

No	Phase	Activity	Activity Continued	Aspect	Impact	Severity				
						Flow Regime	Physico & Chemical (Water quality)	Habitat (Geomorph + Vegetation)	Biota	Severity
5	Construction Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Mechanical clearance of vegetation and excavation activities, associated with the construction of the proposed solar facility development.	<p>Contamination of the Orange River and pan by dust generation and emissions</p> <p>The construction activities associated with the proposed solar development, could potentially result in significant fugitive dust emissions, due to vegetation clearance and movement of machinery and equipment. Generated dust could potentially spread into the surrounding undeveloped landscape and contaminate the Orange River and pan.</p> <p>The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the river, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	1	1	1	1	1.00

Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Confidence level	Control Measures	Control Measures Continued	PES & EIS of Watercourse
2	2	5.00	2	1	5	3	11	55	Low	90	<p>Implement suitable dust management and prevention measures during the construction phase of the proposed development.</p> <p>Construction areas and –roads to be sufficiently wetted down during the construction phase in order to prevent significant fugitive dust emissions.</p> <p>It is recommended that vegetation clearance should be minimised as far as practicably/reasonably possible and should only occur within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. Existing vegetation in- between the main physical footprint areas, should not be cleared or damaged and should be left intact and adequately conserved, as far as practicably/reasonably possible. This must be done in order to sufficiently manage and prevent any significant fugitive dust emissions from occurring in and around the assessment area, which could potentially lead to contamination of the Orange River.</p>	<p>It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

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6	Construction Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicable/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Mechanical clearance of vegetation and excavation activities, associated with the construction of the proposed solar facility development.	<p>Impeding of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area</p> <p>The activities associated with the construction phase could potentially result in significant impeding of natural surface water flow towards and within the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area, due to artificial obstruction of flow during rainfall events.</p> <p>It must be noted that ten small artificial earth dam walls have been constructed within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream.</p>	2	1	1	1	1.25

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2	2	5.25	2	1	5	2	10	52.5	Low	90	<p>The EAP must determine from the relevant competent authorities whether the artificial dam walls which have been constructed within the various watercourses, possess the required Environmental Authorisations and Water Use Licenses, in accordance with the relevant/applicable environmental legislation. If this is not the case, it is recommended that the dam walls be completely removed from the watercourses, with immediate effect. The flow regimes of the watercourses should also be adequately restored in order to allow for continued flow within the localised catchment. This must be done to assist in maintaining the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.</p> <p>It is recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.</p> <p>Avoidance of development through the flow paths/drainage lines would constitute the first impact mitigation option, in accordance with the requirements of the NEMA (Act 107 of 1998) Mitigation Hierarchy. However, as the flow paths/drainage lines merely play an assisting role in the small localised catchment and drainage, it is the opinion of the specialist that avoidance of development through the flow paths/drainage lines is not necessarily required, but is still recommended.</p> <p>It is therefore recommended that the identified three flow paths/drainage lines be adequately buffered out of the proposed development footprint area. A minimum approximately 20 m buffer distance is proposed to be implemented on both sides of all the flow path/drainage line edges. No current or future development is allowed to take place within these buffered zones.</p>	<p>However, if avoidance of development through the flow paths/drainage lines is not practically possible/feasible, it is then recommended that sufficient continued stormwater runoff within- and through the assessment area towards the west, must still be ensured and sufficiently managed. An adequate Stormwater and Erosion Management Plan must be implemented during the construction- and operational phases of the proposed development, in order to assist with this and allow for continued flow within the localised catchment. This must be done to attempt to maintain the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area. A Water Use License Application (WULA) must also be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the flow paths/drainage lines that traverse the assessment area, in accordance with the National Water Act (Act 36 of 1998).</p> <p>It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practically possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

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7	Construction Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Mechanical clearance of vegetation and excavation activities, associated with the construction of the proposed solar facility development.	<p>Contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area</p> <p>The construction phase could potentially result in contamination of natural surface water flow within the associated local and broader quaternary surface water catchment- and drainage area, due to hydrocarbon and/or other chemical spills by construction machinery and equipment.</p>	1	2	1	1	1.25

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2	2	5.25	2	1	5	2	10	52.5	Low	90	<p>If hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably possible from the watercourses and flow paths/drainage lines.</p> <p>Hydrocarbon and other chemical storage areas must be adequately banded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units.</p> <p>Adequate hydrocarbon and other chemical storage, handling, usage and spillage clean-up procedures must be developed and all relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire construction phase.</p> <p>Spill kits must be readily available on the construction site. All employees must be adequately trained on the correct procedure and use of the spill kits.</p>	N/A	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

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8	Operational Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Operation of the established solar power generation facility.	<p>Continued contamination of the Orange River and pan by dust generation and emissions</p> <p>The operational activities associated with the proposed solar development, could potentially result in continued moderate fugitive dust emissions, due to the area having been mechanically cleared and subsequently being devoid of significant portions of surface vegetation cover. Continued movement of machinery and equipment will likely also increase the significance of fugitive dust emissions. Generated dust could continue to spread into the surrounding undeveloped landscape and contaminate the Orange River and pan.</p>	1	1	1	1	1.00

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2	2	5.00	2	1	5	3	11	55	Low	90	<p>All the recommended mitigation measures for the construction phase must be adequately implemented and managed.</p> <p>Implement suitable dust management and prevention measures during the operational phase of the proposed development.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p>	N/A	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

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2	2	5.25	2	1	5	2	10	52.5	Low	90	<p>If all the recommended mitigation measures for the construction phase are adequately implemented and managed, it should prove sufficient in preventing any continued impeding of- or significant impact within the associated local and broader quaternary surface water catchment- and drainage area.</p> <p>The recommended buffer zones must be adequately maintained and no current or future development is allowed to encroach into the buffered zones over time.</p>	N/A	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

No	Phase	Activity	Activity Continued	Aspect	Impact	Severity				
						Flow Regime	Physico & Chemical (Water quality)	Habitat (Geomorph + Vegetation)	Biota	Severity
10	Operational Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Operation of the established solar power generation facility.	<p>Continued contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area</p> <p>The operations of the solar facility could further potentially result in continued contamination of natural surface water flow within the associated local and broader quaternary surface water catchment- and drainage area, due to dirty surface water runoff as a result of the area having been mechanically cleared and subsequently being devoid of significant portions of surface vegetation cover.</p>	1	2	1	1	1.25

Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Confidence level	Control Measures	Control Measures Continued	PES & EIS of Watercourse
2	2	5.25	2	1	5	2	10	52.5	Low	90	<p>If all the recommended mitigation measures for the construction phase are adequately implemented and managed, it should prove sufficient in preventing any continued impeding of- or significant impact within the associated local and broader quaternary surface water catchment- and drainage area.</p> <p>The recommended buffer zones must be adequately maintained and no current or future development is allowed to encroach into the buffered zones over time.</p>	N/A	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

No	Phase	Activity	Activity Continued	Aspect	Impact	Severity				
						Flow Regime	Physico & Chemical (Water quality)	Habitat (Geomorph + Vegetation)	Biota	Severity
11	Operational Phase	<p>The project applicant, Orange River Solar Facility, proposes to develop a 50 MW Photovoltaic (PV) solar power generation facility outside the town of Groblershoop, Northern Cape Province. The proposed development will entail formal construction of approximately 178 ha for the associated solar infrastructure. The town forms part of the !Kheis Local Municipality which in turn, forms part of the ZF Mgcawu District Municipality.</p> <p>The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.</p> <p>The broader region surrounding the assessment area constitutes a vast, continuous undeveloped natural landscape although extensive existing agricultural developments are present, along the localised and broader length of the Orange River.</p> <p>The assessment area falls within the D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the River, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.</p>	<p>Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.</p> <p>Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservation significance, from a hydrological perspective.</p> <p>A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>	Operation of the established solar power generation facility.	<p>Over-extraction of groundwater from the Orange River</p> <p>The operational phase of the proposed solar facility will require significant volumes of raw and potable water to maintain the processes. In accordance with the information received from the EAP (Bulk Services Report), water will be extracted from the Orange River, for the operational processes associated with the proposed solar facility.</p> <p>In accordance with the Bulk Services Report, the property associated with the proposed solar facility possesses an existing Water Use Licence (No. 10/D73D/ACEGI/9892). The annual water allocation of the approved license is for 7 599.6 m³. The annual calculated volume of water required for the operational processes associated with the proposed solar facility is 2 237 m³, which amounts to merely 29.4% of the total water allocation for relevant property. This equates to approximately 6 000 litres/day. This could potentially lead to over-extraction from the Orange River, if not adequately managed.</p>	2	1	1	1	1.25

Spatial scale	Duration	Consequence	Frequency of activity	Frequency of impact	Legal Issues	Detection	Likelihood	Significance	Risk Rating	Confidence level	Control Measures	Control Measures Continued	PES & EIS of Watercourse
2	2	5.25	2	2	5	3	12	63	Medium	90	<p>Water saving initiatives must be implemented for the construction and operational phases of the proposed solar development.</p> <p>Environmentally responsible water use practices and activities must be adopted for the construction and operational phases of the proposed solar development.</p> <p>Only the allotted water quantities as per the approved Water Use License, are to be utilised.</p> <p>A flow meter is to be installed in order to enable monitoring and management water consumption.</p> <p>Water consumption figures must be submitted to the Department of Water and Sanitation (DWS) on a regular basis in order to ensure compliance with the allotted water quantities, as per the approved Water Use License.</p>	N/A	<p>PES (Significant watercourses and small preferential water flow paths/drainage lines) = Class C (moderately modified), although it still borders on Class B. Slight to moderate transformation and associated negative impact has occurred, mainly as a result of the construction of the ten artificial earth dam walls within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. The basic ecosystem functionality within the watercourses and flow paths/drainage lines has however remained predominantly unchanged.</p> <p>PES (Small depression pan) = Class B (largely natural). A small change in natural habitats and biota may have taken place, mainly as a result of grazing by livestock and game that takes place within the assessment area. The ecosystem functionality within the pan has however remained essentially unchanged.</p> <p>EIS (Significant watercourses) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) as well as these watercourses forming an important part of the localised surface water catchment and drainage. The assessment area and watercourses furthermore also form part of the local and broader quaternary surface water catchment- and drainage area, towards the north-west. Biodiversity is however still relatively ubiquitous.</p> <p>EIS (Small preferential flow paths/drainage lines) = Class C (moderate), although it borders on Class D (low/marginal). Merely viewed as being ecologically important and sensitive on local scale. Biodiversity is ubiquitous and not unique or sensitive to habitat modifications.</p> <p>EIS (Small depression pan) = C (moderate). Viewed as being ecologically important and sensitive on local or possibly provincial scale, mainly due to the area forming part of a Critical Biodiversity Area two (CBA 2) and the pan likely providing an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.</p>

10. Aquatic Ecological Impact Assessment

The following section identifies the potential aquatic ecological impacts (both positive and negative), which the proposed development will have on the surrounding environment.

Once the potential aquatic ecological impacts are identified, they are assessed by rating their Environmental Risk after which the final Environmental Significance is calculated and rated for each identified aquatic ecological impact.

The same Environmental Risk rating process is then followed for each aquatic ecological impact to determine the Environmental Significance, if the recommended mitigation measures were to be implemented.

The objective of this section is therefore firstly to identify all the potential aquatic ecological impacts associated with the proposed development and secondly to determine the significance of the impacts and how effective the recommended mitigation measures will be able to reduce their significance. The potential aquatic ecological impacts which are still rated as highly significant, even after implementation of mitigations, can then be identified in order to specifically focus on implementation of effective management strategies for them.

10.1. Construction Phase

Transformation of an aquatic Critical Biodiversity Area two (CBA 2), associated with the important ecological corridor that runs along the Orange River

The assessment area constitutes a single footprint area of approximately 178 ha in size. The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.

The assessment area falls within a Critical Biodiversity Area two (CBA 2), in accordance with the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. From an aquatic perspective, the relevant CBA 2 is mainly associated with the important ecological corridor that runs along the Orange River, which flows past the assessment area, approximately 600 m to the west.

The significance of this potential impact will be medium-high.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Disturbance of-/damage to semi-aquatic faunal habitats, associated with the watercourses and pan

The assessment area constitutes a single footprint area of approximately 178 ha in size. The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.

The increased woody densities associated with the watercourses likely provide significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.

The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.

The significance of this potential impact will be medium.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Terrestrial and aquatic alien invasive species establishment within the watercourses, flow paths/drainage lines and pan

At the time of the site assessment, no significant legally declared alien invasive species establishments were found to be present throughout the watercourses, flow paths/drainage lines or pan, associated with the assessment area.

The proposed development area could however potentially be prone to slight alien invasive species establishment, due to surface disturbance and vegetation clearance caused by construction activities. The presence of the watercourses and flow paths/drainage which traverse the assessment area, could further also potentially act as a significant transport/distribution vector for numerous terrestrial and aquatic alien invasive species into the broader region.

The significance of this potential impact will be low.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Contamination of the Orange River by surface material erosion

The majority of the assessment area constitutes a relatively natural slight to moderately sloping landscape, while the south-western and central-southern portions consist of steeply sloping and undulating hills.

The assessment area constitutes a single footprint area of approximately 178 ha in size. The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. The assessment area could therefore likely be prone to significant potential surface soil erosion, due to the sloping and undulating landscape together with the loosening of surface materials and clearance of vegetation caused by construction activities, which usually binds the soil surface. Such soil erosion could potentially lead to gradual continual contamination of the Orange River over time.

The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the river, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.

The significance of this potential impact will be low.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Contamination of the Orange River and pan by dust generation and emissions

The construction activities associated with the proposed solar development, could potentially result in significant fugitive dust emissions, due to vegetation clearance and movement of machinery and equipment. Generated dust could potentially spread into the surrounding undeveloped landscape and contaminate the Orange River and pan.

The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the river, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.

The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.

The significance of this potential impact will be low.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area

The assessment area falls within the Lower Orange Water Management Area (WMA 14) and the associated D73D quaternary surface water catchment- and drainage area. Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.

Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area. These flow paths/drainage lines therefore merely play an assisting role in the localised catchment and drainage and are not necessarily viewed as being of high conservational significance, from a hydrological perspective.

The activities associated with the construction phase could potentially result in significant impeding of natural surface water flow towards and within the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area, due to artificial obstruction of flow during rainfall events.

It must be noted that ten small artificial earth dam walls have been constructed within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream.

The construction phase could potentially also result in contamination of natural surface water flow within the associated local and broader quaternary surface water catchment- and drainage area, due to hydrocarbon and/or other chemical spills by construction machinery and equipment.

The significance of this potential impact will be medium for the watercourses but low for the flow paths/drainage lines.

Mitigation measures to reduce impacts are recommended under heading 9.4.

10.2. Operational Phase

Transformation of an aquatic Critical Biodiversity Area two (CBA 2) as well as impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as significant potential long-term aquatic ecological impacts, associated with the construction phase of the proposed development.

A number of additional significant potential aquatic ecological impacts, could however likely occur during the operational phase of the proposed solar facility. The following continued and additional significant potential aquatic ecological impacts are associated with the operational phase:

Continued contamination of the Orange River and pan by dust generation and emissions

The operational activities associated with the proposed solar development, could potentially result in continued moderate fugitive dust emissions, due to the area having been mechanically cleared and subsequently being devoid of significant portions of surface vegetation cover. Continued movement of machinery and equipment will likely also increase the significance of fugitive dust emissions. Generated dust could continue to spread into the surrounding undeveloped landscape and contaminate the Orange River and pan.

The significance of this potential impact will be medium for the Orange River but low for the pan.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Continued impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area

The established solar facility could potentially continuously impede on natural surface water flow towards and within the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area, due to artificial obstruction of flow during rainfall events.

The operations of the solar facility could further potentially result in continued contamination of natural surface water flow within the associated local and broader quaternary surface water catchment- and drainage area, due to dirty surface water runoff as a result of the area having been mechanically cleared and subsequently being devoid of significant portions of surface vegetation cover.

The significance of this potential impact will be medium for the watercourses but low for the flow paths/drainage lines.

Mitigation measures to reduce impacts are recommended under heading 9.4.

Over-extraction of water from the Orange River

The operational phase of the proposed solar facility will require significant volumes of raw and potable water to maintain the processes. In accordance with the information received from the EAP (Bulk Services Report), water will be extracted from the Orange River, for the operational processes associated with the proposed solar facility.

In accordance with the Bulk Services Report, the property associated with the proposed solar facility possesses an existing Water Use Licence (No. 10/D73D/ACEGI/9892). The annual water allocation of the approved license is for 7 599.6 m³. The annual calculated volume of water required for the operational processes associated with the proposed solar facility is 2 237 m³, which amounts to merely 29.4% of the total water allocation for relevant property. This equates to approximately 6 000 litres/day. This could potentially lead to over-extraction from the Orange River, if not adequately managed.

The significance of this potential impact will be medium.

Mitigation measures to reduce impacts are recommended under heading 9.4

10.3. Cumulative Impacts

The assessment area constitutes a single footprint area of approximately 178 ha in size. The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints.

The assessment area falls within the Lower Orange Water Management Area (WMA 14) and the associated D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the river, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.

Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.

The significant watercourses scored a moderate Ecological Importance and Sensitivity (EIS) value and are viewed as being of moderate conversational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, Critical Biodiversity Area two (CBA 2) as well as the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

Due to the sloping and undulating landscape of the assessment area, numerous small first-order ephemeral preferential water flow paths/drainage lines also traverse the assessment area, of which three are deemed to be hydrologically significant. These flow paths/drainage lines assist with channelling and discharging surface water runoff through the assessment area, into the significant watercourses associated with the assessment area.

The flow paths/drainage lines scored a moderate to low/marginal Ecological Importance and Sensitivity (EIS) value and merely play an assisting role in the localised catchment and drainage. They are therefore not necessarily viewed as being of high conservational significance, from a hydrological perspective.

A small isolated depression water-pan is also situated directly adjacent outside the north-western corner boundary of the assessment area. The pan likely provides an important watering hole as well as significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.

Due to the minute size and isolated nature of the small depression pan, it scored a moderate Ecological Importance and Sensitivity (EIS) value and is merely viewed as being of low to moderate conservational significance/value, from an aquatic perspective.

Transformation of an aquatic Critical Biodiversity Area two (CBA 2), associated with the important ecological corridor that runs along the Orange River as well as continued impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area, were identified and addressed as a significant potential long-term aquatic ecological impacts, associated with the construction- and operational phases of the proposed solar development.

These potential long-term aquatic ecological impacts identified for the proposed development, could potentially add moderate cumulative impact to existing negative impacts caused by the extensive presence of existing agricultural developments, along the localised and broader length of the Orange River.

It is however the opinion of the specialist, by application of the NEMA: Mitigation Hierarchy, that all the identified potential cumulative aquatic ecological impacts associated with the proposed development, can be suitably reduced and mitigated to within acceptable residual levels, by implementation of the recommended mitigation measures. It is therefore not anticipated that the proposed solar development will necessarily add any significant residual cumulative aquatic ecological impacts to the surrounding environment or the Orange River, if all recommended mitigation measures as per this ecological report are adequately implemented and managed, for both the construction- and operational phases of the proposed development.

It is the opinion of the specialist from an aquatic ecological and hydrological perspective, that the proposed development of the assessment area should be considered by the competent authority for Environmental Authorisation and approval. All recommended mitigation measures as per this aquatic ecological report must however be adequately implemented and managed for both the construction- and operational phases of the proposed development. All necessary authorisations, permits and licenses must also be obtained prior to the commencement of any construction.

10.4. Risk Ratings of Potential Aquatic Ecological Impacts

The following section provides the Environmental Risk as well as the Environmental Significance Ratings for the potential aquatic ecological impacts associated with the proposed development, both before and after implementation of the recommended mitigation measures.

10.4.1. Construction Phase

Table 11: Environmental Risk and Significance Ratings

	Assessment area	-
Identified Environmental Impact	Transformation of an aquatic Critical Biodiversity Area two (CBA 2), associated with the important ecological corridor that runs along the Orange River	
Magnitude of Negative or Positive Impact	Medium (6)	-
Duration of Negative or Positive Impact	Long term (4)	-
Extent of Positive or Negative Impact	Regional (3)	-
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	-
Reversibility of Impact	Low (4)	-
Probability of Impact Occurrence	High (4)	-
Cumulative Impact Rating prior to mitigation	Medium	-
Environmental Significance Score and Rating prior to mitigation	Medium-High (80)	-

<p>Mitigation Measures to be implemented</p>	<p>The EAP must determine from the relevant competent authorities whether the artificial dam walls which have been constructed within the various watercourses, possess the required Environmental Authorisations and Water Use Licenses, in accordance with the relevant/applicable environmental legislation. If this is not the case, it is recommended that the dam walls be completely removed from the watercourses, with immediate effect. The flow regimes of the watercourses should also be adequately restored in order to allow for continued flow within the localised catchment. This must be done to assist in maintaining the ecological functionality and - integrity of the local and broader quaternary surface water catchment- and drainage area.</p> <p>It is recommended that vegetation clearance should be minimised as far as practicably/reasonably possible and should only occur within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. Existing vegetation in- between the main physical footprint areas, should not be cleared or damaged and should be left intact and adequately conserved, as far as practicably/reasonably possible.</p> <p>The proposed development construction footprint must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the localised undeveloped landscape surrounding the proposed development footprint, may take place.</p> <p>No site construction basecamps may be established within the localised undeveloped landscape surrounding the proposed development footprint.</p>
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	<p>Adequately cordon off the proposed development construction footprint area and ensure that no construction activities, -machinery or -equipment operate or impact within the localised undeveloped landscape outside the cordoned off area.</p> <p>Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint area and to ensure environmentally responsible construction practices and activities.</p> <p>Existing roads and farm tracks in close proximity to the proposed development construction footprint area, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the localised undeveloped landscape surrounding the proposed development footprint.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>From an aquatic ecological perspective, it is the opinion of the specialist that a Biodiversity Offset is not necessarily required for the proposed transformation of the relevant CBA 2 portion. The relevant competent authorities, namely DENC and DAFF, must however advise on the potential requirement of a Biodiversity Offset, in order to compensate for the inevitable loss of terrestrial biodiversity.</p>
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Cumulative Impact Rating after mitigation implementation	Medium	-
Environmental Significance Score and Rating after mitigation implementation	Medium (51)	-
	Assessment area	-
Identified Environmental Impact	Disturbance of-/damage to semi-aquatic faunal habitats, associated with the watercourses and pan	
Magnitude of Negative or Positive Impact	Low (4)	-
Duration of Negative or Positive Impact	Long term (4)	-
Extent of Positive or Negative Impact	Local (2)	-
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	-
Reversibility of Impact	Low (4)	-
Probability of Impact Occurrence	Medium (3)	-

Cumulative Impact Rating prior to mitigation	Medium	-
Environmental Significance Score and Rating prior to mitigation	Medium (51)	-
Mitigation Measures to be implemented	<p>It is recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.</p> <p>Avoidance of development through the flow paths/drainage lines would constitute the first impact mitigation option, in accordance with the requirements of the NEMA (Act No. 107 of 1998): Mitigation Hierarchy. However, as the flow paths/drainage lines merely play an assisting role in the small localised catchment and drainage, it is the opinion of the specialist that avoidance of development through the flow paths/drainage lines is not necessarily required, but is still recommended.</p> <p>It is therefore recommended that the identified three flow paths/drainage lines be adequately buffered out of the proposed development footprint area. A minimum approximately 20 m buffer distance is proposed to be implemented on both sides of all the flow path/drainage line edges. No current or future development is allowed to take place within these buffered zones.</p>	

However, if avoidance of development through the flow paths/drainage lines is not practicably possible/feasible, it is then recommended that sufficient continued stormwater runoff within- and through the assessment area towards the west, must still be ensured and sufficiently managed. An adequate Stormwater and Erosion Management Plan must be implemented during the construction- and operational phases of the proposed development, in order to assist with this and allow for continued flow within the localised catchment. This must be done to attempt to maintain the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area. A Water Use License Application (WULA) must also be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the flow paths/drainage lines that traverse the assessment area, in accordance with the National Water Act (Act No. 36 of 1998).

It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.

The proposed development construction footprint must be kept as small as practicably possible to reduce the surface impact on surrounding vegetation and no unnecessary/unauthorised footprint expansion into the localised undeveloped landscape surrounding the proposed development footprint, may take place.

No site construction basecamps may be established within the localised undeveloped landscape surrounding the proposed development footprint.

	<p>Adequately cordon off the proposed development construction footprint area and ensure that no construction activities, -machinery or -equipment operate or impact within the localised undeveloped landscape outside the cordoned off area.</p> <p>Adequate operational procedures for construction machinery and equipment must be developed in order to strictly govern and restrict movement of machinery only within the proposed development construction footprint area and to ensure environmentally responsible construction practices and activities.</p> <p>Existing roads and farm tracks in close proximity to the proposed development construction footprint area, must be used during the construction phase. No new temporary roads or tracks may be constructed or implemented through the localised undeveloped landscape surrounding the proposed development footprint.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	-
Environmental Significance Score and Rating after mitigation implementation	Low (14)	-

	Assessment area	-
Identified Environmental Impact	Terrestrial and aquatic alien invasive species establishment within the watercourses, flow paths/drainage lines and pan	
Magnitude of Negative or Positive Impact	Low (4)	-
Duration of Negative or Positive Impact	Long term (4)	-
Extent of Positive or Negative Impact	Regional (3)	-
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	-
Reversibility of Impact	High (2)	-
Probability of Impact Occurrence	Medium (3)	-
Cumulative Impact Rating prior to mitigation	Low	-
Environmental Significance Score and Rating prior to mitigation	Low (48)	-

<p>Mitigation Measures to be implemented</p>	<p>Implement an adequate Alien Invasive Species Management Plan during the construction- and operational phases. Such a Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>It is recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.</p> <p>Avoidance of development through the flow paths/drainage lines would constitute the first impact mitigation option, in accordance with the requirements of the NEMA (Act No. 107 of 1998): Mitigation Hierarchy. However, as the flow paths/drainage lines merely play an assisting role in the small localised catchment and drainage, it is the opinion of the specialist that avoidance of development through the flow paths/drainage lines is not necessarily required, but is still recommended.</p> <p>It is therefore recommended that the identified three flow paths/drainage lines be adequately buffered out of the proposed development footprint area. A minimum approximately 20 m buffer distance is proposed to be implemented on both sides of all the flow path/drainage line edges. No current or future development is allowed to take place within these buffered zones.</p> <p>However, if avoidance of development through the flow paths/drainage lines is not practicably possible/feasible, it is then recommended that sufficient continued stormwater runoff within- and through the assessment area towards the west, must still be ensured and sufficiently managed. An adequate Stormwater and Erosion</p>
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	<p>Management Plan must be implemented during the construction- and operational phases of the proposed development, in order to assist with this and allow for continued flow within the localised catchment. This must be done to attempt to maintain the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area. A Water Use License Application (WULA) must also be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the flow paths/drainage lines that traverse the assessment area, in accordance with the National Water Act (Act No. 36 of 1998).</p> <p>It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	-
Environmental Significance Score and Rating after mitigation implementation	Low (12)	-

	Assessment area	-
Identified Environmental Impact	Contamination of the Orange River by surface material erosion	
Magnitude of Negative or Positive Impact	Low (4)	-
Duration of Negative or Positive Impact	Short term (2)	-
Extent of Positive or Negative Impact	Regional (3)	-
Irreplaceability of Natural Resources being impacted upon	High (4)	-
Reversibility of Impact	Moderate (3)	-
Probability of Impact Occurrence	Medium (3)	-
Cumulative Impact Rating prior to mitigation	Low	-
Environmental Significance Score and Rating prior to mitigation	Low (48)	-

<p>Mitigation Measures to be implemented</p>	<p>It is recommended that vegetation clearance should be minimised as far as practicably/reasonably possible and should only occur within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. Existing vegetation in- between the main physical footprint areas, should not be cleared or damaged and should be left intact and adequately conserved, as far as practicably/reasonably possible. This must be done in order to sufficiently manage and prevent any significant soil erosion from occurring in and around the assessment area, which could potentially lead to contamination of the Orange River over time.</p> <p>It is recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.</p> <p>Avoidance of development through the flow paths/drainage lines would constitute the first impact mitigation option, in accordance with the requirements of the NEMA (Act No. 107 of 1998): Mitigation Hierarchy. However, as the flow paths/drainage lines merely play an assisting role in the small localised catchment and drainage, it is the opinion of the specialist that avoidance of development through the flow paths/drainage lines is not necessarily required, but is still recommended.</p> <p>It is therefore recommended that the identified three flow paths/drainage lines be adequately buffered out of the proposed development footprint area. A minimum approximately 20 m buffer distance is proposed to be implemented on both sides of all the flow path/drainage line edges. No current or future development is allowed to take place within these buffered zones.</p>
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	<p>However, if avoidance of development through the flow paths/drainage lines is not practicably possible/feasible, it is then recommended that sufficient continued stormwater runoff within- and through the assessment area towards the west, must still be ensured and sufficiently managed. An adequate Stormwater and Erosion Management Plan must be implemented during the construction- and operational phases of the proposed development, in order to assist with this and allow for continued flow within the localised catchment. This must be done to attempt to maintain the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area. A Water Use License Application (WULA) must also be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the flow paths/drainage lines that traverse the assessment area, in accordance with the National Water Act (Act No. 36 of 1998).</p> <p>It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.</p> <p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p>	
Cumulative Impact Rating after mitigation implementation	Low	-
Environmental Significance Score and Rating after mitigation implementation	Low (12)	-

	Orange River	Pan
Identified Environmental Impact	Contamination of the Orange River and pan by dust generation and emissions	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Short term (2)	Short term (2)
Extent of Positive or Negative Impact	Regional (3)	Local (2)
Irreplaceability of Natural Resources being impacted upon	High (4)	Moderate (3)
Reversibility of Impact	Moderate (3)	Moderate (3)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Low	Low
Environmental Significance Score and Rating prior to mitigation	Low (48)	Low (36)

<p>Mitigation Measures to be implemented</p>	<p>Implement suitable dust management and prevention measures during the construction phase of the proposed development.</p> <p>Construction areas and –roads to be sufficiently wetted down during the construction phase in order to prevent significant fugitive dust emissions.</p> <p>It is recommended that vegetation clearance should be minimised as far as practicably/reasonably possible and should only occur within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. Existing vegetation in- between the main physical footprint areas, should not be cleared or damaged and should be left intact and adequately conserved, as far as practicably/reasonably possible. This must be done in order to sufficiently manage and prevent any significant fugitive dust emissions from occurring in and around the assessment area, which could potentially lead to contamination of the Orange River.</p> <p>It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p>
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	Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (12)	Low (11)
	Watercourses	Flow paths/drainage lines
Identified Environmental Impact	Impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Short term (2)	Short term (2)
Extent of Positive or Negative Impact	Regional (3)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Low (2)
Reversibility of Impact	Low (2)	Low (2)
Probability of Impact Occurrence	High (4)	High (4)

Cumulative Impact Rating prior to mitigation	Medium	Low
Environmental Significance Score and Rating prior to mitigation	Medium (56)	Low (40)
Mitigation Measures to be implemented	<p>The EAP must determine from the relevant competent authorities whether the artificial dam walls which have been constructed within the various watercourses, possess the required Environmental Authorisations and Water Use Licenses, in accordance with the relevant/applicable environmental legislation. If this is not the case, it is recommended that the dam walls be completely removed from the watercourses, with immediate effect. The flow regimes of the watercourses should also be adequately restored in order to allow for continued flow within the localised catchment. This must be done to assist in maintaining the ecological functionality and - integrity of the local and broader quaternary surface water catchment- and drainage area.</p> <p>It is recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.</p> <p>Avoidance of development through the flow paths/drainage lines would constitute the first impact mitigation option, in accordance with the requirements of the NEMA (Act No. 107 of 1998): Mitigation Hierarchy. However, as the flow paths/drainage lines merely play an assisting role in the small localised catchment and drainage, it is the opinion of the specialist that avoidance of development through the flow paths/drainage lines is not necessarily required, but is still recommended.</p>	

It is therefore recommended that the identified three flow paths/drainage lines be adequately buffered out of the proposed development footprint area. A minimum approximately 20 m buffer distance is proposed to be implemented on both sides of all the flow path/drainage line edges. No current or future development is allowed to take place within these buffered zones.

However, if avoidance of development through the flow paths/drainage lines is not practicably possible/feasible, it is then recommended that sufficient continued stormwater runoff within- and through the assessment area towards the west, must still be ensured and sufficiently managed. An adequate Stormwater and Erosion Management Plan must be implemented during the construction- and operational phases of the proposed development, in order to assist with this and allow for continued flow within the localised catchment. This must be done to attempt to maintain the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area. A Water Use License Application (WULA) must also be submitted to the Department of Water and Sanitation (DWS), to request authorisation for the proposed development through the flow paths/drainage lines that traverse the assessment area, in accordance with the National Water Act (Act No. 36 of 1998).

It is recommended that the identified pan be adequately buffered out of the proposed development footprint area. A minimum approximately 50 m buffer distance is proposed to be implemented around the pan edges. No current or future development is allowed to take place within this buffered zone.

	<p>Disturbed areas within and immediately surrounding the proposed development footprint area must be adequately rehabilitated as soon as practicably possible after construction. A Rehabilitation Management Plan must be compiled by a suitably qualified and experienced ecologist.</p> <p>If hydrocarbons or other chemicals are to be stored on site during the construction phase, the storage areas must be situated as far away as practicably possible from the watercourses and flow paths/drainage lines.</p> <p>Hydrocarbon and other chemical storage areas must be adequately bunded in order to be able to contain a minimum of 150 % of the capacity of storage tanks/units.</p> <p>Adequate hydrocarbon and other chemical storage, handling, usage and spillage clean-up procedures must be developed and all relevant construction personnel must be sufficiently trained on- and apply these procedures during the entire construction phase.</p> <p>Spill kits must be readily available on the construction site. All employees must be adequately trained on the correct procedure and use of the spill kits.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (10)	Low (9)

10.4.2. Operational Phase

Table 12: Environmental Risk and Significance Ratings

	Orange River	Pan
Identified Environmental Impact	Continued contamination of the Orange River and pan by dust generation and emissions	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Medium term (3)	Medium term (3)
Extent of Positive or Negative Impact	Regional (3)	Local (2)
Irreplaceability of Natural Resources being impacted upon	High (4)	Moderate (3)
Reversibility of Impact	Moderate (3)	Moderate (3)
Probability of Impact Occurrence	Medium (3)	Medium (3)
Cumulative Impact Rating prior to mitigation	Medium	Low
Environmental Significance Score and Rating prior to mitigation	Medium (51)	Low (39)

Mitigation Measures to be implemented	<p>All the recommended mitigation measures for the construction phase must be adequately implemented and managed.</p> <p>Implement suitable dust management and prevention measures during the operational phase of the proposed development.</p> <p>Adequate operational procedures for machinery and equipment must be developed to strictly govern and restrict movement of machinery, in order to avoid unnecessary fugitive dust emissions and ensure environmentally responsible construction practices and activities.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (13)	Low (12)
	Watercourses	Flow paths/drainage lines
Identified Environmental Impact	Continued impeding and contamination of the flow regimes of the watercourses and flow paths/drainage lines, within the associated local and broader quaternary surface water catchment- and drainage area	
Magnitude of Negative or Positive Impact	Low (4)	Very low (2)
Duration of Negative or Positive Impact	Medium term (3)	Medium term (3)

Extent of Positive or Negative Impact	Regional (3)	Local (2)
Irreplaceability of Natural Resources being impacted upon	Moderate (3)	Low (2)
Reversibility of Impact	Low (2)	Low (2)
Probability of Impact Occurrence	High (4)	High (4)
Cumulative Impact Rating prior to mitigation	Medium	Low
Environmental Significance Score and Rating prior to mitigation	Medium (60)	Low (44)
Mitigation Measures to be implemented	<p>If all the recommended mitigation measures for the construction phase are adequately implemented and managed, it should prove sufficient in preventing any continued impeding of- or significant impact within the associated local and broader quaternary surface water catchment- and drainage area.</p> <p>The recommended buffer zones must be adequately maintained and no current or future development is allowed to encroach into the buffered zones over time.</p>	
Cumulative Impact Rating after mitigation implementation	Low	Low
Environmental Significance Score and Rating after mitigation implementation	Low (11)	Low (10)

	Assessment area	-
Identified Environmental Impact	Over-extraction of water from the Orange River	
Magnitude of Negative or Positive Impact	Medium (6)	-
Duration of Negative or Positive Impact	Medium term (3)	-
Extent of Positive or Negative Impact	Regional (3)	-
Irreplaceability of Natural Resources being impacted upon	High (4)	-
Reversibility of Impact	Low (2)	-
Probability of Impact Occurrence	Medium (3)	-
Cumulative Impact Rating prior to mitigation	Medium	-
Environmental Significance Score and Rating prior to mitigation	Medium (54)	-
Mitigation Measures to be implemented	<p>Water saving initiatives must be implemented for the construction and operational phases of the proposed solar development.</p> <p>Environmentally responsible water use practices and activities must be adopted for the construction and operational phases of the proposed solar development.</p>	

	<p>Only the allotted water quantities as per the approved Water Use License, are to be utilised.</p> <p>A flow meter is to be installed in order to enable monitoring and management water consumption.</p> <p>Water consumption figures must be submitted to the Department of Water and Sanitation (DWS) on a regular basis in order to ensure compliance with the allotted water quantities, as per the approved Water Use License.</p>	
Cumulative Impact Rating after mitigation implementation	Low	-
Environmental Significance Score and Rating after mitigation implementation	Low (14)	-

11. Summary and Conclusion

The assessment area falls within the Lower Orange Water Management Area (WMA 14) and the associated D73D quaternary surface water catchment- and drainage area. The Orange River flows past the assessment area, approximately 600 m to the west and continues in a north-westerly direction. The Orange River is considered a primary national water resource; any potentially significant negative impacts on the ecological functionality and/or -services provided by the river, which could pose a potential threat to national water security, should therefore be avoided as far as practicably/reasonably possible.

A localised linear topographic highpoint/ridge apex is present directly adjacent east of the assessment area, which roughly lies in a north-south direction. This highpoint/ridge apex acts as a natural surface water runoff and drainage linear separation, between the areas east and west of the highpoint/ridge apex, respectively. The assessment area therefore forms part of a small localised catchment- and drainage area, from which all surface water runoff subsequently drains in a westerly direction, towards the Orange River. Surface water drainage towards the east will therefore not be affected/impacted upon by the proposed development.

The assessment area constitutes a single footprint area of approximately 178 ha in size. The mechanical clearance associated with the proposed solar development, will in all probability completely transform the majority of the existing surface vegetation within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. The assessment area could therefore likely be prone to significant potential surface soil erosion, due to the sloping and undulating landscape together with the loosening of surface materials and clearance of vegetation caused by construction activities, which usually binds the soil surface. Such soil erosion could potentially lead to gradual continual contamination of the Orange River over time.

It is therefore recommended that vegetation clearance should be minimised as far as practicably/reasonably possible and should only occur within the PV grid-, internal access/services road- and other associated facility infrastructure footprints. Existing vegetation in- between the main physical footprint areas, should not be cleared or damaged and should be left intact and adequately conserved, as far as practicably/reasonably possible. This must be done in order to sufficiently manage and prevent any significant soil erosion from occurring in and around the assessment area, which could potentially lead to contamination of the Orange River over time.

The assessment area falls within a Critical Biodiversity Area two (CBA 2), in accordance with the Northern Cape Provincial Spatial Biodiversity Plan 2016 (NCPSBP), which sets out biodiversity priority areas in the province. From an aquatic perspective, the relevant CBA 2 is mainly associated with the important ecological corridor that runs along the Orange River.

Significant Watercourses

Eight significant first- and second-order ephemeral watercourses traverse the assessment area, which constitute the main surface water flow paths of the small localised catchment- and drainage area towards the west, associated with the assessment area. These watercourses therefore form an important part of the localised surface water catchment and drainage.

The significant watercourses scored a moderate Ecological Importance and Sensitivity (EIS) value and are viewed as being of moderate conversational significance/value for habitat preservation and ecological functionality persistence in support of the surrounding ecosystem, Critical Biodiversity Area two (CBA 2) as well as the ecological functionality and -integrity of the local and broader quaternary surface water catchment- and drainage area.

The assessment area does not fall within any Important Bird Areas (IBA) as per the latest IBA map obtained from the Birdlife SA website (<https://www.birdlife.org.za/what-we-do/important-bird-and-biodiversity-areas/media-and-resources/#1553597171790-6f83422a-a731>). No conservationally significant or important waterbird species/nests were observed, during the site assessment or are necessarily expected to utilise the assessment area for breeding, foraging and/or persistence purposes. Only common local resident bird species/nests were observed.

Although this is the case, the increased woody densities associated with the watercourses likely provide significant refuge and locally distinct habitat for common and habitat-specific bird-, reptilian-, small antelope- as well as other mammalian species.

It is therefore recommended that the identified eight significant watercourses be adequately buffered out of the proposed development footprint area. A minimum approximately 35 m buffer distance is proposed to be implemented on both sides of all the watercourse edges. No current or future development is allowed to take place within these buffered zones.

It must be noted that ten small artificial earth dam walls have been constructed within the various watercourses, which are significantly impeding the ephemeral flow regimes of the watercourses. The negative impacts of these impediments will however mostly be experienced further downstream. **The EAP must determine from the relevant competent authorities whether these dam walls possess the required Environmental Authorisations and Water Use Licenses, in accordance with the relevant/applicable environmental legislation. If this is not the case, it is recommended that the dam walls be completely removed from the watercourses, with immediate effect.**