppliers that will be used during the decommissioning and construction phases.
- Providing transportation, shipping and warehousing services for the project
- Providing food and cleaning services.

4 Positive Impacts During the Depot Operation Phase

- The project will enhance environmental conditions at the depot by removing pollution sources such as fueling stations and maintenance workshops. Diesel tanks will be neutralized, filled with sand, and then will be either extracted or buried in place based on Mis Petroleum decision and in both scenarios, this will prevent leaks and protect the soil and groundwater from contamination. Additionally, fuel pumps will be removed to avoid potential spills.
- New bus-washing technology will minimize water usage and wastewater generation through improved water treatment and recycling methods. At least 70% of wastewater will be recycled for washing, conserving water resources.
- The introduction of electric buses will improve the status of CTA workers during operation and maintenance phase. Capacity building will be provided to CTA workers to effectively operate and maintain the e-buses.
- Technological advancement via the procurement and installation of advanced equipment such as mobile chargers, and heavy maintenance equipment demonstrate a commitment to technological advancement and operational efficiency.

6.3.2 Positive Impacts During the Electric Buses Operation Phase

- Reduction in Greenhouse Gas Emissions: Electric buses produce zero tailpipe emissions, significantly reducing GHG compared to diesel buses. The transition to electric buses on the five selected routes, replacing 75 fossil fuel-powered buses and anticipating a 20% modal shift, will reduce GHG emissions by around 2944.2 tons of CO2 per year (44.3% of current baseline emissions in the 5 selected routes). Although electric buses do not emit pollutants, the project's GHG calculations account for emissions from the power plants producing the electricity used to charge these buses.
- Improved Ambient Air Quality: By eliminating harmful pollutants like BC and PM2.5, electric buses contribute to better air quality, reducing the incidence of respiratory illnesses. The replacement of 75 fossil fuel buses on five selected routes will reduce PM2.5 emissions by 0.043 tons/year and BC emissions by 0.15 tons/year (92.6% reduction from current BC carbon emissions in the 5 selected routes).
- Reduced Traffic Noise: Electric buses operate more quietly than diesel buses, reducing noise pollution in urban areas and contributing to a more pleasant environment and can alleviate stress and annoyance associated with excessive traffic noise, improving the overall quality of life for residents and commuters.
- Traffic Flow Optimization: Electric buses will help optimize traffic flow by reducing the number of private vehicles on the road, alleviating congestion, and improving urban traffic conditions. By providing reliable and efficient public transportation options, electric buses encourage modal shifts away from single-occupancy vehicles, ultimately reducing congestion and improving traffic flow in urban areas.
- Improvement of Quality of Life: Electric buses will improve passengers' quality of life through enhanced comfort, safety, and reduced travel times. Features such as air-conditioning, reduced noise, Wi-Fi, comfortable seating, and accessibility for persons with reduced mobility or health problems will positively impact passengers' physical and psychological well-being.







- Rehabilitation of CTA Workers and Drivers: The project will build both technical and nontechnical capacities among CTA workers and drivers, improving their professional status during the operation and maintenance phases.
- Market Expansion: The shift to electric buses will stimulate market growth and diversification, fostering the development of a diverse supplier ecosystem and encouraging innovation in the electric vehicle industry.
- Economic Savings: Over their lifecycle, electric buses offer economic advantages through lower operating and maintenance costs, reduced fuel expenses, and simplified maintenance requirements. These savings can be redirected towards other essential services and infrastructure projects. Additionally, reduced traffic congestion will lead to economic gains through improved productivity and reduced travel times.







6.4 Identified Negative Impacts and Risks

Negative impacts and risks that are expected to arise from the project activities during the project implementation phases including decommissioning, construction and operation phases are discussed in the following subsections.

6.4.1 Decommissioning and Construction Phase

The table below shows the impact assessment during the depot decommissioning and construction phases.

Table 6-5 Impact assessment during preconstruction and construction phases

| | Decommissioning and Construction Phases | | | | | |
|--|--|--|---------------|-----------------|--------------|--|
| 1 | Aspect | Air Quality (code : AQI) | | | | |
| | Aspect | Relevant ESSs: ESS1, ESS2, ESS 3, ESS 4 | | | | |
| | Description | Gaseous emissions: are expected from machinery used for decommissioning and construction activities (e.g., excavator and wheel loader); including CO ₂ , NOx, CO, PM. HC, CO and SO ₂ from diesel combustion in construction equipment and existing oil type transformer, exhausts of vehicles used to transport workers, raw materials (cables, pipes, etc.), waste and other basic equipment. | | | | |
| | | <u>Dust emissions:</u> are expected to occur due to the on-site excavation and demolition activities in addition to the movement of the construction vehicles and loading/unloading of material (e.g., sand, asphalt and cement, etc.) and waste. | | | | |
| | | Emissions will be temporarily as they will exist only during decommissioning and construction periods. | | | | |
| | Direct Impacts | As indicated in the baseline chapter, PMI0 and TSP were found to be below the permissible levels at point (3) located outside the depot. Therefore, the sensitivity of the air shed as a receptor is considered to be moderate. | | | | |
| | | As the site is surrounded by residential, commercial and industrial area, the increase in particulate matter and gaseous emissions will affect primarily construction workers working near the equipment and the citizens as the nearest residential area is about 42 m away from the depot on the north side. | | | | |
| | Indirect Impacts No indirect impacts have been identified. | | | | | |
| | Source | Decommissioning and construction work including demolition, excavation, and construction activities (e.g., loading/unloading and storage of fine materials) generating dust and particulate matter, as well as emissions from heavy machinery, vehicles, and equipment used on-site. | | | | |
| | Receptors | Ambient air quality, decommissioning and construction workers, nearby citizens and surrounding activities. | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | |
| | | 3 | 3 | 9 | Moderate | |
| Impact Assessment Negative, Moderate; Short-term, Reversible | | | | | | |







| 2 | 0 am a st | Noise and Vibra | Noise and Vibration (code: NVI) | | | | |
|---|-------------------|--|---------------------------------|------------------------|--|--|--|
| | Aspect | Relevant ESSs: ESS1, ESS 2, ESS 4 | | | | | |
| | Dagariation | As indicated in the baseline chapter, the noise level is in compliance with the permissible level. | | | | | |
| | Description | operating on-site. | | ,, | former, equipment and machinery | | |
| | | Vibration will be generated by heavy machinery, pile driving, and excavation activities. Increased levels of noise and vibration will impact workers, nearby citizens and to | | | | | |
| | Direct Impacts | surrounding activit | ies. | | , | | |
| | Indirect Impacts | Continuous vibrat maintained building | | | tural fatigue in older or poorly | | |
| | Source | Operation of heav | y machinery such | as excavators, bullde | ozers, and cranes. | | |
| | 3001.00 | Demolition activiti | es involving the u | ise of jackhammers, o | crushers, etc. | | |
| | Receptors | Construction worl | kers, nearby resid | lents and other surro | ounding activities. | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | | 3 | 3 | 9 | Moderate | | |
| | Impact Assessment | Negative, Moderat | e; Short-term, Re | eversible | | | |
| 3 | Aspect | Soil, geology and | d topography (| code: SGTI) | | | |
| | | Relevant ESSs: E | ESSI, ESS 3 | | | | |
| | Description | Depot site is covered with concrete. However, due to the presence of four (4) underground diesel tanks, soil is expected to be contaminated from potential leakage/ spills. Soil potential contamination from improper storage of waste generated from construction activities and chemicals handing and/or storage Soil potential contamination from improper disposal of wastewater | | | | | |
| | | Soil erosion due to | o exposure of so | il surfaces to rain ar | nd wind during site clearing, earth | | |
| | Direct Impacts | and wastewater, lu | bricants and fueli | | nandling of chemicals and/or waste | | |
| | | Generation of muc | | | | | |
| | Indirect Impacts | No indirect impact | | | | | |
| | Source | | | | nks, sand filling of diesel tanks, roper chemicals/waste temporary | | |
| | Receptors | Soil quality | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | 0.8 | 4 | 3 | 12 | Substantial | | |
| | Impact assessment | Negative, Substant | ial; Short-term, Ir | rreversible | | | |







| 4 Aspect Water bodies and Groundwater (code WBI) | | | | | | |
|--|-------------------|--|-------------------|---------------------|------------------------------------|--|
| | Aspect | Relevant ESSs: ESSI, ESS 3, ESS 4 | | | | |
| | | The nearest surface water body to the depot is Ismailia canal which 1.6 km away. Accordingly, no impact is expected. | | | | |
| | Description | The depot site is situated within the Nile Delta aquifer system, characterized by highly productive quaternary deposits of sand and gravel interbedded with clay with depths typically ranging from 10 to 50 meters below ground level and below 5 m in some places near to the Nile River. The aquifer's significance lies in its role in supporting local water demands. The construction and decommissioning phases are unlikely to impact the groundwater; however, potential fuel/chemicals spills/leakes and/or improper wastewater discharge could lead to groundwater contamination. | | | | |
| | | No impact is expe | cted om Ismailia | canal. | | |
| | Direct Impacts | Accidental fuel/cho to groundwater co | | es and/or improper | wastewater discharge could lead | |
| | Indirect Impacts | Improper decomn contamination that | | | ndling of waste can leave residual | |
| | Source | Decommissioning | and construction | activities | | |
| | Receptors | Surface and groun | dwater quality | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | |
| | 3.8 | 3 | 3 | 9 | Moderate | |
| | Impact assessment | Negative, Moderat | te; Short-term, R | eversible | | |
| 5 | Aspect | Resource efficie Relevant ESSs: I | | on generation (co | de: RPI) | |
| | | Energy: Increase in energy consumption for transportation of materials and the use of decommissioning and construction equipment to prepare the site (e.g., trucks, loaders, etc.) Water: Increase in consumption of water for decommissioning and construction activities including that water needed for the hydrostatic testing of the pipes. | | | | |
| | | Raw materials: Use of asphalt, ready mix concrete, soil, pipes, pumps, cables, ducts, sand used for neutralizing diesel tanks, switchgears, and light bulbs | | | | |
| | | Scrap and waste (hazardous and non-hazardous) generation: | | | | |
| | | Scrap and waste (h | • | n-hazardous) genera | tion: | |
| | Description | Scrap and waste (h Wet utilities: pipes | nazardous and no | , | tion: | |







| | Direct Impacts Indirect Impacts | community. In addition, increased water and fuel consumption as well as the demand for wastewater treatment facilities to dispose of sewage from workers. Air pollution is due to exhaust emissions from equipment and vehicles used. Emissions of GHGs due to fuel combustion used for operation machinery and vehicles. Improper raw materials handling and storage and mismanagement of the waste generated including construction and demolition and potential uncontrolled disposal causing pollution in surrounding areas and associated impacts such as visual disturbance, odor, attraction of insects and rodents and even open burning Improper handling of wastewater can cause soil contamination causing impacts on human health, local environment. No indirect impacts have been identified. Increase in energy consumption for operation of equipment and vehicles Increase in water consumption for construction work including hydrostatic testing of the pipes and by workers at the site | | | | |
|---|----------------------------------|---|--|--|--|--|
| | Source | | | | | |
| | Receptor | Local environment | | , | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | |
| | | 4 | 3 | 12 | Substantial | |
| | Impact | Negative, Substantial; Short-term, Reversible | | | | |
| | Assessment | Negative, Substant | ial; Short-term, F | Reversible | | |
| 6 | • | | | Reversible ency situations (co | de: NDRI) | |
| 6 | Assessment | | · Risk / Emerge | | de: NDRI) | |
| 6 | Assessment | Natural Disaster Relevant ESSs: E The common nature that attack Egypt w Additionally, vario explosions equipm in regard to the ne will be most proba- not properly mana | r Risk / Emerge ESSI, ESS 2 ral disasters that which are mainly low us emergency sement malfunctions entralization of unably in-place buringed. | may affect the depot a heavy rains and heat situations could arise s, and chemicals / fue nderground diesel sta | are the common natural disasters waves e. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if | |
| 6 | Assessment Aspect | Natural Disaster Relevant ESSs: E The common nature that attack Egypt w Additionally, vario explosions equipm in regard to the ne will be most proba not properly mana Heat waves can dir Additionally, heat w | r Risk / Emerge ESSI, ESS 2 ral disasters that which are mainly low us emergency senent malfunctions eutralization of unably in-place buringed. | may affect the depot a heavy rains and heat dituations could arise and chemicals / fue anderground diesel state or removal which or the performance of the performanc | are the common natural disasters waves a. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if rease strain on water and energy, the equipment. | |
| 6 | Assessment Aspect | Natural Disaster Relevant ESSs: E The common natur that attack Egypt w Additionally, vario explosions equipm in regard to the ne will be most proba not properly mana Heat waves can dir Additionally, heat w Heavy rains can performance of the | r Risk / Emerger SSI, ESS 2 ral disasters that which are mainly lower mainly lower mainly lower malfunctions that which are mainly lower malfunctions that we want and the second may affect lower may affect lowe | may affect the depot and heavy rains and heat situations could arise and chemicals / fue and or removal which rkers' health and increthe performance of the workers' performance | are the common natural disasters waves a. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if rease strain on water and energy, the equipment. ance and also may affect the | |
| 6 | Assessment Aspect | Natural Disaster Relevant ESSs: E The common nature that attack Egypt we Additionally, various explosions equipment in regard to the newill be most probanot properly mana. Heat waves can dire Additionally, heat we Heavy rains can performance of the Chemical/oil/fuel le working place. | r Risk / Emergers SSI, ESS 2 ral disasters that which are mainly lower mainly lower mainly lower malfunctions entralization of unably in-place buringed. rectly impact work waves may affect directly impact e equipment eaks and/or spills | may affect the depot a heavy rains and heat situations could arise s, and chemicals / fue nderground diesel stal or removal which rkers' health and increthe performance of the workers' performance of the stal to hazard | are the common natural disasters waves a. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if rease strain on water and energy, the equipment. ance and also may affect the lous conditions for workers and | |
| 6 | Assessment Aspect Description | Natural Disaster Relevant ESSs: E The common nature that attack Egypt we Additionally, various explosions equipment in regard to the newill be most probanot properly mana. Heat waves can dire Additionally, heat we Heavy rains can performance of the Chemical/oil/fuel le working place. | r Risk / Emergers SSI, ESS 2 ral disasters that which are mainly lower mainly lower mainly lower malfunctions entralization of unably in-place buringed. rectly impact work waves may affect directly impact e equipment eaks and/or spills | may affect the depot a heavy rains and heat situations could arise s, and chemicals / fue nderground diesel stal or removal which rkers' health and increthe performance of the workers' performance of the stal to hazard | are the common natural disasters waves a. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if rease strain on water and energy, the equipment. ance and also may affect the | |
| 6 | Assessment Aspect Description | Natural Disaster Relevant ESSs: E The common nature that attack Egypt we Additionally, vario explosions equipment in regard to the new will be most probanot properly mana Heat waves can dir Additionally, heat we Heavy rains can performance of the Chemical/oil/fuel le working place. Equipment failures injuries. Risk of explosion de | r Risk / Emerger SSI, ESS 2 ral disasters that which are mainly lower may affect waves may affect directly impact wowaves may affect equipment eaks and/or spills: Malfunctions in the to residual fue | may affect the depot and heavy rains and heat situations could arise and chemicals / fue and chemicals / fue and or removal which arkers' health and increthe performance of the workers' performance of the can lead to hazard an equipment or machel vapors during tank | are the common natural disasters waves a. These include electrical fires, I / oil leak and/ spills. orage tanks. As the final decision could lead to potential hazards if rease strain on water and energy, the equipment. ance and also may affect the lous conditions for workers and | |







| | Control | Natural elements: temperature, rain, wind, dust, operational failures (equipment, fires, spills, leaks) and human error. | | | | | |
|---|----------------------|--|--|-----------------|--------------|--|--|
| | Source | Neutralization of underground diesel tanks. | | | | | |
| | | Presence of residual f | uel vapors and flammat | ole materials. | | | |
| | Receptor | Workers and constru | ction materials | | | | |
| | Кесергог | Nearby communities | and residents. | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | | 5 | 2 | 10 | Moderate | | |
| | Impact Assessment | Negative, Moderate, Short-term, irreversible | | | | | |
| 7 | Acrest | Occupational Health and Safety (code: OHSI) | | | | | |
| | Aspect | Relevant ESSs: ESS1, ESS 2 | | | | | |
| | Description | out cables and pi | ivities include demolitio ipes, working at height of infectious diseases | • | , , , , | | |













| | Description | The relocation of labor force is not a physical relocation per se. CTA confirmed that all employees, admins, engineers, technicians, drivers, conductors, and service workers will be transferred to the neighboring depots, namely: Al Sawah and Al Matariyah. Buses are supposed to operate on same existing routes but from the neighboring depots during decommissioning instead. This matter should not imply any significant social risks if well managed timely ahead of evacuation and decommissioning. Passengers will not be affected in this regard. | | | | | |
|----|-----------------------------|--|--------------------------------|-----------------------|--------------|--|--|
| | Direct Impacts | Relocation of CTA staff from Al-Ameriyah depot to El Sawah and Al-Matariyah depots | | | | | |
| | Indirect impacts | Moving the logistic | Moving the logistics and staff | | | | |
| | Source | Decommissioning | and Construction | n activities | | | |
| | Receptors | CTA staff at Al-Ar | neriyah Depot | | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | |
| | | 3 | 3 | 9 | Moderate | | |
| | Impact assessment | Negative, Moderat | | | | | |
| 9 | Aspect | Community Hea | | | | | |
| | Description Direct Impacts | Construction activities may result in an increase in movement of heavy vehicles for the transport of construction materials and equipment During excavation activities, existing underground infrastructure that serve the area may be broken The impacts of the decommissioning and the construction work on public health are dust, gas emissions, noise, and health risks from poor waste disposal, which could affect the community surrounding the depot. CHSI expected impacts are as follows: Risks may arise from unauthorized access to the construction site, particularly by members of the local community such as children or individuals unfamiliar with site hazards. This can result in accidental contact with hazardous materials (e.g., fuels, chemicals), exposure to unstable excavations, or interaction with incomplete structures, increasing the likelihood of injuries, falls, or entrapment incidents in addition to the risk of explosion due to potential fuel residues in underground diesel storage tanks, pressurized gas pipelines, or electrical faults, which could pose hazards if not properly neutralized and handled according to safety protocols. | | | | | |
| | | Complaints from the surrounding community. | | | | | |
| | Indirect impacts | Accidents and inju | ries can affect the | e livelihood of local | communities. | | |
| | Source | Construction activ | rities | | | | |
| | Receptors | Surrounding comm | nunity | | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | |
| | | 3 | 3 | 9 | Moderate | | |
| | Impact assessment | Negative, Moderat | | | | | |
| 10 | Aspect | Temporary La Relevant ESSs: | | | | | |







| | Description | Hiring workers from outside the project area might result in unfavorable impacts on the available resources and it may also result in inconvenience to the local communities, particularly in the areas where communities are conservative or not accustomed to having outsiders. (e.g., pressure on accommodation, food, risk of communicable diseases, health care and medication and potable source of water). | | | | | | | |
|----|--|---|---|--|---|--|--|--|--|
| | Direct Impacts | Accessibility to the land/resources/structures, security concerns | | | | | | | |
| | Indirect impacts | Conflicts and disp | utes | | | | | | |
| | Source | Temporary labor influx risks as a result of construction activities. | | | | | | | |
| | Receptors | Construction workers | | | | | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | | | |
| | Significance | 3 | 2 | 6 | Moderate | | | | |
| | Impact assessment | Negative, Modera | te, Short-term, I | Reversible | | | | | |
| 11 | Aspect | Child Labor (co | de: CHLI) | | | | | | |
| | Aspect | Relevant ESSs: | ESSI, ESS 2 | | | | | | |
| | Description | during the construstions afety, and development | uction phase. Chopment, as they | nild labor poses signi may be exposed to | ntractors or service providers ficant risks to children's health, hazardous working conditions, ing their long-term growth and | | | | |
| | Direct Impacts | Fatigue and stress Disruption in the | Exposure to unsafe working conditions Fatigue and stress, hindering their physical and mental development. Disruption in the child's education is due to long working hours or dangerous work | | | | | | |
| | Indirect impacts | environments. The presence of child laborers in hazardous environments can create moral and ethical dilemmas for other workers and supervisors, potentially leading to workplace tensions. | | | | | | | |
| | Source | Hiring children du | iring constructio | n phase | | | | | |
| | Receptors | Working children | | | | | | | |
| | · | | | | | | | | |
| | C:::f: | Severity | Frequency | Magnitude (SxF) | Significance | | | | |
| | Significance | Ŭ. | | Magnitude (SxF) | Significance Low | | | | |
| | Significance Impact assessment | Severity | Frequency | 4 | ŭ . | | | | |
| 12 | Impact assessment | Severity 4 | Frequency I cant, Short-term | 4 , Reversible | ŭ . | | | | |
| 12 | | Severity 4 Negative, Insignific | Frequency I cant, Short-term ge (code: CHI) | 4 , Reversible | ŭ . | | | | |
| 12 | Impact assessment | Severity 4 Negative, Insignification Culture Heritage Relevant ESSs: Although it's unlike | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 sely to find artifalat the depot is a | , Reversible cts in the project are in existing depot, it i | ŭ . | | | | |
| 12 | Impact assessment Aspect | Severity 4 Negative, Insignific Culture Heritag Relevant ESSs: Although it's unlik is not deep and the | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 sely to find artifalat the depot is a | , Reversible cts in the project are in existing depot, it i | Low ea especially that the excavation | | | | |
| 12 | Impact assessment Aspect Description | Severity 4 Negative, Insignification Culture Heritage Relevant ESSs: Although it's unlike is not deep and the prepares and implementation. | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 sely to find artifalat the depot is a | , Reversible cts in the project are in existing depot, it i | Low ea especially that the excavation | | | | |
| 12 | Impact assessment Aspect Description Direct Impacts | Severity 4 Negative, Insignific Culture Heritag Relevant ESSs: Although it's unlik is not deep and th prepares and impl Chance finds Not expected | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 tely to find artifal hat the depot is a dements chance for | , Reversible cts in the project are in existing depot, it is finds procedure. | Low ea especially that the excavation | | | | |
| 12 | Impact assessment Aspect Description Direct Impacts Indirect impacts | Severity 4 Negative, Insignific Culture Heritag Relevant ESSs: Although it's unlik is not deep and th prepares and impl Chance finds Not expected | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 tely to find artifal hat the depot is a dements chance for | , Reversible cts in the project are in existing depot, it is finds procedure. | ea especially that the excavation important that the contractor | | | | |
| 12 | Impact assessment Aspect Description Direct Impacts Indirect impacts Source | Severity 4 Negative, Insignified Culture Heritage Relevant ESSs: Although it's unlike is not deep and the prepares and implement of the company of the | Frequency I cant, Short-term ge (code: CHI) ESSI, ESS 8 tely to find artifal hat the depot is a dements chance for | , Reversible cts in the project are in existing depot, it is finds procedure. | ea especially that the excavation important that the contractor | | | | |







| | Impact assessment | Negative, Low, Short-term, Reversible | | | | | | |
|----|-------------------|---|--|-------------------------|--|--|--|--|
| | Aspect | | Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/Sexual Harassment (SEA-SH) (code: GB&SEI) | | | | | |
| | | Relevant ESSs: ESS1, ESS 2, ESS4, ESS10 | | | | | | |
| | Description | The labor-intensive nature of construction and decommissioning phases typically involves a male-dominated workforce, which can increase interaction between workers and the local community. The scale of labor influx combined with the absorptive capacity of the local community indicates a heightened risk of GBV and SEA-SH incidents. Women and girls in the community, as well as female workers on-site, are particularly vulnerable. | | | | | | |
| 13 | Direct Impacts | Sexual Harassment: Women in the local community and within the workplace may face sexual harassment from construction workers, particularly in and around worker accommodations. Exploitative Sexual Relationships: Power imbalances during employment or community interactions may result in exploitative sexual relationships, including those based on economic dependency. Discrimination: Women may encounter unequal employment opportunities, lower wages, and unsafe workplace conditions compared to their male counterparts. | | | | | | |
| | Indirect impacts | | Addressing GBV incidents can place an additional burden on local health and social services, which may already be limited in capacity. | | | | | |
| | Source | Construction Work | ers | | | | | |
| | Receptors | Women and Girls in | the Local Community | , | | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | | |
| | | 4 | 1 | 4 | Low | | | |
| | Impact assessment | Negative, Low, Short-term, Reversible | | | | | | |
| | Aspect | Road Safety (Code Relevant ESSs: ES | | | | | | |
| | Description | | | | ficant increase in traffic, uction equipment, and | | | |
| 14 | Direct Impacts | construction site Traffic congestion | construction site. Traffic congestion affecting local communities, businesses, and emergency services. Potential collisions with pedestrians, cyclists, and vehicles, particularly in areas with | | | | | |
| | Indirect impacts | | s and grievances about | t road safety, accessib | oility, and disruptions. | | | |
| | Source | Transport of constru | uction materials, excav | ation equipment, and | waste disposal trucks. | | | |
| | Receptors | Pedestrians, local res | sidents, businesses, and | froad users in the vic | inity of the project site. | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | | |
| | Jigiiiii Cairice | 4 | 2 | 8 | Moderate | | | |
| | Impact assessment | Negative, Moderate, | Short-term, Reversibl | е | | | | |







6.4.2 Operation and Maintenance Phase

The table below shows the impact assessment during the operation and maintenance phase.

Table 6-6 Impact assessment during operation phase of the depot

| | Operation and Maintenance Phase of the depot | | | | | | |
|---|--|---|--|---|--------------------------|--|--|
| 1 | | Air Quality (code : | AQ2) | | | | |
| | Aspect Relevant ESSs: ESS1, ESS2, ESS3, ESS 4 | | | | | | |
| | Description | Gaseous emissions: emissions of CO2, NOx, CO, PM, HC, SO2 from diesel combustion case of operating the backup generators. No gaseous emissions will be emitted from dry type transformers. Gaseous emissions are expected to be temporary, only in the case of backup generate and maintenance activities (using lubricants). It's anticipated that the emission of pollutants will not exceed the critical permissib concentration. | | | | | |
| | Direct Impacts | | | | | | |
| | Indirect Impacts | No indirect impacts. | | | | | |
| | Source | Operation of backup | generators and during r | maintenance activities of | f the e-buses. | | |
| | Receptors | Nearby residential are | ea | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | 0.0 | 2 | 2 | 4 | Low | | |
| | Impact Assessment | Negative, Low; long-term, Reversible | | | | | |
| | | Noise and Vibration (code: NV2) Relevant ESSs: ESS1, ESS 2, ESS 4 | | | | | |
| 2 | Aspect | | | | | | |
| 2 | Aspect Description | Relevant ESSs: ESS | SI, ESS 2, ESS 4 uring the operation in th | ne depot can arise from | maintenance activities, | | |
| 2 | | Relevant ESSs: ESS Noise and vibration do and the dry transform | SI, ESS 2, ESS 4 uring the operation in th | | maintenance activities, | | |
| 2 | Description Direct | Relevant ESSs: ESS Noise and vibration do and the dry transform | or, ESS 2, ESS 4 uring the operation in | | maintenance activities, | | |
| 2 | Description Direct Impacts Indirect | Relevant ESS: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h | oring the operation in | | | | |
| 2 | Description Direct Impacts Indirect Impacts | Relevant ESSs: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h Maintenance worksho | oring the operation in | to be high. the dry transformers a | | | |
| 2 | Description Direct Impacts Indirect Impacts Source Receptors | Relevant ESSs: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h Maintenance worksho | or, ESS 2, ESS 4 uring the operation in the ers. local and not expected ave been identified. ops, washing equipment, | to be high. the dry transformers a | | | |
| 2 | Description Direct Impacts Indirect Impacts Source | Relevant ESS: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h Maintenance workshow Workers, drivers, ride | uring the operation in theers. local and not expected ave been identified. ops, washing equipment, ers/passengers and near | to be high. the dry transformers a | nd chargers | | |
| 2 | Description Direct Impacts Indirect Impacts Source Receptors | Relevant ESS: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h Maintenance workshow Workers, drivers, ride Severity (S) | uring the operation in the ders. local and not expected ave been identified. pps, washing equipment, ers/passengers and near Frequency (F) | to be high. the dry transformers a by residents Magnitude (SxF) | nd chargers Significance | | |
| 3 | Description Direct Impacts Indirect Impacts Source Receptors Significance Impact | Relevant ESSs: ESS Noise and vibration do and the dry transform Level of noise will be No indirect impacts h Maintenance workshow Workers, drivers, ride Severity (S) 2 Negative, Low; Short- | uring the operation in | to be high. the dry transformers a by residents Magnitude (SxF) | nd chargers Significance | | |







| | Operation a | nd Maintenance P | hase of the depot | | | | |
|---|----------------------|--|-------------------------|--------------------------|----------------------------|--|--|
| | Direct Impacts | Accidental spills during maintenance, improper disposal of hazardous materials, runoff during washing or firefighting Improper disposal of cleaning agents or chlorination residues during underground tank | | | | | |
| | Indirect Impacts | Maintenance could lead to soil or water contamination. Soil contamination could impact human health in the local environment. | | | | | |
| | Source | | r network, leakage of o | | ors and possible leakage | | |
| | Receptors | Soil, topography in th | e site routes, drivers | | | | |
| | C:==:£:===== | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | Significance | 3 | 2 | 6 | Moderate | | |
| | Impact Assessment | Negative, Moderate; | Long-term, Reversible | | | | |
| 4 | A | Water Bodies and | Groundwater(code ' | WB2) | | | |
| | Aspect | Relevant ESSs: ESS | SI, ESS 3, ESS 4 | | | | |
| | Description | The nearest surface water body (Ismailia canal) is 1.6 km away. So, no significant impact is expected on surface water bodies. Spills or leaks of hazardous materials (e.g., lubricants, and chemicals used in bus | | | | | |
| | Direct | maintenance) could infiltrate through the soil and reach the groundwater, posing a risk of contamination. Improper disposal of cleaning agents or chlorination residues during the underground tank maintenance could lead to soil or water contamination, However, this impact is unlikely | | | | | |
| | Impacts | due to the isolation of the depot floor after retrofitting, Additionally, during the construction phase, any groundwater encountered will be appropriately managed through dewatering practices. | | | | | |
| | Indirect Impacts | Over time, small leaks and spills could lead to the buildup of contaminants in the aquifer, especially in areas with slow groundwater movement. | | | | | |
| | Source | Maintenance activities | and waste generation. | | | | |
| | Receptors | Groundwater and sur | face water | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | Significance | 3 | 2 | 6 | Moderate | | |
| | Impact Assessment | Negative, Moderate; | Long-term, Reversible | | | | |
| 5 | Aspect | Resource efficiency | y and pollution gener | ration (code: RP2) | | | |
| | | Relevant ESSs: ESS | SI, ESS2, ESS3, ESS4 | 4 | | | |
| | Description | Significant increase in | electricity consumption | n (up to 14 MVA). | | | |
| | | Hazardous waste genagents). | neration expected (wire | es, transformer coils, s | pills, batteries, cleaning | | |
| | | Treatment of the was | stewater generated from | n E-bus washing will ge | nerate sludge. | | |
| | Direct | Increase in energy co | nsumption, | | | | |
| | Impacts | Improper raw materia | als handling, | | | | |







| | Operation and Maintenance Phase of the depot | | | | | | | |
|---|--|---|--|--|--------------------------|--|--|--|
| | | Pollution from waste | | | | | | |
| | | Spill of detergents and chemical used in bus washing machine | | | | | | |
| | Indirect | Increase of hazardous waste/sludge | | | | | | |
| | Impacts | mer case of mazar dous wasterstudge | | | | | | |
| | Source | Increase of resources consumption | | | | | | |
| | | Raw materials handlin | g and storage | | | | | |
| | | Hazardous and non-hazardous waste generation | | | | | | |
| | | Sludge from bus wash | ing machine | | | | | |
| | Receptors | Local environment, su | irrounding community, | depot workers | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | | 3 | 4 | 12 | Substantial | | | |
| | Impact Assessment | Negative, Substantial; | Long-term, Irreversible | | | | | |
| 7 | Aspect | Natural Disaster R | isk / Operational Em | ergencies Situations | (code: NDR2) | | | |
| | | Relevant ESSs: ESS | 5 2, ESS 4 | | | | | |
| | Description | The natural disaster risk that are expected to affect the operation of the depot are heat waves and heavy rains, | | | | | | |
| | | Additionally, some op | erational emergencies s | situations may occur suc | ch as: | | | |
| | | | during charging can fa ery overheats and pote | il or overheat, leading ntially ignites. | to a thermal runaway | | | |
| | | Chemical spills of haza | ardous materials such a | s cleaning agents, or coo | plant fluids used in bus | | | |
| | | Fire outbreaks due to | electrical faults in char | ging stations or faulty w | riring, | | | |
| | Direct Impacts | Heat waves: can directly cause softening of pavement, which can then be substantially damaged by vehicle circulation. Additionally, heat waves will increase the energy consumed by the depot and the e-bus because of the Air conditioner (AC) will be operating most of the day. With regards to the e-buses, this might affect the batteries drainage time and the frequency to recharge the batteries. Also, Heat waves can cause short circuits inside the charging system inside the depot. | | | | | | |
| | | Heavy rains: Can dire workers inside the de | | s for the chargers and c | an cause accidents for | | | |
| | | | ncies situations : Fire se of toxic fumes from | hazards due to shor batteries, C | t circuits, equipment | | | |
| | | Combining firefighting water quality | g and domestic water su | applies in a single under | ground tank can affect | | | |
| | Indirect Impacts | Increase in maintenan | ce cost and strains on e | e-buses | | | | |
| | Source | Natural elements: ten | nperature, rain, wind, | | | | | |
| | Receptors | Infrastructure materia | al (e.g., roads, buses, cha | argers and batteries) | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | | ce Severity (S) Frequency (F) Magnitude (SxF) Significance | | | | | | |







| | Operation a | nd Maintenance P | hase of the depot | | | | | |
|----|----------------------|--|--|---|--------------|--|--|--|
| | Impact Assessment | Negative, Moderate, Long-term, Irreversible | | | | | | |
| 8 | Aspect | Occupational Health and Safety (code: OHS2) | | | | | | |
| | | Relevant ESSs: ESS | SI, ESS 2 | | | | | |
| | Description | Involves various activities that pose potential health, safety risks to the workforce. The risks include exposure to electric shocks, hazardous substances, physical injuring ergonomic issues, fire hazards and accidents related to bus operations and maintenance. | | | | | | |
| | Direct | Electric shocks from I | nigh-voltage systems | | | | | |
| | Impacts | Battery-related incide | nts such as leaks or fire | es | | | | |
| | | Physical injuries during | g maintenance and oper | ration | | | | |
| | Indirect Impacts | Livelihood impacts as | a result of sickness and | injuries. | | | | |
| | Source | Operation/maintenand | ce activities | | | | | |
| | Receptors | Workers | | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | | 4 | 3 | 12 | Substantial | | | |
| | Impact Assessment | Negative, Substantial; Long-term, Irreversible | | | | | | |
| 9 | | Labor Force Behavior (LFBI) | | | | | | |
| | Aspect | Relevant ESSs: ESSI, EE2, ESSI0 | | | | | | |
| | Description | The transition from diesel and natural gas buses to electric buses introduces operational challenges, including the need for drivers and maintenance staff to adapt to new technologies and operational practices. Insufficient training or inadequate behavior could result in safety risks, operational inefficiencies, and negative passenger experiences | | | | | | |
| | Direct Impacts | Operational inefficien | Operational inefficiencies and safety risks. | | | | | |
| | Indirect impacts | Reduce passenger sat | isfaction and low riders | ship rates | | | | |
| | Source | Operation and Mainte | enance Activities | | | | | |
| | Receptors | Bus users | | | | | | |
| | Cignificance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | Significance | 4 | 3 | 12 | Substantial | | | |
| | Impact assessment | Negative, Substantial, | Long-term, Irreversible | 9 | | | | |
| | | Community Health | and Safety (Code: C | CHS2) | | | | |
| | Aspect | Relevant ESSs: ESS | SI, ESS 4 , ESSIO | | | | | |
| 10 | Description | | night pose potential hea | ctivities, including bus op alth and safety risks to t | | | | |







Operation and Maintenance Phase of the depot No direct impacts are expected during the operation phase of the depot rather than potential deficiency in the system that might cause fire risk. Direct Increased noise from depot operations (e.g., workshop activities) might affect nearby **Impacts** Complaints from the surrounding community. Indirect No significant impact is expected. impacts Source E-bus charging stations, maintenance areas, Receptors Surrounding community Severity Frequency Magnitude (SxF) Significance Significance 4 low **Impact** Negative, low, long-term, Irreversible assessment Road Safety (Code: RS2) **Aspect** Relevant ESSs: ESS 4, ESS10 Description The depot operation will involve frequent movement of electric buses and staff. Risk of collisions between buses, pedestrians, and maintenance vehicles within the depot. Direct **Impacts** Traffic bottlenecks due to buses entering and exiting the depot at peak hours. Indirect Disruptions to surrounding businesses and residents due to depot-related congestion. impacts Frequent bus movements, maintenance activities, and entry/exit points of the depot. Source Receptors Surrounding community Severity Frequency Magnitude (SxF) Significance Significance 2 Moderate Impact Negative, Moderate, long-term, Irreversible assessment

Table 6-7 Impact assessment during operation phase of E-buses

| Оре | Operation and Maintenance Phase of the E-buses | | | | | |
|---|--|--|--|--|--|--|
| 1 | Aspect | Air Quality (code : AQ2) Relevant ESSs: ESS1, ESS2, ESS3, ESS 4 | | | | |
| | Description | Minimal dust emissions expected during the operation of the e-buses on the selected routes | | | | |
| Direct No direct emissions are released | | No direct emissions are released from the e-buses | | | | |
| | Indirect Impacts | While the e-buses themselves do not emit pollutants during operation, indirect impacts are associated with the energy required to charge the buses. If the electricity used to charge the e-buses comes from fossil fuel-based power plants, | | | | |
| | Source | Wheels of electric buses Charging of buses | | | | |
| | Receptors | Nearby residential area | | | | |







| Ор | Operation and Maintenance Phase of the E-buses | | | | | | | |
|----|--|--|---|-----------------|--------------|--|--|--|
| | C::C | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | Significance | 2 | 4 | 8 | Moderate | | | |
| | Impact assessment | Negative, Moderate; Long-term, Reversible | | | | | | |
| 2 | Aspect | Noise and Vibration (code: NV2) Relevant ESSs: ESS1, ESS 2, ESS 4 | | | | | | |
| | Description | | E-buses are quieter compared to diesel buses; operational activities within the depot and routes expected to be within accepted limits. | | | | | |
| | Direct Impacts | Low-level noise ex | pected came from buses. | | | | | |
| | Indirect Impacts | No indirect impact | No indirect impacts have been identified. | | | | | |
| | Source | E-buses operation | | | | | | |
| | Receptors | Drivers, riders/pas | sengers, residents | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | | 2 | 2 | 4 | Low | | | |
| | Impact assessment | Negative, Low; Long-term, Reversible | | | | | | |
| 3 | Aspect | Water Bodies and Groundwater (code WB2) Relevant ESSs: ESS1, ESS 3, ESS 4 | | | | | | |
| | Description | The operation of e-buses, given their nature, is unlikely to have a significant impact on any water bodies. This nature of bus operations limits any potential impact. | | | | | | |
| | Direct Impacts | No significant impact is expected. | | | | | | |
| | Indirect Impacts | No significant impact is expected. | | | | | | |
| | Source | Bus operation | | | | | | |
| | Receptors | Groundwater and surface water | | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | Jigimicanec | T | 1 | T | Low | | | |
| | Impact assessment | Negative, Low; Long-term, Reversible | | | | | | |
| 4 | Aspect | Resource efficiency and pollution generation (code: RP2) Relevant ESSs: ESS1, ESS2, ESS3, ESS4 | | | | | | |







| Оре | eration and Mai | tion and Maintenance Phase of the E-buses | | | | | | |
|-----|---|---|--|---------------------------|---------------|--|--|--|
| | Description | There will be a significant increase in the overall electricity consumption during operation of the e-buses due to charging Heat waves may lead to an increase in energy consumption of the e-buses' batteries which will require recharging more often than the designated time for recharging. Moreover, it could affect the condition of the tires, which will require replacement. Non-hazardous waste and scrap: Broken/unused parts, pipes Tires Spare parts | | | | | | |
| | Direct Impacts | Municipal solid The primary direct which could strain materials related | Wastewater: Failure in sewage piping network Municipal solid waste The primary direct impact will be the increased demand for electricity to power the e-buses, which could strain the local power grid. Additionally, improper handling and disposal of materials related to the operation, such as worn tires and waste generated during maintenance, can contribute to environmental pollution. | | | | | |
| | Indirect Impacts | Increase greenhou | se gas emissions if the ele | ectricity is sourced from | fossil fuels. | | | |
| | Source | Increase of resources consumption Raw materials handling and storage Hazardous and non-hazardous waste generation | | | | | | |
| | Receptor | Local environment, surrounding community and employees. | | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | | 3 | 4 | 12 | Substantial | | | |
| | Impact Assessment | Negative, Substantial; Long-term, Irreversible | | | | | | |
| 5 | Aspect | Natural Disaster Risk/ Operational Emergencies Situations (code: NDR2) Relevant ESSs: ESS 2, ESS 4 | | | | | | |
| | Description | The main expected natural disaster risks that are expected to affect the operation of the buses are heat waves and heavy rains, Additionally, some operational emergencies situations may occur: Electric bus batteries can fail or overheat, leading to a thermal runaway event, where the battery overheats and potentially ignites | | | | | | |
| | Direct Impacts | Heat waves: Potential damage to e-bus batteries and increase energy consumption for cooling systems and decrease the lifetime of tires Operational emergencies situations: Fire hazards, release of toxic fumes from batteries and potential injury to passengers and drivers | | | | | | |
| | Indirect impacts | Increase in maintenance cost and strains on e-buses and natural resources | | | | | | |
| | Source | Natural elements: | temperature, rain, wind, | human error | | | | |
| | Receptors | Infrastructure mate | erial (e.g., roads, buses, cl | hargers and batteries) | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | Significance | 3 | 2 | 6 | Moderate | | | |
| | Impact Assessment Negative, Moderate, Long-term, Irreversible | | | | | | | |







| Оре | Operation and Maintenance Phase of the E-buses | | | | | | |
|--|--|---|---|----------------------------|----------------------------|--|--|
| 6 | | | Occupational Health and Safety (code: OHS2) | | | | |
| | Aspect | Relevant ESSs: E | | | | | |
| | Description | Driving hazards po users during the of fatigue, road cond | Driving hazards pose significant risks to both the bus drivers, passengers and other road users during the operation of electric buses. These hazards may be resulted from driver fatigue, road conditions, poor visibility, reckless driving, mechanical failures, long driving hours, traffic congestion, and sudden stops. | | | | |
| | Direct Impacts | Accidents lead to p | ootential injury or fatalitie | es. | | | |
| | Indirect impacts | Livelihood impacts | as a result of sickness, ar | nd injuries | | | |
| | Source | Operation activitie | s | | | | |
| | Receptors | Workers and Ride | rs/Passengers | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | oignineance | 4 | 3 | 12 | Substantial | | |
| | Impact assessment | Negative, Substanti | ial; Long-term, Irreversibl | le | | | |
| 7 | Aspect | Road Safety (Co | de: RS2) | | | | |
| | Aspect | Relevant ESSs: ESS | 4, ESS10 | | | | |
| | Description | The replacement of 75 diesel buses with 98 electric buses (as 98 e-buses identified as the theoretical requirement to maintain equivalent service levels to the existing 75 buses) will result in a slight increase in traffic due to the higher number of buses operating on the same routes. | | | | | |
| | Direct Impacts | The addition of 23 more buses to the fleet could result in more frequent stops and starts, potentially slowing down overall traffic flow and increasing congestion. However, it is expected about 20% modal shift, where a significant portion of car and taxi users will switch to using the buses. This modal shift will lead to a reduction in the number of private vehicles on the road, which should offset the congestion caused by the additional buses. Therefore, while there may be an initial increase in traffic congestion, the overall effect on traffic flow is expected to be minimal due to the reduction in private vehicle usage. | | | | | |
| | Indirect impacts | Potential Delays in Public Transportation: other road users, including private vehicles and non-motorized transport, may experience delays. | | | | | |
| | Source | Increased Number | of Buses | | | | |
| | Receptors | Community and Lo | ocal Residents | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | |
| | Jigiiiiicanee | 2 | 4 | 8 | Moderate | | |
| | Impact assessment | Negative, Moderat | e, Long-term, Irreversible | 2 | | | |
| 8 | Aspost | Labor Force Bel | navior | | | | |
| | Aspect | Relevant ESSs: E | SSI, ESS2, ESSI0 | | | | |
| | Description | Drivers will need to | o be trained to conform v | with the shift from fuel o | r diesel buses to e-buses. | | |
| Direct Insufficient/inadequate technical and non-technical | | | hnical training in dealing | with the e-bus operation | | | |







| Оре | eration and Mai | ntenance Phase of th | ne E-buses | | | | | |
|---|----------------------|--|---|---|-------------------------|--|--|--|
| | Indirect impacts | Operation malfund | Operation malfunction | | | | | |
| Source Operation and Maintenance Activities | | | | | | | | |
| | Receptors | Bus users, and in specific females and persons with limited mobility or disabilities | | | | | | |
| | Significance | Severity (S) | Frequency (F) | Magnitude (SxF) | Significance | | | |
| | Significance | 4 | 3 | 12 | Substantial | | | |
| | Impact assessment | Negative, Substant | ial, Long-term, Irrevers | ble | | | | |
| 9 | Associ | Community Hea | alth and Safety (Cod | e: CHS2) | | | | |
| | Aspect | Relevant ESSs: F | ESS 1, ESS4 , ESS10 | | | | | |
| | Description | | | vior during the shifting fronts and increase risks to c | | | | |
| | Direct | Traffic Accidents a | nd Pedestrian Safety: in | case of improper driver s | selection. | | | |
| | Impacts | Complaints from t | he surrounding commu | nity. | | | | |
| | Indirect impacts | Increased Traffic Congestion: Higher bus frequency could lead to congestion, impacting local traffic flow and increasing accident risks. | | | | | | |
| | Source | E-buses | | | | | | |
| | Receptors | Surrounding comm | nunity and riders/passer | ty and riders/passengers | | | | |
| | Significance | Severity | Frequency | Magnitude (SxF) | Significance | | | |
| | oignineance | 4 | 3 | 12 | Substantial | | | |
| | Impact assessment | Negative, Substan | tial; Long-term, Irrevers | sible | | | | |
| 10 | Aspect | Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/S Harassment (SEA-SH) (code: GB&SE2) Relevant ESSs: ESS I, ESS10 | | | n and Abuse/Sexual | | | |
| | Description | The intensive ridership of e-buses can increase interaction between males and females indicates a heightened risk of GBV and SEA-SH incidents. Women and girls in the public transportation means are particularly vulnerable. | | | | | | |
| | Direct Impacts | Sexual Harassme riders. | nt and gender-based v | riolence from male e-bu | us users towards female | | | |
| | Indirect impacts | Unsafe environment for women and girls inside e-buses Male riders and Drivers Female e-bus users | | | | | | |
| | Source | | | | | | | |
| | Receptors | | | | | | | |
| | Cignificance | Severity | Frequency | Magnitude (SxF) | Significance | | | |
| | Significance | 3 | 3 | 9 | Moderate | | | |
| | Impact assessment | Negative, Moder | Negative, Moderate, Long-term, Reversible | | | | | |







6.4.3 Impact Rating Summary

The following table shows a rating summary of the environmental and social impacts resulting from decommissioning, construction and maintenance and operation phases.

Table 6-8 Environmental, social and gender impact rating summary

| Phase | Receptor/ EHS Aspect | lı | mpact | Rati | ng |
|---------------------|---|----------|--------------|-----------------|------|
| | | Low | Mode rate | Subst antial | High |
| Decommissioning and | Air Quality | | | | |
| Construction | Noise and Vibration | | V | | |
| | Soil, geology and topography | | | V | |
| | Water bodies and groundwater | | V | | |
| | Resource efficiency and pollution prevention | | | V | |
| | Natural disaster risks / working Emergency Situations | | 1 | | |
| | Occupational Health and safety | | | 1 | |
| | Labor force relocation | | 1 | | |
| | Community Health and Safety | | V | | |
| | Labor Influx | | V | | |
| | Child Labor | V | | | |
| | Cultural Heritage | √ | | | |
| | Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/Sexual Harassment | V | | | |
| | Road Safety | | V | | |
| Operation and | Air Quality | V | | | |
| Maintenance of the | Noise and Vibration | V | | | |
| Depot | Soil, geology and topography | | V | | |
| | Water bodies and groundwater | | √ | | |
| | Resource efficiency and pollution prevention | | | V | |
| | Natural disaster risks/ emergency operational situations | | V | | |
| | Occupational Health and safety | | | 1 | |
| | Labor Force Behavior | | | 1 | |
| | Community Health and Safety | V | | | |
| | Road Safety | | 1 | | |
| | Air Quality | | V | | |
| | Noise and Vibration | V | | | |
| | 1 | | | | |







| Phase | Receptor/ EHS Aspect | | Impact Rating | | | |
|----------------------------|--|-----|---------------|-----------------|------|--|
| | | Low | Mode rate | Subst antial | High | |
| Operation and | Water bodies and groundwater | V | | | | |
| Maintenance of the E-buses | Resource efficiency and pollution prevention | | | V | | |
| buses | Natural disaster risks / emergency operational situations | | V | | | |
| | Occupational Health and safety | | | V | | |
| | Road Safety | | V | | | |
| | Labor Force Behavior | | | V | | |
| | Community Health and Safety | | V | | | |
| | Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/Sexual Harassment (SEA-SH) | | V | | | |







7 Environmental and Social Management Plan (ESMP)

7.1 Implementation Arrangement for the Project

The e-bus project, which falls under Component 3 of GCCC will be executed in accordance with the Environmental and Social Commitment Plan (ESCP) (available here). The ESCP outlines specific responsibilities, roles, and mitigation measures aimed at managing environmental and social (E&S) risks during the decommissioning, construction, and operational phases of the project. The following outlines the E&S-specific implementation arrangements:

7.1.1 Project Coordination Unit (PCU):

The PCU is responsible for the overall coordination of the project's implementation, including the E&S requirements. It oversees and ensures compliance with the E&S obligations stipulated in the ESCP. The PCU includes an **Environmental Specialist**, **Social Development and Gender Specialist**, and **Health and Safety Specialist** who are responsible for:

- Reviewing and approving all E&S documentation prepared by the contractors, such as the Environmental and Social Management Plan (ESMP), Occupational Health and Safety (OHS) Plans, and the Traffic Management Plan, etc.
- Conducting regular site inspections to monitor the compliance with E&S requirements, including but not limited to environmental protection measures, worker safety, hazardous materials handling, and waste management.
- Ensuring that all project activities are conducted in line with the applicable World Bank Environmental and Social Standards (ESSs) and the national laws and regulations.
- Technical Implementation Unit (TIU):
- The TIU will be responsible for supervising the day-to-day project implementation. In terms of E&S oversight, the TIU's key responsibilities include but not limited to the following:
- Supervising private contractors to ensure that E&S measures from the ESMP and ESCP are implemented effectively.
- Ensuring that all the necessary permits, approvals, and clearances (e.g., construction permits, environmental approvals) are obtained and maintained.
- In coordination with the PCU Conducting regular site inspections to monitor compliance with E&S requirements, including but not limited to environmental protection measures, worker safety, hazardous materials handling, and waste management.
- Ensuring proper record-keeping of all E&S documentation, including monitoring reports, incident reports, and corrective action plans.
- **Non-Compliance Management**: Any identified non-compliance or E&S risks will be escalated to the TIU to take corrective action.

7.1.2 Contractor Obligations:

All contractors hired by the TIU/PCU for the decommissioning, construction, and operation phases will be required to comply with the E&S provisions outlined in the GCCC Project plans as SEP, LMP, SEA/SH Action Plan, ESCP and ESMP etc.

Contractors are required to develop and implement site-specific plans such as:

- Mobilization and Demobilization Plan: To ensure that all E&S permits and clearances are in place prior to commencing activities.
- **Traffic Management Plan**: To minimize traffic disruption and ensure community safety during the construction phase.
- Resource Efficiency Plan: To optimize the use of energy, water, and raw materials while minimizing waste generation.







- Waste Management Plan: For both hazardous and non-hazardous waste generated during decommissioning and construction, ensuring safe disposal practices in line with national regulations and ESS3.
- Chemicals and Hazardous Substances Management Plan: For handling and storage of hazardous materials such as oils, lubricants, and fuels, to prevent environmental contamination.
- Occupational Health and Safety Plan (OHS): Addressing worker safety, including prevention of accidents and ensuring adequate safety measures during construction and operation.
- **Emergency Preparedness and Response Procedures**: Ensuring emergency response capabilities for natural disasters, spills, fires, and accidents.
- Community and Worker Grievance Redress Mechanism (GRM): To handle complaints related to E&S issues, including gender-based violence (GBV) and other labor-related concerns, in compliance with ESS2 and ESS10.
- Staffing for E&S Compliance: the contractor(s) must employ qualified E&S personnel, including:
- **Environmental Specialist**: to implement the environmental requirements, e.g., resources consumption, waste management, and pollution control, ...etc.
- Social Development and Gender Specialist: to implement requirements to mitigate social, GBV and SEA/SH risks.
- Health and Safety Specialist: To ensure compliance with OHS standards, including trainings and capacity buildings, safety gear, and hazard prevention...etc.

The contractor is responsible for the compliance of the workers and subcontractors and primary service providers and suppliers with the ESMP. The contractor will report to the PCU and the TIU on implementation of the ESMP. **Appendix H includes the Qualifications of Specialists Hired by the Contractor**.

7.1.3 Consultant:

- Supervise works and ensure compliance with Environmental and Social Framework (ESF) of the World Bank as pertaining to the project as well as the prepared ESIA.
- Support the implementation of Grievance Redress Mechanism in compliance with the Environmental and Social Commitment Plan of the project.

7.2 Capacity Building for CTA:

The Capacity Building program for the CTA aims to equip personnel with the skills and knowledge needed to effectively manage and sustain the e-bus project. It focuses on areas such as e-bus technologies, maintenance, and battery disposal, as well as managerial practices, public transport planning, and service quality. The program also addresses disaster response, safety for vulnerable users, and environmental awareness, with an emphasis on reducing emissions. Ultimately, the goal is to ensure the successful implementation of the e-bus system, promoting sustainability, operational efficiency, and safety.

7.3 Environmental and Social Management Plan

The environmental and social management plan describes the process for implementation of measures to avoid, mitigate, reduce or offset significant impacts identified during decommissioning, construction, and operation and maintenance (O/M) phases of the project.

For each identified significant impact and set of mitigation measures, the description of the implementation process includes defined responsibilities for implementing the measures, and monitoring plan, specifying methods for monitoring, indicators to assess compliance and implementation of ESMP, including provisions outlined in instruments developed for the project for safeguarding ESS, i.e., Stakeholder Engagement Plan (SEP) (available here), Labor Management Procedures (LMP) (available <a href=here), and Environmental and Social Commitment Plan (ESCP)







(available here), frequency of monitoring, location, applicable project phase, estimated costs for implementation of ESMP.

Applicable phases of the project are denoted by the following: DC/C for decommissioning and construction, O/M for operation and maintenance.

The ESMP is presented in the tables below.













Table 7-1 Environmental and social management plan for the proposed project during decommissioning and construction phase

| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
|-----------------------|--|
| AQI | Air Quality - Dust and gaseous emissions during decommissioning and construction phase |
| Mitigation measures | The contractor should assign HSE manager at all decommissioning and construction sites who will ensure the implementation of the OHS plan and the ESMP requirements In addition to adequate HSE resources and prepare and implement an Air Quality Management Plan. The plan will be reviewed and approved by the PCU. The plans should focus on both minimizing emissions at source and preventing dust blow-off through the use of screens. The plan will include the adequate mitigation measures including but not limited to: Regular maintenance of vehicles and machinery to ensure optimal performance and reduced emissions. Use of low-emission equipment if possible. Minimizing drop heights for material handling activities such as unloading of friable materials. Minimizing dust from open area sources, including storage piles, by using control measures such as installing enclosures and covers, and increasing the moisture content. Use ready mix concrete and asphalt whenever possible Keeping the roads damped via watering spraying to minimize dust from spraying as a result of vehicles moving. Ensuring that vehicles travel on paved routes wherever possible. Sheeting of lorries transporting friable construction materials. Enforcing speed limits on unpaved roads to be <30 km/h. Replacing older vehicles with newer, more fuel-efficient alternatives. Using low sulfur content diesel. |
| | Minimize idling time of vehicles. Open burning for clearance or of solid wastes shall be prohibited. The plan must incorporate a grievance mechanism, which will be accessible and confidential. |
| Residual impact | Negative, low, short term |
| Methods of monitoring | Visual inspections onsite Spot check measurements of ambient air quality Review of maintenance records of machinery- according to reference testing methods (e.g., US EPA) Recording and documentation of complaint Results of monitoring to be drafted in monthly report for submission to TIU |
| Monitoring frequency | Daily inspections onsite of weather conditions and operating machinery, soil conditions Prior to procurement of machinery onsite: verification of maintenance records Monthly: ambient air quality measurements at 3 locations: onsite, at the residential area, and downwind |
| Monitoring Indicators | Weather conditions: visual ambient dust levels; windy conditions Operating vehicles and machinery: dust generation and black exhaust emissions |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities | | | |
|--|---|--|--|--|
| | Dust levels generated during construction activities (earthworks) Onsite ambient air quality compliance with WB and national limits for NOx, SOx, CO, PM Compliance for machinery inspection records | | | |
| Monitoring location | Construction site and surrounding at 3 locations: onsite, selected point in the residential area, downwind (refer to baseline locations) Machinery, equipment, and vehicles exhaust | | | |
| Responsibility and Staffing Requirement for Mitigation | fing A supervision consultant will supervise the construction activities including the E&S and OHS measures. | | | |
| Estimated cost (EGP) | Included in the construction contractor cost | | | |
| NVI | Noise and Vibration during decommissioning and construction phase | | | |
| Mitigation measures | The following mitigation measures will be applied to reduce the impact of noise during both decommissioning and construction phase.: Avoid demolition and construction work in the evening. Restricting the movement of lorry cars to prevent noise in the early morning and late evening periods. All machines and vehicles must be stopped when not in use. Prior to contractor procurement, evaluation of noise level of the decommissioning and construction equipment should be conducted especially for the activities with expected high noise and vibration such as crushers. The equipment with the least noise level possible in terms of cost and technology level should be selected. The contractor should prepare and implement a Noise and Vibration Management Plan. The plan should include the approach to noise and vibration management at the site such as those mentioned in the above bullet points. The plan should also include monitoring of noise and vibration levels to confirm the effectiveness of measures implemented. The plan must incorporate a grievance mechanism, which will be accessible and confidential. | | | |
| | With regards to OHS, the following will be implanted: The contractor must train all workers before starting demolition and construction work on the danger of noise and how to avoid them. Safety induction training should be delivered to all workers in the hiring phase. This orientation should cover all the hazards might be exist on site includes excessive noise hazards. Provide workers in areas of activities with high noise levels with earplugs. Reduce workers' exposure times to noise, so that they do not exceed the safety limits stipulated in the Egyptian environmental law in addition to VVB Standards. Heavy equipment operators must have valid operating license. Also, drivers must have professional license not private based on the class of the vehicle. | | | |









| CODE | Environmental and Social Component During the Decommissioning and the Construction activities | | | | | |
|---|---|--|--|--|--|--|
| Residual impact | Negative, low, short term | | | | | |
| Methods of monitoring | Inspection of operating machinery and vehicles onsite for proper functioning Inspection of proper PPE use Noise and vibration measurements compliance with local limits as per Law 4/1994 amended by law 9/2009 and amended ER no 2466/2024. and the WBG General Guideline, (Chapter 3, section 3.3) Check community GM register | | | | | |
| Monitoring frequency | Daily inspection of operating machinery onsite Monthly ambient noise and vibration measurements | | | | | |
| Monitoring Indicators | Noise level below permissible levels Maintenance records for equipment and inspection of proper noise enclosure fitting Time logs for work/construction activities Number of grievances | | | | | |
| Monitoring location | Depot | | | | | |
| Responsibility and Staffing Requirement for Mitigation | A supervision consultant will supervise the construction activities including the E&S measures. Contractor shall also contract noise and vibration measurement company. Contractor shall hire: Environmental health and safety specialist/project site engineer, and social development specialist for reporting on grievances related to complaints on noise and vibration | | | | | |
| Estimated cost (EGP) Included in the construction contractor cost | | | | | | |
| SGTI | Soil, geology, and topography during decommissioning and construction phase | | | | | |
| Mitigation measures | Schedule decommissioning and construction activities to avoid rainfall and high wind periods to the extent practical. Sequence decommissioning and construction activities so that the soil is not exposed for long periods of time. Misr Petroleum should develop and implement a Soil remediation Plan as a result of removing the 4 underground diesel tanks, according to the requirements of the Environmental national legislations and ensure obtaining the Civil Defense Approval in case of removing the tanks. Use appropriate lining and containment systems when neutralizing and cleaning underground diesel tanks to prevent chemical seepage into the soil. Use offsite equipment fueling and oil stations as much as possible Include spill kit on site to control, contain and clean up any potential spill. Ensure safe and proper handling and storage of Chemicals on site as per their materials safety data sheets (MSDS). Maintain soil cohesiveness (by wetting disturbed areas and by avoiding unnecessary traffic on construction sites). Cover on-site stockpiles of spoils and fill. Reduce the amount of import or export of soil required. | | | | | |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities | | | |
|--|---|--|--|--|
| | Provide temporary cover such as mulch or plastic when extended exposure is unavoidable. | | | |
| Residual impact | Negative, low, short term | | | |
| Methods of monitoring | Visual inspection of site: backfilling and restoration Inspection of vehicles, equipment and machinery used and associated maintenance records Regular soil sampling | | | |
| Monitoring frequency | Daily visual inspection Monthly for the maintenance reports, accidental spills/leaks reports | | | |
| Monitoring Indicators | Controlled equipment uses during works Erosion and cracking of soil | | | |
| Monitoring location | Onsite and surrounding | | | |
| Responsibility and Staffing Requirement for Mitigation | A supervision consultant will supervise the construction activities including the E&S measures. Contractor shall hire: Environmental health and safety specialist/project site engineer, and social development specialist for reporting on grievances related to complaints on noise and vibration | | | |
| Estimated cost (EGP) | Included in the construction contractor cost | | | |
| WBI | Water Bodies and Groundwater (WBI) | | | |
| Mitigation measures | In addition to the previous mentioned mitigation measures that will be applied to reduce, if elimination cannot be achieved, the negative impact regarding the Soil, Geology, and Topography the contractor shall also: | | | |
| | Perform borehole drilling to determine groundwater depth, subsurface conditions, and soil stratification. Assess the potential for dewatering during excavation activities and its impact on surrounding groundwater. Develop a dewatering plan, if required, that ensures minimal disruption to the aquifer. Record all findings, including groundwater depth, flow direction, and quality, in regular monitoring reports. Share these reports with relevant stakeholders, including local water authorities and environmental agencies. | | | |
| Residual impact | Negative, low, short term | | | |
| Methods of monitoring | Groundwater level measurement Analysis of collected groundwater samples Conduct borehole drilling to observe groundwater conditions and record depth. | | | |
| Monitoring frequency | Conduct groundwater depth and quality assessments before construction/decommissioning begins. Weekly Monitoring during high-impact activities such as excavation or dewatering. | | | |
| Monitoring Indicators | Groundwater Depth Water Quality | | | |
| Monitoring location | ■ Depot | | | |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities | | | |
|---|---|--|--|--|
| Responsibility and Staffing Requirement for Mitigation | Construction contractor shall hire environmental management specialist/site engineer | | | |
| Estimated cost (EGP) | Included in the construction contractor cost | | | |
| RPI | Resource Efficiency and Pollution Prevention: Energy, Water, Raw Materials, and Waste/Scrap Management | | | |
| Mitigation measures | A) Resource Efficiency | | | |
| | The contractor shall prepare and implement a Decommissioning and Construction Resource Efficiency Plan This plan will include: | | | |
| | Detailed measures to ensure efficient use of raw materials: | | | |
| | Training to workers should incorporate information from Material Safety Data Sheets (MSDSs) for hazardous materials being handled and stored | | | |
| | Obtain raw materials such as sand, concrete, pipes, pumps, cables, ducts, switchgears, asphalt and light bulbs, etc. from registered and authorized sources complying with the national and internal standards and requirements. Proper handling of raw materials to minimize waste | | | |
| | Proper testing and checking of the raw material to make sure they are in good condition and would work properly (sucl inspection of HDPE pipes, bricks are not broken) | | | |
| | Effort, care, and sufficient time to inspect pipes, valves, and special parts before installation will save considerable time to repair defects that might appear during installation and after testing. Inspection must be carried out by and under the supervision of an implementation engineer to inspect for any apparent hairline fractures or cracks in the body or ends of the pipes. | | | |
| | Reuse and recycle materials when feasible | | | |
| | Monitor consumption to make sure the raw materials are used efficiently Detailed measures to ensure efficient energy use: | | | |
| Optimize fuel consumption in construction equipment (opt for newer more efficient equipment when possible) Conduct regular maintenance of equipment based on manufacturer recommendation Minimize idling time | | | | |
| | Workers will be trained and increase their experience and know-how of operating machinery and vehicles Switch off the equipment and vehicles when not in use Detailed measures to ensure efficient water use: | | | |
| | Details on water supply locations within the project area so that it doesn't affect water availability for the residents. Detail measures to ensure efficient water usage in project construction activities such as undertaking regular leak checks, repair or replacement of faulty plumbing encountered and monitoring of construction water usage. B) Pollution Prevention: Waste/Scrap | | | |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | The contractor shall prepare and implement a Waste Management Plan (WMP), and Hazardous Waste and Material Management Plan (HAZMAT). The plans will be reviewed and approved by the PCU. The plan will include the adequate mitigation measures including but not limited to: |
| | The contractor will obtain official permits from the local authorities for the disposal of waste (construction wastes landfills, hazardous wastes landfills, etc.) prior to the commencement of construction activities. Wastes will be segregated and temporarily stored safely in the waste skips of sufficient volume at the allocated areas for waste storage on the premises of the construction site in a way that doesn't cause further traffic disruption. Waste will be covered to avoid the pollution of the ambient air by dust dispersion. Adequate trucks will be used for wastes transportation and the trucks will not be overloaded with waste volumes. Consignments for waste disposal will be recorded in terms of weight, destination and person responsible. Waste collection should occur daily, and it should be transported to the approved and safe disposal locations via adequately equipped trucks. The supervisor has to make sure that this process occurs without any hazards or problems. This will be included in the Temporary Traffic Management Plan (TTMP) for vehicles travelling between construction sites and dump sites. Non-hazardous (domestic) waste disposal |
| | The proposed Solid Waste Management Plan for the safe disposal of domestic waste should include, but not be limited to: The non-hazardous wastes (paper, garbage, wood and plastics) will be segregated and transported to the local disposal sites by means of the approved contractor. The non-hazardous waste will be transported off-site for recycling or final disposal by a licensed contractor and supervisor will be responsible for the disposal procedure and the conditions of the trucks. This will be included in the Temporary Traffic Management Plan (TTMP) for vehicles travelling between construction sites and dump sites. Hazardous waste generation |
| | Hazardous waste is limited to contaminated soil, spent lubricating oil, contaminated spill kits, empty paint cans. The proposed Hazardous Waste Management Plan for the safe disposal of such waste shall be including, but not limited to: |
| | According to Article 33 of Law 4/1994, the contractor is required to keep records and manifests in a register for the methods of waste disposal and the agencies contracted to receive such waste. Training to employees should incorporate information from Material Safety Data Sheets (MSDSs) for hazardous materials being handled and stored to minimize the amount of waste generated from improper handling and storage (e.g., potential spills/leaks). MSDSs should be readily accessible to employees in their local language. Wastewater |
| | During decommissioning and activities will be mainly the domestic wastewater that will be discharged into the existing sewage network. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | The wastewater from the hydrostatic testing of the pipes will be used for multiple tests to conserve water and minimize discharges. After completing the tests, water will be pumped back to wastewater trucks and will be discharged to the nearest wastewater treatment plant. The hydrostatic testing wastewater will be prohibited to be mixed with the domestic wastewater. It is not expected to be contaminated as the chemicals added to the water will be environmentally friendly. The final safe disposal of the wastewater generated from the construction activities (domestic and hydrostatic water test) will be the construction contractor's responsibility. |
| Residual impact | Negative, low, short term |
| Methods of monitoring | Site and surrounding visual inspection Review the ER Review the waste and the scrap receipts/ records Review of grievances |
| Monitoring frequency | Daily visual inspection of site and surrounding and temporary waste storage area Weekly inspection of waste registers/receipts Weekly for the complaints |
| Monitoring Indicators | Implementation of waste management plan including verification of records of delivery at final disposal sites, waste generated, contract validity with authorized waste collection contractor. Implementation of water management plan and energy management plans Maintenance checks Number of grievances/complaints |
| Monitoring location | Project site and surrounding (incl. any dedicated temporary waste storage areas) Databases and record keeping files |
| Responsibility and Staffing Requirement for Mitigation | A supervision consultant will supervise the construction activities including the E&S measures. contractor (DC/C), environmental and social development/communication specialists |
| Estimated cost (EGP) | Contractor hiring of environmental specialists for development of waste, energy and water management plans Contract with disposal site; estimated waste generation and transfer to disposal site costs |
| NDRI | Natural Disaster Risks / Emergency Situations |
| Mitigation measures | The contractor shall prepare and implement an Occupational Health and safety Management Plan including an emergency response plan that provide site-specific procedures during decommissioning and construction activities, so workers know what is expected and what to do in natural disasters and in the event of an emergency situations due to work. The plan shall be able to manage emergency events mainly heavy rains and heat waves by prevention, mitigation, preparedness, response and recovery and includes protocols for dealing with fires, chemical spills, equipment failures, and natural disasters. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | The plan shall take into consideration the following: |
| | Hazard identification/assessment Emergency response to respond to different risks including natural disasters Emergency resources The emergency spillage contingency plans Description of response activities in the event of a spill, release, or other chemical emergency should be incorporated Provision for rescue and contact, if necessary, with the emergency services Communication systems Administration of the plan Emergency response procedures include a firefighting plan that includes creating firebreaks and emergency evacuation routes, fire detection systems and firefighting equipment (fire extinguishers, hoses, etc.) at key points. Train workers on fire response protocols and ensure regular fire drills. Ensure that emergency exits, routes, and assembly points are clearly marked. Post visible emergency exit maps and routes throughout the site, including marked locations of firefighting equipment and first-aid stations. |
| | Other Mitigation measures: Conduct a comprehensive risk assessment before the start of decommissioning, evaluating explosion risks and defining proper mitigation measures. Ensure tanks are completely degassed and purged of residual fuels before any excavation or disposal activities. Implement controlled ventilation and inerting procedures (e.g., nitrogen purging) to prevent vapor buildup inside tanks. Deploy gas detection systems to continuously monitor the presence of flammable vapors. Avoid scheduling construction activities during bad weather conditions (e.g.: dust storms – heavy rains – heat wavesetc.). Provide shaded rest areas for workers. Provide proper containment and spill kits for hazardous substances. Train workers on handling hazardous materials and emergency spill response. Implement regular inspection and maintenance schedules for machinery to prevent malfunctions and reduce risk. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Supervision and reporting of fuel removal and tank decommissioning process by specialized hazardous materials teams. Availability and Adequacy of Emergency Response Plan Clarity and Accessibility of Emergency Evacuation Routes |
| Monitoring frequency | Daily |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| Monitoring Indicators | Weather forecast Number of fuel vapor concentration exceedances detected. Number of fire or explosion incidents reported. |
| Monitoring location | Onsite and surrounding |
| Responsibility and Staffing Requirement for Mitigation | A supervision consultant will supervise the construction activities including the E&S measures. Private contractor (DC/C), environmental management specialist and OHS specialist |
| Estimated cost (EGP) | Included in the construction contractor cost |
| OHSI | Occupational Health and Safety |
| Mitigation measures | The contractor shall develop and implement an OHS plan. The plan shall include at the minimum the following mitigation actions to avoid such hazards: |
| | Physical Hazards: |
| | The OHS plan must include procedures for managing risks associated with moving equipment, ensuring safety guards, proper training, and supervision during operations. Monitoring and controlling noise levels should be enforced to ensure compliance with allowable thresholds. Ear protection should be mandatory in high-noise zones, and vibration exposure should be minimized through equipment design or scheduling work to avoid long-term exposure. Safety measures must be implemented, including insulation and proper grounding of electrical equipment, regular inspections, and training workers in handling electrical components. Eye protection (e.g., safety goggles) must be provided and used in areas where dust, chemicals, or welding are present. Hot work permits must be issued for activities involving welding or other high-heat operations, ensuring proper ventilation, fire extinguishers, and training on fire hazards. Traffic management procedures should ensure the safe operation of industrial vehicles within the site, with specific lanes for pedestrians and vehicles and clear signage. Drivers must be licensed and trained in safe vehicle operation. Extreme temperatures, such as heat waves, require mitigation measures including proper hydration, rest breaks, shaded areas, and heat-resistant PPE. Proper training on manual handling techniques must be provided to avoid strain or injury from repetitive tasks or heavy lifting. Fall protection measures such as harnesses, guardrails, and proper scaffolding should be in place for any work at heights over 2m, with regular inspections of equipment. Adequate lighting must be provided to ensure visibility, especially in work areas where precision is necessary and to reduce the risk of accidents in low-light conditions. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | Chemical Hazards: |
| | Ensure that air quality monitoring is conducted regularly, especially in enclosed spaces. Measures should be taken to control dust and emissions, including the use of ventilation systems and respiratory protection. Fire prevention strategies should include training on handling flammable materials, maintaining fire extinguishers, and ensuring proper storage of hazardous substances. Emergency response drills for fire events should be held regularly. MSDSs must be accessible to all workers, and training on the safe handling of these materials should be mandatory. Spill containment and neutralization procedures must be in place. Personal Protective Equipment (PPE): |
| | The contractor must ensure the provision of appropriate PPE based on the identified hazards. This includes gloves, helmets, ear protection, and respirators, depending on the task. Regular checks on the condition and suitability of PPE should be conducted to maintain safety standards. Special Hazard Environments: |
| | Confined spaces should be managed through work permits, with monitoring systems for oxygen levels, ventilation, and standby rescue teams for emergencies. Implementation and Communication: |
| | The OHS plan must include a clear policy statement on OHS principles, ensuring the commitment to safety laws and regulations. This should outline the safety performance procedures and how contractors and workers will observe safety practices. A comprehensive risk management system will evaluate hazards linked to decommissioning and construction, including risks related to tank handling and hazardous material spills. Training and Competency Programs will be mandatory for all employees to ensure they recognize hazards, know how to safely use equipment, and are prepared to respond to emergencies. Emergency Response Plans (ERP) will cover potential emergency situations such as fires, chemical spills, and equipment malfunctions, with provisions for evacuations, first aid, and regular emergency drills. The plan must incorporate a grievance mechanism, which will be accessible and confidential, taking into account workers' grievances, including gender-sensitive concerns and considerations for people with disabilities. Monitoring and Review: |
| | Any incidents or accidents should be thoroughly investigated to identify root causes and corrective actions. Monitoring and review of safety performance will include periodic audits and safety inspections, particularly for high-risk activities like tank decommissioning. The plan will maintain detailed records of training, incident reports, audits, and OHS performance, ensuring compliance and the opportunity for continuous improvement. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | Both scenarios (In-Place Burial and Tanks Removal) should be incorporated into the OHS risk register. This will involve identifying specific hazards associated with each scenario, such as risks of soil contamination, fire, or accidents during tank handling. |
| | Verify that the sub-contractor(s) acts responsibly as subcontractors should submit their own OHS plan based on its scope. Also, insurance statement should cover subcontractor workers by number not by names. |
| | Contractor and sub-contractors to hire people who are covered by social insurance including work related accidents (injuries and fatalities) and have legal documents in place (even daily workers), in addition to mitigate the health and safety risk on all types of workers. |
| Residual impact | Negative, moderate, short term |
| Methods of monitoring | Visual inspection for proper use of PPE, emergency preparedness, adequate signage for meeting point etc. and fencing Visual inspection for good housekeeping and storage of hazardous materials and equipment Verification of training records including daily induction for general construction related risks and hazards, proper use of PPE Inspection of complaints and grievance reports and register Inspection of employment contracts Records about occupational injuries and infectious diseases among workers Inspection of insurance policies and attendance sheets |
| Monitoring frequency | Daily site inspection and surrounding Weekly inspection of training records Daily vehicles inspection |
| Monitoring Indicators | Occupational health and safety incident reports Medical reporting on received cases Insurance coverage for everyone on site with proof of their presence on site through attendance sheets and copy of IDs Clear and accessible grievance channels to all workers, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints Internal grievance logs Number and type of workplace complaints received and resolved Response timeline for resolution of complaints CDA approval on firefighting system for the developers Vehicles inspection records Number of Job Hazard Analysis Number of Toolbox Talks- on the job training Number of Permit to work issued/ closed Number of unsafe actions/ conditions |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | Number of checklists completed Number of trainings delivered Number of safety induction against workforce Number of medical checkup and drug test Number of safety signs and guidance Number of welfare facilities Number of OHS supervisors Number of safety audits against OHS plan Number of safety breaches by ISC and closed by the contractor |
| Monitoring location | Construction site, |
| | Databases/register for vehicles inspection, grievances, incident/accidents, medical check-up, training |
| Responsibility and Staffing Requirement for Mitigation | DC/C-Contractor is responsible for implementing the plan and handling workplace grievances of direct workers internally through direct supervisors or managers depending on the nature of complaint. DC/C-Contractor is responsible for handling grievances for contracted workers; staffing should include occupational health and safety and social development specialists. A supervision consultant will supervise the construction activities including the OHS measures |
| Estimated cost (EGP) | Contractor cost |
| CHSI | Community Health and Safety |
| Mitigation measures | To mitigate site traffic impacts, the following mitigation measure are proposed: |
| | The contractor will develop and implement a Traffic Management Plan (including routes and alternative routes, truck movements and transport of workers). The access roads for construction material and workers shall be determined prior to construction in coordination with the traffic department in Al-Ameriyah, Zeitoun district. The contractors and the site supervisor should choose a location for temporary storage of construction materials, equipment, tools, wastes and machinery before construction so as not to cause further traffic disruptions due to routes blockages. Minimizing pedestrian interaction with construction vehicles. Construction work should be avoided at the traffic peak times whenever possible. Employing safe traffic control measures, including road signs and flag persons to warn of dangerous conditions. Regular maintenance of vehicles and use of manufacturer approved parts to minimize potentially serious accidents caused by equipment malfunction or premature failure. Using locally sourced materials, whenever possible, to minimize transport distances. Locating worker accommodation close to project sites and arranging worker bus transport to minimize external traffic. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | Improving driving skills and requiring licensing of drivers. Adopting limits for trip duration and arranging driver rosters to avoid overtiredness. Use of speed control devices (governors) on trucks, and remote monitoring of driver actions, if possible. Approval from the traffic department should be obtained by the contractor prior to the construction preparation The contractors should make sure that the employed drivers of construction machinery (such as trucks and loaders) have received sensitization/training on safety utilization of their machines in order to minimize accidents risks. Unusual traffic delays or accident caused during construction, or any complaints received should be reported in the monthly report prepared by the construction supervisor To mitigate site trespassing impacts, the following mitigation measure are proposed: |
| | The construction site to be fenced and guarded by security personnel in order to prevent any unauthorized access to the site Develop and implement a well communicated and accessible grievance mechanism for community members to address any complaints Develop communication channels with surrounding communities including informal settlers and recruit workers from them to establish rapport For all phases: |
| | Implement LMP paying particular attention to code of conduct and risks related to GBV, SEA and SH especially in vicinity of existing community near to the project site, prevention of COVID-19 or any other pandemic spread. Train workers on implementing the code of conduct Implement SEP and all provisions relevant to project grievances Prepare and implement a Community Health and Safety Management Plan including provisions in SEP (e.g., sharing Information with community regularly), description of communication and coordination mechanisms to engage with community, e.g., detours during work, equipment mobilization etc., job hazard analysis for all project activities Establish clear and accessible Grievance mechanism for community members to address any complaints The project will establish a grievance mechanism for workers and community members, ensuring anonymity, confidentiality, and accessibility for all, including people with disabilities. The mechanism will be gender-sensitive, with special considerations for handling grievances related to Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). The grievance mechanism will be regularly communicated to all stakeholders and will provide a clear, transparent process for addressing and resolving complaints |
| | A GRM to the different GRM methodology and channels that will be applied in case of receiving any grievances. Receiving and handling of the grievances and complaints will take place at the level of the parties concerned with project implementation, and at the central level represented by the PCU when grievances are escalated to them. Contractor is responsible for handling the grievances of contracted workers. Staffing of GRM should include an Operational Health and Safety specialist as well |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | as Social Development specialists. GRM channels will be developed and disclosed to the public once ready, for the time being the complainers can use: |
| | Unified government complaints system (all government agencies involved in the implementation of the project are connected to the government complaints system) through: Hotline: 16528 |
| | The electronic portal for the unified government complaints system (www.shakwa.eg) WhatsApp numbers (01555516528 - 01555525444) The websites of Cairo Governorates, Ministry of Transport, and CTA |
| Residual impact | Negative, low short term |
| Methods of monitoring | Inspection of community grievance log Reviewing community consultation reports Reviewing interviews with community members Inspection of proper safety signage, fencing delimiting construction site, detour signage Inspection of training records of security workers Inspection of outreach meeting minutes |
| Monitoring frequency | Daily safety inspection of site and surrounding Weekly inspection of records reports, grievance logs |
| Monitoring Indicators | Number of reported complaints from the community including surrounding industries Contractor's response measures to complaints |
| Monitoring location | Site and surrounding, Databases and record keeping locations |
| Responsibility and Staffing Requirement for Mitigation | Private contractor (DC/C); Contractor will hire OHS and social development specialists. The contractor is responsible for implementing the plans and resolving any concerns or complaints raised in the workplace. Yet, as needed, if complaints received are beyond their capacity, they should be escalated to the PCU or the TIU (it depends on the nature of the complaint). The contractor is responsible for resolving any concerns or complaints raised in the workplace (DC/C) |
| Estimated cost (EGP) | Contractor cost / Project cost |
| СНІ | Cultural Heritage |
| | Steps to be included in the chance finds procedure include: |
| Mitigation measures | Stop all works in the vicinity of the find, until a solution is found for the preservation of these artefacts, or advice from the relevant authorities is obtained. Notify the relevant authorities of the find. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | Document and record any chance find which may occur. |
| Residual impact | Negative reduce the severity of the impact of CHI to lower than before, short term |
| Methods of monitoring | Verification of approvals from formal authorization or guidance from relevant cultural heritage authorities, such as the Ministry of Tourism Incident reports if any (formal documentation prepared by the contractor in case of any unplanned discoveries (chance finds) during excavation or construction.) |
| Monitoring frequency | As needed during decommissioning and construction |
| Monitoring indicators | Number of incident reports |
| Monitoring location | Project site |
| Responsibility and Staffing Requirement for Mitigation | The contractor shall hire environmental and social development specialist |
| Estimated cost (EGP) | Contractor cost / Project cost |
| LFRI | Labor Force Relocation |
| Mitigation measures | CTA to prepare a comprehensive decommissioning plan. This plan will outline the specific actions to mitigate potential risks and ensure a smooth transition for the workforce. |
| | The decommissioning plan should include detailed procedures for the 'process, including timelines, communication strategies, and logistical support. It should also address the management of employee concerns, the continuity of operations during the transition, and the monitoring of impacts post-relocation. |
| | Additionally, the plan should identify the roles and responsibilities of all stakeholders, including the contractor, the depot management, and the affected employees. By preparing and implementing this decommissioning plan, the contractor will help to ensure that the relocation is conducted efficiently, with minimal disruption to both the workforce and depot operations, thereby mitigating potential social and operational risks associated with this aspect. |
| | Other mitigation measures: |
| | Ensure timely and transparent communication with all affected employees about the relocation process, timelines, and expectations. This includes providing detailed information on the new work locations and any changes in job responsibilities. |











| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| Residual impact | Provide logistical support for the transfer, such as transportation arrangements to the new depots if necessary. This could include organizing group transport. Conduct consultation sessions with employees to address any concerns or suggestions they may have about the relocation. Establish accessible, clear, and anonymous grievance mechanisms for employees. Develop and implement corrective actions if any unforeseen issues arise during or after the relocation process. Negative, low, short term |
| Methods of monitoring | Daily Activities Grievance mechanism. Employee Feedback Survey: collects employees' experiences, concerns, and satisfaction levels regarding the relocation process to identify issues and improve support. It is conducted before, during, and after the relocation to monitor and address potential challenges. Incident Reports |
| Monitoring frequency | ■ Weekly |
| Monitoring indicators | Occupational health and safety incident reports Timeliness and completeness of communication. No accidents Surveys Clear and accessible grievance channels to all workers, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints Internal grievance logs Percentage of grievances resolved against received |
| Monitoring location | ■ Depot |
| Responsibility and Staffing Requirement for Mitigation | • CTA |
| Estimated cost (EGP) | Project cost |
| TLII | Temporary Labor Influx |
| Mitigation measures | The project will prioritize the hiring of local workers to reduce the number of laborers coming from outside the project area. This approach will help to minimize pressure on local resources such as accommodation, food supplies, healthcare, and potable water. |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| | All workers, including those from outside the area, will be required to sign a code of conduct that clearly defines acceptable behavior and the consequences of violating community norms. This will include respect for local culture, adherence to safety and health protocols, and anti-harassment policies. Accommodation and Services: Where temporary labor is necessary, contractors will be required to provide appropriate accommodation and services for their workers, ensuring that workers do not depend on local resources. These accommodations will meet minimum standards for sanitation, health, and safety to avoid putting a strain on local infrastructure. Health screenings and communicable disease prevention measures will be put in place to minimize the risk of diseases spreading to local communities. Regular health checks will be mandatory, and appropriate medical facilities will be provided to handle any healthcare needs for the labor force. Regular engagement with local communities will be conducted to ensure that they are informed about the project and its labor requirements. Grievance mechanisms will be established for community members to raise concerns or issues regarding the presence of non-local workers. |
| Residual impact | Negative, low, short term |
| Methods of monitoring | Site Inspections Health Checks Grievance Mechanisms Code of conduct Consultation activities report Inspect workers' accommodation |
| Monitoring frequency | Weekly |
| Monitoring indicators | Internal grievance logs Percentage of local workers hired compared to the total workforce. Compliance with accommodation standards (sanitation, safety, and health conditions). Number of health screenings conducted and follow-ups on communicable diseases. Number of grievances submitted by community members and resolution times. |
| Monitoring location | Depot – workers accommodation |
| Responsibility and Staffing Requirement for Mitigation | The contractor shall hire social development specialist |
| Estimated cost (EGP) | Project cost |
| CHLI | Child Labor |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| Mitigation measures | Contractors and subcontractors must comply with Egyptian labor laws and international standards prohibiting child labor. No person under the minimum age of 18 will be employed by the contractor or subcontractors, as specified in the Labor Management Procedures (LMP), due to the hazardous nature of the work. A robust age verification system will be implemented before hiring any worker, including temporary and subcontracted laborers. Verification methods may include checking official documents (birth certificate, national ID), obtaining medical practitioner confirmation, written parental/guardian consent, or community verification where official documents are unavailable. Regular unannounced inspections of work sites will be conducted to ensure compliance with labor laws and prevent any cases of child labor. An accessible and anonymous grievance mechanism will be in place for workers to report any violations related to child labor, ensuring confidentiality and protection against retaliation. |
| Residual impact | Negative, lower significance, short term |
| Methods of monitoring | Site Inspections Grievance Mechanisms Worker verification records |
| Monitoring frequency | Weekly |
| Monitoring indicators | Internal grievance logs Number of child labor violations identified |
| Monitoring location | Depot |
| Responsibility and Staffing Requirement for Mitigation | The contractor shall hire social and gender development specialists |
| Estimated cost (EGP) | Project cost |
| GBV&SEI | Gender-Based Violence (GBV) and Sexual Exploitation and Abuse/Sexual Harassment (SEA-SH) |
| Mitigation measures | All workers, including subcontractors, must sign a code of conduct that explicitly prohibits GBV and SEA-SH. Conduct mandatory training for all workers on acceptable behavior, anti-harassment policies, and respect for local culture. Ensure the grievance mechanism is confidential, accessible to women and girls, and includes provisions for addressing GBV complaints. |
| Residual impact | Negative, lower significance, short term |
| Methods of monitoring | Worker code of conduct compliance, Grievance Mechanisms Worker verification records |













| CODE | Environmental and Social Component During the Decommissioning and the Construction activities |
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| Monitoring frequency | Weekly |
| Monitoring indicators | Grievance logs Number of GBV/SEA and SEH identified |
| Monitoring location | Depot and surroundings |
| Responsibility and Staffing Requirement for Mitigation | The contractor shall hire social and gender development specialists |
| Estimated cost (EGP) | Project cost |
| <u>RSI</u> | Road Safety |
| Mitigation measures | Develop and implement a Traffic Management Plan (TMP) with clear traffic control measures. Schedule vehicle movements during off-peak hours to minimize congestion. Install traffic signs and speed limit indicators at key locations near the construction zone. Deploy trained traffic marshals to guide vehicles and pedestrians safely. Ensure the grievance mechanism is confidential, accessible to community and includes provisions for addressing road safety complaints. |
| Residual impact | Negative, low, short term |
| Methods of monitoring | Grievance Mechanisms On-site traffic inspections and real-time monitoring of vehicle movements. Review of incident reports |
| Monitoring frequency | Weekly |
| Monitoring indicators | Grievance logs Number of reported traffic incidents or near-miss accidents. |
| Monitoring location | Depot and surroundings |
| Responsibility and Staffing Requirement for Mitigation | The contractor |
| Estimated cost (EGP) | Project cost |













Table 7-2 Environmental and social management plan for the proposed project during operation and maintenance phase of the depot

| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
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| SGT2 | Soil, geology, and topography during operation and maintenance phases |
| Mitigation measures | The depot floor to be of impermeable layer to prevent potential and/or accidental spills and leakage from reaching the soil and the groundwater. Develop and implement a Spill Prevention and Response Plan. Equip the site with spill kits and train staff on spill response procedures. Ensure proper disposal of hazardous and non-hazardous waste materials. Use designated areas for waste storage, away from soil and water sources. Implement a waste segregation system to manage hazardous materials separately. Store chemicals and hazardous materials in designated, contained areas according to their MSDS with appropriate labeling. E-buses washing area to be including drainage system that shall be designed as per codes and standards to washing wastewater in a way that it won't cause soil erosion, pavement cracks as a result of water seeping under the pavement. The following mitigation measures shall be considered in the design of e-buses' washing water to minimize impacts on the soil and depot floor: Surface channels should have adequate capacity for the design runoff volume and should be located and shaped in a manner that doesn't present a traffic hazard. Channels should have lining, when possible, based upon design velocity criteria. Appropriate linings to control erosion. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Inspection of vehicles, equipment and machinery used and associated maintenance records |
| Monitoring frequency | Daily visual inspection Monthly for the maintenance reports, accidental spills/leaks reports |
| Monitoring Indicators | Controlled equipment uses during works Erosion and cracking of soil |
| Monitoring location | Onsite and surrounding |
| Responsibility and Staffing Requirement for Mitigation | CTA will be responsible for monitoring the activities during the operation of the depot and after the completion of GCCC project. |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| WB2 | Water Bodies and Groundwater |
| Mitigation measures | The mentioned mitigation measures to mitigate risks of Soil, Geology, and Topography should be followed to mitigate also any risks related to the groundwater. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|--|---|
| Residual impact | Negative, low, long term |
| Methods of monitoring | Inspection of vehicles, equipment and machinery used and associated maintenance records |
| Monitoring frequency | Daily visual inspection Monthly for the maintenance reports, accidental spills/leaks reports |
| Monitoring Indicators | Controlled equipment uses during works Erosion and cracking of soil |
| Monitoring location | Onsite and surrounding |
| Responsibility and Staffing Requirement for Mitigation | CTA will be responsible for monitoring the activities during the operation of the depot and after the completion of GCCC project. |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| RP2 | Resource Efficiency and Pollution Prevention: Energy, Water, Raw Materials, and Waste/Scrap Management |
| Mitigation measures | A) Resource Efficiency |
| | Electricity Consumption |
| | Ensure there is an effective maintenance plan in place for all the utilities. The plan should include maintenance schedule and regular inspection, waste management plan for the proper recycling or disposal of spare parts by certified contractors. Design buildings and workspaces to maximize the use of natural light, reducing the need for artificial lighting during the day |
| | Water Consumption |
| | Install low-flow fixtures and fittings in restrooms and wash areas. Monitor water consumption, for example for buses cleaning to ensure that no excess water is being wasted. Use water-efficient bus washing systems, such as high-pressure, low-volume nozzles, and automated washing machines with water recycling capabilities. About 70% of wastewater will be reused for washing. Regular maintenance to ensure efficient operation of the washing systems, which means efficient water consumption. Schedule bus washing during off-peak water usage times to reduce strain on the water supply system. Washing shall be done after the e-bus return from their trips at the end of the day and after the daily inspection. Water leakage from pipe networks takes place as a result of the presence of weak joints or fittings or as a result of high-water pressure. Accordingly, water leakage can be controlled by improving pipe resistance (fittings and joints) and reducing water pressure. In most networks, active pressure control for loss minimization, through the reduction of excess water pressure is essential. There are a number of methods for regulating pressure. Pressure is controlled by systems using valves such as pressure reducing valves (PRV) and variable speed pumps (VSP). VSPs include Variable Speed Drive (VSD). The VSD regulates |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|------|---|
| | the rotational speed of the pump's motor by changing the frequency of the input power. Changing the speed of the electric motor can change the hydraulic performance of the pump (such as power consumption, outlet flow, and pressure). In addition, to ensure leakage is avoided and flow is smooth, pressure gauges should be installed to monitor the pressure inside the network. Network optimization will be applied as the pipes size will deliver the highest pressures and flows according to mass conservation law AIVI=A2V2. Additionally, there will be run of hydraulic simulation of the network to investigate its performance. For example, enlarging pipe diameters can increase pressures, it reduces flow velocity. Thus, network optimization is very important to obtain the best results. |
| | Spare Parts and Raw Materials |
| | Source materials locally and consider eco-friendly alternatives to reduce environmental impacts, whenever possible. Implement regular inventory to record the types, quantities and expiry dates of chemicals stored. Apply a return policy for unused items/chemicals before their expiry date, whenever possible. Ensure that all chemicals are stored according to their MSDS. Implement a robust inventory management system to track and control spare parts usage, ensuring that only necessary parts are ordered and used. Use just-in-time (JIT) inventory practices to reduce excess stock and minimize waste. Recondition and refurbish used parts whenever possible instead of replacing them with new ones. Pollution Prevention |
| | The CTA shall prepare and implement the Environmental Register (ER) and Waste Management Plan (WMP). |
| | The ER shall be developed as per the requirements of Annex 3 of the ER of the Egyptian Environment Protection Law No. 4/1994 and its amended ER no 2466/2024. including, but not limited to the following: |
| | Name and address of establishment Name and job title of person in charge of filling in the Register. Period covered by the current data. Type of activity and nature of raw materials and production during the corresponding time period. Laws governing the establishment. Special conditions set by the EEAA for the establishment. Statement of the types of emissions, the rates of discharge (per hour/ day/ month/ year), and method of disposal thereof. Rates at which tests are conducted on each type of emission emanating from the establishment. Extracted materials after treatment processes. Extent of efficiency of treatment method. Date and signature of officer in charge. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|------|---|
| | The WMP plan will include the adequate mitigation measures including, but not limited to: |
| | Obtaining official permits from the local authorities for the disposal of waste generated from the depot activities and e-bus cleaning. Waste segregation and temporarily safe storage of waste generated in labeled waste skips of sufficient volume at allocated areas for waste storage in a safe and proper way. Adequate trucks will be used for wastes transportation and the trucks will not be overloaded with waste volumes. Consignments for waste disposal will be recorded in terms of types, weight, destination and person responsible. Waste collection should occur daily, and it should be transported to the approved and safe disposal locations via adequately equipped trucks as coordinated with WMRA. The supervisor has to make sure that this process occurs without any hazards or problems. |
| | I. Non-hazardous (domestic) waste/scrap disposal |
| | The proposed WMP for the safe disposal of non-hazardous waste/scrap should include, but not be limited to: |
| | The non-hazardous waste (paper, garbage, wood and plastics) will be segregated and transported to the local disposal sites by means of the approved and licensed waste contractor in close coordination with WMRA and Al-Ameriyah district. The non-hazardous waste will be transported off-site, and the site supervisor will be responsible for the safe disposal procedure and the conditions of the trucks. Scrap will be segregated and, labeled and sold via auctions to certified scrap contractors The certified scrap contractors will be responsible for the safe transportation procedure of the scrap outside the depot with close coordination with the CTA and the conditions of the trucks. According to Article 33 of Law 4/1994, the contractor is required to keep records and manifests in a register for the methods of waste disposal and the agencies contracted to receive such waste. The sludge generated from the bus washing process will be analyzed after treated to determine its classification as either hazardous or non-hazardous waste. Based on this classification, it will be managed accordingly and disposed of through licensed waste management contractors, ensuring compliance with environmental regulations and preventing potential soil contamination. |
| | II. Hazardous waste generation and disposal |
| | Hazardous waste is limited to spent lubricating oil/lubricants, spill kits, empty paint cans. The proposed Hazardous Waste Management Plan for the safe disposal of such waste shall be including, but not limited to: |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
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| | According to to Annex 8 of the Executive regulations of the waste Management law, the contractor is required to keep records and manifests in a register for the methods of waste disposal and the agencies contracted to receive such waste. Training to employees should incorporate information from Material Safety Data Sheets (MSDSs) for hazardous materials being handled and stored. MSDSs should be readily accessible to employees in their local language. Description of response activities in the event of a spill, release, or other chemical emergency should be incorporated. Wastewater |
| | During the operation and maintenance phase, the wastewater generated will primarily consist of domestic wastewater, which will be discharged into the existing sewage network. Additionally, the wastewater from e-bus washing activities will amount to approximately 150 liters per bus per wash per day. About 70% of this wastewater will be treated and reused for subsequent washing processes. The final discharge from the washing area will be directed through the drainage system linked to the existing sewage network connected to the public network, on condition that the treated WW complies with the permissible limits of decree 44 of the year 2000 concerning the discharge of industrial WW to the sewage system |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Review of maintenance records for buses (up to code etc.) Review the ER Review the waste and the scrap receipts/ records Review of grievances |
| Monitoring frequency | Daily visual inspection of site and surrounding and temporary waste storage area Weekly inspection of waste registers/receipts Weekly for the complaints |
| Monitoring Indicators | Implementation of waste management plan including verification of records of delivery at final disposal sites, waste generated, contract validity with authorized waste collection contractor. Implementation of water management plan and energy management plans Maintenance checks Number of grievances/complaints |
| Monitoring location | Project site and surrounding (incl. any dedicated temporary waste storage areas) Databases and record keeping files |
| Responsibility and Staffing Requirement for Mitigation | CTA will be responsible for monitoring the activities during the operation of the depot and after the completion of GCCC project. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|----------------------|---|
| Estimated cost (EGP) | CTA hiring of environmental specialists for development of waste, energy and water management plans Contract with disposal site; estimated waste generation and transfer to disposal site costs Included in the CTA operation and maintenance cost |
| NDR2 | Natural Disaster Risks / Emergency Situations |
| | The CTA shall prepare and implement an Occupational Health and safety Management Plan including an emergency response plan that provides site-specific procedures, so workers know what is expected and what to do in the event of an emergency. The plan shall be able to manage emergency events by prevention, mitigation, preparedness, response and recovery. The plan shall take into consideration the following: Hazard identification/assessment |
| | Excessive Heat Waves and rain Emergency resources Emergency plans will include specific procedures for natural disasters such as earthquakes, floods, and storms. Thermal runaway mitigation measures will include fire-resistant battery enclosures and thermal insulation to prevent overheating caused by natural disasters. The emergency spillage contingency plans Description of response activities in the event of a spill, release, or other chemical emergency should be incorporated Provision for rescue and contact, if necessary, with the emergency services |
| Mitigation measures | Communication systems Administration of the plan Emergency response procedure Communication of the procedure Including evacuation routes and procedures. Provide guidelines for immediate first-aid treatment for injuries / accidents sustained during emergencies Include the location of first aid kits and assign trained personnel to provide medical assistance until professional help arrives. Maintain readily accessible fire extinguishers, spill containment kits, personal protective equipment (PPE), and other emergency tools. Other mitigation measures: |
| | Conduct risk assessments and update disaster preparedness plans regularly. |
| | Create firebreaks around the depot to prevent the spread of fires. Collaborate with local authorities and emergency services for coordinated disaster response efforts. A new technology for washing buses will be utilized which will minimize the amount of water used and accordingly the amount of wastewater generated by better used water treatment and recycling. About 70% of wastewater will be reused for washing. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|-----------------------|--|
| | Develop water conservation strategies and contingency plans for water shortages. Create firebreaks around the depot to prevent the spread of fires. Thermal runaway mitigation measures will include fire-resistant battery enclosures and thermal insulation to prevent overheating. Regular maintenance and inspection of the battery systems will be performed to ensure they are functioning within safe operational limits. In case of battery failure or overheating, an emergency shutdown procedure will be put in place to isolate the battery and prevent further damage or fire. Hazardous materials used in bus maintenance (e.g.: coolants, cleaning agents) will be stored in designated areas with proper containment systems to prevent spills from spreading. Charging stations and electrical systems will be equipped with fire suppression systems (such as fire extinguishers, foam, or water-based systems) designed to handle electrical fires. For combining firefighting and domestic water supplies in a single underground tank to prevent mixing, a system will be implemented where, after a certain water level is reached, the domestic water pump will stop functioning, ensuring only the firefighting pump remains operational. This setup, which is standard practice in similar projects across Egypt, helps mitigate issues such as water contamination, ensures proper pressure and flow for both firefighting and domestic use, and reduces maintenance complications. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Periodic checks of the emergency response plan implementation, A system for reporting any incidents, including near misses, spills, chemical emergencies, and natural disaster events. Communication System Checks Maintenance Logs Follow up the following: |
| | Cables conditions Remote Terminal Unit (RTU) Fire Alarm Control Panel Accident and Incident report |
| Monitoring frequency | Daily Monthly for the maintenance reports and accident & incident report |
| Monitoring indicators | Weather forecast Battery status Signal strength Fault signals (open circuits, short circuits) |











| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|--|---|
| Monitoring location | Onsite |
| Responsibility and Staffing Requirement for Mitigation | CTA will be responsible for monitoring the activities during the operation of the depot and after the completion of GCCC project. |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| OHS2 | Occupational Health and Safety |
| | Workers are exposed to different hazards including heat, electric field and confined spaces. |
| | The CTA shall develop and implement an Occupational Health and Safety (OHS) plan. The plan shall include at the minimum the following mitigation actions to avoid such hazards: |
| | Presence of remarkable sidewalk for safe pedestrian walk inside the depot |
| | Erect clear signs along the sidewalk for the pedestrians' safety |
| | Provide pedestrian gates spate from the vehicle gates |
| | Other mitigation measures: |
| | Posted Speed Limits: |
| NA*. * | - Internal roads inside the depot: Maximum 30 km/h. |
| Mitigation measures | - Within the depot: Maximum 20 km/h. |
| | Traffic Management: |
| | - Erect clear signs indicating the buses and passenger cars lanes inside the depot as well as pedestrian sidewalk. |
| | Training and Awareness: |
| | - Training should include basic hazard awareness, site-specific hazards, safe work practices, and emergency procedures for fire, evacuation, and natural disasters. |
| | Working Conditions: |
| | - Ensure adequate temperature and lighting inside the depot workshops. |
| | First Aid: |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|-----------------------|--|
| | - Qualified first-aid should be provided at all times inside the depot. |
| | Personal Protective Equipment (PPE): |
| | - Active use and regular maintenance of PPEs (e.g., protective gloves against heat, safety shoes, shielding materials in electric and magnetic field areas). |
| | Safety Measures: |
| | Permit-required confined spaces should have permanent safety measures for venting, monitoring, and rescue operations. |
| | - Workplaces must be equipped with collective and individual protection means, primary firefighting equipment, and communication and signaling equipment. |
| | • Fire Safety: |
| | - Ensure fire extinguishers are well maintained, ready to use and distributed adequately. |
| | - Obtain Civil Defense Approval (CDA) to ensure an efficient firefighting system. |
| | Handling Hazardous Materials: |
| | - Training should include information from Material Safety Data Sheets (MSDSs) for hazardous materials to minimize waste from improper handling and storage. MSDSs should be readily accessible in the local language. |
| | - Incorporate response activities for spills, releases, or other chemical emergencies. |
| | - The project will establish a grievance mechanism for workers, The grievance mechanism will be regularly communicated to all stakeholders and will provide a clear, transparent process for addressing and resolving complaints |
| Residual impact | Negative, moderate, long term |
| Methods of monitoring | Records about occupational injuries and infectious diseases among workers Inspection of insurance policies and attendance sheets Compliance Checks Grievance mechanism. |
| Monitoring frequency | Daily site inspection and surrounding Weekly inspection of training records |
| Monitoring indicators | Occupational health and safety incident reports |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|---|--|
| | Medical reporting on received cases No accidents Number of Job Hazard Analysis Number of Toolbox Talks- on the job training Number of Permit to work issued/ closed Number of unsafe actions/ conditions Number of checklist completed Number of training delivered Number of safety induction against workforce Number of safety signs and guidance Number of safety signs and guidance Number of welfare facilities Number of OHS supervisors Number of safety audits against OHS plan Number of safety breaches by ISC and closed by the contractor Clear and accessible grievance channels to all workers, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints Internal grievance logs Number and type of workplace complaints received and resolved Response timeline for resolution of complaints CDA approval on firefighting system for the developers |
| Monitoring location | ■ Depot |
| Responsibility and Staffing Requirement for Mitigation | CTA is responsible for handling workplace grievances for all types of workers during operation. CTA is typically responsible for ensuring that the Occupational Health and Safety (OHS) plan is developed, approved, and monitored. This includes overseeing the implementation of the mitigation measures and ensuring that contractors and other stakeholders adhere to safety standards. |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| LFB2 | Labor Force Behavior |
| Mitigation measures | Ensure timely and transparent communication with all affected employees about the repositioning process, timelines, and expectations. This includes providing detailed information on the new work tasks and any changes in job responsibilities. Train maintenance staff on e-bus diagnostics, battery management systems (BMS), and handling high-voltage components. Conduct regular performance reviews for maintenance staff. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|--|--|
| | Develop and implement corrective actions if any unforeseen issues arise during or after the repositioning process. Ensure an accessible and anonymous grievance mechanism for workers to report any difficulties in work. |
| Residual impact | Negative, moderate, long term |
| Methods of monitoring | Conduct regular performance reviews for employee and maintenance staff. Consultation Records: Maintain detailed records of all consultation sessions held with employees, including attendance, key issues discussed, and agreed-upon actions. Number of incidents due to dealing with chargers / washing machine or any new technology |
| Monitoring frequency | ■ Weekly |
| Monitoring indicators | Internal grievance logs Percentage of drivers and maintenance staff who have completed required training programs. Number of operational incidents linked to inadequate training or driver behavior. Number and type of workplace complaints received and resolved Response timeline for resolution of complaints |
| Monitoring location | ■ Depot, |
| Responsibility and Staffing Requirement for Mitigation | ■ CTA |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost system |
| CHS2 | Community Health and Safety |
| Mitigation measures | CTA to: Equip charging stations and maintenance areas with automatic fire detection and suppression systems. This includes the use of fire-resistant materials, fire alarms, and extinguishers designed specifically for electrical fires. Training of drivers on defensive driving practices Conduct routine checks and maintenance of charging infrastructure, cables, and connectors to ensure they are in good working condition. Train workers and staff on emergency response procedures, including handling electrical fires and using firefighting equipment. The project will establish a grievance mechanism for workers and community members, ensuring anonymity, confidentiality, and accessibility for all, including people with disabilities. The mechanism will be gender-sensitive, with special considerations for handling grievances related to Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). The grievance mechanism will be regularly communicated to all stakeholders and will provide a clear, transparent process for addressing and resolving complaints |













| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|--|--|
| Residual impact | Negative, low, long term |
| Methods of monitoring | Perform scheduled tests of alarms and extinguishers. Maintain detailed logs of all inspections, tests, and maintenance activities to track compliance and identify areas needing attention. Conduct regular visual inspections and operational tests on all charging infrastructure components, including cables and connectors. Incident Reporting: Establish a system for reporting and addressing any issues. Grievance mechanism. |
| Monitoring frequency | Weekly inspections and monthly system tests for fire detection and suppression systems. Daily visual inspections and weekly diagnostic checks for charging infrastructure and equipment. |
| Monitoring indicators | Operational status of alarms and extinguishers. Response times of suppression systems during tests. Number of faults detected in cables, connectors, and charging stations. Frequency of maintenance or repair activities. No accidents Clear and accessible grievance channels to all workers, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints Internal grievance logs |
| Monitoring location | Depot, |
| Responsibility and Staffing Requirement for Mitigation | ■ CTA |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost system |
| RS2 | Road Safety |
| Mitigation measures | CTA to: Implement strict speed limits and install clear traffic signage inside and around the depot. Ensure adequate lighting and security cameras to enhance visibility and safety. Conduct driver training on safe depot navigation and pedestrian awareness. The project will establish a grievance mechanism for workers and community members, ensuring anonymity, confidentiality, and accessibility for all |
| Residual impact | Negative, low, long term |











| CODE | Environmental and Social Component During the operation and Maintenance activities of the depot |
|--|---|
| Methods of monitoring | CCTV surveillance for real-time monitoring of bus movements. Incident Reporting: Establish a system for reporting and addressing any issues. Grievance mechanism. |
| Monitoring frequency | Daily monitoring by depot managers and safety officers. |
| Monitoring indicators | Number of reported incidents or near-miss collisions inside the depot. Clear and accessible grievance channels community, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints |
| Monitoring location | ■ Depot, |
| Responsibility and Staffing Requirement for Mitigation | ■ CTA |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost system |

Table 7-3 Environmental and social management plan for the proposed project during operation and maintenance phase of E-buses

| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|-----------------------|---|
| AQ2 | Air Quality |
| Mitigation measures | Energy Source Diversification: Advocate for the use of renewable energy sources for charging stations to reduce reliance on fossil fuels. Charging Efficiency: Implement efficient charging practices to minimize energy consumption and emissions. Energy Monitoring: Install energy consumption monitoring systems to optimize charging schedules, reducing peak load and associated emissions. Maintenance of Charging Equipment: Regular maintenance of charging infrastructure to prevent energy loss and ensure efficient operation. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Inspection of vehicles, Emission Calculations and Energy Audits |
| Monitoring frequency | Daily visual inspection Monthly for the Energy audits. Annual emission calculations. |
| Monitoring Indicators | Energy ConsumptionGHG Emission |











| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|--|---|
| Monitoring location | Onsite and surrounding |
| Responsibility and Staffing Requirement for Mitigation | СТА |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| RP2 | Resource Efficiency and Pollution Prevention: Energy, Water, Raw Materials, and Waste/Scrap Management |
| Mitigation measures | A) Resource Efficiency |
| | Electricity Consumption |
| | Regular maintenance to ensure efficient operation of depot and buses, which means efficient energy use. Installation of light sensors to switch off during the day. Installation of energy-efficient lighting, heating, ventilation, and air conditioning (HVAC) systems. Improve insulation in walls, roofs, and windows to reduce heat loss in winter and heat gain in summer. Seal gaps and cracks around doors and windows to prevent air leaks. Use smart charging systems for electric buses that optimize charging times to take advantage of off-peak electricity rates. Implement demand response strategies to reduce electricity use during peak demand periods. Use energy-efficient motors and machinery. Implement energy-saving technologies such as variable frequency drives (VFDs) for motors. Spare Parts and Raw Materials |
| | Source materials locally and consider eco-friendly alternatives to reduce environmental impacts, whenever possible. Apply a return policy for unused items/chemicals before their expiry date, whenever possible. Implement a robust inventory management system to track and control spare parts usage, ensuring that only necessary parts are ordered and used. Recondition and refurbish used parts whenever possible instead of replacing them with new ones. Waste/Scrap: |
| | Tires and Renovation and maintenance materials (HDPE pipes, valves, cables) To be sold to certified recycling contractors or disposed of via license waste contractor. |
| | E-bus batteries to be recycled by vehicle manufacturers / sending back to the supplier. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Review of maintenance records for buses (up to code etc.) Review the ER |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|--|---|
| | Review the waste and the scrap receipts/ records Review of grievances |
| Monitoring frequency | Daily visual inspection of site and surrounding and temporary waste storage area Weekly inspection of waste registers/receipts Weekly for the complaints |
| Monitoring Indicators | Implementation of waste management plan including verification of records of delivery at final disposal sites, waste generated, contract validity with authorized waste collection contractor. Implementation of water management plan and energy management plans Maintenance checks Number of grievances/complaints |
| Monitoring location | Project site and surrounding (incl. any dedicated temporary waste storage areas) Databases and record keeping files |
| Responsibility and Staffing Requirement for Mitigation | СТА |
| Estimated cost (EGP) | CTA hiring of environmental specialists for development of waste, energy and water management plans Contract with disposal site; Estimated costs for waste generation and transportation to the disposal site. Included in the CTA operation and maintenance cost |
| NDR2 | Natural Disaster Risks / Emergency situations |
| | CTA shall prepare and implement an Occupational Health and safety Management Plan including an emergency response plan that provides site-specific procedures, so drivers know what is expected and what to do in the event of an emergency. The plan shall be able to manage emergency events by prevention, mitigation, preparedness, response and recovery. The plan shall take into consideration the following: |
| Mitigation measures | Hazard identification/assessment Emergency resources Emergency response to respond to different risks including natural disasters Communication systems Administration of the plan Develop clear evacuation procedures for passengers in the event of an emergency, ensuring that all personnel are familiar with the emergency exits, muster points, and actions to take. Communication of the procedure Including evacuation routes and procedures. Including posters and labels for emergency and fire response procedures |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
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| | Other mitigation measures: |
| | Implementing advanced cooling systems for the e-buses and charging stations to prevent battery overheating. Ensure that air conditioning (AC) systems are functioning efficiently to prevent overheating of bus interiors and batteries during extreme heat. Provide shading for bus parking areas to minimize direct exposure to sunlight Equip buses with proper rainproofing measures. Train drivers and staff to manage operations safely during heavy rain and in wet road conditions to avoid accidents and breakdowns. Equip electric buses and charging stations with emergency shutdown systems to isolate overheating batteries and prevent fire or explosion. |
| Residual impact | Negative, low, long term |
| Methods of monitoring | Cables conditions Remote Terminal Unit (RTU) Fire Alarm Control Panel Accident and Incident report |
| Monitoring frequency | Daily Monthly for the maintenance reports and accident & incident report |
| Monitoring indicators | Weather forecast Battery status Signal strength Fault signals (open circuits, short circuits) |
| Monitoring location | Onsite |
| Responsibility and Staffing Requirement for Mitigation | CTA |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| OHS2 | Occupational Health and Safety |
| Mitigation measures | The CTA shall develop and implement an Occupational Health and Safety (OHS) plan. The plan shall include at the minimum the following mitigation actions to avoid such hazards: Mitigation measures for OHS shall include at the minimum: |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|------|--|
| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses Training drivers on defensive driving practices, including maintaining safe following distances, avoiding distractions (such as mobile phone use), and adhering to traffic safety rules and regulations., and also training on traffic safety rules and measures (e.g., leave safe distance and avoid distractions with mobile phones) Set penalties for drivers who violate travel rules Ensure that all drivers of electric buses are trained in high-voltage safety. This includes recognizing hazards associated with high-voltage components and using insulated tools and equipment designed for high-voltage work. Train drivers and maintenance staff on the impacts of heavy battery weight on vehicle handling. Adjust driving techniques and maintenance procedures to account for this weight, particularly during maneuvers or emergency stops. Carry out regular maintenance and inspection of buses to ensure that mechanical failures, such as brake malfunctions, do not occur. Equip buses with advanced monitoring systems that detect mechanical issues in real-time, allowing for quick repairs before failures lead to accidents. The braking system shall be designed to offer maximum safety, with features such as (but not limited to): Compliance with international safety standards. A Halt Brake For effective immobilization. An anti-roll system to prevent unintentional vehicle movement on slopes. Install GPS tracking systems in buses to monitor and analyze driving routes, ensuring drivers follow the safest and most efficient routes. Equip buses with emergency response tools such as fire extinguishers, first aid kits, and reflective safety vests. Develop emergency response protocols for accidents or mechanical failures on the road. Train drivers and onboard staff on how to manage emergency situations, including the safe evacuation of passengers. A simple video protection system shall be installed, with an easily accessible recorder for the rem |
| | E-buses should be equipped with necessary means of protection and emergency response equipment. The project will establish a grievance mechanism for workers and will provide a clear, transparent process for addressing and resolving complaints. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|--|---|
| Residual impact | Negative, moderate, long term |
| Methods of monitoring | Vehicle Safety Inspections Accident and Incident Reporting Grievance Mechanism Driver Behavior Monitoring |
| Monitoring frequency | Daily site inspection and surrounding Weekly inspection of training records Daily vehicles inspection |
| Monitoring indicators | Occupational health and safety incident reports Medical reporting on received cases No accidents Insurance coverage for everyone on site with proof of their presence on site through attendance sheets and copy of IDs Clear and accessible grievance channels to all workers, i.e., grievance boxes at the project site, specified phone number, email, social media platform, and physical address for submission of complaints Internal grievance logs Number and type of workplace complaints received and resolved Response timeline for resolution of complaints CDA approval on firefighting system for the developers Vehicles inspection records |
| Monitoring location | Depot, Databases/register for vehicles inspection, grievances, incident/accidents, medical check-up, training |
| Responsibility and Staffing Requirement for Mitigation | CTA is responsible for handling workplace grievances of direct workers. O/M- TIU responsible for handling grievances for all types of workers during operation. |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| LFR2 | Labor Force Behavior |
| Mitigation measures | CTA to: Provide in-depth training programs to ensure drivers are familiar with the e-bus operation, including its unique features and systems (e.g., battery management, charging protocols). Focus on both technical and non-technical aspects, including customer service, especially for vulnerable users (e.g., females, persons with disabilities) Set up a driver support hotline where new drivers can call in for immediate assistance or guidance when they face operational difficulties. |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses | | | | |
|--|--|--|--|--|--|
| Posidual impact | Create a comprehensive, easy-to-follow manual for drivers outlining the key differences in operating e-buses, such as energy-efficient driving techniques, how to operate charging stations, and handling malfunctions or technical issues. Monitor buses operation using cameras. Implement regular checks to assess bus performance and ensure the technology is functioning properly. This includes monitoring for any malfunctions or issues that could impact passenger safety or comfort Set up a grievance mechanism for bus users to provide feedback on the operation, particularly on driver behavior and comfort, to identify areas for improvement. Negative, Moderate long term | | | | |
| Residual impact | | | | | |
| Methods of monitoring | Driver Performance Review Passenger Feedback Collection/grievance mechanism Bus performance data, including issues such as malfunctions, breakdowns, and battery efficiency | | | | |
| Monitoring frequency | Weekly | | | | |
| Monitoring indicators | Driver Training Completion Rate Passenger Satisfaction Operational Issues Battery and System Performance No accidents Surveys Internal grievance logs | | | | |
| Monitoring location | Depot, | | | | |
| Responsibility and Staffing Requirement for Mitigation | • CTA | | | | |
| CHS2 | Community Health and Safety | | | | |
| Mitigation measures | Implement comprehensive driver training programs that focus on safe driving practices, awareness of high-risk areas (e.g., schools, pedestrian crossings), and emergency response skills. Implement speed limits and traffic calming measures in areas with high pedestrian traffic to reduce the risk of accidents. Regularly maintain and inspect buses to ensure that tires and brake systems are in good condition, reducing dust from tire wear where Inspection should cover all functions based on pre and post checklist Ensure all buses are equipped with functional separate entry and exit doors, regularly maintained to avoid malfunctions. Train bus drivers to fully stop during passenger boarding and disembarking, ensuring passenger safety, particularly for vulnerable groups such as children, the elderly, and persons with disabilities. Install monitoring devices like cameras to monitor and deter incidents of harassment, theft, or other forms of misconduct | | | | |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses | | | |
|-----------------------|--|--|--|--|
| | Implement a traffic management plan to optimize bus routes and reduce unnecessary or frequent stops Introduce gender-sensitive training for drivers and conductors to help identify and prevent harassment Ensure all buses are equipped with sufficient lighting, particularly during nighttime operations, to improve safety and visibility for passengers Provide training for bus staff on how to handle cases of bad behavior and implement disciplinary actions where necessary. The project will establish a grievance mechanism for workers and community members, ensuring anonymity, confidentiality, and accessibility for all, including people with disabilities. The mechanism will be gender-sensitive, with special considerations for handling grievances related to Gender-Based Violence (GBV), Sexual Exploitation and Abuse (SEA), and Sexual Harassment (SH). The grievance mechanism will be regularly communicated to all stakeholders and will provide a clear, transparent process for addressing and resolving complaints | | | |
| Residual impact | Negative, lower significance than before, long term | | | |
| Methods of monitoring | Maintain detailed records of defensive driving programs, including attendance, completion rates, and test scores. Conduct regular performance evaluations of drivers to assess adherence to safe driving practices and emergency response protocols. Monitor and analyze traffic incident reports involving buses to identify any correlation with driver behavior or training deficiencies. Gather feedback from community members and local stakeholders regarding traffic conditions and pedestrian safety near high-risk areas. Keep comprehensive maintenance logs detailing routine inspections, repairs, and replacements of tires, brake systems, and other critical components. | | | |
| Monitoring frequency | Monthly or quarterly performance evaluations. Implement In-Vehicle Monitoring System (IVMS) where: Continuous monitoring through speed monitoring devices. Continuous monitoring of traffic incidents and analysis reports. Regular and ad hoc drug testing. Number of Speeding violations Grievance Mechanism: number of theft incidents and number of harassment complaints | | | |
| Monitoring indicators | Number of drivers trained and certified. Driver test scores and performance evaluation results. Community feedback on perceived safety improvements or concerns (users satisfaction surveys). | | | |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses |
|--|---|
| Monitoring location | Reporting of traffic accidents versus number of trips performed safely External grievance logs Drug test results Harsh acceleration/ deceleration report Passenger evaluation survey No. of pre-post checklist No. of trips completed safely Depot, |
| Responsibility and Staffing Requirement for Mitigation | - CTA |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost |
| RS2 | Road Safety |
| Mitigation measures | The increase in the number of e-buses and the number of the e-buses' passengers taking into consideration the model shift scenario, the CTA shall develop a traffic management and contingency plans The objective of the traffic management plan is to ensure safety and smooth traffic flows on roads. While the contingency plan shall include studying different scenarios including, but not limited to the following: Selecting e-buses with riders' capacity bigger than the current diesel buses, if possible. Increase the number of buses on the 5 selected routes by providing NG buses from other depots. This scenario shall be the last |
| | one to be considered by the CTA. |
| Residual impact | Mitigation measures will reduce impacts of T2 to low. |
| Methods of monitoring | Traffic flow assessments Bus frequency Traffic management and contingency plans |
| Monitoring frequency | Weekly: Monitor passenger counts, bus frequency, and traffic flow. Monthly: Review road safety records, journey times, and traffic management plan implementation. |
| Monitoring indicators | Traffic Flow Bus Frequency Passenger Load Factor |
| Monitoring location | Depot: Documentation system including the developed plans Routes: applying the plans |













| CODE | Environmental and Social Component During the operation and Maintenance activities of E-buses | | | | |
|--|---|--|--|--|--|
| Responsibility and Staffing Requirement for Mitigation | СТА | | | | |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost | | | | |
| GBV & SEA-SH 2 | Gender-Based Violence (GBV2) and Sexual Exploitation and Abuse/Sexual Harassment (SEA-SH2) | | | | |
| Mitigation measures | Implement and enforce a strict Code of Conduct for drivers and all staff, outlining zero tolerance for GBV and SEA-SH. Provide training and awareness sessions for bus drivers and conductors on preventing GBV and SEA-SH, including appropriate intervention methods. Equip buses with CCTV cameras for monitoring and deterring harassment incidents, ensuring footage is regularly reviewed. Establish a dedicated, anonymous, and accessible grievance mechanism for female passengers to report incidents safely and confidentially. Conduct random inspections and monitoring to ensure compliance with safety protocols and anti-harassment measures. Strengthen coordination with law enforcement to ensure immediate response to reported cases of harassment or violence. Launch public awareness campaigns targeting all bus users to promote respectful behavior and increase awareness about GBV and SEA-SH prevention. | | | | |
| Residual impact | Mitigation measures will reduce impacts of GBV & SEA-SH 2 to low. | | | | |
| Methods of monitoring | Review of CCTV footage Passenger satisfaction and safety surveys Grievance reports Training attendance records | | | | |
| Monitoring frequency | CCTV footage review: Weekly or in response to reported incidents. Passenger surveys: Bi-annually (every 6 months). Grievance mechanism tracking: Monthly analysis of complaints and resolutions. Bus inspections and audits: Monthly or as part of routine maintenance checks. | | | | |
| Monitoring indicators | Number of SEA/SH complaints received | | | | |
| Monitoring location | Buses | | | | |
| Responsibility and Staffing Requirement for Mitigation | CTA | | | | |
| Estimated cost (EGP) | Included in the CTA operation and maintenance cost | | | | |













7.3.1 ESMP Budget

Estimated costs for implementation of the ESMP include monitoring activities and institutional strengthening and capacity building activities (in the form of training) and are presented in the following table.

Table 7-4 Proposed budget for ESMP

| | Table 7-1 Troposed budget for Est ii | | | | | |
|--|--|---|--|--|--|--|
| Item | Details | Estimated Cost (EGP) | | | | |
| Monitoring requirements during | g construction and operation | | | | | |
| Air quality measurements | 3 measurements monthly for 6 months SO2, CO, NO, NO2, NOx, O3, PM10, TSP | 216 000 EGP/ 6 months | | | | |
| Noise and vibration measurements | 3 measurements monthly for 6 months | 216 000 EGP/6 months | | | | |
| Monitoring of vehicles | Installments of GPS to track vehicles routes and distances | 5000 EGP/truck 25 000 EGP | | | | |
| Supervision and monitoring of implementation of ESMP during decommissioning and construction activities. | Supervision Consultant: External hire of 3 specialists by private contractor: OHS, environmental and social development specialists (Assuming 6 months DC/C/) | 20 000/month per specialist 360 000 EGP/6 months | | | | |
| Supervision and monitoring of implementation of ESMP during operation and maintenance phase. | EHS specialist (operation and maintenance) during lifetime of E-bus demonstration project Social and gender development specialist 2 professors of automotive mechanics engineering at Ain Shams University have been contracted to provide technical advice to the Technical Implementation Unit and supervise the project work. | 960 000 EGP/year | | | | |
| Capacity building and training | g | | | | | |
| ESIA/ESMP: ES impacts and mitigation, compliance with local regulations, WB Standards, Good practice notes; Grievance mechanism process, all management plans referenced in ESMP | 3 days | 60 000 EGP/ 3 days | | | | |











| Item | Details | Estimated Cost (EGP) |
|--|---------|--------------------------|
| Implementation of LMP (as per ESMF and present ESMP), notably, Code of Conduct; prevention of COVID, prevention of GBV | 2 days | 40 000 EGP/ 2 days |
| Implementation of SEP (referenced in ESMP) | I day | 20 000 EGP/ I day |
| Monitoring and Evaluation for Field Inspection on implementation of ESMP | I day | 20 000 EGP/ Iday |
| Monitoring and evaluation of progress report | I day | 20 000 EGP/ I day |
| Total Cost | | I 937 000 EGP for year I |

The proposed budget for the ESMP covers only a one-year implementation period. Any delays in project execution beyond this timeframe will result in additional costs, which will need to be reassessed and allocated accordingly.

7.4 Institutional Strengthening, Capacity Building, and Training for Implementation of ESMP

Monitoring and evaluation of ESMP implementation will be performed by Team Leader and Environmental and Social Focal Points/Officers of the TIU and by the Environmental and Social Specialists at the PCU. The TIU Team Leader and Environmental and Social Focal Points/Officers should be trained on principles of ESF to understand applicable ESSs to the project and associated environmental and social receptors affected by activities and related indicators to assess compliance with ESMP (and plans therein) of identified receptors, trained to conduct site visits for field monitoring using checklist, trained on preparation of monthly progress reports on implementation of ESMPs and for submission to PCU, knowledge on specified management plans consisting of emissions control plans, resources (energy, water, etc.) management plan, waste management plans, etc.

The following table defines the roles and responsibilities for the implementation of the ESMP during the decommissioning / construction and operation phases:

Table 7-5 Responsibilities during phases of the project

| Table 7-5 Responsibilities during phases of the project | | | | | |
|---|--------|--------------------------------------|-----------------------------------|-------------------------------|--|
| Phase | Entity | Key Responsibilities | Monitoring and Supervision | Reporting | |
| Decommissio ning/ Construction | Contr | Implement ESMP and comply with ESSs. | Contractor reports to supervision | Supervisio n consultant | |













| | | Develop and implement all needed management plans. Ensure all workers and subcontractors comply with the ESMP requirements. | consultant, then the consultant will review and send his comments to the contractor to be addressed, then the supervisor will submit the cleared report to the PCU and the TIU. | reports to TIU. TIU submits reports to PCU. |
|---------------------------|--------|---|---|---|
| Operation (First Year) | Consul | Supervise works and ensure compliance with Environmental and Social Framework (ESF) of the World Bank as pertaining to the project as well as the prepared ESIA Support the implementation of Grievance Redress Mechanism in compliance with the Environmental and Social Commitment Plan of the project, LMP and GRM report of Component 3 | Consultant ensures compliance with all management plans | Consultant submits reports to TIU and PCU. |
| Long-Term Operation | СТА | Take over operational Responsibilities after the first year. Ensure long-term monitoring of the depot and e-buses operation in compliance with the ESMP. | cta manages day-to-day operations and compliance monitoring after the first year. | reports to PCU until completio n of GCCC project. |

To strengthen the ESMP, the project can explore ways to support the CTA in establishing the GM earlier, possibly during the late construction or pre-operational phase. This could involve:

- Capacity Building & Training by Providing technical assistance to CTA on best practices for GM implementation, including digital complaint tracking and resolution mechanisms.
- Encouraging CTA to engage early with customers and stakeholders to design an accessible and effective GM.
- Establishing a preliminary grievance system during the initial deployment of buses to test and refine the mechanism before full-scale operation.

The training topics and recipients are presented in the following table. The contractor/TIU and PCU will be responsible for implementation of the ESMP by all workers.

Table 7-6 Training Plan for Implementation of ESMP

| Training topic | Contractor | TIU | PCU |
|---|------------|-----|-----|
| ESIA/ESMP: implementation of mitigation measures, compliance with local regulations, WB standards, good practice notes; grievance mechanism process, all management plans referenced in ESMP; description of roles and responsibilities | | Yes | Yes |













| Training topic | Contractor | TIU | PCU |
|--|------------|-----|-----|
| Implementation of LMP (as per ESMF and present ESMP), notably, OHS plan, code of conduct; prevention of COVID, prevention of GBV, emergency response plan, | Yes | Yes | |
| Implementation of SEP (referenced in ESMP); engagement plans; grievance mechanisms | Yes | Yes | |
| Monitoring and evaluation for field inspection on implementation of ESMP; use of ESMP compliance checklist; report drafting | | Yes | |
| Monitoring and evaluation of progress report | | | Yes |

Appendix J includes Indicative checklist to guide field monitoring (to be used by TIU)

7.4.1 ESMP implementation report indicative outline

According to the project ESCP, the contractor is requested to submit a monthly E&S progress report. Thus, it is required that contractors and the supervising firms to provide monthly progress reports on ESHS performance in accordance with the metrics specified in the respective bidding documents and contracts. The reports shall be reviewed and verified by the TIU and the PCU. The ESMP implementation report shall report on status of implementation of mitigation measures, compliance with local and WB regulations, where applicable, on internal and external grievances and associated response measures and time and preventative measures, any accidents and associated corrective actions, any incidents of non-compliance.

The ESMP implementation report outline includes:

- Executive summary
- Scope of the Report
- Key Activities
- Monitoring Overview
- Compliance and Corrective Actions
- A summary of complaints or grievances received and how they were addressed.
- Training and Capacity Building
- Evidence and Attachments













8 Stakeholders Consultations and Public Disclosure

8.1 Stakeholders Identification and Analysis

8.1.1 Primary Stakeholders

Primary stakeholders are the beneficiaries of a development intervention (the E-bus Project) who will be directly affected, positively or negatively. These include the following groups:

I Bus users

Bus users are the main beneficiaries of operating E-buses. They will experience better transportation journeys; less noise and air pollution during the ride, more comfortable seats, WIFI, and air conditioning inside buses. Bus users include all passengers likely to use the E-bus. Special attention will be given to a) women, pregnant women, women with babies, children b) vulnerable groups, e.g., elderly, people with disabilities, and c) university students and school pupils who are expected to use E-buses on regular basis during the academic year.

2 Local communities

Local communities are most impacted and intended final beneficiaries of the introduction of the E-buses. They will be interested in the project's impact on air quality, noise levels, and overall quality of life, as well potentially expecting improved quality of service. However, local communities in the close vicinity of the depot are likely to be negatively affected by noise and traffic congestion, especially at the beginning and the ending of bus operating hours. CTA routes cover the entirety of the Greater Cairo Region (GCR). As such, the entire population of the GCR are potential beneficiaries of the implementation of the E-Buses. This can be narrowed down to the citizens living in the vicinity of the routes to be electrified following application of the Multi-Criteria Analysis and Route Choice.

3 Employees and Workers Unions

Employees and workers unions are primary stakeholders in the project, as they will be impacted by the introduction of the E-buses. Bus drivers in specific will be interested in the project's impact on their job security and working conditions, as well as the training needs and support provided for the transition.

4 Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs)

Organizations with direct interest in the project and which may have useful data or insight into local issues of relevance to the project. These organizations can also influence the views of others regarding the project, nationally and internationally. Representing local communities' interests and also responsible of sharing information with the community.

8.1.2 Secondary Stakeholders

Secondary stakeholders include agencies, experts, interested parties and anyone able to influence the outcome of the development, because of their ability to contribute with their knowledge or ideas to improve the design, or because of their ability to provide mitigations of environmental and social impacts, or because of their influence on the development; and also, those likely to be indirectly affected by the project. They include Central Government, line ministries, local government/authorities, implementing agencies, project staff, active Civil Society Organizations (CSOs) and Non-Governmental Organizations (NGOs), private sector firms, WB and its stakeholders, pertinent development agencies, Media, and Academia. Secondary stakeholders of this project include the following groups:

I Beneficiary Institutions











Key direct secondary stakeholders are beneficiary institutions, in specific, the Cairo Transport Authority (CTA); the Technical Implementation Unit (TIU) and Project Implementation Unit (PCU); the Client, specifically the Egyptian Ministry of Environment (MoE), and it's implementing Agency, the Egyptian Environmental Affairs Agency (EEAA); and Funding agency, the World Bank.

8.1.3 Public Officials

This group includes all those who are responsible for politically championing, funding and approving the E-Bus implementation project, as well as regulating the wider energy and transportation industries. Government officials are typically interested in the project's technical and financial feasibility, environmental impact, and any economic benefits as well as adverse consequences it might bring. Typically, city-level officials are primary stakeholders. In Egypt national-level decision makers often are primary stakeholders. The project level SEP identifies the following relevant public officials:

The Egyptian Cabinet and Prime Minister's (GoE-PM) office

Political priority is assigned to the electrification of transport in general, and passenger bus transport in particular, by the highest level of political decision making. This was first championed with the Executive decision to procure 140 Electric Buses for Operation at the COP27 Climate Change conference in Sharm El-Sheikh.

I Line Ministries

Ministry of Environment - Egyptian Environmental Affairs Agency (EEAA), Responsible for developing public policies related to the protection of environment and improving its quality. In addition, it is responsible for issuing regulations for environmental determinants and monitoring their implementation. Various Ministries are involved including the following:

- Ministry of Environment (MoE), which is the political champion of the E-Bus Implementation Project;
- Ministry of Local Development (MoLD), which coordinated various Governorates to purchase the 140 E-Buses for use in COP 27 in Sharm El Sheikh;
- Ministry of Transport (MoT), which decided to operate E-Buses in its under-construction Cairo Ring Road Bus Rapid Transit (BRT) system and recently supervised the procurement of 100 E-Buses for use on the BRT;
- Ministry of Public Business Sector (MoPBS), which supervises the Armor Production and Repair Plant (Military Factory 200). It is operated in a Joint Venture (JV) with Manufacturing Commercial Vehicles (MCV) to produce E-Buses.
- Ministry of Electricity and Renewable Energy (MoERE), which manages the vertically integrated electricity sector through the state-owned Egyptian Electricity Holding Company (EEHC) and its subsidiaries. It oversees the generation, transmission, and distribution segments.
- Ministry of International Cooperation (MolC), which manages international development cooperation and banks to allow implementation of technical / financial assistance in Egypt.
- Ministry of Planning and Economic Development (MoPED), which provides estimates of the revenues, allocations, and expenditures related to infrastructure projects (investment). This includes the annual budget of public Authorities such as the CTA.
- Ministry of Interior (MoI), and in particular local emergency services, e.g., the Egypt Fire Protection (EFP) services, Traffic Engineering Bureau (TEB), and Traffic Police (TP); all of which are part of the Ministry of Interior and located within the respective Governorate or NCDA.

2 Transport Governance Authorities

The Land Transport Regulatory Authority (LTRA) which plans, organizes, monitors, and evaluates the performance of transport activities in Egypt, including at the level of the Greater Cairo Region (GCR). The LTRA provides concessions to private sector entities (incl. Mwasalat Misr (MM)) to operate Bus













services. It is also the project manager for the MoT Cairo Ring Road BRT project. The LTRA is hosted within the MoT.

3 Local Administration Entities

- Regional level entities include the GCR which consists of the Cairo, Giza and Qalyubia governorates; and New City Development Agencies (NCDA). Each NUC is managed by a NCDA.
- Local level entities include Local Government Units (LGUs) within the targeted Governorate in the respective areas related to the project, which support the project through giving permits for electricity installation and water supply and mobilizing people to gain information about the project.

4 Public Transport Operators

Also called transit agencies or bus operating entities. They are responsible for the operation and maintenance of public transportation systems. They will be involved in the E-bus project from the planning and design stages, through to the implementation and operation of the E-buses.

5 Electric Utility Authorities

Electric utility authorities are responsible for providing the electricity needed to power the E-buses. They will be interested in the project's impact on electricity demand, spatial distribution and impact on transmission networks. They might be needed to construct supporting facilities.

6 Bus Manufacturers and Suppliers

Original Equipment Manufacturers (OEM) will be responsible for supplying the E-buses, batteries, charging equipment and infrastructure that is needed.

7 Financing Institutions

Will be providing initial funding for the E-Bus Pilot project. Enabling and proofing E-Bus Operations financial viability and potential returns on investment are key to unlocking long-term investments.

8.2 Consultation activities with stakeholders

8.2.1 Consultation activities

A variety of consultation activities has been undertaken during the project design and preparation of the ESIA with key primary and secondary stakeholders. The main aim of intensive consultation is to better understand social concerns and social inclusion risks from different perspectives. Thus, the output of consultation activities is meant to guide e-bus specifications during design to attain a higher satisfaction of users. Consultation extended over the period from January 2023 to July 2024.

I Rus users

It was highly informative to discuss a number of topics with bus users in-depth to better understand their experiences, challenges, and recommendations for the project. A total of 16 FGDs comprising 127 participants were conducted with bus users to assess and formulate recommendations in the context of diversity, inclusiveness, and resilience considerations for the e-bus demonstration project as follows:

a) FGDS

■ 15 FGDs were conducted in 5 areas along the routes of Al-Ameriyah Depot, i.e., El Daher (5 lines); Hadeyek Al Qobba (4 lines); Al Waily (3 lines); Al Azbakeya (3 lines); and Heliopolis (2 lines). Each group was limited to 8 participants to be able to focus on the groups' concerns in detail. Number of male groups in each area is 5, another 5 with females, 3 with young men, and 2 with ladies/young girls. Additionally, participants in each group were asked to discuss challenges and special considerations for women (including pregnant, with babies, and elderly), persons with













special needs (and their companions), as well as young population (school pupils and university students).

One FGD was conducted with 7 persons with disabilities at the National Council for Persons with Disabilities (NCPD) to better articulate their concerns regarding the use of public buses and better understand how to achieve utmost inclusiveness for various types of disabilities by providing special specifications in the new e-buses.

Participants were very interactive during discussions, especially females. In addition to their basic socio-economic information, discussions covered various aspects related to:

- Practices with public transportation means;
- Preferences when choosing;
- Experience with CTA buses;
- Mobility constraints;
- Safety concerns;
- Special concerns (experienced or witnessed) related to women, persons with limited mobility or disabilities, and young riders (males and females);
- Perceptions of e-buses; and
- Proposed moderation measures.

2 Passengers' Surveys

In addition to FGDs, a passenger survey was carried out. Passengers' surveys were performed for Imbaba bus routes, and projected Badr bus routes (as given by CTA), those two depots and corresponding routes being the ones that came out of the Multi criteria Analysis (GCCC decision pursuant to MCA Phase I and Phase II presentation on 10/05/2023 meeting. Passenger interviews were conducted in a street-intercept method in selected zones surrounding the 14 surveyed CTA routes. 29 zones were selected across the GCR with 583 surveys collected from all zones. The criteria for choosing the zones were the volume of boarding & alighting clusters, driven from the onboard survey results. Areas with high boarding & alighting values were chosen for each district in our project's area of interest (Badr city, Shorouq, New Cairo, Imbaba, Nasr City, etc.) and the total number of surveys targeted (initially 500) was distributed based on the relative boarding & alighting volume between the selected zones. The survey targeted a 50/50 gender split per zone, and subsequently a 50/50 split for the total sample. No other pre-selection criteria for passengers were included. The targeted population were existing public transport users waiting at stops.

The passenger survey was divided into three components:

- Journey Details: origin and destination of their current trip, trip purpose, modes used, fare paid, access and egress time, etc.
- Passenger experience: The main portion of the survey with impressions, ratings, and preferences for public transport. Specific questions target gender and active travel aspects.
- Basic demographic information: including questions on physical challenges to accessing PT.

3 CTA Central Staff

The consultant team had regular consultation meetings with CTA staff, mainly every month during the monthly progress meeting, in addition to interval meetings or depot site visits as needed. The initial aim of meetings is to discuss depot selection and layout through a multi criteria analysis, assess CTA capacity, and exchange points of view. Meetings were attended by CTA central staff, GCCC staff, EEAA representatives, and the World Bank team (during kick-off and follow-up missions).

In broad terms, meetings intended to:

- Follow up on data collection and main challenges;
- Communicate additional required secondary data and purpose of collecting data;













- Arrange site visits to depots, and/or meetings with other stakeholders;
- Discuss any inquiries from the consultant team to undertake the analysis; and
- Follow up on deliverables.

4 Depot Manager and Supervisors

It was also important to understand depot-related aspects interconnected to the physical environment and work organization. Interviews helped to triangulate data collected from other stakeholders, especially CTA central staff. Outcome of meetings is reflected in section 4-3, the baseline section of the ESIA and the GRM document. A total of 13 Key Informant Interviews (KIIs) were conducted with CTA officers and Al-Ameriyah Depot staff, e.g., CTA central depart., CTA planning dept., CTA training depart., depot manager, depot observers, engineering depart., public relation depart., human resources depart., and deputy head of workers' syndicate. Topics with different participants covered mainly the following:

- Number of managers, employees, workers, and service workers by sex;
- Number of persons with disabilities employed at the depot by sex and level;
- Facilities and amenities inside Al-Ameriyah Depot;
- Description of workers' welfare features;
- Social services provided for workers;
- Training programs provided to depot staff;
- Capacity building needs;
- Internal grievance resolution including right to anonymous complaints; and
- Workers' rights, including right to rebel.

5 Bus Drivers

An interesting exercise was to discuss work experience and challenges with different passengers, especially those with limited mobility, and to get drivers feedback on main findings of FGDs. An interview was conducted with two drivers in the Al-Ameriyah Depot. Discussion with drivers revolved around the following topics:

- Density and nature of passengers by section and timings of the day, and changes in such patterns over weekdays and/or seasons;
- Challenges and management of passengers with reduced mobility;
- Personal perceptions of introducing e-buses, and how to maximize benefits and minimize risks;
- Personal and professional criteria for drivers' and conductors' selection on e-buses;
- Required trainings to build the capacity of drivers and conductors;
- Emergency situations and contingency management;
- Awareness raising needs for different categories of stakeholders (users and operators);
- The extent to which drivers are aware of the danger of air pollutants emanating from diesel bus exhaust on public health and the benefit of replacing them with electric buses; and
- The acceptance of bus drivers to the idea of having female colleagues (drivers).

The drivers confirmed the positive impacts of the e-bus for users and operators. They were also positive about the value of training provided to drivers by manufacturing companies based on their experience during the operation of e-buses in Sharm El Sheikh during the COP summit. Agreeing on challenges facing persons with limited mobility, they confirmed that CTA drivers have a humanitarian attitude for any person in need for support.

8.2.2 Public Consultation Meeting

The public consultation session was physically held on July 17th, 2024, at Triumph Plaza Hotel, Heliopolis. About 46 participants attended and the following table shows the distribution of













participants according to the specialty. Appendix K shows the registered attendees and their affiliations.

Table 8-1 Distribution of attendees according to their affiliation

| Distribution of participants according to their affiliation | Number | Percentage (%) |
|--|--------|----------------|
| Administrative official's governorate level (MoE, EEAA, MOT) | 14 | 30.4 |
| Consultants and experts | 6 | 13 |
| World Bank | 2 | 4.3 |
| Civil society | 15 | 32.6 |
| Academic Institutions | I | 2.2 |
| Private sector in the transportation field | 8 | 17.5 |
| Total | 46 | 100 |

Guests were informed of the date and venue of the public consultation session at least two weeks prior to the meeting date. Invitations were sent by the PCU in cooperation with the consulting office via WhatsApp, e-mails and phone calls.

The aim of the session is to present the results of the ESIA, with a focus on the environmental and social impacts resulting from the project, methods of mitigating negative impacts, maximizing the benefit from the positive effects, and ensuring that the parties involved are satisfied with the measures to reduce environmental and social impacts and management plan.

The following topics were presented during the public consultation session:

- Introduction about the project
- Objective of the project
- Project partners
- Project description
- Methodology of ESIA preparation
- Environmental laws applicable to the project
- Description of the environmental and social baseline
- Alternatives
- Project's environmental and social impact assessment methodology results
- Environmental and Social Management and Monitoring Plan

Most of the attendees actively participated in the session and came up with fruitful ideas for discussion. Moreover, surveys were given to the participants upon their arrival to fill in with their feedback/questions. These survey forms are attached to the study in Appendix L.

The following table provides a summary of the main comments and concerns raised during the session.

















Figure 8-1 Public Consultation Meeting













Table 8-2: Key questions and comments raised during the public consultation session settect

| D / | | Response | Reflection on the |
|--|---|---|---|
| Participant/ affiliation | Questions/Remarks | project/ESIA | |
| EEAA Consultant | I. What does this 44.3% decrease in GHG emissions represent? | It represents the reduction of the GHG emissions in the 5 selected routes mentioned based on the replaced diesel buses and the reduction came from modal shift of cars and taxis | Project Description Chapter, Section 2.5.3.4. and chapter 6 section 6.3.2.1 |
| Project Engineer for TPA | 2. Are emissions from electricity generation taken into consideration during calculation of emission reduction? | Yes, for electric buses as they don't produce direct emission. Calculated emissions for the electric buses came from power plants emissions to produce electricity that is used to charge the buses according to CDM methodology. | Project Description Chapter, Section 2.5.3.4. And chapter 6 section 6.3.2.1 |
| Mwasalat Misr (private transportation Sector) | 3. What is the Current Ridership methodology to calculate modal shift %? | By Applying a certain occupancy rate per private car (section count -1000 car x occupancy rate) and there was section count for cars and taxis but it is difficult to know the exact number for shifted cars and taxis that's why we have considered different scenarios, but these numbers were obtained from the researches who ride the buses in the selected routes and counted and also from the data received from CTA. | Project Description Chapter, Section 2.5.3.4. And chapter 6 section 6.3.2.1 |
| General Authority for Transportation Projects Planning | 4. How can there be modal shift when the buses are full capacity | It is not at full capacity | Potential Environmental and Social Impacts Chapter 6.4.2.7 |













| CIA MARIANA | | SHAKER Transport واصلح for Caliro للقافرة | | | |
|---|---|---|---|--|--|
| Participant/ affiliation | Questions/Remarks | Response | Reflection on the project/ESIA | | |
| EEAA Consultant | 5. Questioning 70% reuse of water and if there will be wastewater treatment unit used in the depot. | • 70% of the generated wastewater will be recycled after treatment to be reused in the bus washing process. This is facilitated by a wastewater treatment system that includes settling tanks, hydrocarbon separators, and biological reactors. This system ensures that wastewater is adequately treated and filtered, making it suitable for reuse in subsequent washing cycles. The remaining 30% of the wastewater, including any sludge, will be appropriately managed and disposed of according to environmental regulations, ensuring minimal environmental impact | Project description chapter Sec2.5.3.7 | | |
| EEAA Consultant | 6. Do you have plans for electricity cuts and why the decision to go electric at a time of electricity scarcity? | Same as metro - no electricity cuts because it is a national project, and this had been considered in the feasibility study (cut off for Thour). | - | | |
| Land Transport Regulatory Authority | 7. What is the full capacity of the depot?8. What will happen with the other routes that are not electrified? | The Depot could occupy up to 110 buses. Buses of the other routes will be operated from other depots. | Project Description Chapter Section 2.5 | | |
| Arab organization for industrialization (AOI) | 9. There is a module from some graduation students at the Canadian university on car washing that uses solar power 10. Model of the buses must be chosen in perfect way and to fit | Operation of the depot with solar energy is challenging because of the large area needed to install the solar PV cells to satisfy the depot needs, the CAPEX and the maintenance cost of the system and also busses will be charged at night which means that this will request a lot of | Project Description Chapter Section 2.5.2.2 | | |













| ETA AND LAULAN ALLANDA | | SHAKER CONSULTARICY GROUP for Cairo | |
|--|--|---|---|
| Participant/ affiliation | Questions/Remarks | Response | Reflection on the project/ESIA |
| | the circumstances of the paths and suggesting contacting with Armed Forces Research Authority 11. Operate the depot with the solar energy 12. Retrofitting old diesel buses to electric buses. | batteries, although renewable energy may be considered in the near future. Locally there are companies that retrofit only small vehicles. with high cost. Also, the current buses are not equipped for handicapped people | |
| Transport Labor Union | 13. What is the plan for workers that will lose their jobs? | • There is a full capacity building plan in the project and that was mentioned in the project potential impacts during operation. Additionally, CTA has training and rehabilitation center so as no workers will lose their jobs, but they can be moved to other depots or change their jobs as what happened to the drivers in COP 27 in Sharm El sheikh as they were trained in MCV and proved themselves during their work | Potential Environmental and Social Impacts Chapter Sec 6.4.2 Mitigation Measures Sec 6.5.2 ESMP Chapter Stakeholders Consultation and Public Disclosure Chapter sec 7.3 |
| Mwasalat Misr (private transportation sector) | 14. Does the study include the fleet management system or mobile application? | No, but CTA has its own strategy, and the bidding package states that the buses must have a monitoring system | Project description chapter Sec 2.4.3 |
| Mwasalat Misr (private transportation sector) | 15. Does the study include ticketing system? | No, but CTA is currently working on prepaid system for tickets and hired a consultant for that | Stakeholders Consultation and Public Disclosure Chapter |
| General Authority for Transportation Projects Planning | 16. How long does the charged battery can operate? | Charged battery can last for about 250 km which is equal to one day operation, but that may differ during summer because of air | Project description chapter Sec 2.4.3 |













| (ii) SIA | | SHAKER Transport واصلح for Cairo للقافرة | |
|--|--|---|---|
| Participant/ affiliation | Questions/Remarks | Response | Reflection on the project/ESIA |
| | | conditioner so there are 2 operational plans one for summer and the other for winter. | Stakeholders Consultation and Public Disclosure Chapter |
| General Authority for Transportation Projects Planning | 17. What are the battery disposal scenarios? | It will be the supplier's responsibility to reuse it or dispose it and that will be in the contract between CTA and the supplier | Alternatives chapter Sec 5.3.2 |
| EEAA | 18. What will happen to the diesel buses? | Good, conditioned buses will be operated from other depots and others will be scrapped. | Project Description Chapter Sec 2.5.1 |
| General Authority for Transportation Projects Planning | 19. Would the tickets be in fare and uni-price | No decision has been made and that it will likely stay the same | Didn't affect the study |
| EEAA | 20. What is the neutralization process of the diesel tanks? What are the chemicals that will be used? What are the safety procedures to avoid splitting? What are the insulating procedures? | Neutralizing the tanks Misr Petroleum's responsibility; however, they decided to fill the underground diesel tanks with sand and buried them underground by trained workers and in presence of HSE officer taking all safety procedures in extinguishers without usage of chemicals and insulation. | Project Description Chapter Sec 2.5.1 Potential Environmental and Social Impacts Chapter Sec 6.4.1 Project Alternatives Chapter Sec 5.5 Mitigation Measures Chapters Sec 6.5.1 |
| EEAA | 21. What are the procedures with maintenance waste? | Storage will be temporary as it will be separated and disposed off site via a certified waste contractor and an environmental register will be prepared for the depot which will include types | Potential Environmental and Social Impacts Chapter Sec 6.4.2 |













| CIA AND MAINTAINE | | SHAKER Transport واصلخ for Cairo | |
|--|---|--|---|
| Participant/ affiliation | Questions/Remarks | Response | Reflection on the project/ESIA |
| | | and quantities of wastes generated and their final disposal method. | Mitigation Measures Chapters Sec 6.5.2 ESMP Chapter Sec 7.3 |
| Director of Egypt's Project for Transport Workers Training under the International Transport Federation ITF | 22. Training of E-bus drivers and workers.23. Transformational training for workers and conductors.24. Re-positioning of workers plan | There is a stand-alone document for training and capacity building | Potential Environmental and Social Impacts Chapter Sec 6.4.2 Mitigation Measures Sec 6.5.2 ESMP Chapter sec 7.3 |
| General Authority for Transport Organization | 25. Is there a grievance mechanism for the project? And how can people submit their complaints? | There is a stand-alone document for GRM Summary of GRM is also included in the ESIA | Stakeholders Consultation and Public Disclosure Sec 8.3 |
| General Authority for Transportation Projects Planning | 26. What is the ticket pricing system? And how it will be calculated?27. Will tickets be chargeable? | The pricing of tickets is not included in the scope of this ESIA. CTA is responsible for setting fares. Final fare price not yet determined; affordability will be considered | Covered in the consultation report |
| General Authority for Transportation Projects Planning | 28. Is infrastructure included in funding? | • Yes | Didn't affect the study |
| MCV | 29. Local or international bid: | • International Bid | Introduction Chapter Sec I.I Project Description Chapter Sec 2.I |













8.3 Grievance Redress Mechanism

The GRM is a key component of stakeholder engagement, designed to address and resolve grievances and/or complaints related to the project's environmental and social impacts. The mechanism is detailed in a stand-alone document (Appendix R), which outlines its scope, procedural steps, and specifies roles and responsibilities.

The following presents the main topics of the GRM standalone document.

8.3.1 Goals of the GRM

- To ensure all project-related grievances are addressed promptly, effectively, and transparently.
- To provide a mechanism that is culturally appropriate and accessible to all affected parties without cost or retribution.

8.3.2 Roles and Responsibilities

- CTA commits to timely address grievances related to the environmental and social performance.
- Responsibilities are clearly delineated for managing complaints, especially those involving external grievances about project activities or unanticipated impacts.

8.3.3 Procedural Steps

- Communication and disclosure of GRM using publicly advertised procedures, setting out the length
 of time users can expect to wait for acknowledgment, response, and resolution of their grievances;
- Receipt of Grievance: Grievances can be filed by affected individuals or groups, including local communities, residents around service areas, beneficiaries, and particularly vulnerable groups such as women, youth, and persons with disabilities.
- Grievance Processing: CTA's Citizen Service Department, including its Complaint Division, handles the registration and initial assessment of grievances to determine their admissibility and scope.
- Investigation and Action: Grievances undergo verification and investigation to formulate an appropriate response. If necessary, grievances concerning complex issues like e-bus operations may require escalated actions.
- Resolution and Feedback: Grievances are resolved in a manner proportional to the assessed risks and impacts, with outcomes communicated back to the complainant.

8.3.4 Communication Channels

- The GRM utilizes various channels for submitting grievances, including in-person, phone, text message, email, or via dedicated portals on the website. CTA ensures these channels are accessible, inclusive, and capable of handling anonymous complaints.
- According to CTA PR department and supporting documents, following channels are used to receive complaints:

CTA complaint email: khedmetmwatnen@gmail.com;

CTA what's app number: 01273133917-01129947162

CTA landline: +2-23425714

Unified Governmental Complaint System www.shakwa.eg

Unified Governmental hotline: 16528

Unified Governmental what's app number: 01555525444-01555516528

Additional channels may include but not limited to:

Letters:

Verbal narration from walk-in complainants;

Reports on visits to project offices and sites by project staff, independent monitors, supervision teams, government officials, or journalists interested in special groups like persons with disabilities, elderly people;















Reports of staff, consultants, PCU;

Comments or grievances from radio or television programs;

Findings of WB supervision missions;

Comment/complaint boxes inside buses and in stations;

Escalation to third party entities, e.g., Ministry of Environment, EEAA, Cairo Governor Office, or the WB Grievance Department; and

Media newscasts, newspaper articles, and other publications.

8.3.5 Implementation and Monitoring

- The GRM is subject to continuous monitoring and revision based on stakeholder feedback and the evolving needs of the project.
- CTA integrates feedback from the GRM into the project operation to enhance responsiveness and effectiveness in mitigating environmental and social risks.













9 Appendices

| Appendix | Name |
|------------|--|
| Appendix A | E-bus Specifications |
| Appendix B | Selected Routes |
| Appendix C | Environmental, Social and Gender considerations in E-bus Specs. |
| Appendix D | Firefighting Specifications |
| Appendix E | Consultation Strategy Plan and Report |
| Appendix F | Al Amirya Environmental Monitoring Report (Baseline Measurements) |
| Appendix G | Detailed Measurements' Report on Public Transport Modes in Cairo, Egypt in 2017 by EEA |
| Appendix H | Qualifications of Specialists Hired by the Contractor |
| Appendix I | Capacity Building Report |
| Appendix J | Indicative Checklist to Guide Monitoring (for TIU) |
| Appendix K | List of Registered Attendees to Public Consultation |
| Appendix L | Survey forms of The Public Consultation |
| Appendix M | Layout of Project Depot |
| Appendix N | List of Male FGDs Participants |
| Appendix O | List of Female FGDs Participants |
| Appendix P | List of NCPD FGD Participants |
| Appendix Q | List of Al-Ameriyah Interview Participants |
| Appendix R | Grievance Mechanism |











9.1 Appendix A: E-bus Specifications

Appendix A: E-Bus **Specifications**













Introduction and Project Objectives

Project Background and Justification

The Cairo Transport Authority (CTA)'s project to introduce electric buses into its fleet is a key initiative within the wider air pollution management and climate change project in Greater Cairo, supported by the World Bank.

This initiative aims to mitigate air pollution and climate change issues in the Cairo metropolitan area by focusing on reducing vehicle emissions. The project aligns with the Egyptian Ministry of Environment's electromobility strategy, which prioritizes high-usage and high-occupancy vehicles to maximize emission reduction benefits.

Electric buses are seen as an ideal solution for public transport due to their significant emission reduction potential and energy efficiency.

General and Specific Objectives

The project aims to demonstrate the viability and effectiveness of electric buses in Cairo's urban context. Specific objectives include:

- **Greenhouse Gas Emissions Reduction**: Contributing to national emission reduction goals through the adoption of cleaner transport technologies.
- **Energy Efficiency Improvement**: Introducing electric buses to increase energy efficiency in the public transport sector.
- **Technological Integration and Innovation**: Incorporating advanced technologies for managing electric bus fleets, including charging and energy management systems.
- The pilot project also aims to provide valuable lessons on operational requirements for successful and scalable implementation of electromobility across the Greater Cairo region.

General Contract Description

Contract Scope

The Contract encompasses the design, supply, commissioning, guarantee and maintenance of electric buses and their charging systems for the Cairo Transport Authority (CTA). This project is part of a broader initiative to improve air quality and manage climate change in Greater Cairo.

Electric Bus Supply

- Quantity and Type of Vehicles: Specific details on the number and type of electric buses will be determined based on CTA's operational needs and feasibility study results (Deliverable D2-2).
- **Technical Specifications:** Electric buses shall meet precise technical and performance specifications outlined in this document, including performance, battery capacity, accessibility, and compliance with environmental standards.

Design Review Phase

During the Design phase, the Supply shall submit the following technical proposals and plans for review:

- Technical proposals and vehicle plans showcasing all dimensions: static, dynamic, turning radius, etc.
- Interior configuration and dimension plans, detailing the layout and size of the vehicle's interior space.
- Seat layout and wheelchair area plans, including the placement of bars, handrails, stop buttons, and USB ports.
- Driver's cabin layout plans, highlighting ergonomic design and accessibility features.
- Comprehensive plans of all technical compartments, both interior and exterior, including the roof and undercarriage areas.

This phase aims to ensure that the proposed designs meet CTA's requirements for functionality, passenger comfort, and operational efficiency.













Testing & Commissioning

- Testing and Validation: Thorough testing shall be conducted to ensure buses comply with technical specifications and safety standards. Testing and Validation plans and procedures shall be proposed by the Supplier during the Design phase, subject to the Employer's approval.
- Training and Support: Training of CTA staff on the operation and maintenance of electric buses and charging equipment will be a crucial aspect of commissioning.

Charging Systems

- Types of Chargers: The acquisition will include chargers compatible with the electric buses for slow charging.
- The Supplier shall provide during the Design Phase all the necessary information related to the chargers technical characteristics, and interface information for installation in the Depot.
- Installation and Integration: Chargers will be installed at strategic locations and integrated into CTA's existing garage. The Supplier will have to manage interfaces (planning, installation, testing) with the Contractor in charge of the CTA Depot revamping.

Maintenance

- Maintenance Program: A comprehensive maintenance plan shall be established by the Supplier to ensure the longevity and reliability of the buses and charging systems. It shall be subject to the Employer's review.
- Technical Support: Ongoing technical support shall be provided by the Supplier, including
 access to spare parts and specialized technical assistance during at least 7 years from the
 commissioning date (transfer of responsibility of the vehicles from the Supplier to the
 Operator CTA).

Sustainability and Environmental Impact

- Emission Reduction: Electric buses shall contribute to a significant reduction in greenhouse gas emissions and atmospheric pollutants in the Greater Cairo region.
- Eco-Design: Special attention shall be given to environmental aspects, including the use of sustainable materials and the recyclability of bus components.

Purpose of the Contract

This framework agreement and subsequent contracts derived from it will focus on the supply of standard electric buses (approximately 12 meters in length) and their chargers, along with associated maintenance services for the Cairo Transport Authority (CTA). Bidders shall propose:

- A basic offer including the design, supply, installation and testing and commissioning of vehicles, batteries, and chargers, as well as corresponding guarantees.
- An annual maintenance contract for the battery, Battery Management System (BMS), Battery Thermal Management system (BTMS), traction electronics, and one or more motors.
- Options for additional e-buses and chargers.

This framework agreement also includes the listed optional additional services which bidders (and future supplier) shall respond to in addition to their base offer. The selection committee reserves the right to retain or omit these during the award of the framework agreement. They may not necessarily apply to all subsequent contracts. In the contracts where they are retained, they may be applied partially.

Buses shall guarantee high performance in Egyptian climate conditions such as high humidity, high temperatures, and dusty winds.

The construction of the vehicle shall involve the use of materials and manufacturing processes designed to minimize maintenance costs during the vehicle's operational period, particularly in terms of:

- Corrosion Protection: Protecting the framework and bodywork against corrosion.
- Assembly Techniques: Employing assembly techniques for the different components.













• **Battery Lifespan:** Indicating the optimal lifespan of the batteries.

The supplier shall indicate the optimal lifespan of the buses, considering both acquisition and maintenance costs. This lifespan shall not be less than 15 years.

The vehicles (materials, parts, or assemblies) shall meet the conditions imposed by:

- Egyptian Standards
- Local Regulations: Complying with local regulations applicable to public transport vehicles
- Uniform Requirements: Adhering to uniform regulations for the homologation of category heavy vehicles concerning their general construction characteristics in force.

The vehicle shall meet the requirements of the Traffic Code and conditions imposed by current Egyptian regulations. Additionally, it shall comply with the article regarding "Fire Risk Prevention."

Upon arrival at the CTA depot, the vehicles, shall undergo an "individual acceptance test for each bus" conducted by the Supplier.

Any specifications of any part or element detailed in this technical specification (type, characteristics) shall be complied by the bidders/supplier. However, bidders can indicate in their response through a specific document "Proposed Modification" any elements not conforming to this technical specification, clearly stating the technical reasons for these non-compliances and any potential advantages for analysis and acceptance by the offer analysis committee.

The offer analysis committee reserves the right to reject offers that do not comply with all the prescriptions of this technical specification.

General Characteristics of Vehicles

Bus Specifications

The technical specifications required for these vehicles are detailed below:

Dimensions:

- Total Length: around 12000mm.
- Total Width: 2550mm.
- Total Height: Less than 3400mm (with rooftop air conditioning).
- Ground Clearance at Full Load: More than 250mm.

Capacity and Weight:

- Minimum Number of Seats and Standing Places: Capacity for 80 passengers.
- Gross Vehicle Weight (GVW): 19600 Kg.

Suspension and Axle Load:

- Pneumatic Suspension: 2 at the front 4 at the rear, with stabilizer bars, descent valves, and suitable unidirectional telescopic shock absorbers.
- Front Axle Load: 7000 Kg.
- Rear Axle Load: I3000 Kg.

Environment of operation and maintenance

- Ambient Temperature: Buses shall be designed to operate efficiently in a temperature range from -25°C to +45°C, with the capability to handle regular temperature spikes up to 35°C.
- **Humidity**: Adaptation to high humidity levels, reaching up to 80%, to ensure the reliability and durability of bus components.
- **Atmospheric Pollution**: Integration of advanced air filtration systems to protect both passengers and internal bus components from high levels of atmospheric pollution.
- **Solar Radiation**: Use of UV and fade-resistant materials for the bus exterior to prevent damage from intense solar exposure.













- Charging Infrastructure: Designing charging systems for optimal performance in hightemperature conditions and protection against weather elements, including intense heat and humidity.
- **Durability and Maintenance**: Key components, such as the battery and electrical system, shall be robust and resistant to climatic variations. The design shall also facilitate access for maintenance and repairs.
- **Safety and Comfort**: Installation of effective air conditioning systems to maintain passenger comfort and ensure the proper functioning of onboard electronic equipment.
- High Performance in Egyptian Climate Conditions: Buses shall guarantee high performance in Egyptian climate conditions, such as high humidity, high temperatures, and dusty winds.
- Average Daily Operation Hours: Approximately 18 hours per day for a bus.
- **Intensive Service Conditions**: Buses operate as public transport in intensive service conditions, including frequent stops and load movements.
- Compliance with Egyptian Traffic Law: Buses manufactured shall meet the requirements of the Egyptian traffic law.
- **High Quality Standards**: Buses shall be manufactured to high quality levels according to modern international standards.
- **Driver's Dashboard Indicators**: Shall be in the metric system.

Interior Layout

- Seating: at least 40 seats, with ischial supports near spaces for passengers with reduced mobility in Wheelchairs.
- The design of the seats (both seats and backrests) shall harmoniously align with the interior ambiance. Multiple seating and layout proposals shall be developed during the design review phase for selection and prior validation by the Employer before manufacturing.
- The bus design shall incorporate an adaptable seat for a ticket collector agent, which can
 be efficiently utilized in the absence of a manual ticketing system. In scenarios where an
 automated ticketing system is deployed, this seat shall be designed to ensure accessibility
 and usability for individuals with disabilities.
- Platform in Front of Door No. 2: At least one space for Users in Wheelchairs (WU) on the platform at door number 2, in compliance with current regulations. This space shall be equipped with:
 - A totem for securely positioning wheelchairs, which can be back-facing.
 - External and internal request buttons for the ramp, piezo-electric, sensitive, and illuminated in blue with a dedicated regulatory pictogram.
- Wheelchair areas shall be equipped with foldable seats to maximize accessibility and ensure efficient space utilization. The vehicle can accommodate wheelchairs comfortably, allowing for the foldable seats to be used when the space is not occupied by wheelchair users.
- Standing Capacity: The number of standing places shall be defined in accordance with current regulations and the vehicle's capacity (axle load).
- Interior Design and Color Distribution: The arrangement and distribution of seat colors will be finalized during the design review.

Access

The vehicle shall be equipped with two doors:

- Two doors located on the right side of the vehicle.
 - First door located at the front, before the front wheel.
 - Second door located at the rear.
- Both doors designed to swing inward.
- Doors operated by an electropneumatic system.
- Control of doors from the driver's station.













Performance

- Maximum Speed: Limited to 80 km/h by design.
- Battery Capacity: Installed traction battery capacity shall exceed 370kWh.
- Daily Range: Minimum of 300 km under the following conditions:
 - Driving according to the traffic and congestion conditions of the CTA network lines.
 - o A passenger load of 4 persons/m².
 - o Regardless of weather conditions in Cairo, with air conditioning use.
 - O At the end of the battery's life.
- **Battery Usage**: This range shall be compatible with the battery's usage recommendations (optimal Depth of Discharge (DOD)) to optimize its lifespan.
- **Incline Start**: With a battery charge level above the minimal DOD and fully loaded with passengers, the vehicle shall be able to climb slopes of at least 17%.
- Remote Activation: Certain functions shall be remotely activated via the Combo 2
 CSS plug (heating, air conditioning, defogging, etc.) when the bus is plugged in for
 charging.
- Communication Protocol: The exchange protocol defined between buses and chargers shall be fully interoperable with other brands and supervision systems according to the OCPP with the version 2.0.1. The communication matrix shall be fully disclosed during the design review to ensure interoperability.
- **Temperature Impact**: The supplier shall specify the impact of external temperature on vehicle performance and battery range (mileage autonomy, air conditioning, etc.)
- Acceleration: From 0 to 100m in a maximum of 12 seconds when empty:
 - o In operational service.
 - Without air conditioning.
- Adjustable Parameters: The Supplier shall propose the list of adjustable parameters
 during the Design Review Period for Employer's review. These adjustable parameters
 shall allow CTA to adjust those values using diagnostic tools provided by the Supplier
 during future operation.

• E-Bus Technical and functional requirements

Chassis

- The chassis shall guarantee maintenance-free operation for at least 15 years.
- Construction in aluminum or steel profiles with advanced anti-corrosion protection.
- Anti-corrosion treatment for all hollow bodies.
- Durable assembly (20 years of life without preventive maintenance).
- Resistant design to high-pressure washing, with ease of cleaning the chassis using a highpressure system.

Wheels

- 6 radial type tires of suitable size + (1) spare, dimension 295/80 R22.5.
- Tubeless radial tires to be provided mounted on high-quality, durable metal rims. The rims shall be designed for easy mounting and dismounting.
- Rims must feature ventilation openings for brake pad cooling, enhancing performance and safety.
- Delivery with a spare wheel.
- Wheel loosening indicators on all wheels, without specification of color or brand.

\circ Traction Battery and Charging Plug

For Cairo buses, batteries shall ensure reliable starting in all climatic conditions. Battery charging shall be done via a Combo 2 CSS plug, compliant with international standards ISO 15118 and IEC 61851.

• The Combo 2 CSS charging plug shall be located on the right rear face of the bus (height: about Im from the ground).













- The charge management system shall ensure a full recharge in a maximum of 4 hours, with the possibility of fractional charges without affecting battery life.
- The system shall have very high protection against short circuit, overload, excessive discharge, overheating, shock resistance, and water tightness.
- The chosen battery technology is Lithium-ion Iron Phosphate with an appropriate temperature management system.
- Minimum battery capacity of 370 kWh to ensure 300km per charge cycle at the end of life.
- The offer shall include a commitment on battery life associated with specific warranty conditions
- The battery capacity shall allow maximum kilometers after a slow and semi-rapid charge, without degradation of its lifespan. The C-rate shall be explicitly stated in the technical memorandum of the offer.
- The charging plug shall be protected by an electromagnetically locked hatch, with safety measures preventing the vehicle from starting if the hatch is open.
- The supplier shall provide a certificate of interoperability with different charger brands. Additionally, Supplier shall be responsible for the end-of-life treatment of batteries, including their recovery and recycling. The valuation of used batteries shall be determined at the end of their lifespan, contingent on their condition.

Engine

General

- Interchangeability of all organs.
- Use of insulating materials suitable for international consultation.

Technical Characteristics

- Electric motor: AC Synchronous, Induction Motor, PMSM.
- Maximum power: greater than or equal to 200kW.
- Maximum torque: not less than 1000 Nm.
- Protection level: not less than IP 65.

Temperature Monitoring

• A monitoring system to prevent engine overheating.

Protection

Motor protection against pollution and splash water tightness.

Cooling

- Liquid cooling for batteries and the electric motor, with minimal maintenance.
- Liquid reservoir with minimum level detection/transmission.
- Cooling circuit tightness with thermo-compensated clamps.

Bearings

- Bearing tightness adapted to the most demanding operating conditions.
- Easy access to greasers and grease valves.

Fire Detection

- An electric fire detection system in the engine compartment.
- Option for an automatic extinguishing system in addition to the two manual fire extinguishers shall be proposed by the Supplier.

Transmission

The transmission shall be adapted to Cairo's varied and often dense traffic conditions, with features such as:

- An ergonomic and intuitive control panel.
- An efficient deceleration system through electrical regeneration.
- A speed control device adapted to local standards.













- An anti-skid system for safe driving.
- A push button to deactivate the anti-skid system, with automatic reactivation.

Steering

The power-assisted steering of the vehicle shall be specifically designed to offer optimal maneuverability in Cairo's streets, characterized by:

- Precise response and enhanced control for navigating congested urban areas.
- A robust and reliable system adapted to local driving conditions.

Air Production and Pneumatic Suspension

The air production system and pneumatic suspension will be essential for the comfort and performance of the vehicle in Cairo's hot climate. Key points include:

- An air purifier and dryer to ensure consistent performance.
- Pneumatic suspension protected against external aggressions.
- A load leveling system to adapt to different loading conditions.
- Manual and centralized purging devices for air tanks.
- An air intake is installed at the front near the towing point for brake unlocking in case
 of towing (compressed air supply under 8 bars from the tow truck).

Braking System

The braking system shall be designed to offer maximum safety, with features such as (but not limited to):

- Compliance with international safety standards.
- A Halt Brake For effective immobilization.
- An anti-roll system to prevent unintentional vehicle movement on slopes.

Parking Brake

In Cairo, where safety and accident prevention are paramount, the parking brake system shall be enhanced to include:

- An audible alarm and a message on the driving screen to remind the driver to activate the parking brake before leaving their seat.
- A feature that prevents the engine from stopping unless the parking brake is activated, thus enhancing safety during stops.

Halt Brake

The Halt Brake will be a key feature of the vehicles, designed to:

- Automatically immobilize the vehicle at a stop, without requiring the action of the parking brake, for increased safety and ease of use.
- Engage manually via a convenient lever or automatically when certain conditions are met (e.g., when the vehicle is stopped with sufficient pressure on the brake pedal).
- Remain active until all safety conditions are met (door closure, action on the accelerator pedal).
- Integrate a redundancy system for open door information, increasing reliability and safety.
- Display explicit messages on the driving screen in case of Halt Brake deactivation or malfunction, guiding the driver on the steps to take.

Hill holder

- A "Hill holder" function to prevent the vehicle from rolling forward or backward when parked on a slope.
- This feature will contribute to the overall safety of the vehicle, particularly during frequent stops in sloped areas.

Accessibility to Mechanical Components

Accessibility to mechanical components is essential for efficient and rapid maintenance:













- Wear parts and components requiring frequent adjustments shall be designed to be easily accessible and replaceable, thus reducing downtime for maintenance.
- Access to these components shall be via hatches or skylights, avoiding the need to dismantle bodywork elements and allowing rapid and efficient maintenance by a single technician.

Lubrication

The lubrication system plays a crucial role in preventive maintenance:

- The vehicle shall be equipped with a centralized lubrication system for the front axle, optimizing the longevity and reliability of components.
- This system shall allow regular and efficient maintenance, reducing the risk of breakdowns and extending the lifespan of mechanical parts.

Towing

Central towing hitch or an equivalent device for central-axis towing shall be provided.

Auxiliary Starting Batteries and Electrical Protection

The buses shall be equipped with two maintenance-free 12V batteries mounted on a sliding trolley. For batteries with a capacity greater than 180 Ah, a standardized connector shall allow for easy and secure replacement. All connectors shall have insulating protections.

- The auxiliary circuit power voltage is 24V. These batteries shall not require maintenance.
- Cables for fixed and moving parts shall be properly sized with attachments to prevent interference.
- A manual device shall be provided to cut off the power to these auxiliary batteries.
- A device to shed large consumers shall also be provided.
- A protection system with thermal circuit breakers or resettable fuses is also requested.
- Circuit breakers shall be grouped in a single cabinet for simplified maintenance. Wiring
 harnesses shall be designed to prevent degradation due to short circuits, with routing in
 compliance with international standards.
- A charging and starting socket with protection shall also be provided for the power supply of auxiliary circuits.

Passenger Area Lighting

The interior lighting shall be based on LED technology, with measures to prevent stray reflections on the windshield.

- It shall be controlled by a three-position switch:
 - o Position I: Lighting off.
 - o Position 2: Full lighting.
 - o Position 3: Reduced lighting (No reflections in the windshield)
- An automatic access lighting system and a device for cleaning personnel shall allow for timed lighting of the passenger area.

Supervision System

A supervision system compatible with FMS standards shall be installed, allowing for the retrieval of maintenance, performance, and eco-driving data.

- A specific datalogger shall monitor the use and condition of the batteries, with detailed data available for performance analysis.
- The Supplier shall provide the procedure for retrieving these standard and interior temperature data.

Other embedded systems

Passenger Information System

- The vehicle shall be equipped with a simple and effective passenger information system, including LED electronic destination signs to display the destination and line number.
- The system shall include a front, side, and rear destination sign.













- A simple and intuitive control desk shall be installed for the management of the destination signs.
- The setting of destinations shall be done at the factory. The Supplier shall also provide a system to allow CTA to modify the information displays in the future.

TFT Screens

- TFT screens shall be installed to display dynamic information to passengers.
- The system shall include two vertical displays suitable for showing the line map and passenger information.
- The integration of the screens shall be done in a way that does not obstruct the driver's view.
- Note: the system shall be compatible with future connection by CTA of a Passenger Information System on-board computer for automatic display (network wide Automatic Vehicule Location System and passenger information system)

Public Address System

- A quality public address system shall be installed, with speakers distributed in the
 passenger compartment and driver's cabin, as well as a microphone from the driver's
 cabin.
- An external sound information device shall be installed near the front door, with automatic volume control based on ambient noise.

Operation Support System (OSS)

- A provision for the installation of a simple and effective OSS shall be provided, with positioning that does not obstruct the driver's view.
- This provision will include the door information and an odometer sensor.
- An emergency call button can therefore be easily installed next to the dashboard.

Ticketing

- A provision for the installation of two validators will be provided on either side of door
- The ticketing system is not part of the scope of this Contract, but pre-cabling shall be performed within the vehicles (Ethernet cables).

Video Protection

- A simple video protection system shall be installed, with an easily accessible recorder for the removal of the hard disk.
- The quantity and position of cameras shall be defined during the design review phase to ensure optimal coverage, and shall be subject to Employer's Review.

Passenger Counting System

- Installation of a system for simple counting of passenger boarding and alighting.
- The system shall use sensors at the doors to detect and record passenger movements, with data discriminated as "boarding", "alighting", "per stop", and "per direction of travel".
- Software shall be provided for data extraction and analysis, allowing precise evaluation of attendance and vehicle loading. Discharge of the counting data shall be possible through wifi.
- The system shall be compatible with existing equipment for easy integration into the
 existing bus fleet.

Rear-View Camera

- Installation of a rear-view camera with a display screen at the driver's station.
- The camera shall activate automatically when the vehicle is in reverse, providing a clear view for safe driving.
- When the vehicle is not in reverse, the screen shall remain off to avoid driver's distraction.

Exterior Design













Flooring

- The vehicle shall be equipped with a flat, lowered floor.
- The floor shall be protected from all external aggressions and designed to last the entire life of the vehicle, which is 15 years, without preventative maintenance. It shall be constructed to withstand the road conditions of Cairo's streets and include thermal insulation
- Front and rear bumpers should be separate from other bodywork elements.

Glazing

- The windshield shall be made of laminated glass.
- If side windows are tinted, they shall allow an external observer to see inside the vehicle.
- The upper parts of some glazed sections shall be tiltable and lockable with an 8mm female square key (8mm male square lock).
- The driver's window shall be manually operable.

Exterior Finishes

- The exterior color scheme of the vehicles shall be visually appealing, engaging, and shall
 be pre-approved by the Employer based on the color options proposed by the Supplier
 during the design phase. The quality of the paint shall support the application of adhesive
 graphics on the bus bodywork, ensuring both aesthetic appeal and functional durability.
- All bodywork elements, including rooftop air conditioning covers (or others), shall be painted the same color.
- A gutter shall be installed above the side doors to allow for water drainage.
- Mudflaps shall be installed behind the front, middle, and rear wheels.
- All hatches or traps shall be locked with an 8mm male square lock.
- The roof's exterior finishes shall be designed to withstand the harsh climatic conditions of the operating environment. Materials used shall offer durability, resistance to UV radiation, and minimal maintenance requirements.
- Infiltration Protection: A critical aspect of the roof design is the implementation of robust protections against liquid infiltration. This includes seamless sealing technologies and materials that prevent water ingress, ensuring the longevity of the bus's electrical and interior systems.
- Drainage System: An efficient drainage system shall be incorporated into the roof design to guide water away from sensitive areas, reducing the risk of infiltration.
- Inspection and Maintenance Access: The design shall include access points for easy inspection and maintenance of the roof's exterior finishes and infiltration protections, ensuring that these systems remain effective over the vehicle's operational lifespan.

External Lighting

- LED Lighting: External lighting shall be LED.
- Vehicle Equipment:
 - Reversing lights.
 - A city horn controlled by a three-position lever on the left side of the driver, accessible without releasing the steering wheel.
 - A buzzer that sounds when the vehicle is reversing, with a cut-off switch on the dashboard.

Advertising Frames

Advertising frame specifications, including color and dimensions, shall be determined during the design review phase, based on proposals submitted by the Supplier.

• Replacement Parts Dimension Optimization













The Supplier is required to provide detailed dimensions for all replacement parts, with a specific emphasis on optimizing and minimizing these dimensions to facilitate maintenance operations. This requirement includes, but is not limited to, glass components and exterior panels.

The optimization of part dimensions for ease of maintenance will be a key factor in the evaluation of the Supplier bids. This approach aims to ensure that replacement parts are designed for efficiency, not only in function but also in their ease of installation and maintenance, contributing to reduced downtime and lower overall maintenance costs.

• Interior Design

Passenger Area

- The Supplier shall submit proposals for the interior colors of the buses, focusing on creating an ambiance that promotes safety and well-being for passengers. The harmony of the chosen shades is essential and will be evaluated in collaboration with the Employer's during the design review. The goal is to select colors that not only respect the overall aesthetic but also contribute to a calming and secure travel experience for passengers.
- Compliance with accessibility standards is mandatory, with color contrast in certain areas.
- Flooring shall be installed to prevent water infiltration and identify the sweeping area of the doors.
- All interior coverings shall allow for easy maintenance and cleaning.
- Skirt partition filming is not allowed.
- The vehicle shall be equipped with a platform dedicated to at least one space for Wheelchair Users (WU) or strollers, located near door number 2. This area shall be designed to minimize obstacles such as columns and equipped with all necessary regulatory devices for accessibility and safety.
- These spaces shall be equipped with a fixed bar for lateral wheelchair support and regulatory grip points.
- Handrails, columns, and steel bars shall be made of stainless steel.
- The surface appearance of the trim pieces shall be smooth for easy cleaning and resistant to cleaning products.
- Trim materials shall resist common customer scratches and be colored throughout, graffiti-resistant.
- Interior paints shall guarantee:
 - o Resistance
 - Adhesion
 - Scratch resistance
 - Longevity
 - Resistance to UV action
- The interior layout shall not include spaces that allow for waste accumulation.

Passenger Seats

- Seats shall meet the following technical criteria:
 - Resistance to vandalism and tearing.
 - The design of the seats and backrests shall fit into the overall harmony of the vehicle's interior, without any specific color specification.
 - Handles, plugs, structure, stretcher, and epoxy leg shall have a high-quality finish in line with the overall interior design of the vehicle.
 - o The back of the seats shall be protected against vandalism, particularly "tags."
 - o Ischial supports and column doors shall be made of quality materials, harmonizing with the rest of the interior.













- Seat upholstery shall be in high-quality fabric, suitable for intensive public transport use. The colors of the upholstery shall harmonize with the overall interior design, without specific color specifications.
- This specification aims to ensure that the seats are durable, functional, and aesthetically in line with the vehicle's interior design while meeting resistance and comfort requirements for passengers.

Stop Buttons

- Stop Request Buttons: The vehicle shall be equipped with at least 10 easily identifiable push buttons for passengers, strategically distributed throughout the vehicle. These buttons shall be installed on bars and walls. Their specific location and orientation shall be proposed by the supplier during the design review phase and shall be validated by the Employer.
- WU Space Button: A dedicated button for the WU space shall be clearly visible and located near this space. This button shall inform the driver of the need to deploy the WU ramp at door

Passenger Information Panels

- The vehicle shall be equipped with interior information holders, featuring the following characteristics:
 - o Finished in brushed aluminum.
 - Specific locations for the holders shall be determined in collaboration with the Employer during the design review stage.
- The vehicle shall also include an information holder located at the back of the driver, characterized by:
 - o Finished in brushed aluminum.

Regulatory Pictograms

• The responsibility to provide and install regulatory pictograms on the vehicle lies with the Supplier. A detailed proposal of these pictograms shall be submitted and discussed during the design review for the Employer's approval.

Driver's Cab

- The vehicle shall be equipped with a black driver's seat, featuring a flat base, integrated headrest, armrests, lumbar support, and pneumatic suspension to maximize comfort and minimize vibrations. The seat shall offer optimal adjustment for the driving position, with the following characteristics:
 - Control on the right side.
 - o Right and left armrests without a switch.
 - With presence detection.
 - o Black fabric upholstery.
- The dashboard shall be designed for standardization and integration of various elements. It
 shall include a battery charge indicator, expressed in percentage and remaining kilometers.
 Just before reaching the optimal battery discharge level, the vehicle shall automatically reduce
 its power, and some non-essential auxiliaries shall be shed to extend its range.
- To encourage eco-driving, the driving screen shall display an indicator of traction consumption and electric braking (regeneration) while driving.
- The driver's cabin shall be spacious and equipped with an anti-aggression device with automatic closing by an electromagnetic lock, designed to avoid interference with passenger movement. The opening shall be via a push button inside the gate, and the electromagnetic lock will be deactivated after cutting the contact.
- The vehicle shall have a gate opening with a pneumatic retractable window.
- Adjustments for the seat, steering wheel, and dashboard shall offer a wide variety of positions
 to fit most driver's physiques. The ergonomics of the driver's cab must reduce strain and
 eliminate noise from vibrations or other nuisances.













- Lighting in the driver's cab shall be controlled by a three-position switch on the dashboard, allowing direct lighting by the driver, off lighting, or lighting coupled with the opening of the front door.
- The partition behind the driver shall be fully closed and opaque, with the possibility of installing an advertising frame.
- The driver's cab shall be equipped with a fan, controlled by a push button or switch.

Accessories

The mechanical and electrical specifications, as well as wiring and installation documents for accessories, shall be included in the Bidders technical proposal.

Mirrors

Vehicle mirrors shall:

- Be foldable to facilitate passage through a washing portal and offer complete visibility for all drivers, regardless of their size.
- The right front mirror shall be able to fold along the right side of the bus.
- A rectangular panoramic interior mirror at the front to monitor the entire vehicle.
- An optical device to monitor the doors.

Fire Extinguishers

Two fire extinguishers shall be fixed in locations to be defined during the design review. They shall be easily accessible and securely fixed.

Warning Triangle

The warning triangle shall be provided under plastic protection and fixed by a self-gripping band in the driver's cab.

Compartment for Driver's Personal Belongings

A compartment for the driver's personal belongings shall be provided in the driver's cab, designed not to hinder the driver's entry or exit.

Manual Windshield Sun Visor

The vehicle shall be equipped with a manual windshield sun visor.

Manual Sun Visor

A manual sun visor shall be installed in front of the driver's left side window.

Coat Hook for the Driver

The driver's cab shall be equipped with a coat hook for the driver.

Emergency Hammers

Emergency hammers shall be stored in the driver's cab. The number of hammers shall be defined based on current regulations and the number of emergency exits.

Climatic Comfort

Ventilation - Air Conditioning

Driver Air Conditioning

- The driver's cabin shall have air conditioning with the ability for the driver to adjust the temperature within a range of +/-3°C, providing some flexibility while ensuring the overall system efficiency.
- The arrangements of the diffusers shall be similar to those of the heating system.

Passenger Air Conditioning

- The vehicle shall be equipped with efficient ventilation to ensure air renewal and demisting.
- A nameplate near the air conditioning compressor shall indicate the type of gas, the quantity of gas, and the minimum and maximum pressure.













• The regulation of this aera shall be done automatically; the driver shall only have the option to start and stop the system for the passenger zone.

Temperature Regulation

- Heating and air conditioning equipment shall be designed to maintain a maximum interior temperature of 25°C, considering Cairo's specific climatic conditions.
- Temperature regulation shall be fully automated.
- A thermal preconditioning system shall be integrated to prepare buses during their charging phase, reducing the impact on battery consumption when using air conditioning.

Heating

- The vehicle shall be equipped with an efficient heating system for both the driver and passengers, with the following features:
- A defrosting device for the windshield and side windows of the driver's cabin.
- Independent adjustment for the driver's cabin, ensuring a minimum temperature of 21°C.
- An electric heating solution for the passenger compartment, prioritizing minimal maintenance.
- If filters are required for the heating system, they shall be easily accessible, cleanable, and replaceable in less than 5 minutes.

The vehicle's air conditioning system shall be compatible with the motor's power to ensure no adverse impact on autonomy. This includes an EcoMode function for the HVAC system, optimizing energy use without compromising passenger comfort.

Maintenance, Reliability, and Availability

Technical Manuals and Catalogs:

- Manuals and guides for regular operations per bus shall be supplied in both paper and digital formats.
- Technical documentation covering all preventive and corrective maintenance operations shall be provided for every batch of 10 buses, in both formats.
- A spare parts catalog in paper and digital formats for every batch of 10 buses.

Spare Parts and Price Commitment

- The Supplier shall ensure the availability of spare parts and maintenance equipment for 15 years from the commissioning date.
- An annual price list for all vehicle parts (including prototypes) from the original manufacturer shall be provided.
- The financial offer should detail prices for main groups of parts.
- Prices for the spare parts catalog shall be frozen for 5 years post-delivery, with any subsequent changes notified to CTA 6 months in advance.
- A list of spare parts necessary for preventive and corrective maintenance over 5
 years will be included in both technical and financial offers, specifying type, quantity,
 and price.
- Should a new necessary spare part emerge within the first 5 years and is listed in the technical offer, the supplier shall cover the cost of these spare parts throughout the warranty period.
- Future development of spare parts shall ensure compatibility with old parts, maintaining at least the same level of service.

Local Maintenance Service

The Supplier shall establish a local service point within the Greater Cairo Region for maintenance and repair operations, including repair certificates. This service point shall facilitate both preventive and corrective maintenance and stock necessary spare parts.

Delivery Planning and Availability of Spare Parts













A detailed delivery schedule of spare parts, including motors, ZF axles (or similar), etc., shall be provided. The supplier guarantees the availability of these parts for 15 years.

Maintenance Tools and Training

- Maintenance operations shall be straightforward, with quick and easy access to parts for repair.
- The supplier shall provide, at no additional cost, all necessary equipment to facilitate and reduce repair time, including a complete toolbox with a wheel replacement kit and a jack with a 15-ton lifting capacity, equipped with data transmission.
- For every 20 vehicles, a recent rugged laptop equipped with repair, technical data, and necessary maintenance software shall be provided.
- On-site technical experts, along with all necessary diagnostic and repair tools, shall be available during the warranty period to quickly address all malfunctions.
- A detailed maintenance plan, including technical descriptions of all operations and spare parts, shall be provided prior to the first vehicle delivery, along with all associated technical documentation in English and Arabic.

Environmental and Social Compliance Matrix

In the deliverable D3-3- E&S activities document (SST-T03-000-RPT-013), the environmental and social requirements are outlined according to national laws, international policies, regulatory texts, and the focus group discussion (FGD) process. The technical specifications outlined in this deliverable are identified to comply with the defined requirements.

Below is the compliance matrix indicating the chapters where requirements are addressed:

| Requirement (according to ToR) | As addressed in D3-3 | As addressed in D3-I Section | | |
|--------------------------------|--|---|--|--|
| | Vibration | Requirement addressed elsewhere | | |
| | Lighting system | §VI. External Lighting §V. 14. Passenger Area Lighting | | |
| _ | Ventilation and HVAC systems | §X. Climatic comfort | | |
| Environmental | Batteries | §II. 2. Electric bus supply §IV. 5. Performance §IV. 3. Traction Battery | | |
| Envir | Emergency and firefighting system | § IX. 2- Fire Extinguishers 8- Emergency Hammers | | |
| | Provision of high number of vehicles on the same line to avoid crowdedness | §V. 16 - Passenger Counting System | | |
| | Special places inside the vehicles for women and elderly | §VII. 5. Regulatory pictograms | | |
| | Vehicles with lower / more comfortable steps | § VI.1- Flooring §VII.1- Passenger Area: Compliance with accessibility standard | | |
| | Comfortable seats | §VII. 2 - Passenger Seats | | |
| lei | Narrow down bus steps | §VII.1- Passenger Area: Compliance with accessibility standard | | |
| Social | Use alarm bottoms and cameras to control physical/sexual harassment | §V. 16 - Passenger Counting System - Video Protection | | |













| Requirement | As addressed in D3-3 | As addressed in D3-I |
|--------------------|--|--|
| (according to ToR) | | Section |
| | & thefts inside the buses (emergency bottoms) | |
| | Establish speed control /limit system | §V. 6 - Transmission (speed control device) |
| | Integrate handles | §VII. I- Passenger area §VII. I- Passenger seats |
| | Install alarm ring before buses move of stop | White noise |
| | Provide special spaces for strollers and baby baggage | §VII. I - Passenger Area |
| | Designed seats for pregnant women and women with infants | §VII. 5 - Regulatory pictograms |
| | Airconditioning | §X. I -Ventilation - Air conditioning 2 -Heating |
| | Easy maneuverable windows | §VI. 2 - Glazing |
| | Provide fire extinguishers for use | §IX. 2- Fire Extinguishers |
| | Use waste baskets inside the bus | §VII.1- Passenger Area: The interior layout should not include spaces that allow for waste accumulation' |
| | Use visual and speaking signboards inside the bus | §16 - TFT screens - Passenger Information System |
| | Allow time for safe entry and exit of the bus | §V. 16 -Operation support system (OSS) §V. 9 - Braking system |
| | Training programs to : (for drivers) - Drive safely -Make a fully stop in each station - Deal with PRM | § 16 - Rear View Camera §V. 9- Braking system |
| | Install easy to use ramps dor wheelchairs | §VII. 3- Stop buttons |
| | Allocate comfortable seats | §VII. 2- Passenger seats |
| | Provide special spaces inside the bus for wheelchairs | §VII. I- Passenger Area: At least one space for Wheelchair users |
| | Use visual and specking signboards for persons with different disabilities | §V. 16 - Public address system |
| | Develop a mechanism or support system to provide needed assistance for passengers with special needs | §VII. 3- Stop buttons (WU space button) |
| | Speaking announcements for people with sight disabilities | §V. 16 - Public Address System |











| Requirement (according to ToR) | As addressed in D3-3 | As addressed in D3-I Section | | | |
|--------------------------------|--|--|--|--|--|
| | Alarm bottom for people hearing and speaking disabilities to draw drivers and controllers' attention that they need to descend and need the driver to properly stop for them | §VII. 3- Stop buttons | | | |
| | Have a written route on the bus to help people with hearing disabilities to know the direction | §V. 16- Passenger Information System | | | |
| | Install hydraulic ramps for persons with mobility disability (not only for wheelchairs only, but for persons using crutch(s) as well); | §VII. I - Passenger Area: Compliance with accessibility standard | | | |
| | Apply international standards and specifications in bus design as is without modification, especially for ramps' specs | §VII.1 - Passenger Area: Compliance with accessibility standard | | | |
| | Special spaces for persons with disabilities like Mowassalat Misr and the airport bus is needed to be available in all buses | §VII. 5 - Regulatory pictograms | | | |
| | Allocate seats for elderly or persons with disabilities and make it obvious and clear to all passengers using different kinds of signs inside the bus | §VII. 5- Regulatory pictograms | | | |
| | Use belts for wheelchairs inside the bus | §VII. I- Passenger area 'WU SPACE equipped with a fixed bar for lateral wheelchair support and regulatory grip points. | | | |
| | Employ an announced/published time plan for buses | §V. 16 - Public Address System | | | |
| | Use display maps to allow passengers to plan their rides | §V. 16 - Public Address System | | | |
| | Use ticket machines | §V. 16 - Ticketing | | | |
| | Instruct drivers to stop in stations close to the sidewalk/pavement | Adequate equipment as described in §IX. I- Mirrors | | | |

Tableau 9-i Matrix compliance

General and specific Warranties

General Warranty

The Supplier shall guarantee the proper functioning and maintenance of original equipment characteristics for a minimum of 3 years from the acceptance date of each equipment (commissioning date).

The general warranty extends if reliability and availability targets aren't met in the last 6 months, if repetitive breakdown warranties aren't resolved, or if all identified reserves, defects, and malfunctions aren't addressed.













Specific Warranties

- **Structural Integrity Warranty**: The Supplier shall provide a 7-year warranty covering any breakages or cracks in the bus frame. The Supplier shall be responsible for offering repair solutions for any such damages within this period.
- **Corrosion Protection Warranty**: A 7-year warranty shall be in place to protect the bus's frame and body against corrosion. This warranty includes coverage for paint and all non-metallic elements, ensuring comprehensive protection against corrosion-related damage.
- Component Warranty: The Supplier shall provide a full warranty covering both parts and labor for all listed components until either the specified term expires, or the component reaches the end of its service life, whichever comes first. Any components replaced under warranty shall carry over the remaining warranty period of the original part, guaranteed for at least one year.
- Warranty and Replacement Policy:
 - A 7-year warranty shall be provided for the bus's body and chassis. Should any non-generalized structural issues arise within this period, the Supplier shall commit to replace the affected vehicle with another of the same specifications and performance levels. This replacement shall occur within two months of the issue being reported. Failure to comply shall result in a daily penalty (as defined in the documents relating to penalties). If the vehicle remains unaddressed for six months, CTA reserves the right to pursue legal action to secure a replacement at the Supplier's expense.
 - o In instances of widespread or series defects, the Supplier is required to replace all affected buses with models that have been corrected for the identified issues.
- Extended Rear Axle Warranty: The rear axle shall come with an extended warranty, covering any malfunctions or failures due to manufacturing defects. The Supplier is responsible for any necessary repairs or replacements under this warranty.

Other Specific Warranty Duration:

Traction Chain: 7 years

Batteries: 8 years

Charging System: 7 yearsMain Compressor: 5 years

HVAC system: 5 years

Drive Shaft: 5 years

Rear Axles and Reducer: 3 years

- **Electrical and Electronic Systems Warranty:** The Supplier shall guarantee to supply, at no cost, all replacement parts for electrical and electronic systems that exhibit manufacturing defects throughout the warranty period. Additionally, should any such defects be rectified with replacement parts, the warranty for the affected component shall be renewed, starting from the date of replacement.
- **Technical Support and Intervention Team**: To ensure timely and effective repair operations under the warranty, the manufacturer shall provide a dedicated technical support team. This team, comprising a suitable number of qualified engineers and technicians, shall be responsible for performing all warranted repairs. The manufacturer shall equip this team with specially outfitted vehicles containing all necessary tools for on-site repairs, ensuring they can address any issue promptly and efficiently.

Warranty for Repetitive Breakdowns

Repetitive breakdowns covering a reference fleet's entire range of equipment or materials shall be included. If an incident rate reaches 15% of the reference fleet over 12 months, the Supplier shall cover all costs for parts and labor, replacing the affected part across the fleet.

The Supplier shall also replace immobilized vehicles at no extra cost until the corrective solution is implemented.

Warranty Application Procedures













Defective parts shall be replaced without charge. Repairs and modifications shall be conducted by the supplier in agreement with CTA. The Supplier allows the operator to diagnose and intervene to minimize vehicle downtime, with the operator billing the supplier for services.

Special Cases Involving Safety Incidents

Incidents that could prohibit vehicle operation or use of charging stations due to safety risks, such as braking, steering, door safety, or electrical hazards, are addressed by the supplier through systematic technical upgrades. Preventive and curative replacements are done at the supplier's expense.

Charge System Warranties

A 7-year total warranty (parts and labor) shall be provided for inline and depot charging systems.

Warranty Execution Timelines

During the contractual warranty period, the Supplier shall be responsible for replacing or repairing defective elements within a maximum of 48 hours at no cost. Penalties apply for non-compliance as per the Contract conditions.













9.2Appendix B: Selected Routes

| Route Number | Route Long Name | Route Short Name | Origin | Destination | Trip length (km) | Trip duration (hour) | Number of trips per day | Number of stops | Dead Mileage Km | Km per bus per day | Total Number of buses in operation | Diesel Buses | Natural gas buses |
|--------------|--|------------------|--------------------------------------|--------------------------|------------------|-------------------------|----------------------------|-----------------|-----------------|-----------------------|------------------------------------|--------------|-------------------|
| 1090 | Abageyah - Al- Ameriyah | CTA 1090 | Al-Ameriyah | Abageyah | 15.89 | 1.05 | 128 | 44 | I | 255 | 15 | 9 | 6 |
| 1129 | Al-Ameriyah - Moneeb | CTA 1129 | Al-Ameriyah | Moneeb | 23.82 | 1.5 | 92 | 46 | I | 345 | 15 | 9 | 6 |
| 290 | Ahmed Helmy Station - Masallah Al Gadeda (Matariyah) | CTA 290 | Masallah Al Gadeda (Matariyah) | Ahmed Helmy Station | 13.07 | 0.93 | 102 | 31 | I | 340 | 15 | 8 | 7 |
| 810 | Al Omraneya Al Gadida - Qism El Hadeyek | CTA 810 | Qism El Hadeyek | Al Omraneya Al Gadeda | 19.33 | 1.14 | 54 | 41 | 3 | 245 | 15 | 8 | 7 |
| 831 | Al Zawya Al Hamra - Masakin Zeinhom | CTA 831 | Al Zawya Al Hamra | Masakin Zeinhom | 11.44 | 0.67 | 36 | 32 | 5 | 250 | 15 | 9 | 6 |















9.3 Appendix C: Environmental, Social and Gender considerations in E-bus Specs.

Appendix C: Environmental, Social and Gender Considerations in E-bus Specs

E&S Activities Report

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List of Acronyms

| Acronym | Term |
|---------|--|
| CCI4 | Carbon tetrachloride |
| CFCs | Chlorofluorocarbons |
| CH2BrCl | Bromochloromethane |
| CH3CCI3 | Methyl chloroform |
| СТА | Cairo Transport Authority |
| DoD | Depth of discharge |
| E-bus | Electric bus |
| EHS | Environmental, Health, and Safety |
| ER | Executive Regulation |
| ESS | Environmental and Social Standards |
| FGD | Focus Group Discussion |
| GIIP | Good International Industry Practice |
| GIIP | Good Industry International Practice |
| HBFCs | Hydrobromofluorocarbons |
| HCFCs | Hydrochlorofluorocarbons |
| HFCs | Hydrofluorocarbons |
| HVAC | Heating, Ventilation, and Air Conditioning |
| IEC | International Electrotechnical Commission |
| IR | Infrared |
| ISO | International Organization for Standardization |
| MoE | Ministry of Environment |
| NCPD | National Council for Persons with Disabilities |
| NFPA | National Fire Protection Association |
| PCBs | Polychlorinated biphenyl (PCBs) |
| POPs | Persistent Organic Pollutant |
| scCO2 | Supercritical CO2 |
| SCCPs | Short-chain chlorinated paraffins |
| UV | Ultraviolet |
| WBG | World Bank Group |
| | |













Executive Summary (In English)

The environmental section of this report aims to ensure compliance of the proposed e-bus specifications with the national laws and regulations and the WB standards and requirements, prioritizing more stringent regulations when conflicts arise.

The identified environmental aspects include noise intensity, lighting (illumination), ventilation/HVAC systems, energy conservation, e-bus body, types of batteries and disposal methods, and emergency/firefighting systems.

Although there are no specific requirements mentioned neither in the national laws and regulations nor the WB guidelines and standards, the Consultant to the extent possible tried to identify the relevant national laws and regulations as well as the WB requirements that the e-bus specification shall adhere to. These includes:

National Laws and regulations, including:

The Environmental Protection Law 4/1994 amended by Laws 9/2009 and 105/2015 and its Executive Regulation (ER) 338/1995 and its amendments.

The Labour Law 12/2003

The General Cleanliness Law 38 /1967 amended by Law 31/1976 and its executive regulations Waste Management Law 202/2020 and its executive regulations issued in 2022 (ER 722/2022)

Industrial Minister Decrees No. 7/1999 and No. 851/2006

Petroleum Minister Decree No. 673/1999

Egyptian Fire Fighting codes

Civil Defense requirements

Minister of Industry and Foreign Trade Decree No. 371 of 2013

International Standards and Requirements, including:

WB Environmental and Social Standards (ESS)

WBG Environmental, Health, and Safety (EHS) General Guidelines

Good International Industry Practice (GIIP)

2016 National Fire Protection Association (NFPA)

IEC 61851-1:2017

IEC 61851-23:2014

EC 61851-24:2014

ISO 17409:2020

ISO - 5130

ISO - 10844

IEC 62305

And finally, the international conventions that Egypt is part of; mainly Montreal Protocol, Basel Convention and Stockholm Convention.

Social Aspects

The main aim of the social activities in this report is to assess and formulate recommendations in the context of diversity, inclusiveness, and resilience considerations for the e-bus demonstration project.

16 Focus Group Discussions (FGDs) were conducted with males, females, young men and girls, and persons with disabilities in 5 different areas around the lines of Al Ameriyah depot to reflect and elaborate on concerns and perceptions of each group.

Discussions enriched the understanding of general considerations expressed by all participants, or specific concerns for some groups, e.g., females or persons with limited mobility:

Considerations in preferring public transportation means.















Main challenges expressed regarding CTA buses; and

General considerations for new e-buses (technical specs, stations and roads, operation. Fares, capacity building of drivers and conductors, and behavioral change).

Other aspects covered in the discussions will be presented in the ESIA.

Introduction

This document summarizes the main findings related to the environmental, social and gender perspective that shall be considered while specifying the e-bus specifications.

The **environmental** specifications have been identified based on the applicable national and international laws, regulations, policies and standards. While the **social and gender** specifications have been identified based on the main findings deriving from focus Group discussion (FGDs) with different groups of people in various areas of Greater Cairo.

The first section of the report (section 0) will be concerned with the environmental aspects, while the second section (section 0) will be discussing the social and gender aspects and main outcomes.

Report Objective

The "Environmental and Social Activities" report corresponds to the Deliverable requirements of Task 3.3 found below Task 3 – Development of E-Bus Specifications.

| | D3-3 Environmental and Social Activities Report | | |
|-----------------|---|--|--|
| Tasks Number | Description | Action plan | Chapter of the report responding to ToR requests |
| 3.3 | Gender-related: Produce specific recommendations, actions, protocols and specifications to observe during fleet procurement and operational design- stages that will improve the experience of women in public transport, particularly their personal safety. | I. 16 FGDs were conducted in 5 areas. Each group was limited to 8 participants to be able to focus on the groups' concerns in detail. Number of male groups in each area is 5, another 5 with females, 3 with young men, and 2 with ladies/young girls. Participants in each group were asked to discuss challenges and special considerations for women (including pregnant, with babies, and elderly), persons with special needs (and their companions), as well as young population (school pupils and university students). In addition, one FGD was conducted with 7 persons with disabilities at the NCPD to better articulate their concerns regarding the use of public buses and better understand how to achieve utmost inclusiveness for various types of disabilities by providing special specifications in the new e-buses. The total number of FGDs is 16 and the total | Section 0 |













| | D3-3 Environmental and Social Activities Report | | |
|-----------------|---|--|--|
| Tasks Number | Description | Action plan | Chapter of the report responding to ToR requests |
| | | number of participants in all groups is 127 persons. | |
| 3.3 | Passengers with reduced mobility: In line with the gender-related considerations discussed above, address design considerations for passengers with reduced mobility including senior citizens, passengers traveling with minors, pregnant women, and passengers with physical disabilities. Design consideration should: | One FGD was conducted with 7 persons with disabilities at the NCPD to better articulate their concerns regarding the use of public buses and better understand how to achieve utmost inclusiveness for various types of disabilities by providing special specifications in the new e-buses. | Section 0 |
| 3.3 | Climate and disaster resilience: technical parameters and specifications to consider during fleet procurement and operational design stages that will mitigate disaster risk hazards and strengthen resilience of e-bus operation, and operational protocols for CTA to ensure during implementation. | Conduct a thorough review of the relevant Egyptian laws and regulations, the international convention signed by Egypt, and the WB guidelines and standards concerning noise, vibration, illumination, HVAC systems, e-bus body, types of batteries, batteries disposal methods, and emergency response and firefighting requirements. Develop stringent procurement criteria aligned with regulatory requirements, emphasizing noise reduction, vibration control, energy-efficient lighting, HVAC performance, battery safety, and disposal protocols. | Section Oof this report |













Environmental Aspects

a. Introduction to the Environmental Section

This section lists the national laws and regulations and the international policies and standards applicable to the e-bus specs.

The proposed e-bus specs (developed as part of Task 3 – Deliverable D3-1) must comply with both national and international requirements. If there is a difference between the national and the WBG standards, more stringent standards will be adopted.

b. Methodology

The Consultant identified the appropriate environmental regulatory standards/specifications that are applicable to the project. These includes the following aspects:

- Noise
- Lighting
- Heating, Ventilation and Air Conditioning (HVAC) Systems
- Energy conservation in terms of selecting the chargers and charging system (stations)
- Substances (Materials), Scrap and Waste including:
 - E-bus body
 - Types of batteries
 - Batteries end of life scenarios
 - Other hazardous substances use (e.g., lubricant oil) and hazardous and non-hazardous waste disposal
- Emergency and firefighting system inside the bus and in terms of selecting the chargers and charging system (stations)

The purpose is to ensure that the e-bus specs are in full compliance with the national and international standards and requirements.

A list of all national, international, local and regional regulatory standards/specifications of relevance to the proposed project will be included in the e-bus specs and accordingly, in the bidding documents.

The main regulatory standards/specifications that were followed included the following:

- National Laws and regulations, including but not limited to:
 - The Environmental Protection Law 4/1994 amended by Laws 9/2009 and 105/2015 and its Executive Regulation (ER) 338/1995 and its amendments.
 - o The Labour Law 12/2003
 - The General Cleanliness Law 38/1967 amended by Law 31/1976 and its executive regulations
 - Waste Management Law 202/2020 and its executive regulations issued in 2022 (ER 722/2022)
 - o Industrial Minister Decrees No. 7/1999 and No. 851/2006
 - Petroleum Minister Decree No. 673/1999
 - Egyptian Fire Fighting codes
 - o Civil Defense requirements
 - Minister of Industry and Foreign Trade Decree No. 371 of 2013
- International Standards and Requirements, including but not limited to:
 - WBG Environmental, Health, and Safety (EHS) General Guidelines
 - WB Environmental and Social Standards (ESS)
 - Good International Industry Practice (GIIP)
 - 2016 National Fire Protection Association(NEPA)
 - o IEC 61851-1:2017
 - o IEC 61851-23:2014













- o EC 61851-24:2014
- o ISO 17409:2020
- \circ ISO -5130
- o ISO 10844
- o IEC 62305

Additionally, the regional and international conventions, treaties and agreements addressing labour standards as well as environmental protection such as the climate change, hazardous substances & wastes, and nature conservation has been reviewed whenever relevant to the Project.

c. Main Findings

i. Noise Intensity

As per Annex 7 of the amended ER of Law 4/1994 amended by Laws 9/2009 and 105/2015

Table 9-1: Maximum permissible limit for noise intensity specified for vehicles during the licensing and operation:

| Table (4) of the ER amended in 2011 | | | | |
|---|-----|--|--|--|
| Vehicle Type Maximum Noise Intensity "LAFmax" dB | | | | |
| Passenger vehicles, more than 8 - passengers, in addition to the driver (bus) | 107 | | | |

Measurements are conducted according to International Standards specifications ISO -5130, during vehicles technical inspection in the traffic departments during licensing and roads inspection campaigns.

Maximum noise level "LAFmax" is the highest sound pressure level measured at level (A) during a specific time period and is expressed in decibels.

Table 9-2: Maximum permissible limit for noise intensity specified for vehicles during manufacturing stage before trading:

| Table (5) of the ER amended in 2011 | | | | |
|---|----|--|--|--|
| Vehicle Type Maximum Noise Intensity "LAFmax" dB | | | | |
| Passenger vehicles, more than 8 - passengers, in addition to the driver | 82 | | | |

Vehicle is chosen to measure the noise after being manufactured and before being traded by the market according to International Standards specifications ISO – 10844.

The specifications to set up noise test stations are equipped according to International Standards specifications ISO – 10844, under the supervision of the Industry and Environment Ministries.

Maximum noise level "LAFmax" is the highest sound pressure level measured at level (A) during a specific time period and is expressed in decibels.

Although there are no specific limits for noise intensity for buses. However, as per the WB general guidelines, the e-buses with lower sound power levels will be considered in the e-bus selection criteria.

The relevant WB ESS are ESS1, 2, 3 and 4.

ii. Vibration

No specific limits for vibrations for buses in the Egyptian laws and regulations as well as the WB standards. However, as per the Decree No. 211/2003 of the Ministry of Manpower (amending the executive regulations of Law 12/2003), threshold limit values (TLVs) for exposure of the hand to vibration represent in table 3-2.

Table 9-3: Maximum TLVs for exposure of the hand to vibration according to the Egyptian law:

| Table (10) of Labour law 211/2003 | | | |
|---|----|--|--|
| Total Daily Exposure Duration (hours) Maximum value of frequency weighted acceleration (m/s²) | | | |
| Less than I hour | 12 | | |
| I-2 hours | 8 | | |
| 2-4 hours | 6 | | |
| 4-8 hours | 4 | | |













Additionally, as per the WB general guidelines, buses with vibration dampening pads or devices installed shall be considered in the e-bus selection criteria.

Moreover, the relevant WB ESS are ESS1, 2, 3 and 4.

iii. Lighting System (Illumination)

No specific limits for light intensity for buses in the Egyptians laws and regulations as well as the WB standards. However as per the Decree No. 211/2003 of the Ministry of manpower (amending the executive regulations of Law 12/2003), the light intensity for stairs is identified to be 215 lux (20 candle/m²)

Additionally, as per the WB general guidelines, the following will be considered in the lighting system selection criteria:

Utilizing lighting system of high energy efficiency and with minimum heat emission.

Ensure no glare / reflections and flickering of lights

Ensure minimizing and controlling of optical radiation including direct sunlight.

Ensure minimizing and controlling exposure to high intensity UV and IR radiation and high intensity visible light.

Moreover, the relevant WB ESS are ESS1, 2 and 4.

iv. Heating, Ventilation and Air Conditioning (HVAC) Systems

No specific requirements are listed in the Egyptian Laws and regulations regarding buses' specs.

However, as per Annex 9 of the ER of the Egyptian Environment Law 4/1994 and its amended, the heat stress has limits has been identified per system of work and working hours as well as the work (activity description) as shown in the following tables. Accordingly, the heat stress inside the e-bus shall not exceed the identified limits.

Table 9-4: Permissible Thermal (Heat Stress) Exposure Limits in Workplace

| System of work and hourly rest break | Heat Stress: - Wet Globe Thermometer temperature (°C) - Average exposure to heat in case of intermittent work Medium work | |
|--------------------------------------|--|--|
| Continuous work | 26.7 °C | |
| 75% work, 25% rest | 28 °C | |
| 50% work, 50% rest | 29.4 °C | |
| 25% work, 75% rest | 31.1 °C | |

Table 9-5: Business Description

| Physical Activity | Business Description |
|-------------------|--|
| Medium work | Medium body movement including cars driving. |

As per the Minister of Industry and Foreign Trade Decree No. 371/2013, article (1): "Manufacturers and importers of air conditioning devices are obligated to produce and import AC devices at a temperature that can be set to not less than 20 degrees Celsius in the case of cooling, and at a temperature that can be set to not more than 28 degrees Celsius in the case of heating."

With regarding to the air conditioning, as Egypt is a party to the **Montreal Protocol** on Substances that Deplete the Ozone Layer. Thus, Egypt is following the protocol's phasing out steps for the following Refrigerants:















- I. Chlorofluorocarbons (CFCs):
- R-II
- R-12
- R-500
- R-502
- 2. Halons:

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Halon-1211 (BCF)
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Halon-1301 (CBrF3)

Halon-2402 (CBrF2CBrF2)

- 3. Hydrochlorofluorocarbons (HCFCs):
- R-22
- R-123
- R-124
- R-141b
- R-142b
- 4. Hydrobromofluorocarbons (HBFCs):

Bromochloromethane (CH2BrCl)

5. Hydrofluorocarbons (HFCs):

HFC-134a

HFC-152a

HFC-143a

HFC-125

HFC-32

6. Other Substances:

Carbon tetrachloride (CCI4)

Methyl chloroform (CH3CCI3)

And it is reported in Egypt 2030 strategy that the following refrigerants have been reduced by 97% by 2020:

HCFC-22 (R-22)

HCFC-141b (R-141b)

HCFC-142b (R-142b)

HCFC-123 (R-123)

HCFC-124 (R-124)

Thus, the above substances are prohibited/banned to be used by the Project.

Additionally, as per the WB general guidelines regarding heating, ventilation and air conditioning (HVAC), the following will be considered in the e-bus selection criteria:

- 1. Ensure supplying sufficient fresh air inside the bus.
- 2. Ensure providing an air distribution system so as not to expose bus riders and drivers to draughts.
- 3. Ensure supplying re-circulation of fresh air inside the bus.
- 4. Prevention of the growth and spreading of disease agents (e.g., Legionnella pneumophilia) or breeding of vectors (e.g., mosquitoes and flies) that cause harm to public health

The relevant WB ESS are ESS1, 2, 3 and 4.













v. Substances (Materials), Scrap and Waste

E-bus Body

Corrosion Protection: Protecting the framework and bodywork against corrosion.

Type of Batteries

The following specs will be considered in the selection criteria of the e-bus batteries:

Lifespan: to provide at least number of cycles not less than 5,000 and can perform from 8-10 years. After that, it could be used as an energy storage battery for another 20 years.

Depth of discharge (DoD)²⁸ up to 100%

Safety: to be not flammable and to be strong thermal stability and safe (can handle high temperatures) Components: Cobalt-free and do not contain any heavy metals or rare metals or any of the hazardous substances identified by the different Egyptian Ministries (Ministry of Industry and Mineral Resources, Ministry of Commerce, Interior Ministry, Ministry of Health, Electricity and Energy and Petroleum Ministry) unless obtaining permits from the relevant authority.

Batteries End of Life Scenarios

The batteries' average life span is 8 years, after that the batteries are considered as type of hazardous waste; mainly, e-waste. Thus, the disposal of batteries must be managed and handled in an environmentally safe and proper manner as per the following alternatives:

Recycled by vehicle manufacturers / sent back to the supplier

Used in other applications such as stationary storage on buildings, lighting, etc.

Disposed by qualified renewable resources companies.

Disposed through a license hazardous waste contractor

The above-mentioned batteries end of life scenarios have been mentioned in order, from best to least preferable scenarios, taking into consideration the environmental perspective, the relevant laws, regulations and standards requirements, the international conventions (Montreal Protocol, Basel and Stockholm Convention) and the CTA regulations.

It worth mentioning that the CTA current practice for the diesel/NG buses expired batteries is collecting the expired batteries and selling them via auctions to a certified hazardous waste contractors. With regards to the e-buses currently working under CTA supervision, they haven't reached their end life, yet. However, the contractual agreement with the batteries supplier(s) state that the batteries sent back to the supplier(s) once they reach their end of life.

Hazardous Substances Use and Hazardous and Non-Hazardous Waste Disposal

a) Hazardous Substances:

All chemicals such as lubricant oil, batteries component, etc. shall be treated as per the national and the international requirements.

• National Regulations and WB requirements:

- Utilize the least hazardous alternatives with regards to toxicity, biodegradability, bioavailability, and bioaccumulation potential.
- Avoid using Polychlorinated biphenyl (PCBs) in electrical equipment, and ozone depleting substances.
- Ensure following the licensing procedures for handling hazardous substances, ensuring public and environmental safety.

-

²⁸ DoD is the level to which a battery can be discharged without damaging it.













• International Conventions (Stockholm Convention):

- o Short-chain chlorinated paraffins (SCCPs) are addressed for their carcinogenic properties.
- Decision SC-8/11 exempts certain applications of SCCPs, emphasizing the transition to alternative substances.
- Alternative lubricant formulations include:
 - Oil-in-water emulsions.
 - Vegetable-based lubricants (e.g., soybean, pine tree, rapeseed, mustard, grape seed, sunflower, coconut, canola) with or without additives.
 - Bio-based lubricants combined with supercritical CO2 (scCO2).
 - Oil-in-CO2 dispersion.
 - Gas-based lubricant systems.

These alternatives offer improved biodegradability, reduced toxicity, and enhanced performance compared to conventional lubricants, aligning with sustainable practices and regulatory requirements. Additionally, they ensure compliance with the World Bank standards and relevant international conventions ensures the promotion of environmentally friendly lubricants.

b) Scrap, Hazardous and Non-Hazardous Waste Disposal

National Regulations:

- O According to Ministerial Decree 165/2002 under Law 4/1994 issued by the Ministry of Industry, lists hazardous wastes to include substances such as arsenic, mercury, thallium compounds, hexavalent chromium compounds, and spent electrolytic solutions. Additionally, electrical and electronic assemblies waste, including batteries, are classified as hazardous waste if they contain lead or any other hazardous material and/or may be contaminated with any hazardous element in concentrations sufficient to exhibit any hazardous properties.
- Ministerial Decree 1352/2007 under Law 4/1994 issued by the Ministry of Petroleum lists oil and greases wastes, as well as electrical and electronic installation scrap/waste containing lead or cadmium, as hazardous.

Compliance with these regulations, along with Law 202/2020, is crucial to ensure safe and environmentally sound disposal practices.

• World Bank Requirements:

- Ensure compliance with World Bank guidelines for hazardous waste management, emphasizing pollution prevention and environmental protection.
- o Incorporate measures to minimize risks associated with hazardous waste generation, transportation, and disposal, aligning with international best practices.

• International Conventions:

- Stockholm Convention: regulates the production, use, and disposal of specific POPs, which
 include certain chemicals used in lubricants, coolants, and other products. If any of these POPs
 are present in the lubricants or other materials used in the electric bus project, the project
 must ensure compliance with the convention's restrictions and requirements.
- Basel Convention on the Control of Transboundary Movements of Hazardous
 Wastes and Their Disposal: The Basel Convention establishes procedures and requirements













for the transboundary movement of hazardous wastes. If any hazardous wastes generated from the e-bus project are intended for export or import, the project must comply with the notification, consent, and other procedures outlined in the convention and also The e-bus project must adopt ESM practices to manage any hazardous wastes generated in compliance with the convention's principles.

Moreover, the relevant WB ESS are ESSI and 3.

vi. Chargers and the Charging System (Stations)

No specific requirements are listed in the Egyptian Laws and regulations regarding e-buses' chargers and charging system stations.

Chargers typically adhere to standards and guidelines that prioritize aspects like safety, energy efficiency, and performance rather than having specific environmental requirements outlined in standards such as IEC 62430. These standards ensure that chargers operate safely, reliably, and efficiently, addressing criteria such as electrical safety, compatibility with power sources, and electromagnetic compatibility (EMC).

While environmental considerations like materials selection and end-of-life management are vital aspects of product design, they are generally addressed through broader environmental regulations and guidelines, rather than through specific standards tailored solely to chargers.

The electrical safety provisions of EV Charging Stations shall follow the following standards:

- **IEC 61851-1:2017**: Standard for electric vehicle conductive charging system Part 1: general requirements,
- **IEC 61851-23:2014**: Electric vehicle conductive charging system Part 23: DC electric vehicle charging station,
- **EC 61851-24:2014**: Electric vehicle conductive charging system Part 24: Digital communication between DC EV charging station and an electric vehicle for control of DC charging; and
- **ISO 17409:2020**: Electrically propelled road vehicles- Conductive power transfer Safety Requirements

According to the above-mentioned guidelines the following procedures should be followed:

- All electric vehicle charging stations shall be provided with protection against the overload of input and output supply fittings.
- Cluster connection of electrical charging wires or cord extension by adjoining one wire with another shall not be used.
- The electric vehicle parking place shall be such that the distance between the electric vehicle charging point and the electric vehicle shall be within 05 meters.
- Suitable lightning protection systems shall be provided for the electric vehicle charging stations as per IEC 62305.
- Electric vehicle charging stations shall be equipped with a protective device against the uncontrolled reverse power flow from the electric vehicles.
- If the voltage is higher than 60 Volt DC and when hazardous voltage is detected through the charging process, including after the end of charging and in case of a charging system malfunction, an alternative method of disconnection shall be applied by dislodging the plug connecting the vehicles (used for DC charging).
- In the case of Direct Current (DC) electric vehicle charging, the charging point may disconnect the electricity supply automatically to prevent overvoltage at the battery if the output voltage exceeds the maximum voltage limit sent by the vehicle.
- The electric vehicle charging points shall not energize the charging cable when the vehicle connector is unlocked. The voltage at which the vehicle connector unlocks shall be lower than 60 Volts.













• Electric vehicle connections in the charging station shall be installed in a way to avoid, as far as practicable, the existing network's unbalance related problems.

The relevant WB ESS are ESS1, 2, and 3.

vii. Emergency and Firefighting System

Although there are no specific emergency and firefighting national requirements for e-buses charges and charging system. Yet, the Project will comply with the following:

Egyptian Fire Fighting codes Civil Defense requirements

Additionally, there are no specific emergency and firefighting requirements for e-buses charges and charging system in the WB guidelines. However, as per the WB general guidelines, the following will be considered in the firefighting system selection criteria:

Ensure providing easily accessible manual firefighting equipment and audible/visible fire and emergency alarm systems for effective response for use in case of emergency (e.g., A switch to cut off the power, fire extinguishers, smoke suction system, etc.).

Ensure providing engineering controls such as automatic smoke detectors and alarms, and doors and windows opening system

The relevant WB ESS are ESS1, 2, 3 and 4.

Moreover, the mentioned in section vi will be applied to the extent possible.

More details regarding the technical specifications of the e-bus and its charging system are found in D3-I "Technical and functional specifications for electric buses".

Social Aspects

d. Introduction to the Social Section

This document summarizes the main findings deriving from FGDs with different groups in various areas as presented in the table below. The main aim is to better understand special measures and specifications to be considered during the design of the e-bus to ensure inclusiveness of all social groups with special attention to women and girls, as well as including senior citizens, passengers traveling with minors, pregnant women, and passengers with physical disabilities.

In addition to FGDs, a passenger survey was carried out. Surveys were performed for Imbaba bus routes, and projected Badr bus routes (as given by CTA), those two depots and corresponding routes being the ones that came out of the Multicriteria Analysis (GCCC decision pursuant to MCA Phase I and Phase II presentation on 10/05/2023 meeting.

e. Methodology

i. Composition of Focus Group Discussions

To assess and formulate recommendations in the context of diversity, inclusiveness, and resilience considerations for the e-bus demonstration project, a total of 15 FGDs were conducted in 5 areas. Each group was limited to 8 participants to be able to focus on the groups' concerns in detail the total. Total number of male groups is 5, another 5 with females, 3 with young men, and 2 with ladies/young girls. Additionally, participants in each group were asked to discuss challenges and special considerations for women (including pregnant, with babies, and elderly), persons with special needs (and their companions), as well as young population (school pupils and university students). In addition, one FGD was conducted with 7 persons with disabilities at the NCPD to better articulate their concerns regarding the use of public













buses and better understand how to achieve utmost inclusiveness for various types of disabilities by providing special specifications in the new e-buses. The total number of FGDs is 16 and number of participants in all groups is 127 persons.

Table 9-6: FGDs by area, date, group categories, number of participants, and venue

| | | | lumber of partic | Number of participants | | | | | |
|-----|---------------------------|------------|------------------|------------------------|-------|--------------|--------|-------|-----------------------|
| # | Area/group | Date | No of sessions | Men | Women | Young men | Ladies | Total | Venue |
| I | Heliopolis | 31/12/2023 | 3 | 8 | 8 | 0 | 8 | 24 | Dar El Tefl School |
| 2 | El Waily | 01/01/2024 | 3 | 8 | 8 | 8 | 0 | 24 | Home of coordinator |
| 3 | El Daher | 03/01/2024 | 3 | 8 | 8 | 8 | 0 | 24 | Cafe |
| 4 | Hadaeek El Qoba | 04/01/2024 | 3 | 8 | 8 | 0 | 8 | 24 | Cafe |
| 5 | El Azabakeya | 05/01/2024 | 3 | 8 | 8 | 8 | 0 | 24 | Cafe |
| Tot | tal | | 15 | 40 | 40 | 24 | 16 | 120 | |
| 6 | Persons with disabilities | 04/02/2023 | I | | | | | 7 | NCPD |
| Tot | tal | | 16 | 40 | 40 | 24 | 16 | 127 | |

Transcripts of different FGDs were organized in a corresponding spread sheet by type of group, overarching themes, and subthemes. The corresponding spread sheets were used to conduct thematic analysis for qualitative data to find and interpret main patterns and meanings from FGDs transcripts.

ii. Selection Criteria for Study Areas

Areas were chosen upon highest number of lines passing through the day and are assumed to be representative from a socio-economic aspect as follows:

- El Daher (5 lines);
- Hadeek El Qoba (4 lines);
- El Waily (3 lines);
- El Azbakeya (3 lines); and
- Heliopolis (2 lines).

Passenger interviews were conducted in a street-intercept method in selected zones surrounding the 14 surveyed CTA routes. 29 zones were selected across the GCR with 583 surveys collected from all zones. The criteria for choosing the zones was the volume of boarding & alighting clusters, driven from the onboard survey results. Areas with high boarding & alighting values were chosen for each district in our project's area of interest (Badr city, Shorouq, New Cairo, Imbaba, Nasr City, etc.) and the total number of surveys targeted (initially 500) was distributed based on the relative boarding & alighting volume between the selected zones. The survey targeted a 50/50 gender split per zone, and subsequently a 50/50 split for the total sample. No other pre-selection criteria for passengers was included. The targeted population were existing public transport users waiting at stops.

The passenger survey was divided into three components:













- I. Journey Details: origin and destination of their current trip, trip purpose, modes used, fare paid, access and egress time, etc.
- 2. Passenger experience: The main portion of the survey with impressions, ratings, and preferences for public transport. Specific questions target gender and active travel aspects.
- 3. Basic demographic information: including questions on physical challenges to accessing PT.

f. Main Considerations in Preferring a Public Transportation Mean

i. Focus Group Discussions

Participants in all types of groups use one means of public transportation or more; either the metro, public buses, or micro buses. They explained such preferences by the one-way journey without diversions, and safety. Participants using the metro added the availability of an abonnement as an important factor in choosing to use the metro. The most common use for public transportation is to go to work, university, or school at an affordable cost. Participants who have a private car explained that using public transportation saves time, money, and effort of driving and parking.

All participants approved specific consideration when choosing/preferring to use a public transportation mean as follows:

Affordable cost;

Comfort inside the vehicle;

High speed (like the metro for an example);

Time of journey is an important factor in choosing between different means of transportation;

One way journey with not many diversions between different types of transportation means;

Comfort inside the vehicle, while women and girls emphasized the importance of comfort of seats and adequate spaces between seats/separators;

Availability of adequate seats for elderly people;

Safety in all aspects; and

Closeness of stations to the house or desired destination.

Women emphasized more specific considerations as follows:

Provision of high numbers of vehicles on the same line to avoid crowdedness;

Vehicles with lower/more comfortable steps;

Special places inside the vehicles for women and elderly to be made available and enforced;

Smaller vehicles for quicker loading and unloading of passengers; and

Less vibration during riding.

Girls added an important consideration; namely the availability of transportation around the day, especially at night. The explained that CTA buses and metro safer for them, drivers are known, and they can complain in case anything goes wrong; while micro buses are not safe for girls and women.

ii. Passenger Survey















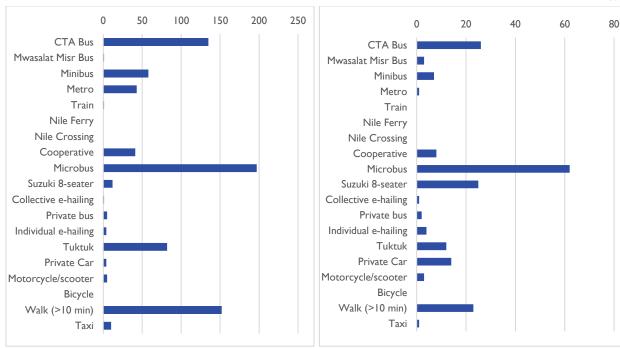


Figure 9-1: (left) Modes used by respondents in their journey (Inner Cairo & Giza)
Figure 9-2: (right) Modes used by respondents in their journey (New Urban Cities i.e. Shorouq, Badr & New Cairo)

Disaggregating modal share from respondents reported used modes based on location shows the differences between the contexts. Figure 9-1 & Figure 9-2 show modes used by respondents in Inner Cairo and New Urban Communities (NUCs) respectively.

Overall, everyone uses microbuses, CTA buses, and walking predominantly. There was a much higher percentage of people walking in Inner Cairo & Giza areas than in NUCs. On the other side, NUCs have a visibly higher percentage of private car, individual and collective e-hailing users.

It is notable that a lot of respondents are using the Suzuki 8-seater mode which is notorious in terms of comfort and seating space. This can only indicate that this mode is covering areas not currently covered by other modes and for distances that are not walkable in the NUC context. This functionality is similar to Tuk-tuks in some dense neighborhoods in inner Cairo & Giza.

g. Main Challenges That Participants Expressed Regarding CTA Buses

. Focus Group Discussion

All participants have agreed on a number of challenges that face them during using CTA buses, as follows:

I- Discomfort mainly due:

Difficulty in ascending and descending buses (first step is too high for passengers, especially if having dependent persons or any luggage with them);

Lumpen condition of bus seats (old and tight);

Crowdedness, especially if causing any physical touching;

Noise; and

Mobile vendors inside the bus.

2- Lack of safety mainly due:

Lack of separate doors for bus entry and exit (the back door is not functioning most of the time); Drivers drive very quickly in an unsafe way that threats children's and elderly safety;















Drivers sometimes do not fully stop when passengers are ascending and descending buses;

Poor condition of stations and roads near the station;

Buses stop too much and suddenly;

Sexual harassment against women along all ages;

No space for bags or any baggage;

Lack of sufficient lighting inside buses;

Exposure to thefts; and

Exposure to bad manners (indecent talks and/or swearwords).

Challenges for young population include more specific aspects, such as:

Bus drivers do not stop on the side of the road;

Discomfort of vehicles and seats;

Irregularity of buses;

Crowdedness: and

Conductors do not give the cash change back.

Challenges for persons with reduced mobility/disabilities include the following:

According to participants of FGDs and FGD with persons with disabilities, they confirmed that the cost of being disabled is five time higher than basic living services and costs of normal persons;

Busses allocated for persons with limited mobility or disabilities in Egypt²⁹ are very limited; though being very useful to help persons to get into and out of the bus;

Unsafety because impatience of drivers to move before they completely get into and out of the bus; Sudden stops imply high risk on all passengers and causes heavy injuries, not only for person with disabilities, but also for infants, elderly, and pregnant women (most of participants in the group might travel with their children or parents);

Participants with reduced mobility have requested CTA to admit the "comprehensive services card" to exempt them from paying 50% of fare (as per law 10/2018); sometimes they are asked to pay or full fare if bus conductors did not recognize the card; and

Drivers do not stop at the stations allocated for persons with disabilities.

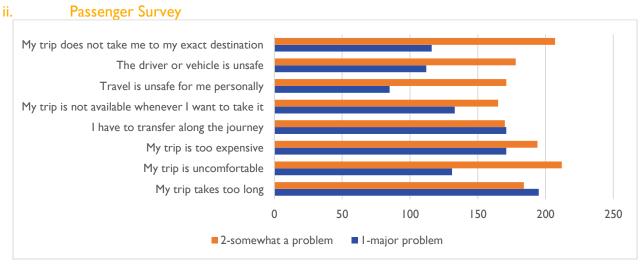


Figure 9-3: Results from rating issues of transport modes respondents were using

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²⁹ Buses with three doors that slope to the right side to facilitate entry and exit of people with limited mobility capacity; the door in the middle is allocated for persons with disabilities and mobility restrictions.













When asked to rate each issue regarding public transport modes the respondents were using, most respondents stated that "their trip taking too long" is a major problem. Also reported frequently as a major problem is the number of transfers and the trip being too expensive for them.

Seeing that "trip is uncomfortable" and "trip doesn't take me to my exact destination" are reported as top two in the "somewhat a problem" ranking, it can be argued that users need more direct, comfortable services. This can be achieved by examining people's geographic travel patterns on a micro level and cross-comparing with the existing public transport network. Also integrated ticketing can lower expenses and the burden of transfers for the users.

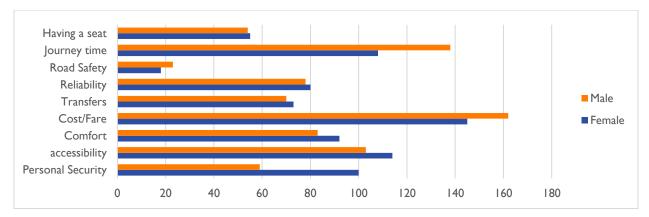


Figure 9-4: Top Three considerations when choosing how to travel generally

Cost is the top consideration for users followed by **journey time** and **accessibility**, where accessibility is defined as "transport services proximity to origin and/or destination". It's confirmed through different questions that **affordability and travel time are the top priorities for users in the GCR**. However, when asked to prioritize three considerations only, it's apparent from Figure 9-4 that **women prioritize personal security** over other attributes.

Accessibility is the second top priority for women. The surrounding environment and the physical effort needed during the access and egress of services, especially if there are children or heavy objects carried, can have more effect on women users.

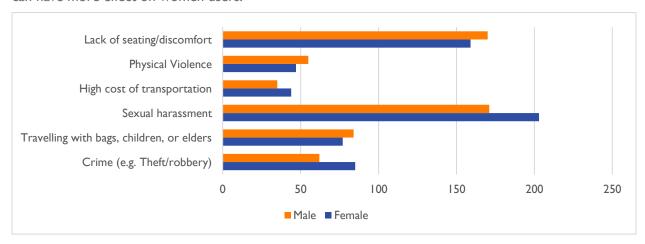


Figure 9-5: Responses to "Top two challenges faced by women" disaggregated by gender

There is a noticeable similarity between males and females' perception on women's challenges in PT. Sexual harassment and lack of seating/discomfort are the top two choices for both genders. However, there is a small discrepancy between the third biggest challenge where males assumed it to be "Travelling"















with bags, children, or elders" whereas women chose "Crime" over the former with a small margin. This shows that in terms of the broader "security" aspect, it is "sexual harassment" that is considered as top risk by women, followed by crime.

In conclusion, public transport users are in urgent need for **shorter**, more **direct trips**. **Sexual harassment** in public transport and in the street is a problem for most female respondents and needs intervention to ensure equal access of women to transport. Further on **women accessibility**, public transport needs to be **comfortable** and not just means to an end. Vehicle conditions need to improve and surrounding **NMT infrastructure** needs to ensure a smooth access and egress experience for users.

h. General Consideration Raised by Participants of FGDs for The New E-Buses

Participants in all groups have approved several specifications to be considered in the new e-bus as follows:

i. Technical bus specification

General (all)

Narrow down bus steps;

Comfortable seats;

Decent space inside the bus "not packed";

Provide enough spaces for luggage and carriage;

Use alarm bottoms and cameras to control physical/sexual harassment and thefts inside buses (emergency bottoms);

Establish speed control/limit system;

Install alarm ring before buses move of stop;

Equip buses with first aid kits; and

Provide handles to help passengers to lean on, especially during sudden movement and stops.

Women, including those pregnant or accompanied by children/girls

Provide special spaces for strollers and baby baggage;

Specify seats for pregnant women and/or women with infants;

Afford enough space between seats;

Allow separators between seats/sections;

Air conditioning;

Easy to open windows;

Use fire-fighting pumps;

Use waste baskets inside the bus;

Special buses for school pupils and university students;

Ensure an effective mechanism for grievances to enable following up on the complaint;

Ensure adequate lighting system inside buses;

Apply sudden inspection on drivers during operation; and

Use visual and speaking signboards inside the bus.

Men

Allow and enforce special seats for women and elderly; and

Prohibit street vendors from inflowing into buses.

Elderly

Specify and prioritize seats for elderly; and

Allow time for safe entry and exit of the bus.

Persons with disabilities

Several considerations were raised within all FGDs regarding persons with disabilities, these include:

Narrow down steps;















Install easy-to-use ramps for wheelchairs;

Allocate comfortable seats;

Provide special spaces inside the bus for wheelchairs;

Use visual and specking signboards for persons with different disabilities; and

Develop a mechanism or support system to provide needed assistance for passengers with special needs.

FGD with persons with disabilities pointed to number of specifications for each type of disability as follows:

Speaking announcements for people with sight disabilities;

Alarm bottom for people hearing and speaking disabilities to draw drivers and controllers' attention that they need to descend and need the driver to properly stop for them;

Have a written route on the bus to help people with hearing disabilities to know the direction;

Provide Braille maps of routes in station to help people with visual disabilities with directions;

Install hydraulic ramps for persons with mobility disability (not only for wheelchairs only, but for persons using crutch(s) as well); and

Apply international standards and specifications in bus design as is without modification, especially for ramps' specs.

During FGD with persons with disabilities at NCPD, they confirmed main findings derived from FGDs, but elaborated in more detail on the following:

Special spaces for persons with disabilities like Mowasalat Misr and the airport bus is needed to be available in all buses:

Allocate seats for elderly or persons with disabilities and make it obvious and clear to all passengers using different kinds of signs inside the bus; and

Use belts for wheelchairs inside the bus.

ii. General Considerations for Stations and Roads

Upgrade stations and provide seats and shade for passengers;

Rehabilitate pavement to enable using lower bus step; and

Upgrade roads and lighting to improve safety, especially at night.

General Considerations for Operation

Employ an announced/published time plan for buses;

Use display maps to allow passengers to plan their rides; and

Separate doors for entry and exit.

iv.

General Considerations for Fares

Establish round-tickets for buses and other means of transportation (metro, monorail... etc.);

Introduce yearly and bi-annual abonnements for passengers;

Apply different fairs according to distance (like the metro system); and

Use ticket machines (because sometimes the driver himself is conducting tickets, which is unsafe and time-consuming).

v. General Considerations for Capacity Building of Drivers and Conductors

Control unneeded/unplanned/sudden bus stops;

Instruct drivers to stop in stations close to the sidewalk/pavement;

Introduce a system for cash change;

Conductors should be able to drive in case of any emergency happens to drivers;

Prepare and train drivers and conductors on different contingencies, and especially minor repairs;

Provide personal skills (general behavior modification, humanitarian approach to deal with elderly and persons with disabilities, stress management ...etc.);

Apply medical check-ups and random drug tests;

Train drivers and conductors on the new e-bus because it is different than old buses; and

Train drivers, conductors, and workers on basic first aid principles.













vi. General Considerations for Behavioral Change

The FGD with **persons with disabilities** was very useful in drawing attention to the importance of community behavioral change and the urgent need to adapt a set of community behavioral change campaigns and workshops to raise the awareness of community members in Egypt towards persons with disabilities. It was explained to them during the meeting that the GCCC project includes a component for behavioral change and that the team will get back to them for further discussion on this topic and welcomes their cooperation in the design of messages and material. Perceived concerns related to community behavioral change can be summarized as follows:

Bus drivers

Bus drivers are mostly impatient to wait until persons with limited mobility can get into and out of the bus:

Some drivers do not stop intentionally when they see persons with disabilities waiting to take the bus;

Bus drivers and conductors need to learn basics of sign language to be able to communicate with people with hearing and speaking disabilities;

Conductors as well as bus drivers need to be educated about the "comprehensive services card" to accept it from passengers without forcing them to pay a ticket or harass them; and

Conductors must accept to see a hanging/pendant "comprehensive services card" without asking to see to card itself, especially with persons with amputated arm(s) or hand(s).

Passengers on the stations and inside buses

Disrespect of passengers to preserve spaces and seat allocated for people with limited mobility (elderly, pregnant women, and persons with disabilities);

Passengers on stations or inside the bus ignore any support or even mercy that should be provided to persons with disabilities; and

Inside the bus, no one would stand up for someone with reduced mobility (pregnant, seniors, disabled... etc.).

Community members

Impatience of car drivers on the road, when the bus drivers need time until a person with limited mobility gets in or out of the bus;

Females with all kinds of disabilities are mor frequently subject to physical/sexual harassment, especially if they need any support in moving;

Awareness raising about persons with disabilities is highly required, as some people do not respect that people are different, especially if they have an obvious disability;

Introduce types of wide range of disabilities to the public to help them understand that not all persons with disabilities are mentally retarded.











- 9.59.4 Appendix D Firefighting Specifications
- 9.69.5 Appendix E: Consultation Strategy Plan and Report
- 9.79.6 Appendix F: Al Amirya Environmental Monitoring Report (Baseline Measurements)
- 9.89.7 Appendix G: Detailed Measurements' Report on Public Transport Modes in Cairo, Egypt in 2017 by EEAA

Appendices D, E, F and G could be found in the following link:

https://drive.google.com/drive/u/I/folders/IhAdrnsbj0xpGfobSCEUpm4pHn3sHxCLg













Appendix H: Qualifications of Specialists Hired by the Contractor

Environmental specialist

- A professional with Post Graduate Degree in Environmental Engineering or Civil/ Mechanical/ Electrical/ or Environmental Science
- 5+ years of experience as environmental specialist
- Related experience in infrastructure projects.
- The specialist should have environmental management experience in ESIAs, QRAs, soil and water analysis
- Have the ability to prepare & implement Resources Management Plan.
- Visual inspections onsite, spot check measurements of ambient air quality, and noise and vibrations measurements, review of maintenance records of machinery- according to reference testing methods (e.g., US EPA)
- Experience with waste management and traffic management plans
- Outstanding analytical abilities and problem-solving skills
- Excellent knowledge in national environmental legislation and
- WB Environmental & Social Standards
- Experience in national and regional projects related to Civil works would be advantageous
- Experience in national and regional projects related to electric works would be advantageous
- Strong analytical, planning and project management skills.
- Good spoken and written English language skills is required.

Social and Gender Development **Specialist**

- A professional with Post Graduate Degree in social sciences or a related field
- 5+ years of experience as social development specialist
- Related experience in infrastructure projects.
- Have good supervisory and management skills.
- Problem solving and decision making
- The specialist should be experienced in monitoring, and evaluation.
- The specialist should have the ability to comply with grievance mechanism system including reporting and documenting any grievances
- The specialist should have a good experience in labor management plans
- Good knowledge in national environmental legislation and WB Environmental & Social standards
- Good spoken and written English language skills is required.

Health and **S**afety specialist

- Minimum bachelor's degree in engineering
- A safety procedures certificate, OSHA certification
- 8 years of experience as a health and safety specialist/officer
- Related experience in infrastructure projects.
- Should have significant experience in developing and complying with labor management plan including provision of HSE training, emergency preparedness and response plan for all phases of the project under their control
- Have the ability of recording and documentation of complaint, create a risk assessment (Qualitative/Quantitative)
- Good knowledge in national environmental legislation and WB Environmental & Social standards
- Must have good Project management skills
- Proven experience in appraising and supervising projects;
- Excellent verbal and writing communication skills
- Good spoken and written English language skills is required.













9.109.9 Appendix I: Capacity Building Report

Capacity Building Report

Technical Capacity Building and Training Needs and Procurement Package













Glossary

| Acronym | Term | Term (Arabic) |
|---------|---|--|
| ВС | Black Carbon | الكربون الأسود |
| BMS | Battery Management Systems | أنظمة إدارة البطاريات |
| CTA | Cairo Transport Authority | هيئة النقل العام بالقاهرة |
| EEAA | Egyptian Environmental Affairs Agency | الجهاز القومي لشؤون البيئة |
| ENIT | Egyptian National Institute for Transport | المعهد الوطني للنقل |
| EPR | Extended Producer Responsibility | مسؤولية المنتج الموسعة |
| FMVSS | Federal Motor Vehicle Safety Standards | معايير السلامة للمركبات الفيدرالية الأمريكية |
| GCCC | Greater Cairo Climate Change | المشروع |
| GHG | Greenhouse Gas | غازات الاحتباس الحراري |
| GIZ | Deutsche Gesellschaft für Internationale Zusammenarbeit | الوكالة الألمانية للتعاون الدولي |
| GoE | Government of Egypt | الحكومة المصرية |
| GTR | Global Technical Regulation | اللائحة الفنية العالمية |
| ISO | International Organization for Standardization | المنظمة الدولية للمعايير |
| ITDP | Institute for Transportation and Development Policy | معهد سياسات التنمية والنقل |
| KPI | Key Performance Indicators | مؤشرات الأداء الرئيسية |
| MoE | Ministry of Environment | وزارة البيئة المصرية |
| MoMP | Ministry of ManPower | وزارة القوى العاملة |
| OEM | Original Equipment Manufacturer | الشركة المصنعة للمعدات الأصلية |
| PIU | Project Implementation Unit | وحدة تنفيذ المشروع |
| SOP | Standard Operating Procedures | الإجراءات التشغيلية القياسية |
| TOR | Terms of Reference | شروط المشروع |
| TUMI | Transformative Urban Mobility Initiative | مبادرة التحول في الحركية الحضرية |
| UITP | International Association of Public Transport | الرابطة الدولية للنقل العام |













Introduction

Background and Context

The Cairo Transport Authority (CTA), in partnership with the Egyptian Environmental Affairs Agency (EEAA), is to introduce electric buses into its fleet. This is a key initiative of the Government of Egypt (GoE) within the wider air pollution management and climate change project in Greater Cairo, supported by the World Bank.

The project aims to mitigate air pollution and climate change issues in the Cairo metropolitan area by focusing on reducing vehicle emissions. The project aligns with the Egyptian Ministry of Environment's electromobility strategy, which prioritizes high-usage and high-occupancy vehicles to maximize emission reduction benefits.

Electric buses are seen as an ideal solution for public transport due to their significant emission reduction potential and energy efficiency.

Capacity Building Objectives

The primary goal of the capacity building program is to equip CTA and EEAA personnel with the necessary skills and knowledge to successfully implement, manage, and sustain the e-bus project. Objectives include enhancing understanding of e-bus technologies, operational and maintenance practices, environmental and social considerations, and ensuring alignment with global best practices in e-bus deployment, management and eventual safe e-bus battery disposal.

Structure of the Report

This report summarizes the capacity training needs and procurement package to procure the capacity training program. It is organized as follows:

- Chapter 2, Capacity Building Framework: the scope of training program development, integration with other project components, and the overall approach to capacity building.
- Chapter 3, Capacity Training Needs Assessment, presents the methodology for assessing capacity training needs, detailing specific requirements for CTA management, staff, and EEAA's social, gender, and environmental capacities.
- Chapter 4, Training Program, offers an overview of the training modules proposed, covering managerial practices, public transport planning, operational efficiency, e-bus operations, maintenance and disaster response, e-Bus Battery Disposal/Recycling, gender sensitivity training and environmental training.
- Chapter 5, Implementation of Capacity Building & Training Program, covers the training logistics, participant selection, delivery methods, and stakeholder coordination, as well as long-term strategies and recommendations for continuous learning and development.
- Chapter 7, Appendices, provides additional resources including profiles of training institutes and instructors, sample training request Terms of Reference (TORs) and the project TORs.

Capacity Building Framework

Scope of Training Program Development

This report will develop a capacity building framework, identifying and designing essential training programs for CTA staff, focusing on e-bus maintenance, operation, disaster response, and gender sensitivity. It will pinpoint training needs, propose appropriate training entities, and align training content with project specifications.

This report – and by extension the project – will not manage the actual delivery of "dedicated training courses", which falls outside the project scope.

Instead, the consultant will facilitate the procurement of these trainings through future contracts or specialized entities, ensuring EEAA/CTA personnel's active engagement in project discussions and reviews for continuous capacity development.













Integration with Other Project Components

The Capacity Building Support integrates with other project components to ensure comprehensive project success. This integration occurs through specific alignments:

- Technical Specifications and Operational Planning (Tasks 2-4): Training programs will consider the service and operational plan proposed (Task 2); the e-bus specifications and associated maintenance protocols (Task 3) and the e-bus depot retrofitting works specified (Task 4). This ensures that CTA management and staff receive relevant training for managing and maintaining the e-bus implementation and operation effectively.
- Environmental and Social Impact Assessments (Task 6): The framework includes training on environmental management and social inclusivity, directly supporting the findings and recommendations from the environmental and social impact assessments. This ensures compliance with the World Bank's Environmental and Social Framework (ESF).
- **Procurement Processes (Task 7)**: The identification of training needs influences the procurement strategy, requiring vendors and contractors to meet technical and operational standards, including the provision of necessary training for CTA staff, on both operational and maintenance aspects.
- **Project Implementation and Supervision (Task 9)**: The capacity-building efforts facilitate effective project oversight, contributing to the successful implementation and operation of the e-bus initiative.

Approach to Capacity Building

The approach to capacity building for the e-bus project in Cairo builds on core insights from the best practice literature on capacity development and is in alignment with the "Capacity Building in Sustainable Urban Mobility for Low Income Countries" project report by Transport for Cairo (TfC)³⁰.

This multi-step approach encompasses individual, organizational, and societal levels, tailored to enhance technical skills, institutional settings, and societal framework conditions for e-bus deployment. It encompasses five steps: Define capacity, Coordinate with project components, engage stakeholders, build capacity and monitoring & evaluation. Below a more detailed explanation of all parts:

- 1. **Defining Capacity**: Drawing on global definitions, capacity is the ability of individuals, organizations, and society to achieve sustainable development outcomes.
- 2. **Project Component Coordination**: The proposed training will be closely coordinated with other project components (see 00) with technical, operational, environmental, and procurement considerations included in training design.
- 3. **Stakeholder Engagement**: Involvement of CTA and EEAA stakeholders guarantees that capacity building is reflective of and responsive to the needs of all project beneficiaries.
- 4. Multi-Level Capacity Building:
 - a. At the **individual level**, the focus is on enhancing the technical knowledge, skills and competencies of CTA staff for e-bus operation, maintenance, disaster response for CTA drivers and maintenance workers. A secondary focus would be on enhancing Gender Sensitivity and Women's Safety for CTA and EEAA team members.
 - b. The **organizational level** aims to expand the CTA management organization capacity by embedding/establishing internal processes, systems and new job profiles that facilitate effective Public Transport Planning and Operations, Managerial Good Practices in Public Transport operations, as well as e-Bus Battery Disposal/Recycling

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³⁰ Farida MOAWAD & Ghada ABDUL AZIZ. Capacity Building in Sustainable Urban Mobility for Low Income Countries "Research on Demand and Success Factors for Future Supply". Forthcoming (2024) as part of the High-Volume Transport Applied Research Programme.













- c. On the **societal level**, the focus is on increasing the acceptance of the e-Bus technology.
- 5. **Monitoring and Evaluation (M&E)**: A rigorous M&E framework supports the ongoing evaluation of training programs, aligning with project goals and identifying areas for enhancement.

Training Institutes, Instructors, Sources & Materials

To ensure a successful capacity-building initiative, a strategic selection of both internal and external resources is necessary:

- Internal Sources: Capitalize on in-house training department of the CTA to develop and deliver tailored training sessions. The CTA historically utilized three training centers under the Training Central Department until 2021. In 2024, it was restructured to a normal department level, now managed under Administrative Affairs. The responsible manager (مدير الخطة التخطيطية للتدريب) is responsible to create an Annual Training Plan (الخطة التخطيطية للتدريب), which includes the number of trainings, trainees, and topics. As per legal requirements, it is required to be presented annually for approval (اعتماد) by the Ministry of Manpower, ensuring compliance and security clearance to proceed. The CTA maintains three internal training centers:
 - o **Front-line Staff Training Center (مركز تدريب الحركة)** Focuses on training bus drivers (typically a 1.5-month training period for drivers, ترقية السانقين الدرجات) and fare collectors, who manage daily front-line operations.
 - o **Technical Training Center (مركز التدريب الفني)** Provides specialized training for technicians in fields such as Heating, Ventilation, and Air Conditioning (HVAC) maintenance, metallurgy, bodyworks, wordsmithing etc.
 - o Cultural Training Center (مركز التدريب الثقافي) Offers a variety of training including procurement processes (3-day session on procurement, tenders, offers, and negotiations), public engagement (دورة السلوك), cultural norms (دورة السلوك) and medical training (3 days covering first aid and basic medical awareness, conducted by CTA medical staff).
- **External Sources:** To broaden the scope and depth of training, engaging with a variety of external providers is beneficial:
 - o Historical: there was a budget باب الميزانية للتدريبات الخارجية
 - o **Academic Institutions:** Universities and research centers.
 - Professional Centers: Training centers that provide specialized, skill-based training.
 - Consultants and Think-Tanks: Organizations that offer expert and practitioner level knowledge sharing on sustainable transport.
 - Associations: UITP, UIC, ICLEI, and others grant access to an extensive range of global training programs. (Note: All Acronyms are in the glossary and in section 0).
 - International Agencies and Global Initiatives: UN-Habitat, the World Bank, GIZ, the TUMI or MYC initiatives and other agencies support comprehensive, development-oriented training efforts.

Trainings can be provided in-person on site in Egypt, abroad during pre-scheduled training sessions, or online through dedicated calls and workshops, or through virtual classroom style webinars.

Case Study: CNG Technology Deployment and Staff Training

The Compressed Natural Gas (CNG) deployment within CTA in the 1990's is an example of training CTA frontline workers and office staff across departments in the adoption and operation of a new technology. Training courses were specifically designed for various roles: Drivers received three days













of training, while payment attendants underwent a one-day safety training focused on dealing with potential gas leaks. Engineers, technicians, and depot managers also received comprehensive on-the-job training.

This training initiative was led by the Original Equipment Manufacturer (OEM) supplying the CNG buses, and were facilitated within CTA's own depots or training centers.

Capacity Building & Training Needs Assessment

Methodology for Assessing Capacity Building & Training Needs Following up on the D1-2 Gap Analysis

A comprehensive Gap Analysis is essential for understanding the current state of the Cairo Transport Authority's (CTA) Transport Information System (TIS) and determining the necessary steps towards achieving the envisioned state as outlined in the E-Bus Demo Project GCCC report and the Deliverable D1-2 Specifications of Computer & Software requirements #1 (SST-T01-000-RPT-002). This analysis aims to define capacity across the following levels, aligning with our structured approach to capacity building.

- 1. **People**: Total headcount, headcount by team, an updated organization chart, and a mapping of working relationships.
- 2. **Procedures and Business Processes:** The operations of CTA that dictate the use of software and hardware.
- 3. **Software and Hardware**: Current technologies utilized by CTA, including local area networks and internet access.
- 4. **Data and Access Rights**: Available data to CTA and the access rights for different users within the organization.
 - . الأشخاص: إجمالي عدد الموظفين، وعدد الموظفين حسب الادارة، الهيكل التنظيمي للوظائف الهيئة، والوصف الوظيفي.
 - ب. اللوائح التنظيمية والإجراءات: الكتيب الذي يملى عمليات والإجراءات واللوائح التنظيمية.
- ت. العهدة والمعدات: الأتوبيسات والمكينات، لتقنيات الحالية التي تستخدمها الهيئة، بما في ذلك شبكات المنطقة المحلية والوصول الي الانترنت.
- ث. البياتات وحُقوق الوصول: البيانات المتاحة للإدارات المختلفة بالهيئة وحقوق الوصول لمختلف المستخدمين داخل المؤسسة.

Figure 9-6 Translation of Capacity Building Framework into Arabic

Stakeholder Engagement for Capacity Building & Training Needs.

Engagement with project stakeholders, particularly CTA and the Egyptian Environmental Affairs Agency (EEAA), is crucial for a comprehensive needs assessment. This engagement will occur through two main avenues:

- Structured Survey: A survey designed by the consultant to collect structured data from CTA. This will facilitate an organized collection of specific information related to the training needs.
- 2. **Unstructured Open Discussion**: To capture the broad spectrum of training needs and interests, open discussions with CTA and EEAA will be conducted. This approach allows for the exploration of nuanced training requirements beyond the structured survey data.

The combination of the Gap (& Needs) analysis with the stakeholder engagement will guide the development of a tailored training program, address both the immediate and long-term capacity building requirements of the CTA and ensuring alignment with the overarching goals of the E-Bus project.

Identified Capacity Building & Training Needs
Environmental and Social Impact Assessment (ESIA) needs













The Environmental and Social Impact Assessment (ESIA) report D6-2 identified several training needs for the Cairo Transport Authority (CTA) staff to enhance technical and non-technical capacities:

- 1. **Technical Training Needs**: D6-2 recognized a need for enhanced technical training for engineers, technicians, and drivers, specifically at the Al-Ameriyah Depot. This includes proper handling of raw materials, minimization of waste, and adherence to Material Safety Data Sheets (MSDSs) for hazardous materials. Additionally, there is an emphasis on the safe and correct use of equipment, machinery, and vehicles, alongside basic emergency procedures, first aid, and special hazard training specific to job roles amidst the transition to Electric Buses.
- 2. **Non-Technical Training Needs**: D6-2 highlighted a deficiency in non-technical training, particularly concerning gender issues and accommodating passengers with limited mobility.
- 3. **Workplace Safety and Health**: Training programs are proposed to prepare workers to recognize and respond to workplace hazards. These programs should include hazard identification, materials handling and storage procedures, and training on the importance of wearing personal protective equipment (PPE).
- 4. **Grievance Management Training**: Training for staff involved in the grievance mechanism is critical. This includes skills in conducting receipt, registration, referral processes, service provision, quality control, monitoring, and record-keeping, as well as training in conflict resolution and grievance management.

This is based on regular consultation meetings with CTA staff, including monthly progress meetings and additional interval meetings or garage site visits conducted to discuss depot selection, layout, capacity assessments, and other exchanged views. Those meetings involved CTA central staff, GCCC staff, EEAA representatives, and occasionally the World Bank team. They serve to follow up on data collection, communicate additional data needs, arrange site visits, discuss inquiries for analysis, and track deliverables.

CTA Management

The Cairo Transport Authority (CTA) currently exhibits an over-reliance on the technical assurances provided by the Original Equipment Manufacturers (OEMs) supplying the electric buses. This approach aims to transition from diesel to electric buses with insufficient regard for the significant technological distinctions, potential risks, and the full spectrum of benefits that electric buses entail.

While the technical specifications set forth will indeed tailor the requirements specific to CTA's operational needs, and while OEMs will bear responsibility under the terms of the provided warranties, it is imperative for CTA to deepen its understanding of the electric bus technology. The organization must proactively engage in broadening its operational perspective to fully embrace and adapt to the intricacies and advantages of this new technology.

CTA's approach must transcend mere technical compliance, evolving towards a comprehensive operational mindset that aligns with the advanced capabilities and environmental benefits of electric buses. This shift requires an active educational and training initiative within CTA to cultivate a workforce that is not only technically proficient but also strategically prepared to leverage the technological advancements for enhanced service efficiency and sustainability.

Operational planning and utilization of the new electric buses to fully capitalize on their capabilities. There is a critical need for heightened awareness regarding potential hazards associated with electric buses, even if such risks are considered low probability. As the operator, CTA bears direct responsibility for effectively managing these risks, which encompasses a spectrum of operational challenges from battery charging practices to disaster management and responses to extreme weather events.

The training and operational protocols must therefore include comprehensive guidelines on battery management, emphasizing best practices in charging and maintenance that maximize efficiency and safety. Additionally, robust disaster management training tailored to the specific risks of electric buses, such as thermal runaway and electrical fires, is essential. This training should also extend to developing













effective strategies for operating under adverse weather conditions, ensuring that both drivers and operational staff are prepared to handle emergencies and maintain service continuity. These measures are crucial not only for safeguarding passenger and staff safety but also for ensuring the reliability and sustainability of the electric bus fleet.

Training Program Development

Overview of Training Modules

Managerial Good Practices

The target stakeholders for the Managerial Good Practices training are the CTA Management Team at the Corporate Level, including القيادات العليا/الممتازة (senior/executive leadership), رؤساء الإدارات المركزية (General Managers of Depots), مديري (General Managers of Depots), مديري (General Managers of Depots), مديري إدارة الحركة (Operations Managers) and who are responsible for the strategic planning and operational oversight of public transport services within the Greater Cairo Region (GCR). This includes members of the CTA Board: CEO, الشؤون الإدارية (Administrative Affairs), and الشؤون الإدارية (Technical Affairs). The objective is to deepen their understanding of global mobility trends and their implications for public transport (such as Electric Bus Adoption, Digitalization and Network Re-organizations), and to master integrated strategies for sustainable urban mobility.

The **curriculum** should include integration of public transport with urban planning, financial management, and operational best practices. It should cover transport economics, strategies for sustainable funding, and operational efficiencies through innovative technologies in bus systems.

By the **end of the training**, participants should develop skills to think holistically of CTA services within the comprehensive urban mobility system of Greater Cairo Region (GCR), gain knowledge of financial and operational strategies to enhance the viability of CTA operations, and learn about the latest transport technologies (across Depots, Vehicles and Operational Management) to improve service delivery and operational efficiency.

Public Transport Planning and Operations

The **target stakeholder** for the training module "Public Transport Planning and Operations" is the Operations Team (5) at the CTA central department, particularly those within شؤون الحركة (Movement Affairs), responsible for route design, scheduling and dispatch. The **learning objectives** focus on enhancing the team's capabilities to integrate electric buses into the existing network, involving strategic route adjustments and timetable optimizations to accommodate the operational characteristics of electric buses, and optimize their use.

The **curriculum** should include methodologies for efficient data collection, management and use for network planning (incl. Geographic Information Systems (GIS)), principles of network design tailored for electric bus operations, and integrating with other modes, and the development of robust route planning strategies that support electric bus deployment. Special emphasis would be placed on the infrastructural needs of electric buses, such as charging strategy, charging times and maintenance facilities.

By the **end of the training**, participants would have the skills to seamlessly integrate electric buses into the CTA's fleet, ensuring operational efficiency and sustainability. They would be equipped to manage changes in network design and operations, enhancing the CTA's capacity to scale up from the current 70 E-Buses sourced from Sharm El-Sheikh and this project towards a fully electric operation in the longer-term.

Operational Efficiency and Service Quality

The target stakeholder for the "Operational Efficiency and Service Quality" module are the

• (4) (4a) Depot Managers, managing the engineers responsible for (b) charging and (c) maintaining the buses, as well as (d) associated technicians reporting to the شــوون الحركة (Movement Affairs).













- Street level Operations (located in public-access Stations and Stops) including (5a) Route Managers'31 managing³² (5b) station level dispatch foremen ناظر المحطة and (5c) customer service team members, مكاتب خدمة المواطنين responsible for interacting with customers, addressing customer complaints, and providing information about bus routes, schedules, and services.
- (7a) Bus Drivers and (7b) Fare Collectors, who operate the buses and interact with the public.

This **training** aims to enhance their knowledge and understanding of service excellence and quality management, emphasizing the importance of maintaining high service standards in public transport.

The **curriculum** would cover key strategies for implementing an effective quality management system, referring to successful global examples such as the EN 13816 European quality standard for public passenger transport services. It would also explore the impact of Electric Buses on improving service quality, as well as other digitalization technologies such as real-time tracking, digital payments and automated scheduling systems.

By the **end of the training**, participants should be able to apply these concepts to elevate the CTA's service delivery. They would gain skills to leverage technology for enhanced operational efficiency and quality, ensuring that CTA services meet international standards and consistently satisfy passenger expectations.

Maintenance of E-Buses and Associated Technologies

The **target stakeholder** for this module is the Fleet and Depot Asset Management Team (4) at the Cairo Transport Authority (CTA), which is responsible for the maintenance and technological upkeep of electric buses. This **training aims** to enhance their capabilities in managing the advanced technological aspects of electric buses, focusing particularly on the maintenance practices and charging technologies that support operational efficiency.

The **curriculum** would cover new electric bus technologies, battery technologies, use of Battery Management Systems (BMS), battery management and diagnostics. It would also cover effective maintenance strategies for bus, battery and charging infrastructures. Participants would engage with case studies on global best practices and explore different charging technologies and their impacts on bus operations.

By the **conclusion of this program**, the team should have a deep understanding of managing the unique requirements of electric buses within the CTA fleet. They will learn about setting up and optimizing charging infrastructure, implementing routine and preventive maintenance schedules tailored for electric buses, and applying best practices from global examples. Particular focus should be given distinguishing what CTA should maintain in-house vs. what maintenance should remain with the OEM suppliers. This distinction should be clarified by the CTA prior to launching the E-Bus Tender Documents.

E-Bus Battery Disposal/Recycling

The **target stakeholders** for this training are the Management Team (I), the Safety and Compliance Team (3) and the Fleet and Depot Asset Management Team (4) of the CTA, responsible for strategic oversight, regulatory compliance of bus operations across all levels. Additionally, teams from the Egyptian Environmental Affairs Agency (EEAA) and the Ministry of Environment (MoE) should be included to align environmental strategies and regulatory frameworks.

The curriculum should focus on the lifecycle management of e-bus batteries, emphasizing the environmental impacts of improper disposal, and the three end-of-life pathways: second-life use, recycling or disposal. Participants would explore battery repurposing for applications like renewable energy storage, and the role of Extended Producer Responsibility (EPR) in ensuring manufacturers contribute to the environmentally responsible management of end-of-life batteries. The training would also cover emerging Battery Passport programmes and their inclusion in CTA

-

³¹ Does not currently exist as a role within CTA.

³² Does not currently exist as a role within CTA













operations, which facilitates the traceability and transparency of batteries through standardized labeling. Furthermore, the costs of battery disassembly, packaging, transportation, and testing—key components in the total cost of ownership calculations, would be learnt.

By the **conclusion** of the program, attendees would be proficient in developing and implementing protocols that support environmental compliance and promote responsible battery lifecycle management in line with CTA's operational standards and national environmental policies

Disaster Response and Post-Disaster Service Restoration

The training would be aimed at the

- Cairo Transport Authority (CTA) Management Team (1) and Safety and Compliance Team (3); specifically, the إدارة الحوادث (Accident Management), النجدة المركزية وشبكة اللاسلكي (Movement Affairs) and Drivers and Depot Technicians involved in the Pilot project.
- The Egyptian Environmental Affairs Agency (EEAA), Ministry of Environment (MoE), and
- Local emergency services including Egypt Fire Protection (EFP), Traffic Engineering Bureau (TEB), and Traffic Police (TP) under the Ministry of Interior (MoI).

This **program should equip** stakeholders with robust practices for disaster response and post-disaster service restoration in public transport systems, particularly addressing emergencies involving electric vehicles and potential battery fires and risks to first responders. It would emphasize safety risks like electric shock, thermal runaway, and battery fires.

The **curriculum** would cover the utilization of ISO 17840 standards for labeling and information dissemination to first responders, enhancing intervention efficiency in emergencies involving electric buses. It will also integrate practices from FMVSS 305 regulations concerning electrolyte spillage and electrical shock protection, and the latest global technical regulations (GTR 20) on electric vehicle safety post-crash. Trainees should learn to identify and mitigate hazards to reduce risks to emergency responders and the public.

Participants would **gain proficiency** in using ISO 17840 symbols and rescue sheets, and how to use emergency response guides that detail vehicle construction and critical intervention points. By training's end, stakeholders would be capable of implementing rapid safety assessments and coordinating with emergency services to ensure quick road closures, concerned bus isolation, safe transportation and fire management, and eventual road re-opening and restoration of public transport operations while maintaining safety and compliance with international standards.

Vulnerable Users' Safety

The **training program** for CTAs Management Team (I), Safety and Compliance Team (3) and (7a) Bus Drivers and (7b) Fare Collectors, who operate the buses and interact with the public, aims to enhance sensitivity and safety for women as well for other vulnerable users such as disabled, seniors, and children, both as employees and passengers within Cairo's public transport systems. The **objective** is to foster an inclusive environment that reflects the diversity of its user base, where over half of the passengers are women, and encourage more women to join the transport sector.

The **curriculum** covers the importance of diversity in public transport, development of HR policies that support gender balance, and the creation of a public transport environment that ensures safety and accommodates the needs of all passengers, particularly women as well as other vulnerable users. It also includes best practices for inclusive communication, conflict identification and management, behavioral change for passengers and gender safety advocacy. By the **end of the program**, participants are expected to implement and communicate policies effectively, enhancing the safety and inclusivity of Cairo's public transport, thereby increasing women's participation and satisfaction as both employees and passengers.

Environmental Training

The Environmental Training program for the CTA's Management Team (I), Safety and Compliance Team (3), مديري الإدارة الهندسية (General Managers of Depots), مديري الإدارة الجراجات بالهيئة (Technical units Managers) مديري إدارة الحركة (Operations Managers) is tailored to enhance their capabilities in













mitigating environmental impacts associated with public transportation. The **training focuses** on understanding, measuring and reducing greenhouse gas (GHG) and black carbon emissions, and linking them to air quality and public health in Cairo as well as to climate change.

Participants **would learn** about calculating GHG and black carbon (BC) emissions, what they represent, how to measure them, their impacts, how the EEAA and the consultant team estimated them etc. The course would serve as a foundation for assessing the benefits of transitioning to electric buses, and gaining wider buy-in into the necessity of the full fleet electrification. The training would also cover the impact of these emissions on air quality and the broader environmental conditions affecting Cairo and its residents.

By the end, CTA team members **ought to be capable** to collaborate with consultants in implementing advanced monitoring techniques and using the data collected to improve reporting on environmental impacts.

Selection of Training Institutes and Instructors

The below Table 9-7 showcases a collection of formal organizations that provide trainings of relevance to the CTA.

Table 9-7: Overview of key organizations in sustainable urban mobility training and development

| Category | organizations in sustainable urban mobility training Name | Short Description |
|-----------------------------|---|--|
| Academic Institutions | Centre of Mobility Research (CMOR), Ain Shams University | A research center focusing on innovative urban mobility solutions. |
| Professional Centers | Egyptian National Institute for Transport (ENIT) Central Agency for Public Mobilisation and Statistics (CAPMAS) Egyptian Tax Authority (ETA) | CAPMAS providing ond ata aggregation Tax Authority to explain new VAT, e-Invoicing, for specialists. Other service providers for language training and other professional services training. |
| Consultants and Think-Tanks | Institute for Transportation and Development Policy (ITDP) | Provides technical expertise and policy advice on sustainable transport. |
| Associations | International Association of Public Transport (UITP) | Global network offering extensive training and knowledge exchange on public transport. |
| Global Initiatives | Transformative Urban Mobility Initiative (TUMI) E-Bus Initiative | Accelerates the implementation of sustainable urban mobility solutions worldwide. |
| External Courses | | |
| OEM Suppliers | MCV, Scania-Alnasr, Mercedes, IVECO-Volvo provided by GB, Man- | Bud Manufacturers to provide trainings for Engineers and Technicians as part of contracts |

Training Materials and Resources

Table 9-8: Matching Training Module Categories with UITP Training Programs

| Training Module Category | UITP Training Program |
|---------------------------|---|
| Managerial Good Practices | Diploma Programme For Pt Managers (Module 1) - 24 > 25 Jun, New Jersey |
| | II. Diploma Programme for Pt Managers (Module 2)23>25sep, Mälmo, Sweden |















| | III. Diploma Programme for Pt Managers (Module 2)I 1 13 nov, Hoing Kong, ChinaIV. Public Transport Fundamentals (Online 16>30 Apr) |
|---|--|
| Public Transport Planning and Operations | V. Bus Network Planning - Early Sep, Barcelona VI. Zero Emissions Buses: Planning & Operations (01>03 Jul, Sydney) VII. Zero Emissions Buses: (16>18 Sept, Toronto) |
| Operational Efficiency and Service Quality | VIII. Quality And Service Excellence - 17 > 19 Sep, online |
| Maintenance of e-Buses and Associated Technologies | IX. Electric Bus Operations & Maintenance (Spanish) - 24 > 26 Sep, Madrid X. Electric Bus 13 > 15 Nov, San Francisco) XI. Electric Bus Week 18 > 22 Nov (Shenzen) |
| e-Bus Battery Disposal/Recycling | XII. No Direct Match |
| Disaster Response and Post-Disaster Service Restoration | XIII. Resiliency & Emergency Preparedness for Rail & Bus for North America - 14 > 16 Oct, New Jersey |
| Gender Sensitivity and Women's Safety | XIV. <u>Diversity And Inclusion In Pt</u> - 17 > 19 Jun, Singapore & 27 > 28 Jun, Sydney |
| Environmental Training | XV. SUSTAINABILITY IN PUBLIC TRANSPORT (Spanish) - 23 SEP > 01 OCT, online |

Implementation of Capacity Building Initiatives & Training Program Training Logistics

To provide trainings to the Cairo Transport Authority (CTA), the Greater Cairo Climate Change (GCCC) Project Implementation Unit (PIU) has two viable procurement options:

- I. integrating training services into future Bus/Depot Contracts, leveraging existing contractual frameworks to ensure training delivery in parallel with E-Bus Implementation, or
- II. engaging specialized entities independently to focus purely on staff training needs.

We propose GCCC to consider hiring individual, Arabic-speaking trainers to deliver these programs directly in Egypt, onsite at the CTA. This approach would tailor the training to CTA's specific operational context and current baseline knowledge levels as well as overcome language barriers.

For effective implementation, the GCCC should establish clear criteria for participant selection through the CTA, and enrollment to align training with individual roles and responsibilities. The **Error! Reference source not found.** should help with this.

Delivery methods should focus on workshops and hands-on sessions, while avoiding digital learning. Coordination with key stakeholders, including department heads and external partners, is crucial to align training objectives with operational goals and to facilitate seamless integration of new skills and knowledge into daily operations. An external coordinator is recommended to manage this role.

Long-term Capacity Building

For the Cairo Transport Authority (CTA) to build its capacity to reach levels similar to successful global models, it needs to enhance investments, reconfigure its routes, operations and organizational mission.

• **Enhanced Investment:** CTA needs to significantly boost funding for upgrading its buses, all the way to eventually 100% electric fleet. However, this requires securing increased budgets













and financial commitments which the current structure may struggle to accommodate without external support or policy changes. The Governorate could support in developing dedicated bus lanes, and improving passenger facilities such as shelters and signage

- Route Reconfiguration: Streamlining and optimizing bus routes to enhance coverage and
 optimize for E-Bus operations will be necessary beyond the pilot. This task demands
 sophisticated data-driven planning tools and expertise that may exceed the current capabilities
 within CTA, pointing to a need for new specialized hires or in-house qualification building.
- Performance Accountability: Establishing strict performance metrics and consistent evaluation of service delivery through measuring Key-Performance-Indicators can drive improvements. This shift would necessitate the development of new monitoring processes and roles, and a cultural shift towards greater data-driven tracking, reporting and decision making.
- Focus on Customer Service: Elevating the customer experience by improving accessibility, safety, and comfort would see CTA need to adopt new technologies that may require fresh IT infrastructure and skilled IT personnel that are currently lacking.

The CTA must refine its long-term capacity building strategy with the ultimate goal of transitioning to a fully electric fleet. This would entail enhancing public relations to highlight the economic and service benefits of an electric fleet, to secure greater public investment; strengthening interagency coordination with entities like the Governorate to improve infrastructure (Stops, Dedicated lanes); enhance bankability through more effective financial management, innovation and de-risking.

Such transformations in CTA's organizational structure go beyond immediate trainings and involve the introduction of new skills, roles, and more dynamic operational processes. They would fundamentally reshape CTA's capabilities, aligning them closer to global public transport operational excellence levels.













9.119.10 Appendix J: Indicative checklist to guide field monitoring (to be used by TIU)













| Code | Field monitoring of implementation of ESMP | Compliance/ Non- compliance | Corrective actions | Comment s |
|---|--|-----------------------------------|--------------------|-------------|
| AQI | Air Quality – Dust and gaseous emissions | | | |
| emiss Is the Are a perm done Is all i Are t yes, a comp plann Are a contr | here any visible sources of uncontrolled sions? Fre an emissions control plan? Fir quality measurements compliant with issible levels and have measurements been according to standards (e.g., US EPA)? Fre machinery deployed to the field up to code? Here internal and/or external complaints? If the internal and documentation of plaint and response measures taken and led to prevent future occurrences? Forementioned elements reported in the factor's monthly ES progress report? Forement specialists? | | | |
| NVI | Noise and vibration | | | |
| unned runni Are a weari Are n with p Are t yes, a comp plann Are a vibrat minin | here any sources of uncontrolled and/or cessary noise and vibration (e.g., machinery ng when not needed etc.)? Ill workers onsite operating machinery ng appropriate noise reduction PPE? Toise and vibration measurements compliant permissible levels? here internal and/or external complaints? If the internal and/or external complaints? If the internal and documentation of plaint and response measures taken and the internal maintenance records up to date? Extivities generating high levels of noise and the internal duration (where possible)? If orementioned elements reported in the factor's monthly ES progress report? | | | |
| by h ls th ls m acco Are yes, com plan | there visual disturbances to the topsoil caused eavy machinery? ere a soil decontamination plan referenced in ESMP developed and implemented for the site? nachinery used up to code and maintenance ording to schedule? there internal and/or external complaints? If are there records and documentation of plaint and response measures taken and ned to prevent future occurrences? | | | |
| RpI | Resource efficiency and pollution prevention: management | energy, water, | raw materials | , and waste |
| impl | all plans referenced in the ESMP developed and emented? Plans: waste management plan, urces (energy, water, etc.) management plan | | | |













| Code | Field monitoring of implementation of ESMP | Compliance/ Non- compliance | Corrective actions | Comment s |
|---|--|-----------------------------------|--------------------|-----------|
| eme • Have exist EDC obta • Are • Is th hous • Are mair • Are NHRI • Is w inter • Are • Is th | there leaks and sources of soil contamination? Natural disasters risks York avoided during extreme hot weather, use storms and heavy rains? there reported incidents of heat related stress? there an ERP developed and approved and municated to workers? | | | |
| weat | quipment properly stored during extreme ther events (shielded from heat and wet ditions)? | | | |
| OHSI | Occupational health and safety | | | |
| Is the Are clear Are LMP PCU Are accid prepaction Are clear boxe eman for s How site | workers wearing appropriate PPE? ere signage clearly posted in high danger areas? emergency numbers and meeting points rly visible? there logs/registers for training of workers on and OHS plan developed and approved by J? there reported incidents including severe dents? If yes, has an incident report been bared and incident investigated, and corrective on defined? workers covered by insurance? grievance channels and mechanism visually r and accessible to all workers (e.g., grievance es at the project site, specified phone number, ill, social media platform, and physical address submission of complaints? r many Job Hazard Analyses have been ducted for high-risk tasks this month? r many Toolbox Talks have been conducted on- this week, and what safety topics were ered? | | | |
| how • Are equi | w many permits to work have been issued, and many have been successfully closed this week? safety checklists being completed for pment and tools before the start of tasks? How y checklists were completed? | | | |













| Code Field monitoring of implementation of ESMP | Compliance/ Non- compliance | Corrective actions | Comment s |
|---|-----------------------------------|--------------------|-----------|
| What percentage of the workforce has completed safety induction training? Are there any workers who still need to undergo induction? Are welfare facilities such as restrooms, break areas, and first aid stations in good working condition and accessible to workers? Have there been any safety breaches on-site? If so, how many have been reported and resolved by the contractor? How many safety audits were conducted this month? Were any non-compliance issues identified during the audits? How many training sessions have been delivered this month, and which topics were covered? How many medical checkups and drug tests have been conducted for the workforce? Are there adequate safety signs and guidance posted throughout the worksite? How many OHS supervisors are present on-site, and are they adequately monitoring compliance? How many unsafe actions or conditions have been reported, and what corrective measures were implemented? | | | |
| CHSI Community health and safety | | | |
| Are workers trained on LMP, prevention of covid-19 or any other pandemic spread? Has a CHS plan been developed and approved by PCU? Are grievance mechanisms and channels disclosed to the community, i.e., proper disclosure of channels? Are there grievances/complaints reported? If yes, have complaints been investigated and addressed? Is the project site properly fenced and inaccessible to local surroundings? Have approvals for external works related to resources supply been obtained (EDC: to avoid resource insufficiency for surrounding community (electricity)? Civil defense authority: to prevent health and safety hazards and risks associated with fire by ensuring proper firefighting systems are in place and operational, i.e., sufficient firefighting equipment in place. Tiil Temporary labor influx | | | |
| 1 / | | | |
| No temporary labor influx is expected, as all construction laborers will be confined inside the depot during construction activities. Has the code of conduct been signed by the subcontractor, if any? | | | |













| Code | Field monitoring of implementation of ESMP | Compliance/ Non- compliance | Corrective actions | Comment s |
|---|--|-----------------------------------|--------------------|-----------|
| • Are adeq | e any incidents of COC violations or other been orted? external grievance mechanisms and channels quately disclosed and known to the surrounding munity? | | | |
| RCLI | Risks of child labor | | 1 | ' |
| proj | there any workers under 18 contracted by the ect? IDs diligently verified for all workers? | | | |
| GBVI | Risks of GBV | | | |
| for g Are incluanor Are adequates | workers trained on COC and GBV prevention? e COC signed by sub-contractor? there any GBV related incidents reported? If was reported to PCU and WB? | | | |
| CHI | Cultural heritage | | I | |
| • Are | workers informed on 'chance find procedure'? there any incidents reported? If yes, have vant authorities been contacted? | | | |
| COVI | ß | | | |
| PCU Are onsir at th no prov Have | covid-19 and communicable diseases agement plan been developed and approved by J? protective measures visibly implemented te, namely: body-temperature measurements ne entrance of the site, wearing of facemasks, gatherings or smoking in enclosed areas, vision of soap, water and disinfectants at the site e workers been trained on covid-19 prevention precautionary measures? | | | |













9.129.11 Appendix K: List of Registered Attendees in the public consultation

| جهة العمل | الوظيفة | |
|---------------------------------------|--|----|
| شركة مصر للبترول | مدير عام مساعد السلامة | 1 |
| وحدة تنسيق المشروع GCCC | اخصائي بيئي | 2 |
| وحدة تنسيق المشروع GCCC | مساعد تقني المشروع GCCC | 3 |
| شرکة MCV | | 4 |
| مواصلات مصر | نائب رئيس مجلس الإدارة | 5 |
| СТА | مدير إدارة التخطيط | 6 |
| LTRA | مهندس جهاز تنظيم النقل البري الداخلي والدولي | 7 |
| هيئة تخطيط مشروعات النقل | مهندسة مشروعات معمارية | 8 |
| World Bank | مهندسة مشروعات معمارية | 9 |
| شاكر | مدير قسم النقل | 10 |
| MCV | مدیر مبیعات | 11 |
| MCV | مدیر مبیعات | 12 |
| MCV | مشرف مبيعات | 13 |
| جهاز شئون البيئة | | 14 |
| MCV | مهندس MCV | 15 |
| الاتحاد الدولي لعمال النقل ITF | منسق | 16 |
| ccc | استشاري المشروع | 17 |
| ТРА | مهندس مشروعات | 18 |
| ТРА | مهندس تخطيط | 19 |
| جامعة القاهرة | انتجرال استشاري اجتماعي | 20 |
| وزارة البيئة | مدير إدارة مشروعات الفنية جهاز شئون البيئة | 21 |
| وزارة البيئة | | 22 |
| وزارة البيئة | مدير عام عادم السيارات | 23 |
| الاتحاد الدولي لعمال النقل ITF | مدیر مشروع ITF مصر | 24 |
| وزارة البيئة | | 25 |
| مشروع GCCC | أخصائي رصد وتقييم | 26 |
| الشركة العربية الأمريكية للسيارات AAV | مهندس | 27 |
| جامعة حلوان | خبير اجتماعي | 28 |
| وزارة البيئة | رئيس الإدارة المركزية لنوعية الهواء | 29 |
| World Bank | استشاري بيئي | 30 |
| مصر للبترول | مدير إدارة الصيانة | 31 |
| PCU | social specialist | 32 |
| هيئة تخطيط مشروعات النقل | مهندس تخطيط | 33 |
| ТРА | مهندسة مشروعات مدني | 34 |
| هيئة تخطيط مشروعات النقل | مهندس تخطيط | 35 |
| ТРА | مهندس مشروعات | 36 |
| ТРА | مهندس مدني | 37 |













| СТА | مدير مركز التدريب | 38 |
|---------------------|--------------------------|----|
| مواصلات مصر | BD Specialist | 39 |
| وزارة البيئة | استشاري جهاز شئون البيئة | 40 |
| Transport for Cairo | استشاري المشروع | 41 |
| Transport for Cairo | استشاري نظم معلومات | 42 |
| جهاز شئون البيئة | مدير عام المشروعات | 43 |
| وزارة النقل | مهندس تخطيط | 44 |
| Integral | أخصائي بيئي | 45 |
| Integral | أخصائي بيئي | 46 |













9.139.12 Appendix L: Surveys of the public consultation 9.149.13 Appendix M: Layout of the Depot

Appendices L& M could be found in the following link:

https://drive.google.com/drive/u/I/folders/IhAdrnsbj0xpGfobSCEUpm4pHn3sHxCLg













9.159.14 Appendix N: List of Male FGDs Participants

| # | Date | Area | English | Name | ٨٥٥ | Marital | Education | Occupation | Car | Grou |
|----|------------|----------|---------|-------|-----|---------|--------------------------------------|------------------------------------|----------|-------|
| | | | Name | IName | Age | status | | | | Р |
| I | 01/01/2024 | Al-Waili | | | 62 | Married | Bachelor of Social Work | Retired | No ne | Men |
| 2 | 01/01/2024 | Al-Wayli | | | 62 | Married | Commercial High School | Retired | No ne | Men |
| 3 | 01/01/2024 | Al-Wayli | | | 48 | Married | Illiterate | Shoemaker | No ne | Men |
| 4 | 01/01/2024 | Al-Wayli | | | 46 | Married | Industrial High School | Microbus Driver | No ne | Men |
| 5 | 01/01/2024 | Al-Wayli | | | 53 | Married | Commercial High School | Merchant/T rader | No ne | Men |
| 6 | 01/01/2024 | Al-Wayli | | | 48 | Married | Bachelor of Commerce | Administrati ve employee | No ne | Men |
| 7 | 01/01/2024 | Al-Wayli | | | 47 | Married | Middle Technical Institute | Administrati ve Employee | No ne | Men |
| 8 | 01/01/2024 | Al-Wayli | | | 45 | Married | Vocational Secondary Education | Worker | No ne | Men |
| 9 | 01/01/2024 | Al-Wayli | | | 39 | Married | Social work institute | Administrati ve employee | No ne | Youth |
| 10 | 01/01/2024 | Al-Wayli | | | 37 | Married | Commercial High School | Gas Station worker | No ne | Youth |
| П | 01/01/2024 | Al-Wayli | | | 35 | Single | Commercial High School | Tuk-tuk Driver | No ne | Youth |
| 12 | 01/01/2024 | Al-Wayli | | | 36 | Single | Illiterate | Mechanic | No ne | Youth |
| 13 | 01/01/2024 | Al-Wayli | | | 37 | Married | Commercial High School | Worker in a Bakery | No ne | Youth |
| 14 | 01/01/2024 | Al-Wayli | | | 28 | Single | Bachelor of Commerce | Administrati ve employee | No ne | Youth |
| 15 | 01/01/2024 | Al-Wayli | | | 30 | Single | Bachelor of Commerce | Accountant | No ne | Youth |
| 16 | 01/01/2024 | Al-Wayli | | | 27 | Single | Industrial High School | Air Conditionin g Technician | No ne | Youth |
| 17 | 01/03/2024 | Al-Daher | | | 44 | Married | Bachelor of Commerce | Accountant | No ne | Men |
| 18 | 01/03/2024 | Al-Daher | | | 40 | Married | Bachelor of Commerce | Accountant | No ne | Men |
| 19 | 01/03/2024 | Al-Daher | | | 39 | Married | Bachelor of Commerce | Accountant | No ne | Men |
| 20 | 01/03/2024 | Al-Daher | | | 38 | Married | Bachelor of Engineering | Engineer | No ne | Men |
| 21 | 01/03/2024 | Al-Daher | | | 50 | Married | Commercial High School | Administrati ve employee | No ne | Men |
| 22 | 01/03/2024 | Al-Daher | | | 36 | Married | Bachelor of Law | Storekeeper | No ne | Men |
| 23 | 01/03/2024 | Al-Daher | | | 42 | Married | Bachelor of Engineering | Engineer | No ne | Men |













| # | Date | Area | English Name | Name | Age | Marital status | Education | Occupation | Car | Grou P |
|----|------------|---------------------|-----------------|------|-----|----------------|--|-----------------------------|--------------------|-----------|
| 24 | 01/03/2024 | Al-Daher | | | 55 | Married | Industrial High School | Administrati ve employee | No ne | Men |
| 25 | 01/03/2024 | Al-Daher | | | 21 | Single | Bachelor of Commerce | Student | No ne | Youth |
| 26 | 01/03/2024 | Al-Daher | | | 21 | Single | Student at Middle Technical Institute | Student | No ne | Youth |
| 27 | 01/03/2024 | Al-Daher | | | 42 | Single | Bachelor of Agriculture | Agronomist | No ne | Youth |
| 28 | 01/03/2024 | Al-Daher | | | 26 | Single | Bachelor of Social Work | Administrati ve Employee | No ne | Youth |
| 29 | 01/03/2024 | Al-Daher | | | 19 | Single | Student at the Faculty of Arts | Student | No ne | Youth |
| 30 | 01/03/2024 | Al-Daher | | | 19 | Single | Student at the Faculty of Arts | Student | No ne | Youth |
| 31 | 01/03/2024 | Al-Daher | | | 28 | Single | Bachelor of Social Work | Customer Service | No ne | Youth |
| 32 | 01/03/2024 | Al-Daher | | | 31 | Married | Bachelor of Commerce | Salesman | No ne | Youth |
| 33 | 01/04/2024 | Hadayeq El-Qobba | | | 59 | Married | Associate Degree in Commerce | Administrati ve Employee | No ne | Men |
| 34 | 01/04/2024 | Hadayeq El-Qobba | | | 64 | Married | Middle School | Retired | No ne | Men |
| 35 | 01/04/2024 | Hadayeq El-Qobba | | | 57 | Married | Middle School | Worker | No ne | Men |
| 36 | 01/04/2024 | Hadayeq El-Qobba | - | | 59 | Married | Illiterate | Worker | No ne | Men |
| 37 | 01/04/2024 | Hadayeq El-Qobba | | | 48 | Married | Industrial High School | Assembling Technician | No ne | Men |
| 38 | 01/04/2024 | Hadayeq El-Qobba | | | 42 | Single | Bachelor of Engineering | Networks Engineer | Yes | Men |
| 39 | 01/04/2024 | Hadayeq El-Qobba | | | 40 | Married | Bachelor of Law | Receptionist | No ne | Men |
| 40 | 01/04/2024 | Hadayeq El-Qobba | | | 39 | Married | Bachelor of Commerce | Accountant | Yes | Men |
| 41 | 01/05/2024 | Al- Azbakeya | | | 55 | Married | Certificate of High School | Merchant/T rader | Mot orc ycle | Men |
| 42 | 01/05/2024 | Al- Azbakeya | | | 45 | Married | Bachelor of Law | Lawyer | Mot orc ycle | Men |
| 43 | 01/05/2024 | Al- Azbakeya | | | 48 | Married | Certificate of High School | Driver | Yes | Men |
| 44 | 01/05/2024 | Al- Azbakeya | | | 46 | Married | Certificate of High School | Driver - Trader | No ne | Men |













| # | Date | Area | English Name | Name | Age | Marital status | Education | Occupation | Car | Grou P |
|----|------------|-----------------|-----------------|------|-----|----------------|--|-------------------------|--------------------|-----------|
| 45 | 01/05/2024 | Al- Azbakeya | | 4. | 53 | Married | Commercial High School | Café Owner | No ne | Men |
| 46 | 01/05/2024 | Al- Azbakeya | | | 45 | Married | Commercial High School | Worker | No ne | Men |
| 47 | 01/05/2024 | Al- Azbakeya | | | 44 | Married | Bachelor of Commerce | Accountant | No ne | Men |
| 48 | 01/05/2024 | Al- Azbakeya | | | 43 | Married | Bachelor of Commerce | Accountant | No ne | Men |
| 49 | 01/05/2024 | Al- Azbakeya | | | 22 | Single | Bachelor of Commerce | Accountant | Mot orc ycle | Youth |
| 50 | 01/05/2024 | Al- Azbakeya | | | 23 | Single | Bachelor of Commerce | Accountant | No ne | Youth |
| 51 | 01/05/2024 | Al- Azbakeya | | | 20 | Single | Student at the Faculty of Science | Worker in a Pharmacy | Yes | Youth |
| 52 | 01/05/2024 | Al- Azbakeya | | | 20 | Single | Student at College | Student | No ne | Youth |
| 53 | 01/05/2024 | Al- Azbakeya | | | 20 | Single | Student at the Faculty of Agriculture | Student | No ne | Youth |
| 54 | 01/05/2024 | Al- Azbakeya | | | 24 | Single | Bachelor of Law | Lawyer | No ne | Youth |
| 55 | 01/05/2024 | Al- Azbakeya | | | 27 | Single | Bachelor of Education | Teacher | No ne | Youth |
| 56 | 01/05/2024 | Al- Azbakeya | | | 22 | Single | Bachelor of Education | Teacher | No ne | Youth |
| 57 | 31/12/2023 | Heliopoli s | | | 49 | Married | Bachelor of Engineering | Engineer | Yes | Men |
| 58 | 31/12/2023 | Heliopoli s | | | 48 | Married | Bachelor of Engineering | Engineer | Yes | Men |
| 59 | 31/12/2023 | Heliopoli s | | | 44 | Married | Bachelor of Medicine | Doctor | Yes | Men |
| 60 | 31/12/2023 | Heliopoli s | | | 52 | Married | Bachelor of Engineering | Engineer | Yes | Men |
| 61 | 31/12/2023 | Heliopoli s | | | 53 | Married | Bachelor of Engineering | Engineer | Yes | Men |
| 62 | 31/12/2023 | Heliopoli s | | | 47 | Married | Bachelor of Engineering | Engineer | Yes | Men |
| 63 | 31/12/2023 | Heliopoli s | | | 35 | Married | Bachelor of Commerce | Teacher | No ne | Men |
| 64 | 31/12/2023 | Heliopoli s | | | 43 | Married | Bachelor of Commerce | Accountant | No ne | Men |













9.169.15 Appendix O List of Female FGDs Participants

| # | Date | Area | Name | English Name | Age | Marital status | Education | Occupation | Car | Group |
|----|------------|------------|------|-----------------|-----|----------------|-------------------------|--------------------------------------|----------------|-------|
| I | 31/12/2023 | Heliopolis | | | 50 | Married | Vocational Education | Beauty Centre Owner | Private Car | Women |
| 2 | 31/12/2023 | Heliopolis | | | 40 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 3 | 31/12/2023 | Heliopolis | | | 55 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 4 | 31/12/2023 | Heliopolis | | | 40 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 5 | 31/12/2023 | Heliopolis | | | 42 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 6 | 31/12/2023 | Heliopolis | | | 39 | Married | Post Graduate Degree | Civil Engineer | Private Car | Women |
| 7 | 31/12/2023 | Heliopolis | | | 45 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 8 | 31/12/2023 | Heliopolis | | | 50 | Widowed | Undergraduate Degree | Teacher | Private Car | Women |
| 9 | 31/12/2023 | Heliopolis | | | 29 | Single | Undergraduate Degree | Teacher | Private Car | Girls |
| 10 | 31/12/2023 | Heliopolis | | | 26 | Single | Undergraduate Degree | Teacher | Private Car | Girls |
| П | 31/12/2023 | Heliopolis | | | 25 | Single | Undergraduate Degree | Computer Engineer | Private Car | Girls |
| 12 | 31/12/2023 | Heliopolis | | | 30 | Married | Post Graduate Degree | Teacher | Private Car | Girls |
| 13 | 31/12/2023 | Heliopolis | | | 32 | Married | Undergraduate Degree | Engineer | Private Car | Girls |
| 14 | 31/12/2023 | Heliopolis | | | 31 | Married | Undergraduate Degree | Teacher | Private Car | Girls |
| 15 | 31/12/2023 | Heliopolis | | | 30 | Married | Undergraduate Degree | Teacher | Private Car | Girls |
| 16 | 31/12/2023 | Heliopolis | | | 29 | Married | Undergraduate Degree | Teacher | Private Car | Girls |
| 17 | 01/01/2024 | Al-Wayli | | | 65 | Married | Illiterate | None | None | Women |
| 18 | 01/01/2024 | Al-Wayli | | | 35 | Married | Undergraduate Degree | None | None | Women |
| 19 | 01/01/2024 | Al-Wayli | | | 67 | Married | Illiterate | None | None | Women |
| 20 | 01/01/2024 | Al-Wayli | | | 26 | Single | Undergraduate Degree | None | None | Women |
| 21 | 01/01/2024 | Al-Wayli | | | 28 | Married | Middle School | None | None | Women |
| 22 | 01/01/2024 | Al-Wayli | | | 49 | Married | Undergraduate Degree | Clerk in a company | Private Car | Women |
| 23 | 01/01/2024 | Al-Wayli | | | 33 | Married | Undergraduate Degree | Data Entry | Private Car | Women |
| 24 | 01/01/2024 | Al-Wayli | | | 48 | Married | Undergraduate Degree | None | None | Women |
| 25 | 01/03/2024 | Al-Daher | | | 45 | Married | Undergraduate Degree | Employee at Al-Alsun Institute | Private Car | Women |
| 26 | 01/03/2024 | Al-Daher | | | 42 | Married | Vocational Education | Employee at Al-Alsun Institute | Private Car | Women |
| 27 | 01/03/2024 | Al-Daher | | | 45 | Married | Vocational Education | Employee at Al-Alsun Institute | Private Car | Women |
| 28 | 01/03/2024 | Al-Daher | | | 41 | Married | Undergraduate Degree | Employee at Al-Alsun Institute | Private Car | Women |
| 29 | 01/03/2024 | Al-Daher | | | 39 | Single | Undergraduate Degree | Call Center | None | Women |













| # | Date | Area | Name | English Name | Age | Marital status | Education | Occupation | Car | Group |
|----|------------|----------------------|------|-----------------|-----|----------------|-------------------------|--------------------------|----------------|-------|
| 30 | 01/03/2024 | Al-Daher | | | 38 | Widowed | Undergraduate Degree | Online Trading | None | Women |
| 31 | 01/03/2024 | Al-Daher | | | 41 | Married | Undergraduate Degree | None | Private Car | Women |
| 32 | 01/03/2024 | Al-Daher | | | 38 | Single | Undergraduate Degree | Sales Officer | None | Women |
| 33 | 01/04/2024 | Hadayeq Al- Qobba | | | 46 | Single | Undergraduate Degree | Accountant | Private Car | Women |
| 34 | 01/04/2024 | Hadayeq Al- Qobba | | | 44 | Married | Undergraduate Degree | Shop Owner | Private Car | Women |
| 35 | 01/04/2024 | Hadayeq Al- Qobba | | | 50 | Married | Undergraduate Degree | None | Private Car | Women |
| 36 | 01/04/2024 | Hadayeq Al- Qobba | | | 52 | Married | Undergraduate Degree | Teacher | Private Car | Women |
| 37 | 01/04/2024 | Hadayeq Al- Qobba | | | 38 | Married | Undergraduate Degree | None | None | Women |
| 38 | 01/04/2024 | Hadayeq Al- Qobba | | | 43 | Married | Undergraduate Degree | None | None | Women |
| 39 | 01/04/2024 | Hadayeq Al- Qobba | | | 42 | Married | Undergraduate Degree | None | None | Women |
| 40 | 01/04/2024 | Hadayeq Al- Qobba | | | 39 | Married | Undergraduate Degree | Clerk | None | Women |
| 41 | 01/04/2024 | Hadayeq Al- Qobba | | | 25 | Single | Undergraduate Degree | Teacher | Private Car | Girls |
| 42 | 01/04/2024 | Hadayeq Al- Qobba | | | 27 | Single | Undergraduate Degree | Clerk in the Post Office | Private Car | Girls |
| 43 | 01/04/2024 | Hadayeq Al- Qobba | | | 26 | Single | Undergraduate Degree | Lawyer | None | Girls |
| 44 | 01/04/2024 | Hadayeq Al- Qobba | | | 23 | Single | Undergraduate Degree | None | None | Girls |
| 45 | 01/04/2024 | Hadayeq Al- Qobba | | | 22 | Single | Undergraduate Degree | None | None | Girls |
| 46 | 01/04/2024 | Hadayeq Al- Qobba | | | 23 | Single | Undergraduate Degree | None | None | Girls |
| 47 | 01/04/2024 | Hadayeq Al- Qobba | | | 24 | Single | Undergraduate Degree | None | None | Girls |
| 48 | 01/04/2024 | Hadayeq Al- Qobba | | | 22 | Single | Undergraduate Degree | None | None | Girls |
| 49 | 01/05/2024 | Al-Azbakeya | | | 42 | Married | Undergraduate Degree | Clerk | Private Car | Women |
| 50 | 01/05/2024 | Al-Azbakeya | | | 45 | Married | Undergraduate Degree | Clerk | Private Car | Women |
| 51 | 01/05/2024 | Al-Azbakeya | | | 42 | Married | Undergraduate Degree | Clerk | None | Women |
| 52 | 01/05/2024 | Al-Azbakeya | | | 44 | Married | Undergraduate Degree | Clerk | None | Women |
| 53 | 01/05/2024 | Al-Azbakeya | | | 36 | Married | Undergraduate Degree | Clerk | Private Car | Women |
| 54 | 01/05/2024 | Al-Azbakeya | | | 37 | Married | Undergraduate Degree | Clerk | None | Women |
| 55 | 01/05/2024 | Al-Azbakeya | | | 46 | Married | Undergraduate Degree | Lawyer | None | Women |
| 56 | 01/05/2024 | Al-Azbakeya | | | 43 | Married | Undergraduate Degree | Clerk | None | Women |













9.179.16 Appendix P: List of NCPD FGD Participants

| # | Name | English Name | Sex | Age | Type of disability | Employment | Marital status | No of children | Car |
|---|------|-----------------|--------|-----|-----------------------------------|-----------------------------|----------------|----------------|-----|
| I | | | Female | 33 | Visual | NCPD | Married | 3 | No |
| 2 | | | Male | 44 | Upper mobility | NCPD | Married | 2 | No |
| 3 | | | Male | 39 | Mobility (spastic cerebral palsy) | NCPD | Married | I | No |
| 4 | | | Female | 45 | Mobility | NCPD | Married | 3 | No |
| 5 | | | Male | 38 | Hearing | NCPD | Married | 3 | No |
| 6 | | | Male | 38 | Mobility | NCPD | Married | 2 | Yes |
| 7 | | | Female | 34 | Hearing | NCPD | Engaged | - | No |
| 8 | | | Female | | | assistant at NCPD | | | |
| 9 | | | Female | | | Sign language specialist | | | |













9.189.17 Appendix Q: List of Al-Ameriyah Interview Participants

| # | Name | English Name | Sex | Position |
|----|------|-----------------|--------|---|
| I | | | Male | Head of central directorate |
| 2 | | | Female | Head of planning department |
| 3 | | | Female | Head of training department |
| 4 | | | Male | Head of central department, North Cairo |
| 5 | | | Male | Head of east Cairo region |
| 6 | | | Male | Depot manager |
| 7 | | | Male | Head of engineering department |
| 8 | | | Male | Depot observer |
| 9 | | | Male | Deputy depot observer |
| 10 | | | Male | Bus driver |
| П | | | Male | Bus driver |
| 12 | | | Female | Head of public relation office |
| 13 | | | Female | Head of complaint department |
| 14 | | | Male | Head of human resources department |
| 15 | | | Male | Deputy head of workers syndicate |













9.199.18 Appendix R: Grievance Mechanism

Grievance Redress Mechanism Report

SST-T06-000-RPT-018-3 Grievance Mechanism (D6-2)

Date 03/09/2024

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Glossary

| AVLS | Automatic Vehicle Locating System |
|-------|---|
| CTA | Cairo Transport Authority |
| EEAA | Egyptian Environmental Affairs Agency |
| ESMFs | Environmental and Social Management Frameworks |
| ESSs | Environmental and Social Safeguards |
| FGDs | Focus Group Discussion |
| GBV | Gender Based Violence |
| CS | Citizens' Service |
| GCCC | Greater Cairo Air Pollution Management and Climate Change |
| GRM | Grievance Redress Mechanism |
| HR | Human Resources |
| KIIs | Key Informant Interview |
| NCPD | National Council for Persons with Disabilities |
| NCW | National Council for Women |
| NGOs | Non-Governmental Organization |
| PAPs | Project Affected Persons/Parties |
| PCU | Project Coordination Unit |
| PIU | Project Implementation Unit |
| SEA | Sexual Exploitation and Abuse |
| SH | Sexual Harassment |
| TIU | Technical Implementation Unit |
| UGCS | Unified Governmental Complaint System |
| WB | The World Bank |













Introduction

This document provides guidance for the management of external complaints and grievances for the "Electric Bus (e-bus) Demonstration Project, Detailed Planning and Design Study for Cairo Transport Authority (CTA)", a component (component 3) of "Egypt: Greater Cairo Air Pollution Management and Climate Change Project" funded by the World Bank. The purpose is to provide an effective external Grievance Redress Mechanism (GRM) for the project in compliance with World Bank (WB) Environmental and Social Safeguards (ESSs) and Environmental and Social Management Frameworks (ESMFs).

The GRM outlines a process for documenting and addressing project external grievances and complaints that may be raised by affected persons or community members regarding specific project activities, environmental and social performance, the engagement process, and/or unanticipated social impacts resulting from project activities. It describes the scope and procedural steps and specifies roles and responsibilities of the parties involved. The GRM is subject to revision based on experience and feedback from stakeholders.

The GRM is considered as a main component of the stakeholder engagement process. It is as such an effective tool to incorporate stakeholders' views, concerns, and complaints into the project operation throughout the life of the project. Thus, engage in a meaningful dialogue with stakeholders, receive input on analysis and proposed plans, discuss concerns, and inform the Beneficiary (CTA) decisions, where appropriate.

Grievance is an issue, concern, problem, or claim (perceived or actual) that an individual or community group wants a delegated authority to address and resolve. The mechanism is ideally a locally based, formalized way to accept, assess, and resolve community complaints concerning the performance or behavior of a project, its contractors, or employees. The purpose of a grievance redress mechanism is to ensure that all complaints from different stakeholders and Project Affected Persons (PAPs) are appropriately dealt with, and measures are taken to resolve matters of concern. Grievance redress mechanisms are increasingly important for development projects where ongoing risks or adverse impacts are anticipated. They serve as a way to meet requirements, prevent and address community concerns, reduce risk, and assist larger processes that create positive social change.

CTA Commitment to GRM

CTA will respond to concerns and grievances of project-affected parties related to the environmental and social performance of the project in a timely manner. For this purpose, CTA will commit to implement an effective grievance mechanism to receive and facilitate resolution of such concerns and grievances. The grievance mechanism will be proportionate to the potential risks and impacts of the project and will be accessible and inclusive.

Project affected parties in this context include a variety of groups or individuals, e.g., local communities where the service lines are operating, local residents around the depot, service beneficiaries in general, young women, women, school pupils or university students, elderly, and persons with disabilities or limited mobility. Project affected parties are those who might need to report a concern/problem, file a complaint, have inquiries, or provide a suggestion.

CTA grievance redress mechanism shall be an accessible and inclusive system, process, or procedure that receives and acts upon complaints and suggestions for improvement in a timely fashion and facilitates resolution of concerns and grievances arising in connection with a project. An effective grievance mechanism provides project-affected parties with redress and helps address issues at an early stage. Where feasible and suitable for the project, the grievance mechanism will utilize existing formal or informal grievance mechanisms, supplemented as needed with project-specific arrangements unless there is an issue that needs extra investigations, e.g., grievances related to operation of e-buses that will need major actions/changes in operation. CTA Citizens' Service department including its citizens' complaint division is the responsible entity to manage complaints.

Other particular grievances related to physical harassment or persons with disabilities might also employ Egyptian national councils, i.e., National Council for Women NCW, or National Council for Persons with Disabilities NCPD for additional interventions or actions.













To ensure CTA's commitment to the GRM among other social safeguards and best practice notes required by the WB, the training capacity building of CTA is seen essential for them to develop social policies and implement it³³.

Scope and Goals

It is important to define the overall purpose and goals for the grievance mechanism and make sure that design decisions flow from its purpose. An effective grievance redress mechanism shall be open to a wide range of concerns: both those based in factual data and those arising from perceptions or misperceptions. Perceived concerns can be as critical to address as actual hazards. They often arise when people do not have adequate information. The mechanism is also anticipated to be able to address multi-party and multi-issue complaints. Types of complaints that the mechanism will primarily target will be then prioritized. Objectives of GRM

The grievance mechanism is expected to address concerns promptly and effectively, in a transparent manner that is culturally appropriate and readily accessible to all project-affected parties, at no cost and without retribution. The mechanism, process, or procedure will not prevent access to judicial or administrative remedies. CTA will inform the project-affected parties about the GRM in the course of its community engagement activities to mainly communicate and disclose the mechanism to the public and also to provide feedback on responses to all grievances received³⁴.

In addition, handling of grievances will be done in a culturally appropriate manner and be discreet, objective, sensitive, and responsive to the needs and concerns of the project-affected parties. The mechanism will also allow for anonymous complaints to be raised and addressed.

Principles of GRM

A grievance redress mechanism is designed based on an understanding of the issues that are likely to be the subject of concerns and grievances. The appropriate design and scale of the grievance redress mechanism is project specific. The design depends upon factors such as the project context, scale, and scope; the number of project beneficiaries; capacity; cultural attitudes toward lodging grievances; available human and financial resources; and technological constraints. Existing formal and/or informal mechanisms identified as part of the environmental and social assessment under ESS I and stakeholder engagement ESS I0 may be used, provided they are deemed suitable for the project's purposes and, as needed, can be supplemented with project-specific arrangements. In some instances, it may be cost effective and sustainable to build on and improve such formal or informal mechanisms for grievance redress.

A grievance redress mechanism is established as early as possible in project development and supported by appropriate human and financial resources. The mechanism provides specific places and ways whereby grievances would be received and the means by which they can be submitted (for example, mail, text message, e-mail, website, telephone, suggestion/complaint boxes, grievance form); specifies a person, an office, or an institution responsible for processing grievances; and establishes timelines for processing a complaint and a process for registering and monitoring grievances. Grievance mechanisms for larger or more complex projects may have multiple locations, means, and methods to receive, process, and monitor grievances, an adequately staffed team, and an appeals process.

To make grievance redress mechanisms accessible to all stakeholders, it is helpful to make the procedures to submit grievances simple and easy to understand; advertise them publicly and broadly via newspapers, radio broadcasts, or other accessible and appropriate channels; and indicate the expected length of timelines for acknowledgment, response, and resolution. The grievance mechanism is free of charge to stakeholders. Accessibility for disadvantaged or vulnerable individuals or groups is important, as is documenting grievances received and responses provided.

³³ Training modules are detailed further in this report in different sections as relevant.

³⁴ See more details in the Communication and Disclosure of GRM section (2.1)













Actions taken on the grievance or suggestions should be informed and balanced. The time frame for grievance resolution depends on factors such as the urgency of the complaint; need for research, investigation, consultation, and funding; and capacity. The grievance mechanism sets out indicative time frames for acknowledgment, interim responses, and, where possible, final resolution of grievances. Some grievances may require coordination among multiple departments/agencies, often outside the control of the project, or require detailed investigation. Such grievances may take longer to address, and this should be communicated to the parties concerned when acknowledging receipt of the grievances. Supporting documents needed to achieve resolution form part of the files related to the grievance/feedback.

Grievance redress mechanism should require all grievances to be treated confidentially, impartially, objectively, and in a timely manner. When submission of anonymous grievances is not tolerable, it is important to ensure confidentiality; in those cases, CTA may consider engaging third-party entities to facilitate escalation of grievances, e.g., Ministry of Environment, EEAA, or Cairo Governor Office.. Users of a grievance mechanism may not be subject to retaliation, abuse, or any kind of discrimination. CTA is expected to address allegations of retaliation, abuse, or discrimination and take appropriate remedial measures.

More specific, principles of project-related GRM can be summarized as follows:

The grievance mechanism is oriented around joint concerns of the project and community and is not oriented primarily around concerns of the community.

The grievance mechanism is it exclusively focused on the resolution of individual complaints and is not oriented toward identifying root causes of conflict and addressing them through systemic change.

The grievance mechanism is primarily oriented toward project investigation and internal redress and not toward a more comprehensive set of options for resolution and the provision of justice.

The grievance mechanism shall be structured in a way that does not reinforce power inequities among parties.

The grievance mechanism may include the following:

Communication and disclosure of GRM using publicly advertised procedures, setting out the length of time users can expect to wait for acknowledgment, response, and resolution of their grievances;

Different ways in which users can submit their grievances, which may include submissions in person, by phone, text message, mail, e-mail or via a website;

A log where grievances are registered in writing and maintained as a database;

Transparency about the grievance procedure, governing structure, and decision makers; and

An appeal process (including the national judiciary) to which unsatisfied grievances may be referred when resolution of grievance has not been achieved.













Main Steps of GRM

WB ESS 10 explains explicitly that:

- a) the grievance mechanism is expected to address concerns promptly and effectively in a transparent manner that is culturally appropriate and readily accessible to all project-affected parties, at no cost and without retribution. The mechanism, process or procedure shall not prevent access to judicial or administrative remedies. The Borrower/Beneficiary (CTA) will inform the project-affected parties about the grievance process in the course of its community engagement activities, and will make publicly available a record documenting the responses to all grievances received; and
- b) handling of grievances will be done in a culturally appropriate manner and be discreet, objective, sensitive and responsive to the needs and concerns of the project-affected parties. The mechanism shall also allow for anonymous complaints to be raised and addressed³⁵.

Communication and Disclosure of GRM

It is highly recommended for CTA to undertake ongoing communication and disclosure sessions with the public closely before the operation of the project in Al-Ameriyah Depot. CTA shall engage with popular leaders in local communities, members of parliament, proactive local authorities, and active members of NGOs in the area. Material containing non-technical information on the GRM shall be prepared timely ahead of consultation activities. The PCU can support in designing disclosure material and assist during sessions. Material is supposed to be user-friendly publications, e.g., leaflets, brochures, or small cards to be easily accessed and used by the public.

Material shall include basic non-technical information on project description, potential positive impacts of E-buses, routes and stations, and principally details of the GRM, e.g., objectives, access, channels, procedures, and confirm the right to file an anonymous complaint as well. In all cases, grievance channels shall include a variety of means, e.g., hotlines, landlines, mobile numbers, what's app groups, comment/complaint boxes, email addresses, and official websites. Channels for submitting complaints must be widely disclosed to the public during CTA communication and disclosure activities.

CTA will essentially need to prepare a set of different announcements articulating clearly the channels that can be used by the public to submit or direct a complaint. Such announcements can be boards with contacts that any person can you to complaint whether named or anonymous. It is highly recommended that messages should be positioned saliently inside the bus, on the bus, and on the stations as well. It should be made very clearly that complaints shall only be related to the current service or ride of the E-bus to avoid general or irrelevant complaints being submitted to CTA.

Figure 9-7: Example of Announcements Inside E-buses and on Bus Stations in Arabic and English³⁶

يمنكم تقديم الشكاوى من خلال القنوات التالية: 1-رقم محمول أو أرضى: 0223425710-01207777560 2-منظومة الشكاوى الوحدة: www.shakwa.eg-16528 3-الموقع الإلكتروني الرسمي للهيئة: public_transport@cairo.gov.eg Complaints can be received through the following channels:
1-Mobile or landline: 01207777560-02-23425710
2-Unified Governmental Complaint Systen: -16528www.shakwa.eg
3-CTA website: public_transport@cairo.gov.eg

-

³⁵ See steps of Grievance Redress Mechanism in Figure 2-1 below. This figure is combined by the Consultant from different sources.

³⁶ Other contacts can be added as updated and approved.













Figure 9-8: Steps of Complaint Redress Mechanism

Communication & Disclosure

Ongoing

Receiving

Ongoing

Classification & Registration

One day after receipt

Investigation & Verification

3-7 working days

Eligibility

Closure, if not eligible

Transfer, if eligible

8-10 working days Resolution & Feedback

Closure of case
10-30
working days

Escalation

If not satisfactory closed













Receiving Complaints

Receiving complaints is supposed to be a simple ongoing process where local people can inform about concerns directly. Receipt procedures are most effective if they are convenient, culturally appropriate, simple to understand, and easy to use. According to CTA PR department and supporting documents, following channels are currently employed to receive complaints:

CTA complaint email: khedmetmwatnen@gmail.com; CTA what's app number: 01273133917-01129947162

CTA landline: +2-23425714

Nasr operation mobile or landline: 01207777560-0223425710 Unified Governmental Complaint System www.shakwa.eg

Unified Governmental hotline: 16528

Unified Governmental what's app number: 01555525444-01555516528

Additional channels may include but not limited to:

Letters;

Verbal narration from walk-in complainants;

Reports on visits to project offices and sites by project staff, independent monitors, supervision teams, government officials, or journalists interested in special groups like persons with disabilities, elderly people;

Reports of staff, consultants, PCU;

Comments or grievances from radio or television programs;

Findings of WB supervision missions;

Comment/complaint boxes inside buses and in stations;

Escalation to third party entities, e.g., Ministry of Environment, EEAA, and Cairo Governor Office; and

Media newscasts, newspaper articles, and other publications.

As a matter of fact, receiving complaints is plainly a central process of collecting grievances, either through the Unified Governmental Complaint System or through CTA central citizens' service department. There is obviously no decentralized system to receive complaints at garage/depot level. There is no citizens' service department at Al-Ameriyah Garage. It is therefore highly recommended for CTA to establish a citizens' service/complaint office at garage level in order to effectively manage various complaints. For this project, CTA can start by establishing the department at Al-Ameriyah garage. The new assigned staff in this department shall be trained and capacitated to use the "Grievance Redress and complaints Manual" produced in Arabic by GCCC to comply with WB requirements, and explicitly WB ESS 10 on Stakeholder Engagement and Information Disclosure including of course the GRM.

Classification and Registration of Complaints

Classification and registration of complaints is the shortest step in the process; it is supposed to take one day only after the receipt of the complaint.

Being a central process, there are two stages of classification and registration; the first at the source recipient of the complaint (Egyptian Ministerial Cabinet through the Unified Governmental Portal), and the second at the level of the entity complained of (CTA).

During consultation with CTA citizens' service department staff, they stated that currently they do not use any in-house registers since the **Unified Governmental Complaint System** UGCS has been applied all over the Country (Presidential Decree 314/2017). No records are currently compiled in excel sheets to register received complaints. CTA uses only soft copies from the governmental portal using specified usernames and passwords. The unified complaint form includes the following information³⁷:

Complaint number, status (open/closed), type of complainant (citizen/entity); Content of grievance;

-

³⁷ Example of soft copy of Unified Governmental Complaint sheet is attached in Annex 2.













Name of complainant, type of complainant (individual/collective), ID number;

Governorate, city, district;

Address, contact number;

Date and time of complaint:

Responsible entity (in this case CTA);

Responsible department;

Start and completion date of complaint;

Attachments;

Feedback on complaint;

Date of complaint transfer to pertinent department; and

Comments.

In addition to current process, a complaint register at garage level is proposed to record information relevant to the case, e.g., name of complainant, address, contact number or email address for communication of follow-up actions, type of complaint, date and nature of complaint, proposed resolution action by compliant, signature, and name of complaint recipient and signature. This form shall include additional sections on follow-up actions, final result, and comments to be filled later after the complaint is investigated, verified, and transferred for resolution. CTA can use ready-made Arabic registration forms attached to the GRM produced by GCCC. The register shall be effectively used in order to keep a compiled record of all complaints, follow-up actions taken and the date and form of communication of follow-up actions to the complainant concerned. Compiled registers in excel sheets can be also used in monthly/bi-annual/annual reporting, especially for lender-funded projects.

Investigation and Verification of Complaints

Consultation with CTA PR staff at Al-Ameriyah Garage indicates that this step of the GRM takes about one week (3-7 working days); it is very important to screen and assess complaints to examine whether a complaint is eligible for the grievance mechanism is an essential step. The screening procedure is usually based upon a few simple eligibility criteria that do not involve judging the substantive merit of the complaint.

Eligibility of Complaints

According to WB ESS 10, eligible complaints may include those where:

The pertains to the project;

The issues raised in the complaint fall within the scope of issues the grievance mechanism is authorized to address; and/or

The complainant has to be properly and timely filed.

While ineligible complaints may include those where:

The complaint is clearly not project-related;

The nature of the issue is outside the mandate of the grievance mechanism;

The complainant has no standing to file; and/or

Other procedures/entities are more appropriate to address the issue.

All ineligible complaints are automatically closed. In all cases, if the complaint is rejected, the complainant is informed of the decision and the reasons for the rejection. During the assessment, the team gathers information about the case, key issues, and concerns to help determining whether and how the complaint might be resolved otherwise.

Transfer of Eligible Complaints

According to CTA PR department staff at Al-Ameriyah Garage, the transfer of eligible complaints is the second important step in the process. It takes **8-10 working days**, and aims at confirming and addressing the department or sector in charge of dealing with and resolving the respective complaint. It is the responsibility of the pertinent department to address the complaint and take actions to resolve the case, e.g., operation department at CTA, then coordination with operation department at garage level

PR staff stated that the monthly average number of grievances varies between 10-15 complaints. Most complaints are mainly related to personal items lost in the bus, increase of service fees, or about













operation inconveniences (the bus did not stop to pick him from the station). Type of different grievances is further explained in section 2.7 (Resolution Approach).

Resolution and Feedback to Complainants

Responding to complaints implies specifying who communicates and how, as well as time frame of grievance redress and notification of result to complainants. It may be appropriate that feedback is provided by staff member(s) responsible for assessment, accompanied by the coordinator of the complaints' procedure, i.e., CTA Citizens' Service department and its Citizens' Complaint division.

According to the CTA PR department staff at Al-Ameriyah Garage, this step being the most important is the longest; it might take up to one month (10-30 working days) to be completed. All pertinent departments who might be related to the type of complaint shall be involved in this step. Resolution Approach

It is highly recommended to offer a variety of grievance resolution approaches to accommodate differences in personal and cultural preferences, and not just a single grievance procedure.

Common characteristics of Effective GRMs can be summarized as follows:

Provide multiple grievance uptake locations and multiple channels for receiving grievances;

Apply fixed service standards for grievance resolution;

Implement prompt and clear processing guidelines (including reviewing procedures and monitoring systems); and

Ensure an effective and timely grievance response system to inform complainants of the action taken.

Anonymous grievances

Any complaint that does not bear the name and address of the complainant is an anonymous complaint. No action is to be taken on anonymous complaints irrespective of the nature of allegations, and such complaints should be filed. Such complaints shall be treated more carefully than registered complaints due to sensitivity of complaint or complainant.

Anonymous complaints are allowed in all agencies; however, CTA staff during consultations have pointed to the following:

- Anonymous complaints can work with sensitive internal grievances containing documented material on financial or administrative corruption, and in-house sexual harassment from colleagues or managers; and
- Anonymous complaints from passengers regardless from its content or source is not effective at all and will not ensure feedback to complainant.

However, despite CTA reservation on effectiveness or inconsideration of anonymous complaints, CTA will have to be operatively trained to consider and handle such sensitive complaints. At the same time, bus users need to know their right to anonymous complaints, if they wish to.

Sexual Harassment Grievances

Sexual exploitation is any actual or attempted abuse of a position of vulnerability, differential power or trust for sexual purposes, including, but not limited to, profiting monetarily, socially or politically from the sexual exploitation of another³⁸. Sexual abuse is actual or threatened physical intrusion of a sexual nature, whether by force or under unequal or coercive conditions³⁹. In simple terms, sexual harassment is unwelcome conduct of a sexual nature that makes someone feel offended, humiliated and/or intimidated, e.g., unwelcome touching, staring or leering, and insults or comments based on women's sex (bullying). According to FGDs with males and females (young and old), such actions happen repeatedly by men (of all ages) to female passengers in CTA buses. Gender based violence (GBV) is rooted in gender inequality and unequal power relations. Responsible and respectful reporting

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³⁸ UN Glossary on Sexual Exploitation and Abuse 2017, pg. 6

³⁹ UN Glossary on Sexual Exploitation and Abuse 2017, pg. 5













on sexual harassment has an important role to play in shifting power by shining a light on the way in which our systems have served to silence survivors and protect perpetrators. The media also has enormous power as a lever of change to challenge the norms and attitudes that accept and normalize sexual harassment.

There is still an immense cultural barrier for women and young girls to report on unwelcome actions that happens to them. This cultural attitude in the Egyptian society will need long-term efforts on different to combat harassment behavior in public spaces on one hand and raise awareness to encourage women to report on such incidences.

Complainants of sexual harassment all over Egypt are not assured that their complaint has been and will be taken seriously, given consideration, and that respective organizations will take action to stop harassment, especially for harassment among passengers. Harassment from CTA drivers or conductors will be easier to track for corrective actions through bus cameras in the control room, while harassment among passengers will remain beyond the capacity of CTA.

CTA Citizens' Service department denied the receipt of any sexual harassment grievances so far. Female subject to any kind of sexual harassment can always accelerate their grievance by contacting NCW hotline to report their case. GCCC has signed a protocol with NCW to assist the project in combating any form of physical or sexual harassment (details of protocol are presented in the "Project GRM Manual").

National Council for Women (NCW) created a hotline to report harassment, drafted a law to fight violence and also developed a plan to reduce harassment on the streets. In 2014, decentralized units were created in Egypt to combat violence and recently special units were created within the police force to deal with sexual harassment. NCW is also working on developing a national strategy to combat gender-based violence. In 2015, the government released its five-year national strategy to combat violence against women. It includes training manuals for law enforcers, more shelters for women, and better monitoring and collection of information in ministries. Any Egyptian female can contact the following numbers to report on sexual harassment incidence or to seek help:

NCW hotline number (16000) to provide emergency help to children around the clock;

NCW mobile number (02-25240288) and hotline (15115) for females; and

NCW hotline free number (08008886666) for disabled children.

SEA/SH case handling is generally not carried out by the GRM itself; it receives and records grievances and refers the survivor to GBV service providers who have appropriate capacity and procedures. Because existing GRMs in general do not have the capacity or procedures in place to effectively manage SEA/SH complaints and cannot be adapted to do so, SEA/SH allegation management may employ a third party with dedicated GBV expertise. Therefore, CTA is encouraged to use a broader established national agency which runs GBV grievance programs to handle complaints such as the National Council for Women in Egypt.

However, it is highly recommended to combat sexual harassment on project level through the following channels:

CTA to include training on gender issues and anti-harassment awareness raising in their non-technical training strategy. It was understood during meetings with training department that they do not have such training modules. In all cases, CTA is obliged to provide any non-technical or behavior change trainings to be revisited and rectified by the PCU.

CTA to use short instruction signs and slogans (similar to those used during the COVID pandemic) favoring positive attitude with women (young, old, pregnant, females accompanied by children or persons with limited mobility, and female passengers with disabilities).

Trainings on gender issues and anti-harassment to be considered within GCCC component 4 on behavior change.

Training and awareness raising is a strong step towards behavioral change, Hence, CTA training on GBV and anti-harassment awareness raising is top priority and shall include the following aspects:

Meanings and forms of GBV, in particular Sexual Exploitation and Abuse (SEA) and Sexual Harassment (SH);

How the project can be adversely affected by SEA/SH risks;













Specific risks to women, children, and other contextually relevant groups;

Standards of conduct for project staff and acts prohibited by the project Code of Conduct to prevent SEA/SH;

SEA/SH allegation reporting mechanism, accountability structures, and referral procedures within agencies and for community members to report cases related to project staff;

Services available for survivors of SEA/SH and GBV; and

Follow-up activities to reinforce training content.

Grievances of Passengers with Limited Mobility

Passengers with limited mobility include elderly, passengers accompanied by children/elderly/persons with disabilities, and passengers with disabilities themselves. It was reported in different FGDs that they are sometimes subject to bullying because their difficulties in mobility or shortage of sight, hearing, or speaking.

During consultation sessions, bus drivers explained that they provide all support possible to disabled passengers on the stations and inside the bus. When confronted with findings of FGD with persons with disabilities, and outcome of FGDs with different passengers' groups regarding challenges experienced during bus rides; both drivers totally disagreed with statements.

Again, it is highly recommended to rectify attitude and behavior towards people with limited mobility on project level through the following channels:

CTA to include training on cases with limited mobility awareness raising in their non-technical training strategy. It was also understood during meetings with training department that they do not have such training modules. In all cases, CTA is obliged to provide any non-technical or behavior change trainings to be revisited and rectified by the PCU.

CTA to use short instruction signs and slogans (similar to those used during the COVID pandemic) favoring positive attitude with passengers with limited mobility (young, old, pregnant women, passenger accompanied by children or persons with limited mobility, and passengers with disabilities themselves).

Trainings on limited mobility issues and anti-bullying to be considered within GCCC component 4 on behavior change.

Grievances Related to Operation

Bus Rides and Routes

One part, where passengers complain to CTA is bus rides and routes in the following cases:

Bus delays:

Bus major or minor malfunction during ride;

Lack of buses during official holidays;

Drivers miss the station or do not stop to pick passengers;

Drivers change the routes during the ride; and

Non-existence/cancellation of some bus lines in areas close to metro stations (Hadayek Al-Qobba and Al Matareya for example).

It is therefore recommended during operation to consider the following:

- Define fares for the e-bus routes that ensures equality of access to e-buses (to be defined by CTA);
- Organize bus frequency to avoid prolonged waiting time in this respect, the Consultant proposed operation considered the planned service by CTA on the selected routes and not the actual service;
- Check and monitor bus cameras on regular basis through the control room (or on demand when complaint is raised); and
- Establish monitoring systems for bus routes and stops (Traffic Management System / AVLs out of the scope of the Demonstration Project and to be established by CTA on a larger scale).

Misconduct of Drivers or Conductors

One major issue pointed to in all FGDs and especially those with disability of limited mobility are the following:

Sudden stops whether on stations or haphazardly; Impatience behavior;













Skipping stations when passengers with limited mobility or persons with disabilities are seen present of the station toc save effort and time; and

Lack of communication with passengers with disabilities; especially hearing and talking.

In light of this, technical and non-technical training of drivers and conductors is expected to have a key role in enhancing their knowledge, attitudes and behavior.

Bus Fares

In case of any complaint from high fares of e-buses, passengers will need to have a prompt effective mechanism to submit their grievances. In all cases, it is recommended that CTA consider the following in the fare pricing policy:

Exempt passengers with disabilities from any fares upon showing their "Integrated Services' Card"; Exempt elderly (age 60+) from 50% of bus fare upon date of birth shown in their personal IDs; Exempt school students of different educational institutions from 50% of bus fees upon showing their student IDs;

Monitor and evaluate passengers' satisfaction in general, and regarding service fare in specific; and Launch a grievance channel for e-bus complaints, including cost of service.

Note: Fare structure and strategy is not part of the Demonstration Project scope.

Lost belongings inside the bus

Passengers might forget personal belongings at the bus. According to CTA citizens' service and citizens' complaint staff, this issue is a frequent complain.

In order to transfer the grievance to the operation department, the complainant must include the number on the bus side and not the number of the line or the bus metal plate. Therefore, complaints with missing information will not be effectively resoled. It is highly recommended to help passengers to properly report complaints about lost items by hanging this information in a notable place inside the bus.

Organizational and Institutional Capacity

CTA will have to define clear roles, responsibilities, and authority, as well as designate specific personnel to be responsible for the implementation and monitoring of stakeholder engagement activities in compliance with WB ESS 10. In all cases, the number of designated staff for GRM implementation should be proportionate to the nature of the project and the types and levels of risks and impacts that are anticipated. CTA may also provide mediation as an option where users are not satisfied with the proposed resolution, e.g., the TIU and PCU unit.

Currently, CTA designates its central Citizens' Service department and its Citizens' Complaint Division to implement its GRM. There are only two officers in this department at central CTA premises in one room with limited electronic equipment, lighting, and ventilation. The department receives on average 10-15 complaints a day, mostly on forgotten items, official bus routes changed by drivers, rise in tickets fares, and elderly users asking for their rights to reduced fares (after the age of 60 years as per 50% discount) or free tickets (after the age of 70 years).

It was also made clear that CTA complaint system is tied to governorate's working hours from 8 am to 4 pm. Transferred complaints are only reviewed within those working hours. Complaints received at the portal after 4 pm will be processed the next day or after the weekend. In all cases, complaints are compiled and processed immediately from the UGCS, but are not recorded for later log or analysis.

It is therefore highly recommended for CTA to consider the following:

- Create an internal mechanism inside CTA to redress grievances in addition to the Unified Governmental Complaint System to ensure access and broaden channels to submit complaints.
- CTA internal complaints system shall maintain direct communications with other depots/garages.













- Establish a Citizens' Service Office as part of the E-bus unit at Al-Ameriyah Depot. The office shall include two components. One for Citizens' Complaints to run the GRM and the other for Information to undertake engagement activities and disclosure of information. This office can also act as a pilot practice for future e-buses;
- Equip the complaint office with high-speed internet connection, computers, printers, and desks:
- Assign a grievance coordinator and new staff and assistants to handle grievances;
- Train new and old staff on WB GRM as part of the training on ESS 10 on Stakeholder Engagement and Information Disclosure;
- Employ the new established complaint office and trained staff to undertake communication and disclosure activities at the same time;
- Integrate the complaint office and staff in the monitoring process of passengers' satisfaction assessment after operation as part of the M&E activities; and
- Develop an excel format to fill all information on case received every month for monitoring and analysis purposes.

Compliance Gaps

The Project Coordination Unit (PCU) and Technical Implementation Unit (CTA and EEAA) are currently entities in charge to contemplate social (and environmental) safeguards at project level. The PCU includes a social specialist with proficient expertise in WB ESSs and further social sensitive issues. While the TIU settle for environmental specialists who oversee social aspects within the scope of environmental affairs.

It is evident that CTA and Al-Ameriyah Depot staff in charge of dealing with social aspects of e-bus operation, e.g., citizens' service department including citizens' complaints and information divisions, and human resources department as well need to be trained on WB ESSs, and in particular WB ESS 10 for Stakeholder Engagement and Information Disclosure.

It is also recommended to train selected members from CTA and Al-Ameriyah Depot staff who are engaged in the e-bus project on WB ESSs and ESMFs.

A document dedicated to Training needs and programme for CTA staff has been issued by the Consultant SST (Deliverable D7-2, document SST-T07-000-RPT-011).

Main compliance gaps of CTA current GRM involve the following aspects:

- Lack of an internal GRM at CTA, the current system of receiving complaints relies on the Unified Governmental Complaint System;
- Complaints received away from the UGCS are addressed and resolved, but not registered for documentation and follow-up;
- All complaints received by UGCS are processed directly on the portal, but also not registered in a log for documentation, follow-up, and monitoring;
- Deficiency and insufficiency of personnel and equipment in the Citizens Service and Complaint Department;
- Absence of training on public relations and grievance management;
- Decentralization of decision making and in grievance management process;
- Lack of communication and engagement with the public, and consequently information on the process, right to complain, and channels to submit grievances are not widely known to the public; and
- Lack of schemes of monitoring and evaluation, users; satisfaction assessment, and thus self-assessment.

Forecasted Role of PCU

It is highly recommended that the PCU supports TIU and CTA in the following domains:

Support CTA in communicating and disclosing its GRM through preparing non-technical summaries and simple brochures and leaflets for different types of passengers; Review CTA's non-technical training programs;













Assess capacity building needs to improve the social performance inside and outside CTA fences; Train CTA on registering, reporting, and follow up on internal and external grievances. Every complaint, irrespective of its source, would be entered in the complaints register chronologically as it is received or taken notice of;

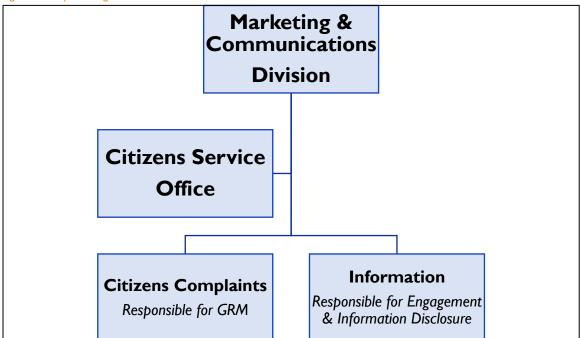
Assist CTA in establishing a grievance emergency unit to respond to sensitive grievances, e.g., sexual harassment, elderly incidences, complaints from persons with disabilities, thefts etc.; and Arrange with the WB team trainings options of CTA and Al-Ameriyah Depot on relevant WB ESSs and ESMFs.

Establishment of E-bus Unit.

As outlined in the meeting minutes of the CTA Introductory Meeting with CTA Leadership (January 5, 2023), the GCCC project consortium proposed the E-Bus unit in Al-Ameriyah Depot to utilize dedicated working space within CTA to ensure smooth project implementation and to integrate electric buses into the CTA fleet and get feedback from operation and maintenance as a demonstration project to evaluate the feasibility and lessons learned for scalability.

The proposed structure and staffing include a Marketing and Communications Division from CTA Public Relations Department to promote e-bus initiatives and maintain stakeholder engagement. It is proposed to expand the scope of this division to include a Citizens Service Office among other components the division. The office shall include two subcomponents, one for "citizens' complaints" to run the GRM and the other for "Information" to be responsible to undertake engagement activities and information disclosure to the public. The next chart outlines the proposed organizational chart of the Citizens Service Office -among other components- under the Marketing and Communications Division.

Figure 9-9: Proposed Organizational Chart for the Citizens Service Office within the E-bus unit















Implementation of the GRM

Introduction and Orientation

The way a grievance mechanism is introduced to the public can have significant implications for its effectiveness over time. Several factors must be carefully considered, including who must receive information regarding the mechanism's existence and use, what information needs to be shared, and how this information will be delivered, both in the immediate term and on an ongoing basis. The development of incentives to use the mechanism might also be considered.

Communication to Build Awareness

Educating the public and local communities about the grievance mechanism is an essential and ongoing responsibility. It does no good to have a perfectly designed grievance mechanism that no one knows about. The fundamentals of a successful strategy to publicize the complaints procedure to the public include:

Simple, visually engaging marketing materials. These should describe the process for handling people's concerns and the benefits that can result. The materials should also inform the public about where to go and who to contact if they have a complaint; and

Materials in a cultural appropriate way and understandable format and language. It is also important to consider special methods for illiterates and/or persons with sight disabilities.

Training of Staff Responsible for Grievance Management

A fundamental goal of the grievance mechanism is to solve problems early at the lowest level. It is important to support that goal with training of CTA staff. Thus, it is important to support that goal with basic stakeholder engagement and conflict resolution training for employees. Training in a variety of responsibilities is required in the startup of a grievance mechanism for the following people:

Personnel who will administer the system must receive skill training in conducting receipt and registration, referral processes, service provision, quality control, monitoring and record keeping, and also the grievance mechanism ethics.

Grievance coordinators must receive training in conflict resolution and grievance management.

Those who register complaints must receive training about the receipt and registration process, and the procedure for forwarding complaints to a central point of contact within CTA.

Managers and supervisors need problem-solving skills because the bulk of complaints can be resolved by using informal "decide together" approaches without having to resort to more formal procedures, such as mediation. Managers and employees who assume a new role -that of a problem solver- will be more successful if they are prepared.

Personnel responsible for the information division within the citizens' service department. The training of staff responsible for grievance management need to incorporate a number of training modules as follows:

- WB ESSs, and in particular ESS 10 on Stakeholder Engagement and Information Disclosure;
- GMR Manual produced by GCCC in 2023;
- Gender mainstreaming and social inclusion of disadvantaged groups and persons with disabilities or limited mobility; and
- GBV, and in specific SEA/SH (meanings, risks, code of conduct, services, and monitoring.













Monitoring and Evaluation of GRM

The development of the GMR is always work in progress, requiring assessment and refinements to assure that the mechanism is achieving desired goals. Lack of satisfaction by CTA users, lack of support in the community, accessibility problems, or service inefficiencies may be indicators that change is needed. In all cases, such change should be the result of an intentional, structured, broadly participatory, and ongoing process. It is necessary to monitor and evaluate the overall performance of the grievance mechanism throughout the project life cycle. The goal of this level of monitoring is not only to improve the system, but also to improve the service. Authorities that can adapt to changes in their external environments are better able to meet their goals. Ongoing service providers-service users learning, and assessment of a grievance mechanism can be viewed as a win-win situation.

Institutionalize the Process

CTA is obligated to draft a policy for grievance redress and to be committed to it. To do so, the training modules mentioned earlier (on WB ESSs and ESS 10, GCCC GRM Manual, gender mainstreaming and social inclusivity, GBV and SEA/SH) are the effective steps and solid start for CTA's awareness raising and behavioral change to commit itself.

It is proposed that CTA to approve some of the following suggestions as appropriate:

Create a grievance advisory committee an oversight group with advisory authority, composed of CTA staff members and community representatives who monitor performance and provide strategic advice about the grievance mechanism;

Include internal company forums such as staff meetings, community relations meetings, and weekly safety meetings. Encourage discussion about the performance of the system and possible suggestions for improving the service;

Conduct annual internal reports to the WB; and

Conduct external evaluation every three to five years using independent experts with expertise in grievance resolution mechanisms to the WB.

Establish Clear Standards and Criteria for Evaluation

Identify which aspects of the grievance mechanism to evaluate: the whole mechanism, the performance or behavior of CTA personnel, the time required to process complaints, kinds of resolutions, patterns of settlements, structural issues posed by the system and its operation, settlement costs, and so forth.

Questions should be developed in two broad areas:

- I) the performance of the grievance mechanism, and
- 2) lessons related to CTA operations that have emerged.

Create a Plan to Implement Changes to the Mechanism

Decisions on changes to the mechanism must be followed up with a clear implementation plan. The plan should explain in detail what is to be done, when, where, how, and by whom.

Ideally, an oversight or monitoring process should be put in place to ensure that implementation happens in a timely and effective manner. In some cases, it may be desirable to utilize participatory monitoring, in which both CTA and community members have oversight of implementation and have the authority to raise concerns if it is not being conducted as mutually understood or planned.

Conduct Regular Self-Assessment

CTA should use information from the grievance mechanism to learn and modify ways that could improve performance:

Report on key insights emerging from individual grievances that indicate where changes might be needed to company operations or management systems;

Indicate possible systemic changes that might be needed to ensure that particular grievances do not reoccur;

Ensure that results of the analysis are factored into the community engagement plan and the social and environmental monitoring plan as these tools are updated; and













Continually provide feedback to management.

CTA should also assess the impacts of any changes to the grievance mechanism by considering how the mechanism responded to complaints and how the complainants viewed the response and assess what further modifications might be necessary to improve the system.

By building in regular review and incorporating findings into improvements in company procedures and activities, CTA can improve both its own performance and any development impacts on the ground.