CLIMATE ADAPTATION GUIDANCE

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Gold Standard®

GOLD STANDARD TEAM

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KEY CONCEPTS AND TERM DEFINITIONS

ADAPTATION: Adaptation refers to adjustments in ecological, social, or economic systems in response to actual or expected climatic stimuli and their effects or impacts (United Nations Framework Convention on Climate Change, n.d.).

ADAPTIVE CAPACITY: It is the ability to absorb or cope with a climate hazard event or extended climate stress to which a person, party, or asset is determined sensitive.

ASSETS OR CRITICAL INFRASTRUCTURE: The physical structures, facilities, networks and other assets which provide services that are essential to the social and economic functioning of a community or society (United Nations Office Disaster Risk Reduction 2009).

BASELINE: Baseline refers to the datasets showcasing the current/present situation relating to the project, its associated systems and communities and forms the benchmark against which future progress can be assessed or compared.

CLIMATE CHANGE CONDITION: This refers to the change in the existing climatic condition such as 'Changing Temperatures', 'Changing Precipitation', 'Rising Sea Levels', and other events.

CLIMATE SCIENCE: Climate science investigates the structure and dynamics of earth's climate system. It seeks to understand how global, regional and local climates are maintained as well as the processes by which they change over time. In doing so, it employs observations and theory from a variety of domains, including meteorology, oceanography, physics, chemistry and more (Parker 2018).

CLIMATE RISK: The potential, when the outcome is uncertain, for adverse consequences on lives, livelihoods, health, ecosystems and species, economic, social and cultural assets, services (including environmental services), and infrastructure. (IPCC). Risk is expressed as the combination of **likelihood** and **consequences** of a climate event or shock and/or of climate change stresses (e.g. damages/losses, injury/death, service interruption). In addition to climate risks resulting from physical

climate hazards, there are **transition risks**. Transition risks are risks associated with a transition to a low-carbon economy (financial, political, legal, technology) (IPCC).

DOWNSTREAM: Systems and resources that are external to the project site and/or assets that will be impacted by the project and the project's performance.

EXPOSURE: The presence of people; livelihoods; species or ecosystems; environmental functions, services, and resources; infrastructure; or economic, social, or cultural assets in places and settings that could be adversely affected. (IPCC SRCCL, 2019). In other words, exposure refers to the inventory of elements in the area in which hazard events may occur (UNISDR), and that may be affected by the hazard event.

1. Exposure may be assessed, for example, by estimating the number of people, the value of assets, the number of critical systems (etc) in the area in which a hazard event may occur.
2. Exposure considers only whether an element is exposed to the hazard or not – it does not evaluate the type of impacts the element might suffer.

EXPOSED PARTIES: All infrastructure assets, systems, people, and natural ecosystems which are or can be influenced and/or impacted by various climate and/or non-climate related hazards within the project's physical and systemic boundaries.

HAZARD LIKELIHOOD: The potential occurrence of a natural or human-induced physical event or trend that may cause loss of life, injury, or other health impacts, as well as damage and loss to property, infrastructure, livelihoods, service provision, ecosystems and environmental resources. (IPCC SRCCL 2019).

1. Climate hazards can be **climate shocks** (high magnitude, low frequency such as hurricanes) or **climate stresses** (low magnitude, high frequency such as nuisance flooding).
2. Unlike other natural hazards, climate hazards are **dynamic** due to climate change. Future hazard conditions will be different from current ones.
    a. Climate change may make climate shocks **more frequent** and/or **more extreme**.
    b. Climate change may affect climate stresses by making regular conditions **more variable** and/or by **changing averages**.

PROJECT LIFESPAN: This term refers to the total time from the project planning phases to the implementation stage to the operations and decommissioning phases, including all intermediary steps in between.

RISK MANAGEMENT: The application of disaster risk reduction policies and strategies to prevent new disaster risk, reduce existing disaster risk and manage residual risk, contributing to the strengthening of resilience and reduction of disaster losses (United Nations Office Disaster Risk Reduction 2009).

RISK PREVENTION: Reducing exposure to the hazard and therefore reducing the likelihood that the risk event will occur.

RISK MITIGATION: While not reducing the exposure and likelihood that the risk event will occur, risk mitigation measures reduce the harm and losses if the event occurs.

RISK SHARING or POOLING: Establishing mechanisms whereby a group of parties facing the same risks share or 'pool' the costs of mitigation and recovery from risk events.

RISK TRANSFER: Transferring the costs of disruption, response, and recovery to an insurer or to capital markets, whether individually or as a risk pool.

SENSITIVITY: The physical predisposition of human beings, infrastructure, and environment to be affected by a dangerous phenomenon due to lack of resistance and predisposition of society and ecosystems to suffer harm as a consequence of intrinsic and context conditions making it plausible that such systems once impacted will collapse or experience major harm and damage due to the influence of a hazard event. (IPCC SREX Ch.2)

SHOCK: Shocks are events that cause an immediate and acute damaging impact. Covariate shocks such as natural disasters or spikes in food prices affect multiple households, communities or regions. Idiosyncratic shocks are smaller in scale - within a household, idiosyncratic shocks may include illness or death of a family member, loss of livestock or of employment.(Government of United Kingdom 2016)

STRESS: Stresses are often longer-term and chronic trends that have slow onset impacts and undermine existing systems over time (Government of United Kingdom 2016).

UPSTREAM: Systems and resources that are external to the project site and/or asset(s) and upon which the project's performance depends.

VULNERABILITY: The propensity or predisposition to be adversely affected by a climate change shock or stress, including climate variability and extremes. Vulnerability encompasses a variety of concepts and elements including sensitivity (or susceptibility to harm) and lack of capacity to cope and adapt. (IPCC). Vulnerability has two components:

1. **Sensitivity (Susceptibility or Fragility):** Physical predisposition of human beings, infrastructure, and environment to be affected by a dangerous phenomenon due to lack of resistance and predisposition of society and ecosystems to suffer harm as a consequence of intrinsic and context conditions making it plausible that such systems once impacted will collapse or experience major harm and damage due to the influence of a hazard event. (IPCC SREX Ch.2)
2. **Lack of Adaptive Capacity**: Limitations in access to and mobilization of the resources of the human beings and their institutions, and incapacity to anticipate, adapt, and respond in absorbing the socio-ecological and economic impact.

GUIDANCE (FOR PROJECT DEVELOPERS AND VERIFICATION PROFESSIONALS)

1. PROJECT DESIGN BRIEF, TEAM FORMATION, AND QUALIFICATIONS

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENT 1.1

In the preparation of the preliminary project design brief, the verification professional should confirm that:

1. The preliminary project design brief has identified, documented, and presented the following:
    a) Project goals and objectives;
    b) The direct location or site(s) boundaries of the project location or site(s) and all directly impacted areas, settlement, habitats, etc. including relevant maps and/or diagrams; (These are referred to below as the project's 'geographic boundaries'.)
    c) The assets, systems and resources that the project will either develop and/or alter within the project boundaries;
    d) The assets, systems and resources that are external to the project boundaries but upon which the project's achievement of stated goals and objectives (i.e., project performance) will depend, or that will otherwise be impacted directly or indirectly by the project; (These are referred to below as the 'systemic boundaries'.)
    e) Key project stakeholders
2. Based on the above documentation and using the table provided in **Appendix A** of the Guidance document, the project development team has identified and conducted an initial high-level 'climate importance' assessment indicating the general severity of climate hazards to the project area, site and/or assets, and the sensitivity of desired project performance to these hazards.

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO PREPARE THE PROJECT DEFINITION BRIEF TO COMPLY WITH REQUIREMENT 1.1

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Define Project Goals and Objectives** Why is this required: Clear definition of project goals and objectives will be used to assess climate risks, to determine risk management measures, and to inform the project conception process.	a) Identify the project type: 1. Infrastructure project with adaptation scope (e.g. transport project designed with adaptation in mind) 2. Non-infrastructure project with adaptation scope (e.g. agricultural project designed with adaptation in mind) 3. Adaptation project (e.g. nature-based solutions or climate infrastructure projects like flood barriers) b) What are the project's overall objectives and goals? c) What are the climate-related goals and objectives of the project, if any? In other words, how will the project address existing conditions related to climate risks?

STEP 2	**Define Project Boundaries** Why is this required: Direct exposure to hazards will at a minimum be evaluated for all assets, systems, settlements, persons, and livelihoods located within the project boundaries. Risk reduction and adaptation solutions will be informed by this analysis of hazard exposures within the project's geographic boundaries, considering what aspects are in direct control or other influence of the project.	a) What are the geographic boundaries of the project's direct investments and activities? Provide map(s) and/or diagrams. b) Within these project's geographic boundaries, what physical aspects are in control of the project? Consider the following categories and be as specific as possible: ● type and placement of buildings and infrastructure (e.g. impervious surfaces) ● type and placement of trees/landscaping/crops/water features/etc. ● topographic characteristics. c) What other non-physical aspects are in control of the project? ● Programming, access, usage ● Management, staffing, training (e.g. emergency preparedness planning)

STEP 3	**Define Associated Project Systems** Why is this required: The systems upon which the project performance depends and the systems that will be impacted by the project. Indirect (upstream and downstream) exposures to climate hazards and resulting climate risk will be evaluated using the definition of the systemic boundaries. While the project may not be able to directly address upstream risks, it is important to understand them and how to consider them in project design. Understanding downstream impacts allows for improved risk management outcome as well as the identification (and potential incorporation in the project) of co-benefits that may support broader societal resilience to climate change.	a) What are the systemic boundaries of the project, i.e., the upstream resources, systems, infrastructures, technologies etc upon which the project's ultimate performance is dependent? Consider the following categories and be as specific as possible in listing elements located outside of the project boundaries that would significantly impact the project's performance if threatened or eliminated: • Natural or industrial resource availability and/or quality • Infrastructure operations/capacity/ performance • Technologies, data • Territories, including natural areas and ecosystem services • Industries and livelihoods • Human resources capacity/availability b) What are downstream elements (including physical areas) that could be impacted (favourably or poorly) by the project's performance? Consider the following categories and be as specific as possible: • Land, territories, human settlements • Species and sensitive habitats

		• Environmental quality (e.g. air quality, ground water, deforestation, etc) • Infrastructure and industry • Technologies • Livelihoods and work/labour conditions
STEP 4	**Identify Project Stakeholders** Why is this required: Understanding adaptation stakeholders is the first step towards engaging them in identifying and understanding climate risks, and in addressing these risks.	Using existing data sources, stakeholder engagement methods, and secondary literature on the neighbourhood, list all key stakeholders who it is anticipated would be impacted by the project and/or could contribute to the project's successful performance over its lifespan. Consider, as applicable, stakeholders from the following categories: 1. Local Residential groups/ homeowner(s) associations/committees 2. Educational entities 3. Local businesses 4. Agricultural entities 5. Industrial units 6. Natural resource management units 7. Local community based organisations, and/or NGOs 8. Private sector 9. Commercial properties 10. Other(s)

STEP 5	**Determine the Project's Operational Lifespan** Why is this required: Projects must be adapted for a range of possible climate conditions and their related hazards, which may change over their useful life. It is important to know a project's useful life to adequately determine the climate change projections that should be considered when evaluating future climate risk.	a) What is the project's estimated operational lifespan (or useful life) over which it is expected to achieve the defined project goals and objectives?

STEP 6	**Assess Climate Importance** Why is this required: The project definition brief will also include an initial high-level 'climate importance' assessment indicating the general estimated severity of different climate hazards to the project and its desired performance. The climate importance assessment will be used to guide recommendations by the verification professional regarding robustness of data and analytical approaches required for the project hazard analysis.	Together with the Stakeholder Reference Group (refer to requirement 2.1), provide an assessment of the project's Climate Importance. This is an initial high-level assessment of the general severity of potential climate change conditions to the project and to the desired project outcomes. This 'climate importance' is distinct from the Hazard Analysis (refer requirements 3.1-3.3) and Risk Assessment (refer requirements 3.4-3.9) that will go into more detail on climate hazard-specific exposures and risks. **Note:** Use the table **'General Project Exposure to Climate Hazards vs General Consequences of Climate-Related Failure'** to accomplish this step (refer to **Appendix A**)

REQUIREMENT 1.2: TEAM QUALIFICATIONS – CLIMATE ADAPTATION LEAD

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 1.2 – 1.4

In determining compliance with the requirement, the verification professional should:

1. Confirm that the project team has identified, selected, and formalised the terms of participation, throughout the whole course of project development and implementation, of a **climate adaptation lead**. The climate adaptation lead

will have a university degree in a field relevant to climate adaptation or will have completed professional assignments relevant to local climate adaptation planning and project preparation.

2. Confirm that the project team has identified, selected, and formalised the terms of participation, throughout the whole course of project development and implementation, of a **climate science consultant** who has the adequate skills to provide guidance, depending on the project's climate importance, to the hazard analysis and to review the climate risk assessment.
3. Confirm that the project team has identified, selected, and formalised the terms of participation, throughout the whole course of project development and implementation, of a **local development consultant OR indigenous knowledge liaison**, who has a positive if not high standing relationship with the community(ies) directly affected by the project and who can serve as a liaison in facilitating indigenous knowledge inputs in the project development process.

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENTS 1.2 – 1.4

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Preliminary Review Stage:** The project team shall submit CV's to be evaluated by the verification professional to verify the following.	1. Project Team includes a **Climate Adaptation Lead:** a) Core project team includes one dedicated Climate Adaptation Lead who has a university degree in a field relevant to climate adaptation or has completed professional assignments relevant to local climate adaptation planning and project preparation.

		b) Relevant university degrees include the following: architecture, urban planning, civil or environmental engineering, environmental science, geoscience, emergency and disaster risk management, sustainable development, public policy or administration as well as other science-related, engineering or earth science fields. Relevant professional experience includes any projects involving natural hazard risk assessment or mitigation through project planning and/or design in which the DRM professional was actively engaged (leading or supporting) these aspects of the project. *If the project has a High Climate Importance, it is recommended that the Climate Adaptation Lead have both a relevant university degree and at least 5 years of relevant project experience.* 2. Project Team advised by a qualified **Climate Science Consultant**: a) For projects with a Low Climate Importance, the Climate Science Consultant reviews outputs of activities related to Hazard Analysis and Risk Assessment. For projects with a Medium or High Climate Importance, the Climate Science Consultant participates in data collection and analytical activities

		related to the Hazard Analysis and Risk Assessment in addition to reviewing outputs. The Climate Science Consultant has a university degree in a field directly tied to climate change adaptation and a minimum of 5 years of professional experience working on climate change adaptation projects or research. b) Relevant university degrees include the following: climate science, environmental science, urban planning, civil and environmental engineering, meteorology, geoscience or other science-related or engineering fields. Relevant professional experience includes projects involving climate hazard characterisation or analysis, climate risk assessment, or climate adaptation project planning and/or design in which the Climate Consultant was actively engaged (leading or supporting these aspects of the project). 3. Project Team advised by a **Local Development Consultant OR Indigenous Knowledge Liaison**: a) The project development team must identify the local communities including indigenous/tribal communities within the project boundaries, and identify a person who is respected by and

		knowledgeable of those communities to be part of the core team. The Local Development Consultant or, as relevant to the project, the Indigenous Knowledge Liaison must have had substantial experience working on shock(s) and/or stress(es) relevant to the affected community(ies) as well as have the ability to support the stakeholder engagement process of the project. The project team must document and consider the expert inputs provided by the Local Development Consultant in each of Stages 2-5 of the project to ensure acknowledgement and incorporation of local community and historical knowledge, especially under the 'no scientific data available' condition. In the instance that the project is influenced or impacted by Indigenous community issues, then the project team should engage a consultant who has trust and a successful track record of liaison with the relevant Indigenous community.
STEP 2	**Recommended Broader Project Team Knowledge & Skills**	Management, staffing, training (e.g. emergency preparedness planning) Additional recommended project team qualifications include:

		• **Design** (architecture, civil engineering, landscape design, urban planning) • Modelling, **data analysis**, GIS • Knowledge of **international best practices** related to the specific climate adaptation project domain (e.g. nature-based solutions, flood control, water and sanitation, etc) • **Cost-benefit analysis** related to climate adaptation and disaster risk reduction • **Monitoring and evaluation** related to climate adaptation / adaptive management
STEP 3	**Recommended Advisory Committee**	If the above project team areas of expertise are not able to be incorporated into the project team itself, it is recommended that an advisory committee be assembled to periodically review and advise on project development. The multi-disciplinary advisory committee should include local, national and/or international experts in relevant project topic areas (e.g. architectural design, landscape design, Indigenous knowledge, forestry, agriculture, coastal management, urban flooding, etc.) to complement the expertise on the team. This advisory committee is separate from the broader stakeholder consultation process of the project.

REQUIREMENT 1.5: Data Identification, Collection and Analysis

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR INDICATOR 1.5

In determining compliance with the requirement, the verification professional should:

1. Confirm that the project team has prepared a plan to identify, source, collect, and evaluate data sets required to analyse climate hazards and to assess climate risks relevant to the project goals, objectives and boundaries, under a range of possible future climate conditions. In the case that no data is available related to specific hazards, conditions or locations, then the project team has provided a detailed plan on how to compensate for lack of data by drawing upon local empirical events and trends and upon the knowledge and guidance of local experts and stakeholders to validate any assumptions to be made.

2. Confirm that the team has identified appropriate (*) strategies for collecting the best quality data for the project across all relevant categories listed (see STEP 1 in the guidance). If there are identified gaps or shortfalls in data acquisition, then provide suggestions to the team to address shortcomings.

   *(*) the term **appropriate** will depend on the Climate Importance of the project, and on the enabling conditions for a data-driven approach to climate hazard analysis and risk assessment. Projects with Medium or High Climate Importance and/or those located in contexts where data is more readily available should satisfy a higher threshold in terms of the type, comprehensiveness, accuracy and resolution of data collected or anticipated to be used on the project than for projects with a Low Climate Importance and/or where availability of and access to data is poor.*

3. Assess and verify the following when reviewing the Final Data Approach Report. (All questions must be answered in the affirmative to meet the requirement–see STEP 2 in the guidance below)**:**

   a) Has the team identified appropriate (*) strategies for identifying, evaluating, and collecting the *best quality data* for the project across all relevant data categories listed in the guidance? (Yes/No)

   b) In the instance that the best quality data cannot be accessed, has the project team taken appropriate (*) actions and utilised best efforts to obtain

other, *adequate data* for the project across all relevant data categories listed in the guidance? (Yes/No)

c) Has the project team identified and/or implemented appropriate (*) actions to address areas of data insufficiency or uncertainty across all relevant data categories listed in the guidance? (Yes/No)

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENT 1.5

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Preliminary Review Stage:** The project team submits preliminary data plan	Describe the project team's plan and sources (e.g. use of published research, access to government data sources, open data, surveying, stakeholder engagement, etc.) for collecting the following general categories of data and data sets (as relevant to the project) as well as any initial information regarding known sources of data. The data categories of interest are: • **Climate hazard and risk data, including the definition of baseline conditions**. Sources may include: science-based climate condition and hazard studies, reports, datasets and maps linked to project-relevant climate condition(s) • **Hazard data regarding other natural hazards relevant to the geographic boundary area.**

		• **Physical characteristics,** vulnerabilities, sensitivities, exposure of project-specific elements/scope • **Socio-economic data** on the different demographic groups and communities that will be affected by the project and by climate change within the project's geographic boundaries. • **Upstream and downstream interdependencies** of the project and project area within the systemic boundaries defined in the preliminary project definition brief. • **Relevant policies, plans, regulations and standards** related to project scope that must be followed or aligned to

** While not a requirement of the adaptation standard, it is also recommended that the Preliminary Data Approach Report include a brief description of the Project Team's **approach to data management**, including storage and information management system, analysis/modeling/integration software, quality control procedures, plans for dissemination and sharing as well as project team members responsible for each aspect of data management.

STEP 2	**Project Review Stage:** The Project team shall submit a Final Data Plan Report	• The Project team's updated plan for collecting data as well as initial information regarding known sources of data (including any stakeholder sourced data), addressing the preliminary comments received from the verification professional. • Description of the data collection process and list of related data/data sets collected for each data category. • Description of project approach to deal with incomplete/insufficient data and/or uncertainties for each data category.

** Optional: updated approach to data management

2. CLIMATE FOCUSED STAKEHOLDER EDUCATION

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 2.1 – 2.3

In determining compliance with the requirement, the verification professional should:

1. Building from the team qualification requirement 1.4, ensure that the project team has provided evidence of the identification of i) the local stakeholder groups within the project's geographic boundary that are most relevant to achievement of project objectives. These stakeholders are referred to below as the 'key stakeholder groups'. Furthermore, ensure that the project team has provided evidence of the identification of ii) the local stakeholder groups and communities that are most affected by the project and local climate change impacts.
2. Review and confirm evidence that the project team has constituted a Stakeholder Reference Group, with mutually agreed terms of reference, that is composed of representatives/liaisons from the identified key stakeholder groups. The mutually agreed terms of reference define who will be consulted by the project team at the different stages of project development, and how such consultation will be organised. Review and confirm documentation that the Stakeholder Reference Group has been informed and consulted regarding the project and the process for project development and preparation, and related methodologies, including on their role in the collection and/or interpretation of data and information about climate hazard exposures and vulnerabilities.
3. Review and confirm documentation of the provision of science-based educational sessions about the nature of i) the proposed project, ii) of climate change and climate trends, and about the physical, environmental, economic, and social impacts that these trends could have upon their region and locality, and iii) of the ways in which the project owner wishes to engage them in the project risk assessment and further project concept development. Review and confirm documentation of the concerns, issues, and perspectives shared by Stakeholder Reference Group members regarding the proposed project.

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENTS 2.1 – 2.3

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Conduct Stakeholder Education Sessions**	• An educational session or series of sessions should be organized and presented with **participation of the full project team and the project Stakeholder Reference Group** (as defined above). • The information provided in the session(s) shall include science-based information and presentation of key concepts on the nature of climate change and climate trends, and about the physical, environmental, economic, and social impacts that these trends could have upon the project-relevant region, locality, and the project site. • The presentation of the above information should be made with and/or by the Project Team's designated Adaptation Lead and/or qualified Climate Consultant and/or by the project's multi-disciplinary advisory committee consisting of local and/or international experts in relevant project topic areas (e.g. architectural design, landscape design, forestry, agriculture, coastal defence, urban flooding, etc.).

		• The educational session(s) and related educational materials shall be presented in the stakeholders' local and regional languages and convened at a time that does not interfere with livelihood activities of the Stakeholder Reference Group members. Reference group members of low-income and/or disadvantaged group backgrounds, or whose participation could expose them to safety concerns, shall be provided financial and/or logistical support to minimise economic burden and any safety risks.

STEP 2	**Develop project communication, consultation and engagement plan for stakeholders**	• In consultation with the project's Stakeholder Reference Group, the Project Team will prepare a plan that defines the ways in which identified project stakeholders will be informed, consulted, and involved in the following project development and design activities:
		  • Hazard analysis
		  • Vulnerability/adaptive capacity assessment
		  • Project concept and design development
		  • Final review stage for the project design
		  • Adaptive management plan
		• The stakeholder engagement plan will indicate when and how the

		project owner aims to engage stakeholders–including on occasion a broader group of community residents and/or stakeholder representatives– in the collection, review, and/or interpretation of data and other information on local climate risks, vulnerabilities, and adaptive capacity.

3. PROJECT CONCEPT DEVELOPMENT

HAZARD ANALYSIS, REQUIREMENTS 3.1 – 3.3

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 3.1 – 3.3

In determining compliance with the requirement, the verification professional should:

1. Confirm that the project team has considered the full range (see **Appendix B**, Table 1) of prospective climate change hazard types (including the acute or shock aspects and the chronic or stress aspects of each hazard **) and has provided a documented explanation for the inclusion or exclusion of each type of climate hazard in the hazard analysis.

   ** Please view the Key Concepts and Term Definitions section at the start of the document to understand more about 'Shock' and Stress'.

2. Receive and review completed local climate hazard summary tables for the project area (i.e., within the project boundaries) for both current and projected future climate conditions, confirming that these have been developed in consultation with the climate science consultant and/or technical advisors using both best available scientific data and local knowledge and event data.
3. Receive and review detailed summaries from the Climate Adaptation Lead or project owner(s), prepared with the support of the Climate Science Consultant and/or advisory committee, on the current and future climate hazards within the project boundary under a range of local climate change conditions. The hazard summaries should describe the potential of each hazard, under different identified conditions, to impact the project and stakeholders during the development and operation of the project over its operational lifespan, considering expected start of occurence of the hazards.
4. Receive and review summary statements from the Climate Adaptation Lead or project owner(s) that describe any non-climate related hazards to which the project area, site, and assets are currently exposed or could be exposed during the development and operation of the project over its operational lifespan.

5. Receive and review summary statements from the Climate Adaptation Lead or project owner(s) describing current or potential climate and non-climate hazards occurring within the project's identified systemic boundaries, prepared with the support of the Climate Science Consultant and/or advisory committee, which could impact the development and performance of the project over its operational lifespan.

STEP BY STEP GUIDANCE FOR THE PROJECT TEAM TO COMPLY WITH REQUIREMENTS 3.1 – 3.3

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT TEAMS (How)
STEP 1	**Determine Climate Hazard Identification Codes**	Using Table 1 provided in Appendix B, please review, edit, and add any relevant climate hazards and their associated IDs based on the 'ID naming Logic' provided in the Table 1 worksheet.
STEP 2	**Preliminary Climate Hazard Identification** <u>Why is this required</u>: A full review of all potential types of climate hazards, considering both climate change shocks and stresses, will help ensure that the full, multi-hazard nature of climate change can be accurately characterised for the project area and site, and for related exposed parties and assets.	In consultation with the Stakeholder Reference Group and any other technical advisors, complete the 'Preliminary Climate Hazard Identification' table using at a minimum the list of climate hazards on the following page, including an Initial Statement of Impact for each hazard considering both shock and/or stress impacts. **Note:** Using the Climate Hazard IDs table , please **complete the 'Table 2: Preliminary Climate Hazard Identification Worksheet'** to accomplish this step (refer to **Appendix B**)

STEP 3	**Current and Future Climate Hazard Data** Why is this required: Data and information about current and future climate hazard conditions is used to assess the current climate exposures that the project needs to address as well as to be able to understand the expected change in climate conditions relative to current conditions and related additional exposures or changes in exposures arising from these.	In consultation with any technical advisors, access and document the available science-based data or other findings for **current and future** conditions associated with each relevant climate hazard (e.g. current and future hazard maps, extreme heat and rainfall projections etc.) from reputable local, national and/or international sources. List the data and sources for each relevant hazard, indicating what is the scale/resolution of the data or other findings (e.g. site-specific, local, regional, national). If no science-based data or other findings are available, or if the scale/resolution is insufficient to guide analysis of hazards within the project's geographic boundaries, then identify and document what is the best alternative type of project-level hazard data or other empirical trend information available, such as historical event data, community resident surveys, etc. **Note:** Using the **'Current and Future Climate Hazard Data Summary Worksheet'** please complete table 3 provided to you (refer to **Appendix B**).

STEP 4	**Non-Climate Hazard Data** Why is this required: Climate hazards often combine with each other and with other non-climate hazards to establish the true risk profile of places, people, assets, and natural systems. For example, the design of a power supply system for a community that confronts only extreme storm risks would be very different from one that confronts both extreme storm and earthquake risks, particularly if there is a probability that both hazard events could happen in the same time span.	In consultation with the Stakeholder Reference Group and other technical advisors, prepare summary profiles of any non-climate hazards that could also impact upon project performance/success over its useful life, and which should be considered together with climate hazards in the later preparation of a multi-hazard project risk assessment. (*Consider reviewing Annex 6 of the UNDRR Hazard Definition and Classification List*) (UNDRR 2020). **Note:** Using the **'Non-climate Hazard Data Summary Worksheet'** please complete the table 4 provided to you (refer to **Appendix B**).

STEP 5	**Hazard Analysis Summary** Why is this required: Because there is inherent uncertainty in future climate change projections, when determining appropriate future hazards to be considered for project design, it is useful to use an 'ensemble approach' where multiple versions of climate projections are analysed using both science-based data and local knowledge and event data, and the project is designed to accommodate the range of conditions from the ensemble.	In consultation with each relevant Climate Change Condition, prepare a **Hazard Analysis Summary** considering all of the relevant hazards to be considered over the full expected useful life of the project. **Note:** Using the **'Hazard Analysis Summary'** please complete table 5 provided in the worksheet (refer to **Appendix B**).

STEP 6	**Final Hazard Analysis Report**	After completing all the hazard analysis tables, please develop a final Hazard Analysis Report for review by the Stakeholder Reference Group, and for submission to the verification professional, which includes information from the hazard analysis and the following items as they pertain to each exposed party identified. 1. List the geographic boundaries and systemic boundaries, and the assets, programs, and other project investments to be made with each of these contexts. 2. Provide maps/diagrams of the project with its geographic boundaries. 3. For each hazard that was analysed describe a. the sources of natural science, social science, and non-science (e.g., qualitative and anecdotal) data and information used in the analysis b. the level of confidence in hazard projections used, considering the availability and quality of science-based data. 4. With reference to each of the hazards analysed, identify the exposed parties (e.g., groups, communities, settlements, assets,

		habitats/species, etc) that will be exposed to the hazard. 5. For each exposed party, relative to each hazard, indicate the time scale of expected exposure. 6. Appendix: Please insert all hazard analysis tables in a legible manner

PROJECT RISK ASSESSMENT, REQUIREMENTS 3.4 – 3.8

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 3.4 – 3.8

In determining compliance with the requirement, the verification professional should further ensure that:

1. The project team has completed a comprehensive risk assessment for the climate hazards to which the communities, groups, people, assets, facilities, systems, habitats, species, and livelihoods (henceforth, 'the exposed parties'), either within the defined project boundaries or related to one of the project's performance objectives, are exposed. In doing so the risk assessment has factored climate hazards within the project's defined geographic boundary and within its systemic boundaries as identified in 3.3.
2. Relative to each hazard and considering the different climate hazard conditions in the Hazard Analysis Report, the risk assessment evaluates the nature of impacts, the likelihood of impacts, and the impact consequences for each exposed party.
3. The assessment of impact consequences for each exposed party considers both the sensitivities and the adaptive capacities of each party.
4. The likelihood and consequences of multi-hazard events involving more than one climate change hazard event and/or other non-climate hazard events has been considered.

STEP BY STEP GUIDANCE FOR PROJECT TEAMs TO COMPLY WITH REQUIREMENTS 3.4 - 3.8

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT TEAM (How)
STEP 1	**Tabulate the Identified 'Climate Hazard conditions' against each exposed party and Create Worksheets**	1. Using the 'Summary of Risk Assessment' table in the Risk Assessment worksheets, please list all Climate Hazards under the 'Climate Change conditions' columns and all identified exposed parties in the relevant Sections. 2. Using the Hazard Analysis Summary Table, against each exposed party, mark 'x' under the hazard conditions to which each party is exposed. 3. To identify the risks, please create copies of the Risk Assessment worksheets provided to you, for each exposed party with separate tabs for each of the hazard conditions to which that party is exposed. Primary concerns of exposure are harms (e.g., to health and safety) and losses (e.g., to assets, livelihoods, incomes). **Note**: Refer to Appendix C, Table 1 to complete this step.

STEP 2	**Document and describe all <u>exposures</u> for each exposed party** <u>Why is this required</u>: The exposure to a hazard, and the identification of who and what aspects are exposed, is a primary factor in determining risk. The purpose of this step is to identify and document for each exposed party, all of the climate hazards to which that party is or will in the future be exposed. This should be completed, minimally, for each exposed party within the project's geographic boundaries.	Determination of the nature and degree of exposure to hazard impacts may be undertaken using qualitative or quantitative methods, depending upon the science and data available. Either way, the evaluation of exposure for each of the considered parties should consider direct exposure within the project boundaries as well as systemic exposures, if any. Again, the priority interest is impacts that cause harms and/or losses. In each hazard condition tab of the 'Exposed Party', please input the following in a sequential order: 1. Input name of all relevant Climate Hazard Conditions along with the exposed parties under the 'NAME AND LEGEND' section. 2. Get acquainted with the Legend on 'Likelihood of Potential Impact', 'Consequence', and 'Risk Screening Matrix'. 3. **Complete the 'EXPOSURES AND TIMELINES' section:** Based upon the hazard conditions specific to the project's geographic and systemic boundaries and referencing the Hazard Analysis Report Summary Table, the project team should list all relevant exposures under 'Considered Exposure' and then provide a description of the exposures on relevant parties. While doing so, keep in mind the following

		questions to identify and document key exposures: a) Who is exposed (e.g., persons, communities, groups, species)? Is it possible to quantify the exposure (e.g. number of people, number of homes)? b) What (specific assets, habitats, upstream resources or supply systems, businesses and livelihoods etc) is exposed? Is it possible to quantify the exposure (e.g. value of assets, service coverage, level of utilisation and reliance on an infrastructure)? For both questions, explicitly identify and highlight exposures related to historically disadvantaged population groups (based on race, ethnicity, gender, age, socio-economic conditions, etc) that might contribute to unequal and greater risks due greater vulnerability (i.e., higher sensitivity and/or lower adaptive capacity) to those hazards. In addition to direct exposures within the project boundaries, consider the systemic exposures of upstream resources and systems upon which that party is dependent. Also consider the exposures of groups or communities 'downstream' or external to the project area who would be

		impacted by climate hazard events within the project boundaries. Example of direct exposure within the project's geographic boundaries: ● A high-value asset located in the project boundary that might be impacted by a hazard event. Example of upstream exposure within the project's systemic boundaries: ● A power transfer station located outside of the project boundary, damage to which would compound harms and losses within the project boundary or area. Example of downstream exposure: ● A high-density informal settlement that is adjacent to the project area that would be impacted by the failure or poor performance of the project. 4. Determine the 'Timeframe of the potential impact of the hazard condition' a. Current/In Next 5 years b. 5-15 years c. 15 + years 5. The final step in this process is to provide a score for each considered exposure, using the 'Likelihood of Potential Impact' Legend on the top of the sheet. Please refer to the hazard analysis summary table's confidence level column as well as input from various stakeholders to assess the

		likelihood of occurrence of the hazard condition. The score is developed on a scale of 1-5, with: a. **1 = Improbable**: So unlikely that it can be assumed that the hazard condition may never be experienced. b. **2 = Remote:** Unlikely but possible to occur several times over the life of the project-related asset, system, place etc. c. **3 = Occasional:** Will occur sometime over the life of the project-related asset, system, place etc. d. **4 = Probable:** Will occur several times or cumulatively over the life of the project-related asset, system, place etc. e. **5 = Frequent:** Likely to occur on an annual, seasonal, or otherwise regular basis. 6. Final score will be calculated automatically as the 'Median'. If the score is in decimal, please round up to the nearest highest number. **Note**: Refer to Appendix C, Table 2's 'EXPOSURES AND TIMELINES' section to complete this step.

STEP 3	**Document and describe all <u>vulnerabilities (sensitivities and adaptive capacities)</u> for each exposure** <u>Why is this required</u>: In addition to likelihood of hazard exposure, the vulnerabilities of the exposed parties and assets are another key determinant of potential harm or losses (i.e., risk). There are two aspects of vulnerability: sensitivity and adaptive capacities. **Sensitivity is:** physical predisposition of human beings, infrastructure, and environment to be affected by a dangerous phenomenon due to lack of resistance and predisposition of society and ecosystems to suffer harm as a consequence of intrinsic and context conditions making it plausible that such systems once impacted will collapse or experience major harm and damage due to the influence of a hazard event. **Adaptive Capacity is:** capacity to anticipate, adapt,	For each of the identified exposed assets/systems/parties, the project team shall identify and document the characteristics and extent of sensitivity and adaptive capacities to the considered climate hazards conditions, identified in the 'Exposure section' above. In the 'Description of Vulnerability (Sensitivity aspect), the project team should identify and describe the characteristics of sensitivity, keeping in mind the following questions: • What are physical or environmental sources of sensitivity? In other words, what physical characteristics are likely to create more severe impacts due to the climate hazard? • What other (social, economic, political, cultural) sources of sensitivity are likely to exacerbate impacts of the event or reduce the ability to cope or recover from the event? <u>For both questions,</u> explicitly identify and highlight the sensitivities of historically disadvantaged population groups (based on race, ethnicity, gender, age, socio-economic conditions, etc) that might contribute to unequal and greater harm and losses due to the relevant climate hazards and within/associated with the project's site and systemic boundaries. Examples of physical or environmental sources of sensitivity:

	and respond in absorbing the socio-ecological and economic impact based on one's socio-economic and political standing.	• For flood risk: topographic conditions (e.g. low-lying areas); quantity of impervious surfaces; deforestation • For drought: crops that are sensitive to drought • For extreme heat: urban environments with large areas of asphalt or dark surfaces Examples of social vulnerabilities and sensitivities: • Low security of housing tenure and quality of housing • Lack of insurance coverage, low financial balances, or poor access to funds • History of discrimination and/or belligerent treatment of minority groups (in terms of race, caste, religion) by local authorities and/or other community members • Low legal and social status of women, LGBTQIA+ Following the above the project team's initial identification of sensitivities, the project team shall then seek input and validation from the Stakeholder Reference Group and any other stakeholders to complete the sensitivity assessment. Next, determine the level of adaptive capacity of the relevant asset/system/party in relation to the considered exposure over three scales: low, medium, and high. Many socio-

		economic and political factors would determine the adaptive capacity of a particular asset/system/party. So, consider the following factors while evaluating the adaptive capacities: 1. Possession of knowledge and information, including knowledge co-production and sharing (e.g. level of education, skill sets, access to data and data management systems) 2. Access to assets (e.g. infrastructure, land, natural resources, materials, technology, human resources) and financial resources (e.g. access to capital, insurance, wealth, GDP) to prevent or reduce harm and losses and recover rapidly 3. Existing community capital, social cohesion and formal or informal networks for mutual response and recovery support 4. Relevant institutional and governance capacities across scales to anticipate, incorporate and respond to evolving risk (e.g. experience of leaders, existence of emergency response or business continuity plans, policies and regulations that support disaster risk management and rapid recovery) 5. Demographics and health conditions (e.g. age, gender, health conditions, access to health care, presence of infectious disease)

		Examples of social, economic, political or cultural vulnerability arising from low adaptive capacity: ● For flood risk: homeowners without flood insurance ● For drought: populations without access to alternate sources of water or rural, isolated communities ● For extreme heat: neighbourhoods without access to easy green spaces/shade; communities with aging populations **Please note:** The assessment to determine the adaptive capacity of an asset/system/party is qualitative in nature and hence input from the stakeholder reference group as well scientific and demographic studies should influence the final evaluation of the capacity to adapt. **Note**: Refer to Appendix C, Table 2's 'VULNERABILITIES, CONSEQUENCES AND RISK RATING' section to complete this step.

STEP 4	**Determine the consequence of the exposure on the relevant party**	Using the vulnerability assessment you conducted above, evaluate the impact a particular considered exposure would have on the asset/system/party and determine the consequence. Refer to the 'Consequence' legend to determine the appropriate category for the exposure: 1. **Marginal:** The event commonly results in minor or less than minor, ecosystem and asset/system/party damage requiring repair or restoration, or operational losses that cannot be recovered. 2. **Moderate:** The event may commonly cause limited but potentially costly disruption to operations and system productivity, and require repairs or restoration, but these can be counteracted or controlled without major system damage. 3. **Critical:** The event may commonly cause severe injury or illness and/or major ecosystem, asset/system/party damage, thereby causing cessation of operations and requiring emergency services, and costly repairs and/or reconstruction and extended recovery to previous system productivity. 4. **Catastrophic:** The event may commonly cause death and/or major ecosystem, asset or system destruction, thereby ceasing all

		operations for an extended period, requiring extended emergency services, and costly and extended reconstruction. **Please note:** The assessment to determine the consequence of an exposure is qualitative in nature and hence input from the stakeholder reference group as well scientific and demographic studies should influence the final evaluation.

STEP 5	**Conduct and determine the cumulative Risk Rating for the exposed party given the hazard exposure conditions pertinent to that party.**	To determine the cumulative risk rating of all the considered hazards, you will refer to the 'Risk Screening Matrix' in the spreadsheet. Use the final score from the 'Exposures and Timelines' section of the worksheet and the 'consequence' rating to determine the level of risk with the considered exposures and vulnerabilities. In the event that every considered hazard has a different consequence level, making it difficult to determine the aggregated consequence, the project team in collaboration with the stakeholder reference group must use their best judgement based on the scientific studies, hazard, exposure, and vulnerability analysis to finalise the 'consequence level' Input the identified rating in the appropriate cell as: *'On a scale of 1-25, without implementation of adequate risk management measures, the risk associated with this aspect of the project ranks as (low/medium/serious/high) + (score)'.* Color the cell based on the legend. **Repeat this process for each hazard condition and each of the exposed parties** **Please Note:**

		For projects with High Climate Risks, it is recommended that a professional climate risk assessment is procured. A professional climate risk assessment is a *quantitative* risk assessment performed by an experienced professional in disaster risk management. Professional risk assessments should consider the potential for **multi-hazard effects** in which other climate hazards, or non-climate hazards, interact to increase risk (e.g. forest fires increasing flood hazard). For non-climate hazards identified in the hazard analysis, although not a requirement of the adaptation standard, it is recommended that a similarly robust approach be used to assess those risks, keeping in mind that climate hazards may increase the risk of non-climate hazards (e.g. drought conditions making the risk of fire greater). **Note**: Refer to Appendix C, Table 2's 'VULNERABILITIES, CONSEQUENCES AND RISK RATING' section to complete this step.

STEP 6	**Document results of these risk assessments in the 'Summary of Risk Assessment' tab of the workbook**	Revisit the Summary tab and input all the risk rating under the relevant hazards for each exposed asset/system/party with relevant colors and risk ratings (low/medium/serious/high) + (score 1-25) **Note**: Refer to Appendix C, Table 1 to complete this step.

THE PROJECT DESIGN BRIEF, REQUIREMENTS 3.9 – 3.10

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 3.9 – 3.10

In determining compliance with the requirement, the verification professional should ensure that:

1. The submitted Project Design Brief covers the topics specified in requirement 3.10, incorporating data, information, findings, and conclusions derived from the Hazard Analysis Report and the Project Risk Assessment Report.
2. The process used to prioritize risks to be addressed in the project design weighs the level of risk, the degree of societal/stakeholder concern about the risk, and the potential cost of mitigating the risk. The risk prioritization process therefore generally requires engagement with the Stakeholder Reference Group and other stakeholders to accurately evaluate the level of concern about each risk.

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENTS 3.9 – 3.10

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1 (3.9)	**Decide on the identified risks that will be given priority consideration in the project design.** Why is this required: The risk assessment may likely have identified a wide range of climate risks of varying probability and consequences. Given the available resources, the level tolerability for different risks, and the complexity potentially involved in trying to reduce or mitigate all risks, the project team will likely need to determine which climate risks will receive priority consideration for near-term reduction or mitigation in the project design.	The project team together with the Stakeholder Reference Group will evaluate which risks should receive priority consideration in designing the project. An ALARP (As Low As Reasonably Practical) approach is recommended for such prioritization. An ALARP approach weighs the risk (and associated potential losses) against the sacrifice (and associated potential costs) needed to reduce the risk to an acceptable degree. There are three factors in an ALARP evaluation of any risk to be addressed: 1) level of risk as determined in the risk assessment process, 2) degree of societal/stakeholder concern about the risk, and 3) cost of alternative risk management measures to address the risk. Risks can be categorized as follows: **Unacceptable Risks:** Risk reduction is essential regardless of cost. Unacceptable risks typically include those with **catastrophic consequences** and that have relatively near term probability.

		Critical Risks: Risk reduction and/or mitigation is essential regardless of cost. Critical risks typically include those with emergency impacts with **critical consequences** and likelihood within a 10 year period. **Manageable Risks:** Risks with **moderate consequences** for which risk reduction and/or mitigation are recommended, but with reference to cost and existing stakeholder concern. These risks should be managed and monitored to change in status. **Acceptable:** Risks with **marginal consequences** to be managed directly by affected stakeholders. • Eliminating unacceptable and critical risks to the extent possible is a reasonable focus in the project design process. • ALARP differs from Benefit-Cost Analysis. The ALARP process does not primarily focus on balancing the costs and benefits of measures. Rather it focuses on ensuring that measures are considered in the project design process except where they would involve grossly disproportionate sacrifices. Typically, in project design, a decision about a measure is weighted towards adoption, because

		the presumption is that the adaptation project owner has a primary duty to reduce risk under a range of future climate conditions. The costs or sacrifice of the risk reduction measure would need to be unreasonable, or grossly disproportionate in consideration of the benefits of risk reduction that would be achieved.
STEP 2 (3.9)	**For the selected priority risks, agree upon project performance targets for reduction and/or mitigation** Why is this required: Determination of targeted risk reduction or mitigation for each priority risk provides an important guide to the project team and its technical advisors regarding project design elements.	For the prioritised risks, define the desired targets for risk reduction and/or mitigation outcomes. These targets will be used to evaluate alternative risk management measures during the project design process. For all other identified, lower priority climate risks, indicate any management objectives to be considered during the project design process.
STEP 3 (3.10)	**Prepare a Design Brief to guide the project design process (Requirements 4.1 - 4.5)** Why is this required: The Design Brief serves as a comprehensive point of	On the basis of the hazard analysis, risk assessment, and prioritisation of risks, prepare a document that will guide the project design process and selection of project risk reduction and mitigation measures.

	reference for technical design team members and stakeholders as they work together to identify and evaluate the range of alternative project measures and designs that would fulfil project objectives and climate risk reduction targets.	The design brief is prepared by the project team. The contents to be included in a design brief are indicated in Requirement 3.10.

4. TECHNICAL PROJECT DESIGN AND PLANNING REQUIREMENTS

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 4.1 – 4.3

In determining compliance with the requirement, the verification professional should ensure:

1. The project development team has provided sufficient evidence detailing the project design process which has considered risk prevention, mitigation, and/or management approaches to overcome intolerable and critical risks for each of the related at-risk parties or assets, as identified in the risk assessment.
2. Stakeholders involved in the compliance process of Requirement 3, have been again invited to take part in designing innovative project concepts in relation to the identified priority risks.
3. Documentation of project's materials and equipment, technologies, supporting infrastructure, utility, and services systems has been provided with explanation of project's performance under extraordinary circumstances.

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENT 4.4

In determining compliance with the requirement, the verification professional should ensure that the project team has conducted a thorough assessment of project approval, timeline, implementation requirements, along with national, sub-national and local climate plans/policies and provided documentation of proposed reforms or amendments required for implementation of the project design.

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENT 4.5

In determining compliance with requirement 4.5, the verification professional should ensure that the project team has estimated, or engaged technical professionals to estimate, the reduction in harms and losses to each of the at-risk parties, assets, or habitats related to the risks being addressed in the project design. Estimates of avoided harms and loss for each at-risk party, asset, or habitat should be made with reference to each of the considered climate conditions. These estimates and related

loss prevention targets may be expressed in a variety of indicator terms (i.e., are not all required to be expressed in monetary terms) that are relevant to the nature of each risk and at-risk party. To enable effective project impact monitoring, the indicators used to express avoided harms and losses should be defined in ways that enable periodic, cost-effective measurement.

STEP BY STEP GUIDANCE FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENT 4.5

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Use the findings and information documented during the risk assessment process (Requirements 3.4 – 3.9) to estimate the anticipated losses and harms under the 'No Adaptation Project Condition (baseline)' for each of the identified at-risk parties under each defined climate conditions** Why is this required: Avoided losses estimations facilitate 1) the attraction of investment in the project by investors seeking to address climate change impacts and 2) establish a framework for monitoring of project's	Requirement 4.5 involves the definition of qualitative, quantitative, and to the extent possible the budgetary or financial benefits associated with implementation of the adaptation project, as designed. The first step in making such an estimation is to document the range of harms and losses anticipated, under each climate condition, related to each of the risks being addressed in the project's design. Estimates related to each risk should be made for each of the identified parties (i.e., including people, livelihoods, assets, habitats, ecosystem services etc) facing that risk. The estimation for each at-risk party will require establishing agreement on measures or indicators for harms and/or losses that pertain to each of the identified at-risk parties. The choice of a

	benefits and its adequacy in reducing or mitigating the impacts of climate change.	measurements or indicators typically should factor: ● The data that is and will be repeatedly available to determine the actual level of harms and/or losses at any point in time. ● The level of technical support that will be required and available to gather data about current indicator values and to make projections about the expected harms and/or losses using that indicator, in particular when seeking to quantify and/or monetize projected harms and losses ● The indicators that are most salient to the public, decision makers, and investors when making their decisions. Once indicators are selected for each at-risk party, the project team together with stakeholders and technical advisors should complete a table with estimates of the expected harms and losses under each climate condition, for each party, under the No Adaptation Project Condition (baseline). **Note:** Use the **'Documentation of expected losses' table** to record the conclusions of this step (refer to **Appendix D**)

STEP 2	**Considering the risk management measures that will be implemented through the project, estimate the anticipated losses and harms for each at risk party under each defined climate conditions when the project is delivered (i.e., the Climate Adapted Condition)** <u>Why is this required:</u> The estimation of anticipated harms and losses under both the No Adaptation Project Condition (baseline) and the Climate Adaptation Project Condition enables estimation of harms and losses that will be avoided through implementation of the project.	After establishing the harm and loss estimates for each relevant at-risk party under No Adaptation Project conditions (baseline), use the same measurements or indicators together with data and findings from project design process (Requirements 4.1 to 4.3) to estimate the losses and harms for each at-risk party once the project is fully implemented. Estimate harms and losses for each of the climate conditions. The project team together with stakeholders and technical advisors should complete a table with estimates of the expected harms and losses under the Climate Adapted Condition. **Note:** Use the **'Documentation of expected losses' table** to record the conclusions of this step (refer to **Appendix D**)

STEP 3	**Complete calculation and documentation of the avoided losses and harms under the Climate Adapted condition**	Condition indicates the extent of harm and loss prevention or reduction to be achieved through project implementation. Investors and decision makers may also require estimation of the related costs for achieving or maintaining the avoidance of harm and loss related to each adaptation measure that is incorporated into the project. Investors may require a present value calculation of the value of the avoided losses over the functional life of each project measure. However, expression of harm and loss prevention in monetary terms is not a requirement of compliance with the standard. If a monetary estimate of harm and loss avoidance is undertaken, it is recommended that these estimates also factor any revenues, increased incomes, and/or increased asset values that may arise due to implementation of the adaptation measures. These economic benefits provide further justification to investors and decision makers for bearing the costs of harm and loss reduction. They may even provide a return on investment. Finally, a project that is designed with creativity will also provide non-adaptation and non-revenue co-benefits that are not directly associated with climate risk management. For instance, a measure to reduce flooding can also be designed to

		provide a green space amenity. Investors and decision makers may wish to consider the full range of non-revenue benefits associated with bearing the costs of adaptation measure **Note:** Use the **'Calculation of Avoided Losses table'** to record the conclusions of this step (refer to **Appendix D**) and indicate the type of information that the project team will seek to provide in building the case for project investment and for approvals by decision making authorities.

5. PROJECT GOVERNANCE AND ADAPTIVE MANAGEMENT

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 5.1 – 5.2

In determining compliance with the requirement, the verification professional should ensure:

1. The project development team has provided documentation of a project monitoring plan detailing monitoring and evaluation methodology to be applied at least bi-annually during project implementation and post-implementation operations to track the effectiveness of risk reduction measures, status of projected co-benefits, and avoided harms and losses outcomes relative to those estimated.
2. The team has explained the process that will be instigated in the instance that targeted risk reduction/mitigation and avoided harms and loss outcomes are consistently and/or substantially not being achieved, which process will be

adequate to engage stakeholders and investments to augment and adapt risk reduction measures in particular due to changing climate conditions.

STEP BY STEP FOR PROJECT OWNERS TO COMPLY WITH REQUIREMENT 5 (5.1 – 5.2)

STAGE	DESCRIPTION OF REQUIRED APPROACH (What)	GUIDANCE FOR PROJECT OWNERS (How)
STEP 1	**Referencing the targeted levels and reductions in harms and losses associated with the project's risk management measures, define indicators and indicator values that will trigger re-convening of project owners, users/stakeholders, and investors to consider options for adapting the project's elements**	There are two aspects to preparing an adaptive management framework. The first is to define indicators of performance (i.e., exposure/event probability, vulnerability, harm and loss reduction) that will be used to monitor the accuracy of projected climate conditions and the success of the adaptation project measures in managing climate risks. The second aspect is to establish indicator values or thresholds of acceptable outcome levels below which the project team and stakeholders agreed to re-evaluate the effectiveness of measures and to consider project changes and additions. **Note:** Use the **'Adaptive Management/Trigger Conditions Table'** to accomplish this step (refer to **Appendix E**)

GUIDANCE FOR VERIFICATION PROFESSIONALS FOR REQUIREMENTS 5.3 – 5.4

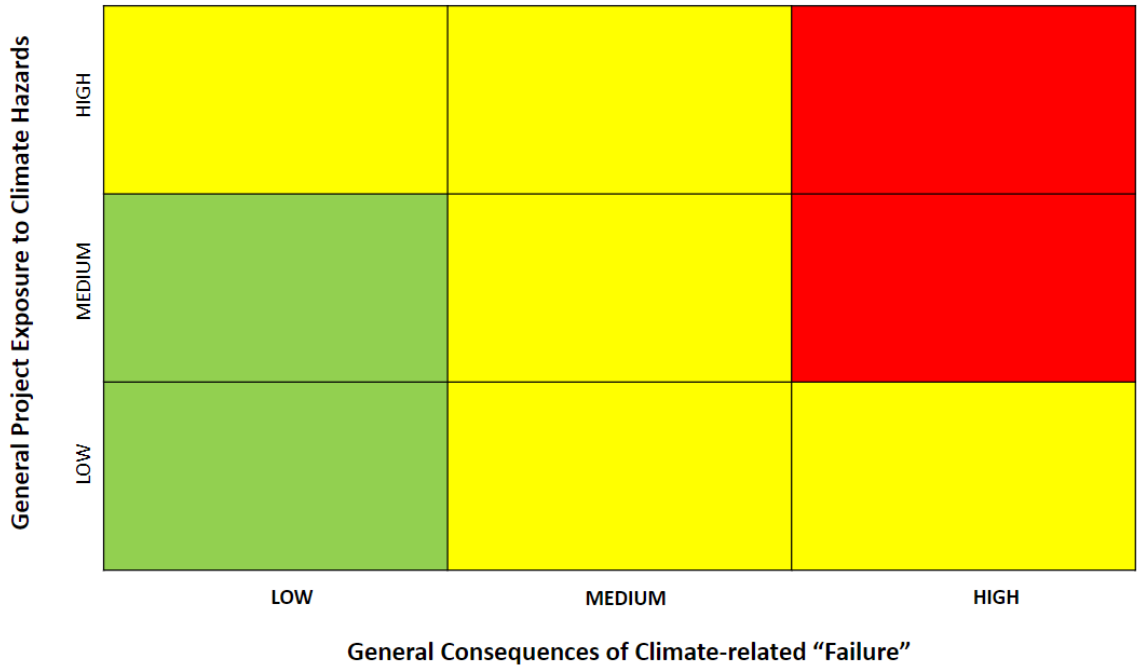
In determining compliance with the requirement, the verification professional should review documentation and have discussions with the project team and with selected, relevant policy and regulatory authority officials, property owners, and investors to confirm whether approvals and agreements needed to fully implement the project as designed. In the instance that approvals and agreements are not yet secured, the verification professional should obtain information required to determine with confidence that the project team has prepared and submitted the required approvals applications and/or other agreements required.

As part of the above evaluation of approvals and agreements for full project implementation, the verification professional should identify whether the project team has made best efforts to determine if amendments, modifications, or reforms are required to plans, regulations, policies, standards or other legal procedures to enable project implementation as designed. In the instance that such amendments or reforms are required, the verification professional should determine whether proposals have been submitted to and/or adopted by the relevant local, regional, and national governing and regulatory bodies.

In the instance that policies, plans, regulations etc do not enable implementation of the project as designed, and that reforms to overcome these barriers are deemed unlikely, then the verification professional should confirm that the project team has established a plan for adapting the project design to achieve similar levels of risk reduction and mitigation in ways that are in accordance with official requirements.

APPENDIX A

REQUIREMENT 1.1: Use the table 'General Project Exposure to Climate Hazards vs General Consequences of Climate-Related Failure' to accomplish this requirement.



IMPLICATIONS OF CLIMATE IMPORTANCE CATEGORY:

High Climate Importance: recommend following a more rigorous, quantitative approach to hazard analysis and risk assessment, even if it requires greater project resources.

Medium Climate Importance: recommend following a more rigorous, quantitative approach to hazard analysis and risk assessment, unless resources and capacity preclude this.

Low Climate Importance: minimum, qualitative approaches to hazard analysis and risk assessment are acceptable

APPENDIX B

Using the following tables please **complete the 'Hazard Analysis' Requirements (3.1-3.3)** and present the documented data in a single PDF as part of the larger documentation process for verification purposes.

TABLE 1: Climate Hazard Identification Codes

PLEASE NOTE: Every condition's hazard type can have more than 1 occurrences. For example, it is possible that in X region where the project is located, there might be two heat and cold events resulting in different conditions. For such instances use CTHC.1 for the first condition and CTHC.2 for the second and so on and so forth. In case you have a hazard type not part of the list below, please create a new line in the relevant section and add in a new ID. **Logic for the ID:** (Initials of the climate change condition + initials of the hazard type) + 1,2.....

Climate Change Conditions	Hazard Type	Hazard ID
CHANGING TEMPERATURE	Heat and/or Cold	(Heat)CTH.1, CTH.2, … OR (Cold) CTC.1, CTC.2…
	Sea surface temperature	CTST.1, CTST.2…
	Air Quality Reduction	CTAQ.1, CTAQ.2…
CHANGING PRECIPITATION	Increased rainfall Intensity	CPIR.1, CPIR.2..
	Delayed Rainy Season Onset	CPDR.1, CPDR.2,
	Extreme Rainfall during El Niño events	CPER.1, CPER.2,...
	Drought during La Niña events	CPDL.1,CPDL.2, ...
SEA LEVEL RISE	Coastal Flooding	SRCF.1, SRCF.2, …
	Coastal Erosion	SRCE.1, SRCE.2, …
OTHER EXTREME EVENTS	Ocean acidification	OEOA.1, OEOA.2...
	Climate Related Disease Outbreaks	OEDO.1, OEDO.2....
	More Frequent El Nino Events	OEME.1, OEME.2…
	Sandstorms	OESS.1, OESS.2…

	Windstorms	OEWS.1, OEWS.2…
	Arctic and Glacier Melt	OEAG.1, OEAG.2…
	Biodiversity Loss	OEBL.1, OEBL.2…
NON-CLIMATE HAZARDS	Pluvial Flooding	NCPF.1, NCPF.2…
	Invasive Species	NCIS.1, NCIS.2….
	Landslides	NCLS.1, NCLS.2…

TABLE 2: Preliminary Climate Hazard Identification

Please fill out both the table below to the best of your knowledge. Feel free to add rows within each section if needed. (examples in RED--please remove in your analysis)

Definitions:

Shock: Shocks are events that cause an immediate damaging impact. Covariate shocks such as natural disasters or spikes in food prices affect multiple households, communities or regions. Idiosyncratic shocks are smaller in scale - within a household, idiosyncratic shocks may include illness or death of a family member, loss of livestock or of employment.

Stress: Stresses are often longer-term trends that have slow onset impacts and undermine existing systems over time

Climate Change Condition	Related Climate Hazards	Climate Hazard ID	Relevance to the Project (Relevant project, Relevant system, not relevant)	Initial Statement (brief description) of Impact for Relevant Shock on the Project and/or System	Initial Statement (brief description) of Impact for Relevant Stress on the Project and/or System
CHANGING TEMPERATURE					
CHANGING PRECIPITATION					
RISING SEA LEVEL					
OTHER EXTREME EVENTS					

TABLE 3: Current and future Climate Hazard Data Summary

Please fill out both the tables below to the best of your knowledge. Feel free to add rows within each section if needed. Each hazard condition could be an ongoing and current issue and/or a future threat or both. So please fill all the appropriate columns as needed.

Climate Change Conditions Categories	Climate Hazard ID	Current Climate Hazard	Future Climate Hazard	Provide a description of the hazard as a type of shock/stress or both based on the given definitions of shocks and stresses	Science-based hazard data and source(s)	Scale of data	Notes on condition assumptions and time horizon (level of conservatism)	Non-science based data and source(s) or approach	Proposed approach to addressing insufficient data	Recommended consideration in risk assessment
CHANGING TEMPERATURE										
CHANGING PRECIPITATION										
RISING SEA LEVEL										
OTHER EXTREME EVENTS										

TABLE 4: Other Non-Climate Hazard Data Summary

Hazard Type	Hazard ID	Provide a description of the hazard as a type of shock/stress or both based on the given definitions of shocks and stresses	Science-based hazard data and source(s)	Scale of data	Non-science based data and source(s) or approach (or proposed approach to addressing insufficient data)	Potential multi-hazard effect with other identified hazards

TABLE 5: Hazard Analysis Summary

Climate Change Condition	Climate Hazard ID	Climate Change Conditions Categories	Current Climate Hazards	Scale of data	Future Climate Hazards	Scale of data	Confidence of Future Projections	Relative Immediacy of Impact	Non-science based data and source(s) or approach	Direct Exposed Parties & Assets	Indirect Exposed Parties & Assets	Contemporaneous impacts	Climate condition Summary Statement	Recommended Risk Assessment treatment
CHANGING TEMPERATURE														
CHANGING PRECIPITATION														
SEA LEVEL RISE														
OTHER EXTREME EVENTS														

NON-CLIMATE HAZARDS														

APPENDIX C

Using the following tables please **complete the 'Risk Assessment' Requirements (3.4-3.9)** and present the documented data in a single PDF as part of the larger documentation process for verification purposes.

RISK ASSESSMENT LEGEND

Likelihood of Potential Impact				CONSEQUENCE	
5	**Frequent**	Likely to occur on an annual, seasonal, or otherwise regular basis		**Marginal**	The event commonly results in minor or less than minor, ecosystem and asset damage requiring repair or restoration, or operational losses that cannot be recovered.
4	**Probable**	Will occur several times or cumulatively over the life of the project-related asset, system, place etc		**Moderate**	The event may commonly cause limited but potentially costly disruption to operations and system productivity, and require repairs or restoration, but these can be counteracted or controlled without major system damage.
3	**Occasional**	Will occur sometime over the life of the project-related asset, system, place etc		**Critical**	The event may commonly cause severe injury or illness and/or major ecosystem, asset or system damage, thereby causing cessation of operations and requiring emergency services, and costly repairs and/or reconstruction and extended recovery to previous system productivity.
2	**Remote**	Unlikely but possible to occur several times over the life of the project-related asset, system, place etc.		**Catastrophic**	The event may commonly cause death and/or major ecosystem, asset or system destruction, thereby ceasing all operations for an extended period, requiring extended emergency services, and costly and extended reconstruction.

1	**Improbable**	So unlikely that is can be assumed that the event may never be experienced.		

LIKELIHOOD & RELATIVE IMMEDIACY OF IMPACT	**Probability**	**CONSEQUENCE**			
		Marginal - 1	**Moderate - 2**	**Critical - 3**	**Catastrophic - 5**
	Frequent - 5	Low -5	Serious – 10	High – 15	High - 25
	Probable - 4	Low – 4	Medium – 8	High – 12	High - 20
	Occasional - 3	Low -3	Medium – 6	Serious – 9	High – 15
	Remote - 2	Low – 2	Low – 4	Medium – 6	Serious - 10
	Improbable - 1	Low – 1	Low – 2	Low – 3	Low - 5

Table 1: Summary of Exposed Parties

EXPOSED ASSETS/SYSTEMS/PARTIES	Climate Change conditions										Total			
	(INPUT: Hazard condition 1)	(INPUT: Hazard condition 2)	(INPUT: Hazard condition 3)	(INPUT: Hazard condition 4)	(INPUT: Hazard condition 5)	(INPUT: Hazard condition 6)	(INPUT: Hazard condition 7)	(INPUT: Hazard condition 8)	(INPUT: Hazard condition 9)	(INPUT: Hazard condition 10)	Low	Medium	Serious	High
Total											0			

Table 2:

EXPOSURES AND TIMELINES				
Considered Exposure		**Description of Asset/System/Party Exposure**	**Relative Immediacy of Potential Impact (in next 5 yrs, 5-15years, 15+ years)**	**Likelihood of Potential Impact**
1				
2				
3				
4				
5				
			MEDIAN	#NUM!

VULNERABILITIES, CONSEQUENCES AND RISK RATING							
Considered Exposure		**Description of Vulnerability (Sensitivity Aspect)**	**Level of Adaptive Capacity (low, medium, high)**	**Provide an explanation for your answer on the level of Adaptive Capacity**	**Consequences**	**Risk Rating** (Use the colored Likelihood vs Consequence sheet)	**Level of Risk Acceptability** (Unacceptable Critical, Manageable, Acceptable)
1							
2							
3							
4							
5							

APPENDIX D

Using the following tables please **complete the 'Project Technical Design and Planning' Requirements (4.1-4.5)** and present the documented data in a single PDF as part of the larger documentation process for verification purposes.

TABLE 4.5: Avoided Loss Estimation table (use the same table separately for Step 1 and Step 2). Please note: The table below contains an example, to be deleted and is only for reference purposes.

At-Risk Party	Type of Harm or Loss	Measure or Metric of Harm or Loss	Degree of Harm or Loss, No Adaptation Project Condition (baseline) ---------- Degree of Harm or Loss, Climate Adapted Condition		
			Climate condition A	Climate condition B	Climate condition C
Resident Population	Loss of life	Deaths arising from flood event	n/a	n/a	1-5 persons
			[Climate Adapted Condition]	[Climate Adapted Condition]	[Climate Adapted Condition]
Building A	Flood damage to main floor	Monetary cost of repairs per annum (20 year period, present value)	$100,000	$250,000	$2,000,000
			[Climate Adapted Condition]	[Climate Adapted Condition]	[Climate Adapted Condition]
Building A	Loss of business income	Monetary reduction in sales per annum (20 year period, present value)	$500,000	$500,000	$1,000,000
			[Climate Adapted Condition]	[Climate Adapted Condition]	[Climate Adapted Condition]
Swift River	Erosion of riparian area	Decline in fish repopulation, average per annum	10% decline in fish population	25% decline in fish population	50% decline in fish population
			[Climate Adapted Condition]	[Climate Adapted Condition]	[Climate Adapted Condition]

The above examples illustrate that the metrics for anticipated harm and losses may need to vary depending upon the nature of the expected impact and the data and

technical support available to calculate a monetary value for various types of harm and loss.

TABLE 4.5: Calculation of Avoided Losses table (use the table for Step 3)

			Period of Estimation	Discount Rate Applied	Revenues	Non-Revenue Benefits	
			[Years]	[Avg % for Period]			
			Losses	Costs/Expenditures			
At Risk Entity Type	**Proposed Climate Adaptation Measure**	**Nature of Climate Risk Addressed in this Measure**	**Harm & Loss Avoided through this Measure during Period of Estimation**	**Cost of Adaptation Measure Implementation, Operation & Maintenance over functional life/use of Investment**	**Anticipated Revenues Arising from Adaptation Measures (e.g. including asset/land value appreciation, tax collection increases)**	**Anticipated Co-Benefits Arising from Adaptation Measure(s)**	**Valuation of Non-Revenue Co-Benefits**
At-Risk Assets							
A							
B							
C							
etc							
At-Risk Economic Activities							
F							
G							
H							
etc							
At-Risk Social Welfare							
J							
K							
L							
etc							

APPENDIX E

Using the following tables please **complete the 'Project Governance and Adaptive Management (5.1-5.5)** and present the documented data in a single PDF as part of the larger documentation process for verification purposes.

TABLE 5.2: Adaptive Management/Trigger Conditions table. Please note: The table below contains an example, to be deleted and is only for reference purposes.

Measure or Metric of Harm or Loss	Targeted Degree of Harm or Loss, Climate Adapted Condition			Indicators & Trigger Values for Review of Risk Management Measures	Indicators & Trigger Values for Review of Climate conditions
	Climate condition A	Climate condition B	Climate condition C		
Deaths arising from flood event	n/a	n/a	n/a		
Monetary cost of repairs per annum arising from climate change event	n/a	n/a	500000		
Monetary reduction in sales per annum arising from climate change	n/a	n/a	$250,000		
Decline in fish population arising from climate change event, average per annum	n/a	n/a	15% decline in fish population		

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