Alliance for Water Stewardship Audit Report

Prepared for Taiwan Semiconductor Manufacturing Company, Ltd.

Multi-site certification

Site: Advanced Backend F5, F12A, F12B

AWS Reference: AWS-000409, AWS-000410, AWS-000411

Prepared by: SGS
SGS Ref.: TW/TPE
Version: 1
Date: 20th Jan. 2022

REPORT DETAILS

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CLIENT REFERENCE	Taiwan Semiconductor Manufacturing Company, Ltd.
REPORT TITLE	ALLIANCE FOR WATER STEWARDSHIP AUDIT REPORT
DATE SUBMITTED:	20th Jan. 2022
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TABLE OF CONTENT

1 EXECUTIVE SUMMARY

The scope of services covers the conformity assessment of water use in compliance with the AWS International Water Stewardship Standard (Version 2.0) for Taiwan Semiconductor Manufacturing Company, Ltd. Advanced Backend Fab 5, F12A, F12B (hereinafter referred to as “TSMC Fab 5, F12A, F12B” or “the site”). The address of the location includes:

Fab 5:

NO.121, Park Ave. 3, Hsinchu Science Park, Hsinchu 300, Taiwan, R.O.C.

Fab 12A:

Fab 12P1/2: NO. 8, Li-Hsin Rd. 6, Hsinchu Science Park, Hsinchu 300-78, Taiwan, R.O.C.

Fab 12P3: NO. 6, Creation Rd. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

Fab 12P4/5: NO. 168, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

Fab 12B:

Fab 12P6: No. 166, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

Fab 12P7: NO. 188, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

The assessment has been completed in compliance with the AWS Certification requirements, Version 2.0 dated Mar. 2019.

Established in 1987 and headquartered in Hsinchu Science Park, Taiwan, TSMC pioneered the pure-play foundry business model with an exclusive focus on manufacturing customers’ products. By choosing not to design, manufacture or market any semiconductor products under its own name, the Company ensures that it never competes with its customers.

And so, TSMC’s foundry business model has enabled the rise of the global fabless industry, and since its inception TSMC has been the world’s leading semiconductor foundry. The Company manufactured 11,617 different products using 281 distinct technologies for 510 different customers in 2020.

On 20th December, 2021, SGS Taiwan Ltd. (hereinafter referred to as “SGS”) conducted the on-site conformity assessment for TSMC Fab 5, F12A, F12B facilities and activities with regard to certification to the AWS Standard (Version 2.0). A total of fifteen findings were raised during the course of the audit process and they were all categorized as observations. Eight findings are for core indications and seven findings are for advanced indicators, respectively.

TSMC Fab 5, F12A, F12B responded to the findings raised with root cause analysis and action plans. Our review confirmed that all corrective action plans are acceptable.

Given the review of evidence provided and the site visit performed at TSMC Fab 5, F12A, F12B, SGS recommends that TSMC Fab 5, F12A, F12B be awarded the AWS Platinum Certified status with a surveillance audit interval of annual frequency.

2 SCOPE OF ASSESSMENT

The scope of services covers the conformity assessment of water use in compliance with the AWS International Water Stewardship Standard (Version 2.0) for Given the review of evidence provided and the site visit performed at TSMC Fab 5, F12A, F12B, SGS recommends that TSMC Fab 5, F12A, F12B be awarded the AWS Platinum Certified status with a surveillance audit interval of annual frequency.

The address of the location includes:

Fab 5:

NO.121, Park Ave. 3, Hsinchu Science Park, Hsinchu 300, Taiwan, R.O.C.

Fab 12A:

Fab 12P1/2: NO. 8, Li-Hsin Rd. 6, Hsinchu Science Park, Hsinchu 300-78, Taiwan, R.O.C.

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Fab 12P4/5: NO. 168, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

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Fab 12P6: No. 166, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

Fab 12P7: NO. 188, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C.

The assessment has been completed in compliance with the AWS Certification requirements, Version 2.0 dated Mar. 2019.

A pre-assessment for TSMC Fab 5, F12A, F12B's facilities and activities with regard to certification to the AWS Standard (Version 2.0) was performed by Mr. Eric Huang and Miss Vanessa Chen, the AWS approved auditor from SGS Taiwan Ltd. (hereinafter referred to as "SGS") on 17th November 2021. During the pre-assessment, SGS conducted an on-site audit that covered water supply facilities, chemical warehouse, waste storage, wastewater treatment facilities, online monitoring devices installed for treated effluent, employees' canteen, personnel interviews and document reviews. A total of twenty findings were raised during the pre-assessment process. TSMC Fab 5, F12A, F12B responded that corrective actions will be taken to successfully close all findings raised at pre-assessment stage and before commencement of conformity assessment.

From 29th November, 2021 to 20th December, 2021, SGS conducted the conformity assessment on-site visit of TSMC Fab 5, F12A, F12B's facilities and activities with regard to

certification to the AWS Standard (Version 2.0). Table 2.1 includes details on SGS audit team. The audit plan is attached as a separate document.

Table 2.1 SGS Audit Team

Audit Team		Qualifications/Experience
Kyle Lu	Team Leader	AWS certified auditors have more than 20 years of experience in environmental management, wastewater and industrial waste reduction treatment and construction, and have participated in ISO 14001, ISO 14064, ISO 14046, ISO 14067 and other standards verification experience for about 10 years.
Vanessa CHEN	Auditor	AWS certified auditor. Vanessa is also a qualified auditor of ISO 14064, ISO 14067, ISO 14001, ISO 14046 and CSR. In the environmental management and sustainable field, Vanessa is not only an auditor now, but she was also a consultant with more than ten years of experience, taking in charge of industrial system management such as ISO 14064, ISO 14067, CSR, ISO 20121 and so on.
Finn HAN	Auditor	An AWS certified auditor with over 20 years of experience in environmental management and sustainable development experiences in audit and consulting, Ms. Han is specializing in Corporate Social Responsibility (CSR)/ Sustainability Report Assurance, ISO 14064, ISO 14067, ISO 14046 verification and ISO14001, ISO 20121 and other ESG related audit and consulting projects.
Angela Chen	Auditor	AWS certified auditors have 15+ years of experience in environmental management, climate change, sustainability field and have participated in ISO 14001, ISO 14064, ISO 14046, ISO 14067 verifications and CSR assurance for nearly 10 years.
Belinda Shih	Auditor	AWS certified auditor with 9 years environmental management experiences in consulting and operation, and have participated in ISO 14001, ISO 45001, ISO 14064, ISO 14046, ISO 14067 and other standards verification experience for about 10 years.
Eric HUANG	pre-assessment Team Leader	AWS certified auditor with 32 years environmental engineering and management experiences in audit, consulting, engineering and operation, and specialising in energy and climate change. Mr. Huang has conducted numerous of river basins pollution management, energy management system audit, Corporate Social Responsibility (CSR)/ Sustainability Report Assurance, ISO 14064-1 Greenhouse Gas verifcation audit, energy & climate change consulting/ audit, waste management, waste treatment/ recycling, site remediation, site decontamination, vibration measurement, industrial service projects.

During the conformity assessment, two SGS auditors splited into A to E teams and spent 3.0 days inspecting TSMC Fab 5, F12A, F12B's installations and ㄐㄛ interviews activities and documents. Inteviews with personnel were also carried out.

TSMC Fab 5, F12A, F12B provided most of the requested supporting documentation as evidence whilst on site. SGS provided initial feedback on the gaps between TSMC Fab 5, F12A, F12B's current management and the level required by the standard during the closing meeting of the conformity assessment on 29th November, 2021 to 20th December, 2021. Figure 2.1 includes pictures taken while on-site.

【Fab 5】

F5 tap water meter

F5 rainwater drain

F5 rainwater drain

Wastewater treatment area

Wastewater treatment area

Waste water flow meter

Figure 2.1 Photos from 29th November, 2021 to 20th December, 2021 Site Assessment

【F12AP3】

Tap water inlet pipe

Tap water meter

Tap water flow meter

Wastewater treatment area

Wastewater NaOH storage tank

Wastewater H_2SO_4 storage tank

Chemical storage tank

Figure 2.1 Photos from 29th November, 2021 to 20th December, 2021 Site Assessment

【F12AP6】

Tap water meter

Rainwater shutoff valve

Waste water outlet flow meter

Wastewater treatment area

Waste water flow meter

Chemical filling area

Figure 2.1 Photos from 29th November, 2021 to 20th December, 2021 Site Assessment

【F12AP45】

Ecological pool

Liquid nitrogen evaporation rack

Chemical irrigation area

Chemical filling storage tank

【F12P7】

Discharge water quality monitoring instrument

Wastewater treatment area

Chemical irrigation area

Figure 2.1 Photos from 29th November, 2021 to 20th December, 2021 Site Assessment

3 STAKEHOLDER ANNOUNCEMENT AND CONCLUAION

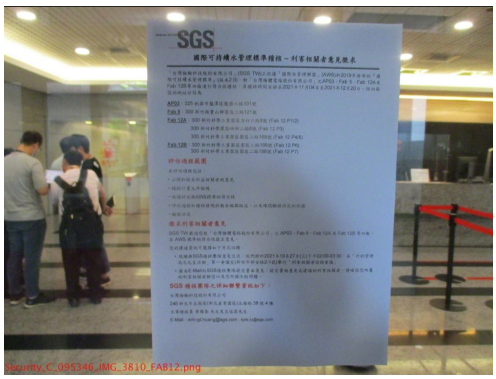
Following the AWS Certification Requirements, before the on-site conformity assessment, SGS prepared a stakeholder announcement on 22nd September 2021, which stated TSMC Fab 5, F12A, F12B's intention to pursue AWS certification. Besides submitting to AWS for publication on the AWS website, the stakeholder announcement was also posted on the information disclosure bulletin board at security both of TSMC Fab 5, F12A, F12B's gate and displayed on TSMC ESG Facebook's website as below weblink, respectively.
https://www.facebook.com/1757471104475504/posts/3140089776213623/?d=n

In addition, the stakeholder announcement was also displayed on SGS' website:

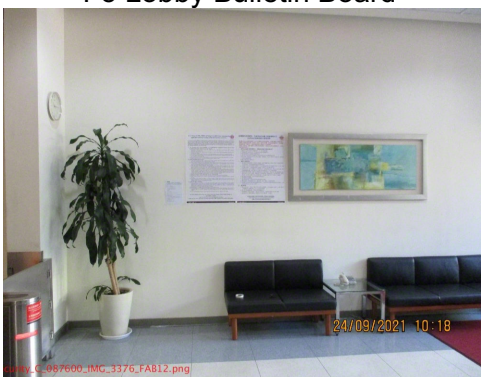
- SGS Taiwan Webpage：
  https://twap.sgs.com/Trainsys/TrainingType/TrainInfoDetail.aspx?ID=218

However, SGS didn't received any feedback information since the release of the stakeholder announcement.

F5 Lobby Bulletin Board



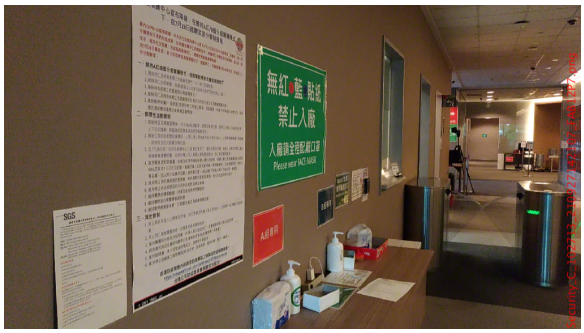
At the entrance of F12P1



At the entrance of F12P3

At the entrance of F12P4

At the entrance of F12P6



At the entrance of F12P7

TSMC ESG FB information

Figure 3-1 Information Disclosure Bulletin Board at stakeholder consulting meeitng venue

SGS held a stakeholder consultation meeting on 27th October 2021 at NINI Life Square Meeting Hall, Hsinchu Science Park Bureau.

Figure 3-2 Live Records of AWS Stakeholder Consultation Meetings (2021/10/27)

An AWS stakeholder consultation meeting will be held in Hsinchu City on October 27, 2021. On the morning of the same day, TSMC arranged for a visit from the competent units, including: Construction Management Office of Planning and Design Division of Hsinchu Science Park Bureau, director and manager of sewage treatment plant of Hsinchu Science Park Bureau, etc. The content of the on-site visit is

- The Construction Management Office of the Planning and Design Division of the Hsinchu Science Park Bureau stated:

TSMC cooperates with the bureau, especially TSMC actively cooperates with the new plant to save water and saves water when the water conditions are severe.

- The director of the sewage treatment plant of the Hsinchu Science Park Bureau said:

The discharge water quality of TSMC factories is far below the acceptance standards of sewage treatment plants. It facilitates dilution of water and helps reduce the load on sewage

treatment plants. When sewage is discharged from the sewage treatment plant into the watershed, the water quality of the watershed is diluted.

- Transcripts of interviews with managers of wastewater treatment plants of the Hsinchu Science Park Bureau need to include how they assessed TSMC's efforts in wastewater discharge quality to demonstrate that stakeholders have assessed TSMC's collective efforts to address water challenges.

On the afternoon of October 27, 2021, an AWS stakeholder consultation meeting was held in Hsinchu, with a total of 24 participants, including: suppliers, customers, residents near the factory, TSMC employees, etc. For detailed on-site attendance records, please refer to the attachment.

- Sun International Semiconductor Corporation (industry in the watershed): AWS's designation and scope of watersheds?

The scope of the watershed in AWS covers the upper, middle and lower reaches, from the water reservoir to the discharge outlet in the environment, and the company's corresponding supplier of commercial water is also the part that needs attention.

- Wanghong Electronics Co., Ltd. (industry in the watershed): Does the factory have questions about excess secondary water use in winter? Does TSMC suggest how to deal with the difference between winter and summer?

The TSMC factory will also encounter differences in water volume in winter and summer. In winter, there is too much secondary water. It will look for relatively clean and easy-to-treat recycled water in the waste water discharged from the machine, and then refine it, so that this water can be returned to the industrial pool. In order to reduce the use of tap water and reduce the problem of excessive discharge of secondary water in winter, but the characteristics of each plant are different, they will find suitable secondary water for re-refining, and recycle as much as possible in summer to reduce the use of tap water.

- PSMC (industry in the watershed): As mentioned above, the reuse of water recycling will generate energy consumption and corresponding waste and other derived costs. How does TSMC deal with it?

Recycling wastewater in water treatment will generate energy consumption and waste and system construction and chemical treatment costs.

1. Energy consumption: The replacement of energy-saving equipment, such as the use of VFD frequency converters, will be evaluated to reduce the use of electricity.
2. Waste: TSMC is committed to resource reuse, and finds possible reuse methods from the characteristics of each wastewater. For example, CuCMP wastewater contains Cu, which can

be converted into copper rods by the principle of electroplating. The copper system is required to turn the Cu in the wastewater into copper rods for reuse, and other TMAH/ammonium sulfate nitrogen have corresponding utilization methods.
3. The cost of dosing treatment: optimize the dosage through daily monitoring and fine-tunin.

- Demao Property Company (manufacturer near the factory): Is there any more sophisticated measures for TSMC's new factory due to the water supply affected by the expansion of Baoshan Reservoir?

Regarding the water used for the expansion of the Baoshan plant, there is information on this aspect in public information, and tsmc has promised to use 100% recycled and treated water.

- Kezhi New Technology Co., Ltd. (Supplier): 1. It is a supplier of TSMC, and it has tried its best to cooperate with TSMC/Water Resources Department's guidance in terms of energy saving, carbon reduction and water saving. However, the current water resources department's guidance is in the direction of water saving in the plant area. It is already extreme, and then it needs to be replaced with newer equipment. Is there any simple technology transferable or subsidized in terms of funding? 2. Does AWS have a common definition of calculation for the utilization of circulating water? For example, in Is there the same basis and calculation method for the calculation of recovery rate?

1. Effective improvement methods and promotion can be discussed in the supplier project counseling in the future.
2. The Science and Technology Administration Bureau of the Park provides a standard water balance table for companies in the park to calculate the water balance.
3. The recovery rate is usually based on the average of the previous year. AWS must conform to the national conditions of each country. The corresponding calculation method is mainly based on the standards of the local government or agency. There is no special presentation method, as long as the results and efforts can be specifically expressed.

- Taiwan's Mitsubishi Chemical Corporation (related industries in Hsinchu County): TSMC used 3.5 times to reuse a drop of water, and the calculation of the recovery rate is more than 300%. The energy consumption in this area will be very large, which is different from seawater. Compared with the energy consumption of desalination, should it be converted into seawater desalination to provide more water sources?

You may have misunderstood the calculation method of the part of TSMC that reuses 3.5 times of water. The calculation method is to divide the recycled water by the tap water, including: the recycled water is the sum of the tap water, pure water recycling, washing tower recycling, air conditioning condensation recycling, etc. In this way, 3.5 times of reuse can be

achieved. The calculation of the recovery rate only calculates the recovery and utilization rate of the drainage of the table. These two items are different.

4 DESCRIPTION OF CATCHMENT

The Baoshan Reservoir is one of the main reservoirs in Hsinchu, Taiwan, and its water source comes from Touqian River. The average daily water supply capacity of reservoir storage is about 42,000 cubic meters, and the total water supply capacity can reach 5.04 million cubic meters. It is mainly supplied to Hsinchu County and City for public use.

The main water source for TSMC Fab 5, F12A, F12B is tap water. The tap water source is from Baoshan Reservoir and Toqianxi Longen Weir, passing through Baoshan Water Purification Plant and Hsinchu Water Purification Plant, providing tap water to Hsinchu County and City. The plant does not use groundwater.

The waste water discharged by TSMC Fab 5, F12A, and F12B is treated by the sewage treatment plant in the Hsinchu Science Park, and then discharged into the Keya Creek after confirming that it meets the standard. The final discharge into the final receiving water body is the Taiwan Strait. Before being discharged to the Hsinchu Science Park sewage treatment plant, TSMC Fab 5, F12A, F12B need to undergo a sewage pretreatment process to meet the Hsinchu Science Park's water intake standards. The Keya River is 25 kilometers long and has a drainage area of about 45.6 square kilometers. It flows through Hsinchu City, Hsinchu County and Baoshan Township.

The following figures 4.1~4.5 show the water bodies in the basin of Fab 5, F12A, and F12B, including the water supply source Baoshan Reservoir, tap water source Baoshan Water Purification Plant, Fab 5, F12A, F12B sewage treatment plant, Hsinchu Science Park sewage treatment plant, and sewage discharge points. Yaxi and the final receiving water body in the Taiwan Strait.

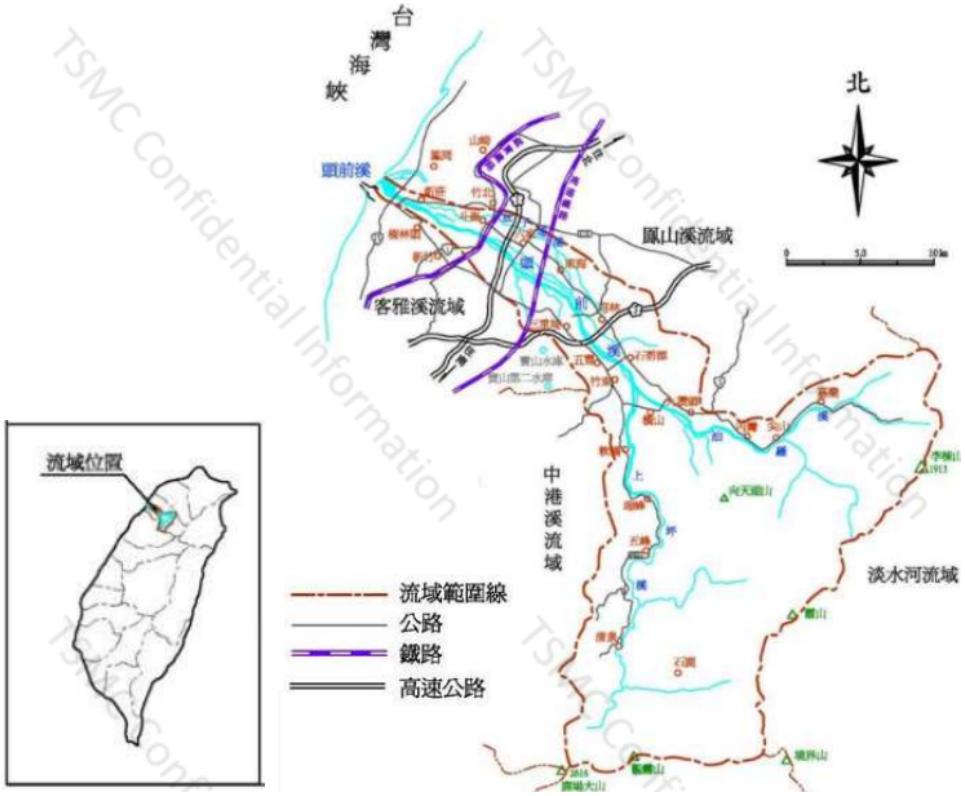


Figure 4.1 Water body in the basin-Baoshan Reservoir

Figure 4.2 The water body in the basin-Keya River Basin

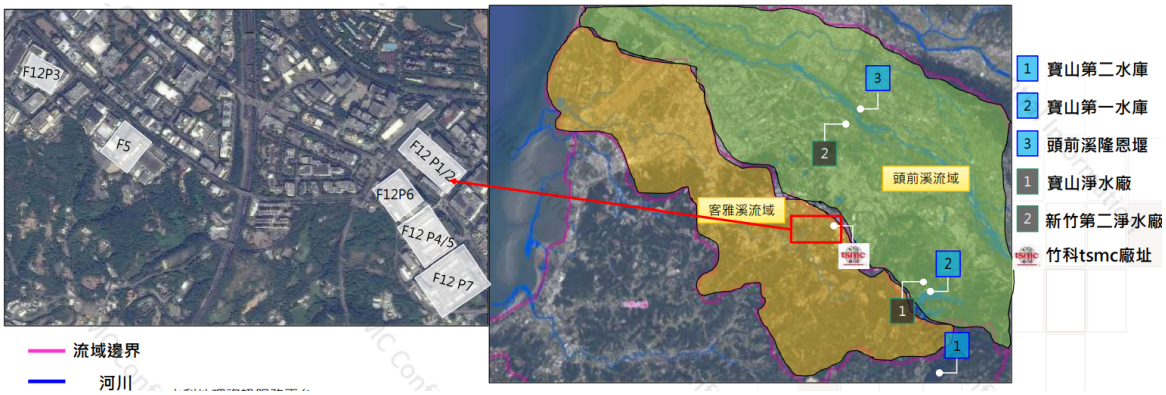


Figure 4.3 Baoshan Reservoir, Kaya River Basin and Baoshan Water Purification Plant

Figure 4.4 Sewage discharge route from TSMC Fab 5, F12A, F12B to Hsinchu Science and Technology Park Wastewater Treatment Plant, and then to Keya Creek

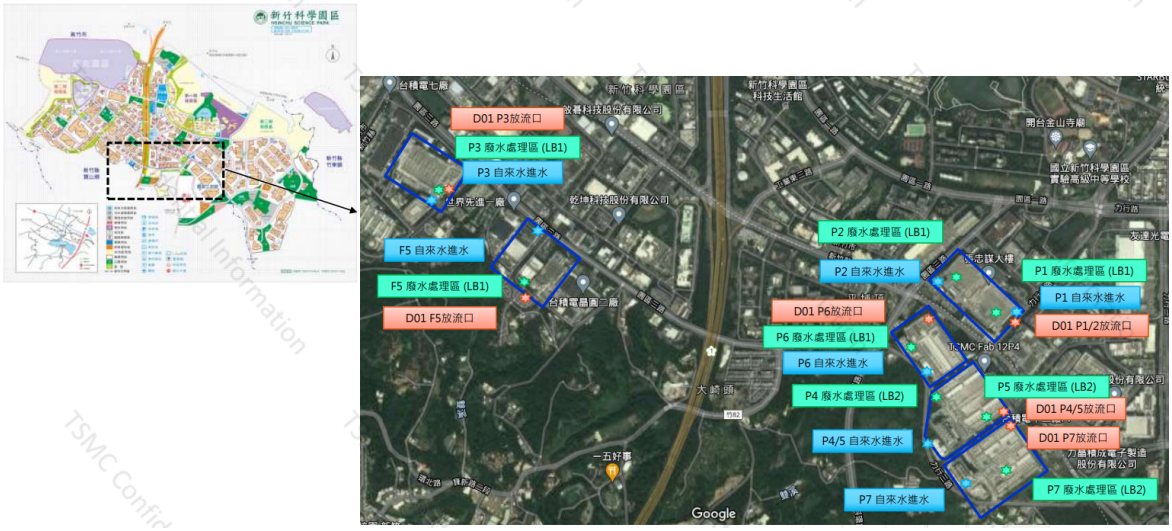


Figure 4.5 TSMC Fab 5, F12A, F12B water supply entry point, sewage treatment plant, sewage discharge point and the relevant location of the Hsinchu Science Park sewage treatment plant

Figure 4.6 to Figure 4.11 show the boundaries of conformity assessment in TSMC Fab 5, F12A, and F12B. The Figure shows the water flow direction of the key areas of each plant, including the discharge outlet of chemical discharge water, waste storage area, rainwater flow direction and rainwater discharge outlet, etc.

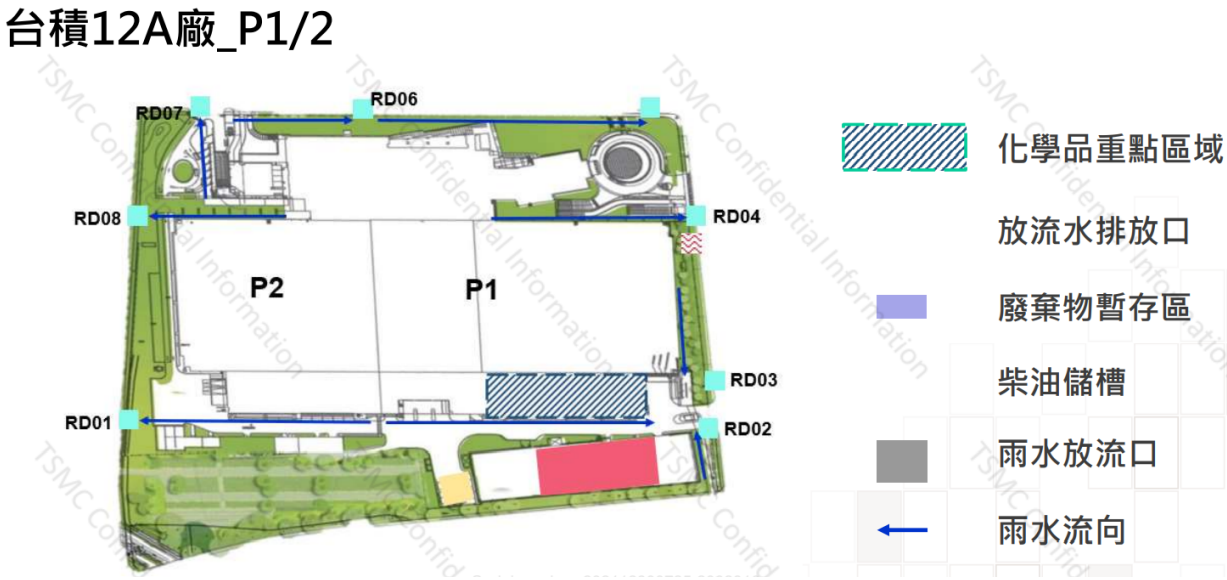


Figure 4.6 The F12A_P1/2 conformity assessment boundary

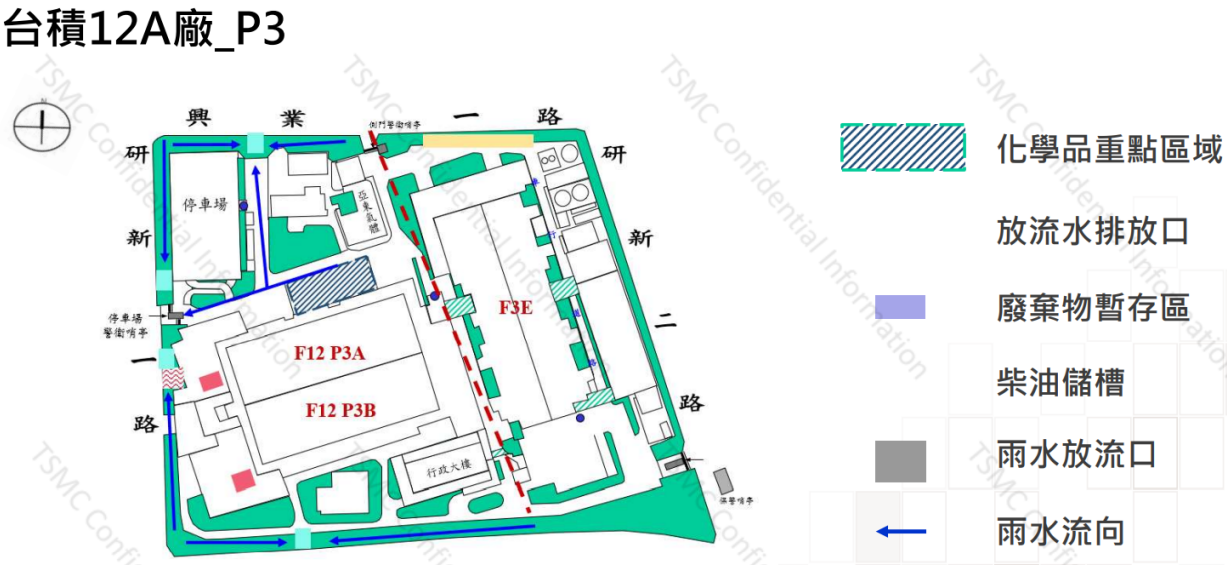


Figure 4.7 The F12A_P3 conformity assessment boundary

台積12A廠_P4/5

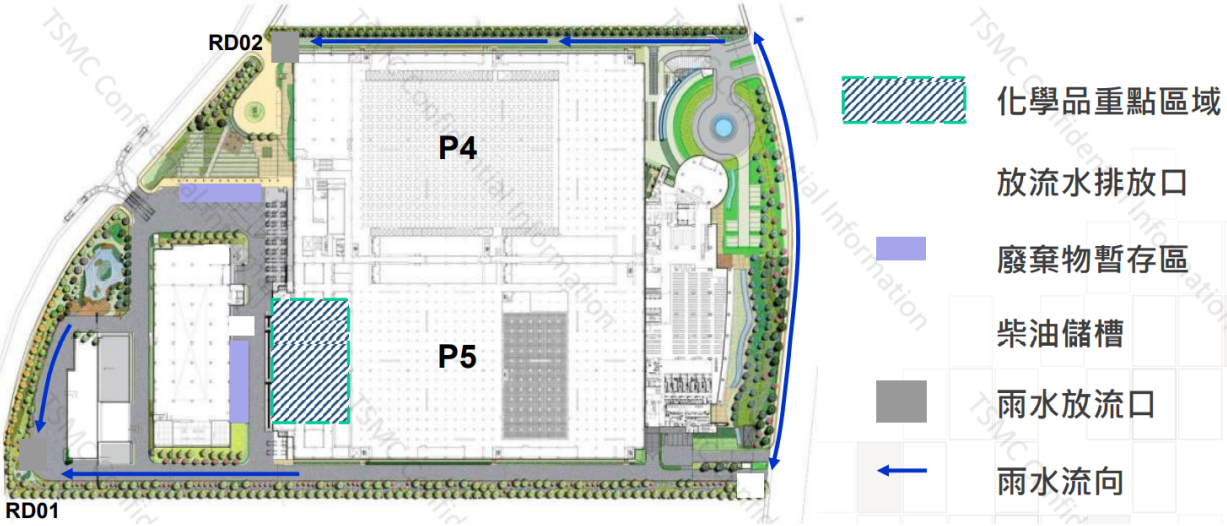


Figure 4.8 The F12A_P4/5 conformity assessment boundary

台積12A廠_P6

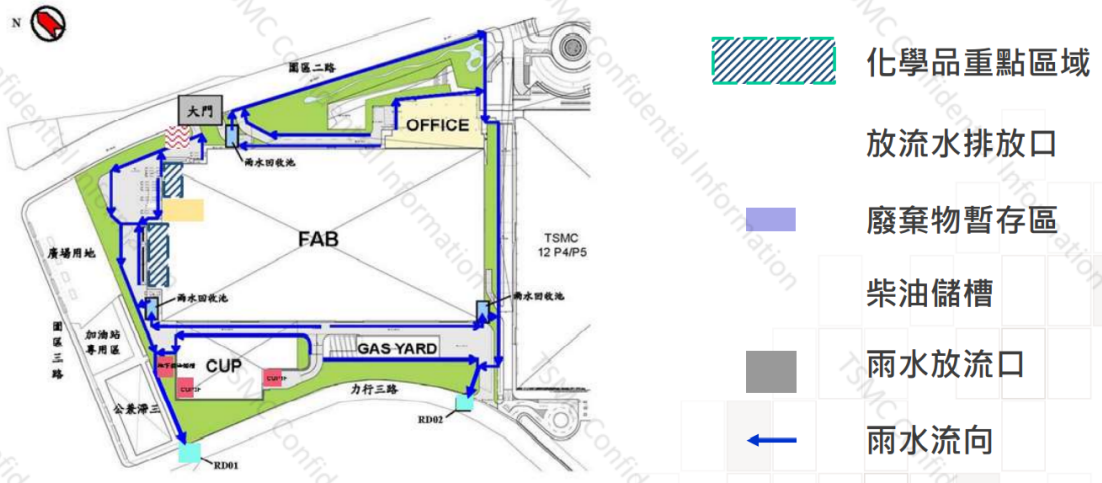


Figure 4.9 The F12A_P6 conformity assessment boundary

台積12B廠_P7

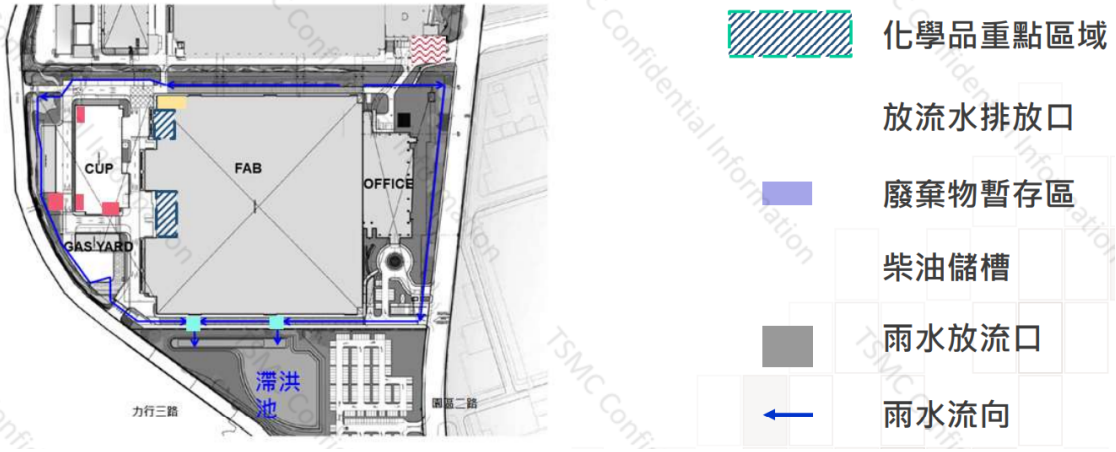


Figure 4.10 The F12B_P7 conformity assessment boundary

台積2/5廠

Figure 4.11 The F5 conformity assessment boundary

5 SUMMARY OF SHARED WATER CHALLENGES

TSMC identified seven Shared Water Challenges, include internal and external challenges. The external shared water challenges are water shortage and water effluent.

The water shortage challenges were prioritized as:

- Climate change, abnormal water supply
- Regional water consumption is increasing year by year
- Water leakage in the water pipeline

The water effluent challenges were prioritized as:

- Receiving water pollution
- Water pollution discharge.

TSMC identify 20 water related risks within their sites. Within conformity assessment sites, there are two risks identified as internal shared water challenges which is high-risk (≥6).

The internal shared water challenges are:

Business Risk Assessment	likelihood of event	Severity of Impact	Risk
Drought caused insufficient water supply	3	4	12
Effluent water increases river polluted index (RPI) cause river water quality risk	3	2	6

6 INDICATORS CHECKLIST

6.1 CORE AWS INDICATORS

As per the requirement set out in the Section 2.11.3.1 of the AWS Certification Requirements, the following table 6.1 presents all the CORE AWS indicators with the relevant reviewed evidence provided by TSMC Fab 5, F12A, and F12B Plant.

Table 6.1 Gaps and Potential Areas for Improvement Against the CORE AWS Indicators

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1	**Gather and Understand (core)**	
1.1	**Gather information to define the site's physical scope for water stewardship purposes, including: its operational boundaries; the water sources from which the site draws; the locations to which the site returns its discharges; and the catchment(s) that the site affect(s) and upon which it is reliant.**	
1.1.1	The physical scope of the site shall be mapped, considering the regulatory landscape and zone of stakeholder interests, including: - Site boundaries; - Water-related infrastructure, including piping network, owned or managed by the site or its parent organization; - Any water sources providing water to the site that are owned or managed by the site or its parent organization; - Water service provider (if applicable) and its ultimate water source; - Discharge points and waste water service provider (if applicable) and ultimate receiving water body or bodies; - Catchment(s) that the site affect(s) and is reliant upon for water.	The address of the location includes: Fab 5: NO.121, Park Ave. 3, Hsinchu Science Park, Hsinchu 300, Taiwan, R.O.C. Fab 12A: Fab 12P1/2: NO. 8, Li-Hsin Rd. 6, Hsinchu Science Park, Hsinchu 300-78, Taiwan, R.O.C. Fab 12P3: NO. 6, Creation Rd. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C. Fab 12P4/5: NO. 168, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C. Fab 12B: Fab 12P6: No. 166, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C. Fab 12P7: NO. 188, Park Ave. 2, Hsinchu Science Park, Hsinchu 300-77, Taiwan, R.O.C. The main water source for TSMC Fab 5, F12A, F12B is tap water. The tap water source is from Baoshan Reservoir and Toqianxi Longen Weir, passing through Baoshan Water Purification Plant and Hsinchu Water Purification Plant, providing tap water to Hsinchu County and City. The plant does not use groundwater. The waste water discharged by TSMC Fab 5, F12A, and F12B is treated by the sewage treatment plant in the Hsinchu Science Park, and then discharged into the Keya Creek after confirming that it meets the standard. The final discharge into the final receiving water body is the Taiwan Strait. Before being discharged to the Hsinchu Science Park sewage treatment plant, TSMC Fab 5, F12A, F12B need to undergo a sewage pretreatment process to meet the Hsinchu Science Park's water intake standards. The Keya River is 25 kilometers long and has a drainage area of about 45.6 square kilometers. It flows through Hsinchu City, Hsinchu County and Baoshan Township.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1.2	**Understand relevant stakeholders, their water-related challenges, and the site's ability to influence beyond its boundaries.**	
1.2.1	Stakeholders and their water-related challenges shall be identified. The process used for stakeholder identification shall be identified. This process shall: - Inclusively cover all relevant stakeholder groups including vulnerable, women, minority, and Indigenous people; - Consider the physical scope identified, including stakeholders, representative of the site's ultimate water source and ultimate receiving water body or bodies; - Provide evidence of stakeholder consultation on water-related interests and challenges; - Note that the ability and/or willingness of stakeholders to participate may vary across the relevant stakeholder groups; - Identify the degree of stakeholder engagement based on their level of interest and influence.	TSMC define the following six stakeholders as the major stakeholders for engagement: employees, shareholders/investors, customers, suppliers/vendors, and government & society (community, academic institutions, media, NGO/ NPO). No indigenous people live in Laojie River Watershed. By evaluating global sustainability trends and engaging with internal/external stakeholders, TSMC identified 21 ESG issues relevant to TSMC in 2020 and shown in TSMC 2020 CSR Report. In 2020, materiality analysis was conducted through surveys due to the COVID-19 pandemic. TSMC received 842 replies in 2020, and used the surveys to analyze their level of interest in ESG issues relevant to TSMC. The ESG Steering Committee analyze the impacts of each issue on operations (profitability, revenue, customer satisfaction, employee cohesion, risk) and review the sustainability roadmap for long-term development with a total of 150 colleagues that included TSMC's senior vice presidents, vice presidents, senior fab directors, and fab directors. According to the results from previous process, TSMC have mapped out the TSMC materiality matrix. The ESG Committee has identifying 14 material issues, including climate change and water management. In July 2021, TSMC conducted AWS stakeholder questionaire survey and result is following. Level of stakeholders interested: the highest is "Safe drinking water and sanitary environment". The lowest is "Healthy water environment". The level of TSMC actions: the highest is "Water pollution prevention". The lowest is "Healthy water environment". Another survey also conducted during stakeholder consultation meeting on 27th October 2021. Level of stakeholders interested: the highest is "Safe drinking water and sanitary environment". The lowest is "Water saving of sustainable water balance". The level of TSMC actions: the highest is "Safe drinking water and sanitary environment". The lowest is "Water Challenges in the catchment". Thus "Safe drinking water and sanitary environment" is the most interested topics by stakeholder. Therefore, an **Observation 01** is raised for this indicator.
1.2.2	Current and potential degree of influence between site and stakeholder shall be identified, within the catchment and considering the site's ultimate water source and ultimate receiving water body for wastewater.	The approved amount of tap water in Longtan Science and Technology Park is 205,000 CMD (current use is 150,000 CMD). TSMC's Hsinchu plant uses 101,639 CMD. The Hsinchu Science Park Sewage Treatment Plant has a processing capacity of 185,000 CMD. TSMC's plant sewage treatment plant has a processing capacity of 55.054 CMD. During the dry season, TSMC will use water tank trucks to replenish water. Therefore, an **Observation 02** is raised for this indicator.
1.3	**Gather water-related data for the site, including: water balance; water quality, Important Water-Related Areas, water governance, WASH; water-related costs, revenues, and shared value creation.**	
1.3.1	Existing water-related incident response plans shall be identified.	TSMC already set the water related emergency response process documents. There are 5 documents related to water pollution and and one document related to water shortage response, including: TSMC EMERGENCY RESPONSE PROCEDURE, TSMC EMERGENCY RESPONSE C.I. TSMC's raw water supply shortage crisis management internal control operation process etc. Those procedure cover the environmental protection incident notification time limit and process, the effluent water quality OCAP handling process, countermeasures against water shortage.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1.3.2	Site water balance, including inflows, losses, storage, and outflows shall be identified and mapped.	A volumetric balance of water input and output is identified and mapped by TSMC Fab 5, F12A, and F12B Plant at 2020. F12A P1/2: City Water Tank = 24,360 m^3, Recycling Water = 330 m^3, AWD System = 560.28 m^3 F12A P3: City Water Tank = 6,200 m^3, Recycling Water = 60 m^3, AWD System = 306 m^3 F12A P4/5: City Water Tank = 20,000 m^3, Recycling Water = 260 m^3, AWD System = 266 m^3 F12B P6: City Water Tank = 35,000 m^3, Recycling Water = 350 m^3, AWD System = 270 m^3 F12B P7: City Water Tank = 39,200 m^3, Recycling Water = 525 m^3, AWD System = 944 m^3 Fab5: City Water Tank = 2,900 m^3, Recycling Water = 15 m^3, AWD System = 576.1 m^3
1.3.3	Site water balance, inflows, losses, storage, and outflows, including indication of annual variance in water usage rates, shall be quantified. Where there is a water-related challenge that would be a threat to good water balance for people or environment, an indication of annual high and low variances shall be quantified.	The water volume of the storage tank in the plant site is usually "full level balance" to deal with the abnormal strain of the upstream water source. When the upstream water source is abnormal, the plant pool can provide water for about 3 days in the plant. Therefore, an **Observation 03** is raised for this indicator.
1.3.4	Water quality of the site's water source(s), provided waters, effluent and receiving water bodies shall be quantified. Where there is a water-related challenge that would be a threat to good water quality status for people or environment, an indication of annual, and where appropriate, seasonal, high and low variances shall be quantified.	The main water source for TSMC's Fab 5, F12A, and F12B plants is tap water. The tap water is processed and supplied by Baoshan Water Purification Plant. The water quality must meet the water quality standards before it can be used. The wastewater from TSMC's Fab 5, F12A, and F12B plants needs to be pre-treated before being discharged into the Hsinchu Science Park Sewage Treatment Plant, and must meet the acceptance criteria set by the Sewage Treatment Plant. The standards are: 5<pH<9, fluoride salt<15ppm, S.S.<300 ppm, NH_3<30 ppm, TMAH<30 ppm, COD<500PPM, Cu<1 ppm. The effluent from the Hsinchu Science Park Sewage Treatment Plant must meet the effluent standards before it can be discharged into the Keya Stream, and finally into the Taiwan Strait. The effluent standards include SS, COD, pH, water temperature, NH_3 and BOD.
1.3.5	Potential sources of pollution shall be identified and if applicable, mapped, including chemicals used or stored on site.	In the boundary of conformity assessment in TSMC Fab 5, F12A and F12B, the direction of water flow in key areas of each plant area, including the discharge outlet of chemical discharge water, waste storage area, rainwater flow direction and rainwater discharge outlet, etc.
1.3.6	On-site Important Water-Related Areas shall be identified and mapped, including a description of their status including Indigenous cultural values.	TSMC's TSMC Fab 5, F12A and F12B site important main wading areas, including: sewage treatment plants and chemical storage areas. The site of the Hsinchu Science Park, which was originally a cemetery and camp before its establishment. When setting up a factory in the park, it can only be installed after the environmental assessment and review by the Science and Technology Management Bureau, because the government has set up appropriate management measures to assess that there is no IWRA damaged area on the site. The regional water source departs from Touqian River at the front end, passes through Baoshan Reservoir, Hsinchu Water Purification Plant, Hsinchu Science Park, Kayaque Creek, and finally

Indicator	Details (Core)	Evidence Reviewed/Document Reference
		receives water bodies belonging to/hillside land/military camp/cemetery/farmland. There is no IWRA damaged area in the basin.
1.3.7	Annual water-related costs, revenues, and a description or quantification of the social, cultural, environmental, or economic water-related value generated by the site shall be identified and used to inform the evaluation of the plan in 4.1.2.	TSMC has continued to invest in various water-saving projects, saving a total of 1.55 million tons of tap water in 2020 compared with 2019. The water saved can be used for 11.3 days of tap water for 2.245 million people in Hsinchu City. Water-saving improvement project in Hsinchu plant: 1) Establish an ammonia nitrogen wastewater treatment system to improve the discharge wastewater ammonia nitrogen of the Hsinchu plant by 77% compared with the base year, and its input cost is about NT$ 307 million. 2) Establishing a TMAH wastewater treatment system to improve the discharge wastewater TMAH of the Hsinchu plant by 75% compared with the base year, and its input cost is about NT$ 260 million.
1.3.8	Levels of access and adequacy of WASH at the site shall be identified.	The tap water source of TSMC's Fab 5, F12A and F12B plants is processed and supplied by Baoshan Water Purification Plant. The Taiwan Water Company regularly inspects the water quality every season to confirm the quality of the water supplied to the community. TSMC's Fab 5, F12A and F12B plants provide employees with sufficient and safe drinking water, clean toilets (in compliance with WBCSD standards and occupational safety and health facilities rules), and warm water for washing in winter. In order to prevent COVID-19, the factory provides hand washing facilities to protect the health of employees and avoid contact. Special toilets are set up for the disabled that are better than the regulations. TSMC's Fab 5, F12A and F12B plants have a total of 265 water dispensers (44 for Fab 5, 54 for F12A P1/2, 38 for F12A P3, 49 for F12A P4/5, 35 for F12B P6, and F12B P7 has 45 sets) According to customer requirements, the office building must be equipped with one water dispenser for every 61M distance, and one for every 2,900 square meters. The water dispenser in the factory is maintained and replaced once a month, and the E. coli is checked every two months. Each inspection accounts for 1/6 of the total, which is better than Taiwan's legal requirements. There are "men's and women's toilets" on every floor of the factory. There are 524 urinals, 219 squatting toilets and 683 toilets in the whole factory. The number of inductive hand washing faucets is 623. Compared with the requirements of building regulations, the quantity meets the requirements and is better than the requirements of the regulations.
1.4	**Gather data on the site's indirect water use, including: its primary inputs; the water use embedded in the production of those primary inputs the status of the waters at the origin of the inputs (where they can be identified); and water used in out-sourced water-related services.**	
1.4.1	The embedded water use of primary inputs, including quantity, quality and level of water risk within the site's catchment, shall be identified.	TSMC uses the 2021 aqueduct water risk map to determine the water risk level. Taiwan's overall water risk level is low to medium level 1-2. The main raw materials of TSMC's Fab 5, F12A and F12B factories include packing, bulk gas, and wafer. All raw material suppliers are outside the catchment area. The overall water risk level is low to medium (1~2).

Indicator	Details (Core)	Evidence Reviewed/Document Reference
		Therefore, an **Observation 04** is raised for this indicator.
1.4.2	The embedded water use of outsourced services shall be identified, and where those services originate within the site's catchment, quantified.	The outsourcing services include clothes cleaning, tray cleaning and parts cleaning and transportation vehicles. Among them, clothes cleaning services are all outside the watershed, but tray cleaning, parts cleaning and transportation vehicles are all within the watershed. For each service, the water consumption is calculated as 678 tons/month for laundry washing, 26,821.1 tons/month for pallet washing, 33,818.75 tons/month for parts washing, and 126 tons/month for transportation vehicles.
1.5	**Gather water-related data for the catchment, including: water governance, water balance, water quality, Important Water-Related Areas, infrastructure, and WASH**	
1.5.1	Water governance initiatives shall be identified, including catchment plan(s), water-related public policies, major publicly-led initiatives under way, and relevant goals to help inform site of possible opportunities for water stewardship collective action.	The government agency, the Department of Water Resources of the Ministry of Agriculture, has formulated the "Strategic Action Plan for Industrial Stabilization of Water Supply". The water conservancy bureau monitors the water supply in science parks, industrial zones, and science and technology industrial parks, and uses different colors to identify water supplies. The Hsinchu Science Park Bureau manages the water supply. The approved tap water volume for Hsinchu Science Park is 205,000 CMD. All water is supplied by Baoshan Reservoir. In response to the stable water supply, the Hsinchu Science Park Bureau handled the manufacturer's water-saving consultation plan, and TSMC implemented water-saving projects on site.
1.5.2	Applicable water-related legal and regulatory requirements shall be identified, including legally-defined and/or stakeholder-verified customary water rights.	TSMC organizes AWS meetings to review and update regulatory changes or new additions. Since all TSMC factories are located in the Science and Technology Park, all factories do not use groundwater. TSMC's Fab 5, F12A and F12B plants have received approval from the Hsinchu Science Park Bureau's "Water Use Plan". The scheme applies water usage to be ● Fab 5 is 3,000 CMD. ● Fab 12A P1/2 was 8,460 CMD. ● Fab 12A P3 was 4,194 CMD. ● Fab 12A P4/5 was 11,880 CMD. ● Fab 12A P6 was 9,084 CMD. ● Fab 12B is 15,600 CMD.
1.5.3	The catchment water-balance, and where applicable, scarcity, shall be quantified, including indication of annual, and where appropriate, seasonal, variance.	In northern Taiwan, reservoir water levels are low due to the low rainfall from March to May each year. Therefore, the water supply risk is higher in March-May. TSMC Fab 5, F12A and F12B have mapped annual and monthly rainfall trends in the site's catchment area. The tap water supply and demand map in the Hsinchu area shows that Taoyuan supplies 560,000 CMD, and the demand is expected to increase to 607,000 CMD in 2021. The water balance map for the northern region shows that only 42.1% of the rainfall is available. This suggests that water resources are abundant, but infrastructure is underutilized.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1.5.4	Water quality, including physical, chemical, and biological status, of the catchment shall be identified, and where possible, quantified. Where there is a water-related challenge that would be a threat to good water quality status for people or environment, an indication of annual, and where appropriate, seasonal, high and low variances shall be identified.	The tap water source is Baoshan Water Purification Plant, and the front-end water source is Baoshan Reservoir. Water quality: The Shimen Reservoir was between eutrophic and mesotrophic for most of 2020. (40< CTSI< 50) CTSI (Carlson Nutritional Status Index) higher than 50 is defined as eutrophication; 40< CTSI< 50 is defined as mesotrophic. Tap water quality: Baoshan Water Purification Plant will meet the water quality standards in 2020. Effluent quality of sewage treatment plant in Hsinchu Science Park: The Keya River at the wastewater discharge point of the WWTP in Hsinchu Science Park meets the 2020 regulatory requirements. The pollution index (RPI) of the Keya River is 1 to 4.5 (average 3), which is moderately polluted, indicating that the water quality of the Keya River has not been seriously polluted.
1.5.5	Important Water-Related Areas shall be identified, and where appropriate, mapped, and their status assessed including any threats to people or the natural environment, using scientific information and through stakeholder engagement.	The upstream is the reservoir water source protection zone, which cannot be exploited without special disasters, and the water source is a protection zone without special disaster risks. There is an important wading area in the basin: Baoshan Reservoir Eutrophication of Shimen Reservoir (CTSI>50) The Keya River is not (lightly) polluted (river pollution index, ≦1). The water quality of TSMC's Fab 5, F12A and F12B plants meets the acceptance criteria for the sewage treatment plant in Hsinchu Science Park. Hsinchu Science and Technology Park: The water supply and water quality are normal. Wastewater meets effluent standards. The Keya River is a class C water body.
1.5.6	Existing and planned water-related infrastructure shall be identified, including condition and potential exposure to extreme events.	Hsinchu City carried out "Nanliao Emergency Desalination Facilities", "Touqian Stream Water Environment Project" and "Optimization of Xipuzi Wetland and Kezi Lake Wetland". Hsinchu City has also established a "smart flood control system", which has been confirmed to affect the safety of downstream communities.
1.5.7	The adequacy of available WASH services within the catchment shall be identified.	According to the tap water penetration rate data released by the Water Resources Department of the Ministry of Economic Affairs, in 2020, the tap water penetration rates in Hsinchu City and Hsinchu County, where TSMC's Fab 5, F12A and F12B factories are located, are 99.11% and 88.80%, respectively, indicating that almost everyone in the area has clean water. Stable offer. In 2020, the total sewage treatment rates of Hsinchu City and Hsinchu County are 65.41% and 69.20% respectively, of which the penetration rates of public sewers are 18.29% and 22.39%, the penetration rates of special sewers are 20.88% and 18.85%, and the installation rate of sewage facilities in buildings is 18.29% and 22.39%. 26.24% and 28.31%. Relevant infrastructure in Hsinchu City includes sewage canal expansion project.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1.6	**Understand current and future shared water challenges in the catchment, by linking the water challenges identified by stakeholders with the site's water challenges.**	
1.6.1	Shared water challenges shall be identified and prioritized from the information gathered.	TSMC identified seven Shared Water Challenges, include internal and external challenges. The external shared water challenges are water shortage and water effluent. The water shortage challenges were prioritized as: ■ Climate change, abnormal water supply ■ Regional water consumption is increasing year by year ■ Water leakage in the water pipeline The water effluent challenges were prioritized as: ■ Receiving water pollution ■ Water pollution discharge. TSMC identify 20 water related risks within their sites. Within conformity assessment sites, there are two risks identified as internal shared water challenges which is high-risk (≥6). The internal shared water challenges are: ■ Drought caused insufficient water supply ■ Effluent water increases river polluted index (RPI) cause river water quality risk
1.6.2	Initiatives to address shared water challenges shall be identified.	TSMC's water challenge initiatives are as follows: ● List of water consumption: ▪ If process recovery rate and plant-wide recovery rate do not meet requirements, it is necessary to re-examine whether there is room for water saving ● Water scarcity – defining water saving opportunities ▪ Actions can be taken based on cost and water savings assessments ▪ Pure water: recycling of backwash wastewater ▪ Wastewater: Process drainage recycling system ▪ Cooling water: ▫ Use a clean alternative water source ▫ Increase the number of cooling water circulation ▫ Discharge water recycling and reuse ● Water scarcity – assessing water saving opportunities ▪ Assess the possibility of recycling plant wastewater ▪ Evaluate whether to extend the collection time of D.I. water activated carbon and resin water depending on the operating water quality. ▪ Establish a system to refine and recycle water into purified water for use ● Improved effluent quality ▪ The effluent concentration is lower than the standard of Hsinchu Science Park Bureau: NH3 <30 ppm, TMAH <30 ppm, COD <500PPM, Cu <1 ppm. Improvement actions for government agencies: ● Throttling - reducing water leakage ● Open source - development of renewable water resources ● Dispatching/Redundancy - redundant pipeline project from Taoyuan to Hsinchu Relevant infrastructure in Hsinchu County and City includes sewage canal expansion project.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
1.7	**Understand the site's water risks and opportunities: Assess and prioritize the water risks and opportunities affecting the site based upon the status of the site, existing risk management plans and/or the issues and future risk trends identified in 1.6.**	
1.7.1	Water risks faced by the site shall be identified, and prioritized, including likelihood and severity of impact within a given timeframe, potential costs and business impact.	TSMC identify 20 water related risks within their sites. Within conformity assessment sites, there are two risks identified as internal shared water challenges which is high-risk (≥6). The internal shared water challenges are: ■ Drought caused insufficient water supply ■ Effluent water increases river polluted index (RPI) cause river water quality risk
1.7.2	Water-related opportunities shall be identified, including how the site may participate, assessment and prioritization of potential savings, and business opportunities.	TSMC'S Fab 5, F12A and F12B factories should identify two risks and implement "risk management of water efficiency in each unit of the factory" and "development of emission pollution prevention and control technologies". The discharged sewage has reached the effluent management standard, and water saving is the top priority. Assess the potential for water savings based on the utilization and characteristics of machine specifications at each site. TSMC's Fab 5, F12A and F12B factories implemented a number of water-saving projects in the manufacturing process in 2020, with water savings of 832,374 tons, 3,080 tons, and 61,954 tons, respectively.
1.8	**Understand best practice towards achieving AWS outcomes: Determining sectoral best practices having a local/catchment, regional, or national relevance.**	
1.8.1	Relevant catchment best practice for water governance shall be identified.	Best practices for water governance identified at TSMC Fab 5, F12A and F12B plants include: (1) water risk management (2) expansion of diversified water resources (3) reduction of water pollution concentration. TSMC's Hsinchu plant is located in the same watershed as UMC, AUO, World Advanced and Nanmao. According to TSMC's benchmark, UMC, AUO, World Advanced, Nanmao and other factories have best practices in "water risk management". In addition, AUO has best practices in TSMC's benchmark "Water Contamination Concentration Reduction". In "Water Risk Management", TSMC's Fab 5, F12A and F12B sites implemented (1) reduced water consumption in the facility sector (2) increased recycling of factory wastewater (3). Improve water production rate (4) reduce drainage loss In "Water Pollution Concentration Reduction", TSMC's Fab 5, F12A and F12B plants increased the COD concentration from the process to a reduction rate of over 90%.
1.8.2	Relevant sector and/or catchment best practice for water balance (either through water efficiency or less total water use) shall be identified.	TSMC corresponds to the water-saving practices of related industries, including AUO, GLOBALFOUNDRIES, Intel and other companies. By comparing the wafer unit consumption standards recognized by the Global Semiconductor Association, it is confirmed that the "Taiwan Semiconductor Standard" is superior to the global standard. TSMC also actively holds corporate/academic/official seminars to exchange and share implementation practices in various aspects such as green factories and green buildings.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
		Therefore, an **Observation 05** is raised for this indicator.
1.8.3	Relevant sector and/or catchment best practice for water quality shall be identified, including rationale for data source.	TSMC and related industries such as UMC, World Advanced, AUO, and Hejing Technology conduct benchmark tests on water quality standards. TSMC meets the acceptance criteria for waste water from the Science Park Sewage Treatment Plant and can be discharged to the sewage treatment plant. Water pollution prevention technologies developed by TSMC include: ■ Effectively strengthen source management and achieve diversification ■ Wastewater discharge monitoring ■ Wastewater quality improvement
1.8.4	Relevant catchment best practice for site maintenance of Important Water-Related Areas shall be identified.	TSMC has several IWRA-related site maintenance projects, including: 1. Hsinchu Science and Technology Park sets up a detention pond. 2. TSMC's Hsinchu plant has set up groundwater monitoring wells to collect groundwater quality and monitor the groundwater quality in the buffer zone. 3. Shimen Reservoir is a reservoir water source protection zone, and Keya Creek is a wetland protection zone, both of which cannot be exploited, are protected areas, and have no special hazards. 4. The effluent of TSMC's Hsinchu plant meets the acceptance standards of the sewage treatment plant in Hsinchu Science and Technology Park, and the effluent of the sewage treatment plant in Hsinchu Science and Technology Park also meets the standards and will not cause harm to the catchment area. TSMC's Hsinchu plant has also set chemical storage management procedures as follows: ■ A. Special chemical storage tanks are regularly maintained as required ■ B. The chemical bank is equipped with leak sensors and regular maintenance according to the type ■ C. The chemical embankment is installed with emergency sump and regular maintenance ■ D. Regular maintenance of the sump on the road where the tanker travels ■ E. Daily on-site inspection The TSMC Hsinchu site established ecological features and determined survival around the plants, confirming no IWRA-damaged areas within the assessed site. Government agencies also manage water conservation promotion activities.
1.8.5	Relevant sector and/or catchment best practice for site provision of equitable and adequate WASH services shall be identified.	TSMC's Hsinchu facility uses the World Business Council for Sustainable Development (WBCSD) WASH Self-Assessment Tool to assess the level of WASH provided through 6 categories of questions and answers. The self-assessment results meet all requirements. This shows that the plant provides the best level of WASH.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
2	**Commit and Plan (core)**	
2.1	**Commit to water stewardship by having the senior-most manager in charge of water at the site, or if necessary, a suitable individual within the organization head office, sign and publicly disclose a commitment to water stewardship, the implementation of the AWS Standard and achieving its five outcomes, and the allocation of required resources.**	
2.1.1	A signed and publicly disclosed site statement OR organizational document shall be identified. The statement or document shall include the following commitments: - That the site will implement and disclose progress on water stewardship program(s) to achieve improvements in AWS water stewardship outcomes - That the site implementation will be aligned to and in support of existing catchment sustainability plans - That the site's stakeholders will be engaged in an open and transparent way - That the site will allocate resources to implement the Standard.	TSMC's environmental policy was signed by Chairman Dr. Mark Liu. In addition, TSMC also published the AWS report on the TSMC ESG website, which was signed by the factory managers of each factory. https://esg.tsmc.com/download/file/esg_aws_c.pdf Therefore, an **Observation 06** is raised for this indicator.
2.2	Develop and document a process to achieve and maintain legal and regulatory compliance.	
2.2.1	The system to maintain compliance obligations for water and wastewater management shall be identified, including: - Identification of responsible persons/positions within facility organizational structure - Process for submissions to regulatory agencies.	TSMC's Fab 5, F12A and F12B factories announced the AWS water management organization chart. The chart identifies the person in charge/position in the relevant facility organization, and the associated job responsibilities.
2.3	**Create a water stewardship strategy and plan including addressing risks (to and from the site), shared catchment water challenges, and opportunities.**	
2.3.1	A water stewardship strategy shall be identified that defines the overarching mission, vision, and goals of the organization towards good water stewardship in line with this AWS Standard.	"Sustainable Water Resources Management Goal" has been set by TSMC, include: ■ Good management system ■ Governance and water management support ■ Excellent water quality ■ Healthy water environment ■ Safe drinking water and sanitary environment ■ Sustainable water balance Each Goal also set respect Water Management Target and total 17 action plans
2.3.2	water stewardship plan shall be identified, including for each target: - How it will be measured and monitored - Actions to achieve and maintain (or exceed) it - Planned timeframes to achieve it - Financial budgets allocated for actions	Sustainable water management related plans are disclosed on the TSMC ESG website. Goal: Maintain good water efficiency. Except for RD Fab, the water consumption per unit product is lower than the world WSC standard (9.97 L/cm2). The Hsinchu plant has implemented 11 projects, including: BG UF system installation, ADWR system installation, ACF backwash tank setup, TMAH recovery system setup, etc. A total of 1,556,312 tons of water were saved. All sites in Taiwan are on average below world WSC standards.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
	- Positions of persons responsible for actions and achieving targets - Where available, note the link between each target and the achievement of best practice to help address shared water challenges and the AWS outcomes.	Maintain good water efficiency: The recovery rate is maintained above 85%, but the F2&5 standard is 70%.
2.4	**Demonstrate the site's responsiveness and resilience to respond to water risks.**	
2.4.1	A plan to mitigate or adapt to identified water risks developed in co-ordination with relevant public-sector and infrastructure agencies shall be identified.	TSMC pays close attention to the water quality testing results of the Taiwan Water Company, and monitors the quality of tap water from the water purification plant in real time. TSMC is also working with a wastewater treatment plant in the Hsinchu Science Park to sample wastewater quality. Submit a water balance map to the Hsinchu Science Park Bureau on a monthly basis. TCMC cooperated with Hsinchu County and City to set up sewage pipes within the factory area.
3	**Implement (core)**	
3.1	**Implement plan to participate positively in catchment governance.**	
3.1.1	Evidence that the site has supported good catchment governance shall be identified.	The topics of cooperation and communication with the competent authority include review of water measures permission, water use plan (undergoing water consumption revision with the Hsinchu Science Park Bureau), drought and water saving discussion meetings, legal explanation meetings, billing test results explanation, and plant counselling visits and water-saving performance review. Therefore, an **Observation 07** is raised for this indicator.
3.1.2	Measures identified to respect the water rights of others including Indigenous peoples, that are not part of 3.2 shall be implemented.	The penetration rate of tap water in Hsinchu City and Hsinchu County is 99.1% and 88.8%. Public facilities in the park (i.e. parks/public toilets) are properly and regularly maintained by the Hsinchu Science Park Bureau to ensure safe water use, respect for sanitation and human rights During droughts and floods, the competent authority sets a water saving target of 5%. Environmental Impact Statement Approved Water and Wastewater Volumes Attended the water resources allocation meeting of the Central Drought Relief Center held by the Water Resources Department of the Ministry of Agriculture.
3.2	**Implement system to comply with water-related legal and regulatory requirements and respect water rights.**	
3.2.1	A process to verify full legal and regulatory compliance shall be implemented.	External units conduct surprise and routine audits on TSMC's Hsinchu plant (Hsinchu Science Park Bureau, Environmental Protection Bureau). From 2018 to 2021, the average number of internal and external audits in each factory area is as high as more than 200, and there is an average of one inspection per week to urge the factory to fully comply with laws and regulations. The pass rate of TSMC's Hsinchu factory area external audit: 100% Supplier audit: C-ESH implements industrial safety/environmental protection audit, which is included in the supplier scorecard. On-site audit: ISEP conducts environment-related audits on a quarterly basis and issues audit results. Improvement measures are required. Audit results are shared at quarterly TB meetings.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
		Each factory has full-time personnel from the environmental protection department to conduct audits TSMC's Hsinchu plant will have no penalties from 2018 to 2021. The amount of water consumption and waste water discharge shall be calculated according to the approved amount of the environmental impact assessment report of Hsinchu Science Park.
3.2.2	Where water rights are part of legal and regulatory requirements, measures identified to respect the water rights of others including Indigenous peoples, shall be implemented.	The average daily water consumption and wastewater discharge of TSMC's Fab 5, F12A and F12B plants are less than the approved amount. The water rights of others, including residents and Aboriginal peoples, are strictly observed. The amount of water consumption and waste water discharge shall be calculated according to the approved amount of the environmental impact assessment report of Hsinchu Science Park.
3.3	**Implement plan to achieve site water balance targets.**	
3.3.1	Status of progress towards meeting water balance targets set in the water stewardship plan shall be identified.	The 2020 Corporate Social Responsibility Report proposes targets for 2020/2021/2030. The 2030 target includes a 30% reduction in water consumption per unit of product and a 30% or more replacement rate for reclaimed water. The comprehensive index of water pollution is 50% higher than the discharge water standard. And it is proposed that the water-saving project results in 2020 are that the water consumption per unit product is lower than the world WSC standard (9.97L/cm2). TSMC continues to manage water resources to increase revenue and reduce expenses in parallel to ensure sustainable production. The TSMC Hsinchu plant meets the standard process with a recovery rate of >85%. To this end, relevant water-saving measures have been implemented, such as improving the C/T&MAU make-up drainage conductivity setting, using secondary water for the Central Scrubber make-up water, recycling the Central Scrubber drainage, recycling CO2 Water from AWD to DIR, and increasing the RO water production rate of the recycling system. The annual target recycling rate of TSMC's Hsinchu plant process is >85%, all of which have achieved the target.
3.3.2	Where water scarcity is a shared water challenge, annual targets to improve the site's water use efficiency, or if practical and applicable, reduce volumetric total use shall be implemented.	TSMC's Hsinchu facility has implemented several projects to maintain a water recycling rate of 85% and reach the target by 2020. Water saving of each plant, for example: F2&5 water saving is 482 tons, F12A P1/2 water saving is 613 tons, F12A P3 water saving is 535 tons, F12A P4/5 water saving is 572 tons, F12B P6 water saving is 669 tons, The F12B P7 saves 1,135 tons of water.
3.3.3	Legally-binding documentation, if applicable, for the re-allocation of water to social, cultural or environmental needs shall be identified.	The TSMC Hsinchu plant negotiates the water consumption with the Hsinchu Science Park Bureau according to the consumption to meet the needs of the plant and meet the requirements of the EIA report. At present, the total water consumption of Hsinchu Science Park is still within the approved water consumption.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
3.4	**Implement plan to achieve site water quality targets.**	
3.4.1	Status of progress towards meeting water quality targets set in the water stewardship plan shall be identified.	TSMC improves the efficiency of water pollution prevention and control and strengthens the removal of wastewater pollutants. TSMC's Hsinchu plant takes ammonia nitrogen, Cu+, TMAH, COD, and TUa as KPIs, and implements 10 projects to achieve short, medium and long-term goals. Progress disclosed in the CSR report.
3.4.2	Where water quality is a shared water challenge, continual improvement to achieve best practice for the site's effluent shall be identified and where applicable, quantified.	TSMC Hsinchu plant faces water quality management challenges, increasingly stringent laws and regulations (tightening and new control standards). To reflect this challenge, TSMC participated in discussions at the Hsinchu Science Park Bureau meeting and participated in an evaluation by an authority.
3.5	**Implement plan to maintain or improve the site's and/or catchment's Important Water-Related Areas.**	
3.5.1	Practices set in the water stewardship plan to maintain and/or enhance the site's Important Water-Related Areas shall be implemented.	The architectural design of the TSMC Hsinchu plant covers the artistic conception of mountains, flowing water and mountains, establishes green belts, and protects and regenerates the diversity of native species and biological growth. Actions include green nets, conservation of species and ecological education. The TSMC Hsinchu plant has established ecological characteristics and determined the survival conditions around the plants. TSMC's Hsinchu plant also sets chemical storage management procedures as follows: ■ Special chemical storage tanks are regularly maintained as required ■ Leak sensors are installed on chemical banks, and regular maintenance is carried out according to the type ■ The chemical embankment is installed with emergency sump and regularly maintained ■ Regular maintenance of the sump on the road where the tanker travels ■ Daily on-site inspection TSMC's Hsinchu plant has set up groundwater monitoring wells to collect and monitor groundwater quality.
3.6	**Implement plan to provide access to safe drinking water, effective sanitation, and protective hygiene (WASH) for all workers at all premises under the site's control.**	
3.6.1	Evidence of the site's provision of adequate access to safe drinking water, effective sanitation, and protective hygiene (WASH) for all workers onsite shall be identified and where applicable, quantified.	The tap water source of TSMC's Hsinchu plant is processed and supplied by Baoshan Water Purification Plant. The Taiwan Water Company conducts regular inspections of water quality every season to confirm the water quality supplied to the community. TSMC's Hsinchu plant provides employees with sufficient and safe drinking water, clean toilets (in compliance with WBCSD standards and occupational safety and hygiene facility rules), and warm water for winter washing. As a precaution against COVID-19, the facility provides handwashing facilities to protect employee health and avoid contact. Set up disabled toilets that are better than specified requirements. There are "men's and women's toilets" on every floor of the factory. There are 524 urinals, 219 squatting toilets and 683 toilets in the whole factory. The number of inductive hand washing faucets

Indicator	Details (Core)	Evidence Reviewed/Document Reference
		is 623. Compared with the requirements of building regulations, the quantity meets the requirements and is better than the requirements of the regulations.
3.6.2	Evidence that the site is not impinging on the human right to safe water and sanitation of communities through their operations, and that traditional access rights for Indigenous and local communities are being respected, and that remedial actions are in place where this is not the case, and that these are effective.	According to the tap water penetration rate data released by the Water Resources Department of the Ministry of Economic Affairs, in 2020, the tap water penetration rate of Hsinchu City and Hsinchu County, where TSMC's Hsinchu plant is located, is 99.1% and 88.8%, indicating that almost everyone in the area has clean and stable tap water. The Water Resources Bureau regularly implements water supply improvement projects in indigenous areas to help indigenous tribes to use water without worry, with good results over the years. The water use in the plant area does not affect the water rights of the aborigines, and the water consumption approved by the Hsinchu Science Park Bureau shall prevail.
3.7	**Implement plan to maintain or improve indirect water use within the catchment.**	
3.7.1	Evidence that indirect water use targets set in the water stewardship plan, as applicable, have been met shall be quantified.	TSMC set suppliers' water-saving targets at 4.5 million tons in 2021 and 35 million tons in 2030, and disclosed in the company's CSR report. TSMC tracks suppliers' water-saving effects and target achievement every year. In 2020, suppliers saved 2.13 million tons of water. TSMC's Fab 5, F12A and F12B factories have passed the water footprint certification to calculate the actual situation of indirect water consumption.
3.7.2	Evidence of engagement with suppliers and service providers, as well as, when applicable, actions they have taken in the catchment as a result of the site's engagement related to indirect water use, shall be identified.	Interaction with suppliers in the catchment to conduct ESH audit by TSMC Plant ISEP (Industry Safety and Environmental Protection) in the catchment watershed audit items included HCL, H2O2, Poly 700, KOH(5%), KOH (45%).
3.8	**Implement plan to engage with and notify the owners of any shared water-related infrastructure of any concerns the site may have.**	
3.8.1	Evidence of engagement, and the key messages relayed with confirmation of receipt, shall be identified.	Documents between ISEP and the Water Authority of TSMC's plants can be tracked with official receipt and delivery records. TSMC's Hsinchu plant ISEP proposes a water pollution prevention and control measure plan and submits it to the competent authority, including a water use plan related to tap water. TSMC held a sustainable supply chain experience sharing session, including water saving goal setting. A total of 148 people from 101 suppliers participated. Emails between ESH and suppliers are kept as records. ISEP audits waste manufacturers to confirm compliance with air pollution/water pollution/toxic chemicals/ISO/work safety. TSMC's Hsinchu plant also holds customer requests for AWS evaluation communications emails.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
3.9	**Implement actions to achieve best practice towards AWS outcomes: continually improve towards achieving sectoral best practice having a local/catchment, regional, or national relevance.**	
3.9.1	Actions towards achieving best practice, related to water governance, as applicable, shall be implemented.	According to the "Measures for the Establishment and Management of Waste (Sewage) Water Treatment Units or Personnel", there are 3 professionals in A-level wastewater and 2 agents. In fact, TSMC has 3 employees in Fab 5, 11 in Fab 12A, and 3 in Fab 12B, so they all meet regulatory requirements. Personnel are registered with the TSMC TSM platform and checked regularly. TSMC builds a monitoring platform for daily tracking:(1)Water balance platform,(2)Hydrology platform,(3)Release water value management and control platform. TSMC built the FAM platform to control maintenance schedules for equipment and instruments. Maintain good water efficiency:(1)Water consumption per unit product decreases year by year,(2)Process recovery rate remains above 85%.
3.9.2	Actions towards achieving best practice, related to targets in terms of water balance shall be implemented.	Enhance water conservation without wasting a drop of water and ensure sustainable production. • Save 1.927 million tons of water in 2022 and maintain good water efficiency. ➢ Except for RD Fab, the water consumption per unit product is lower than the world WSC standard (9.97 L/cm2) ➢ The average value of all regions in Taiwan is lower than the world WSC standard ➢ In 2020, the Hsinchu factory area will reach 7.57L/cm2 • Wastewater recycling in the facility industry increased by 297,000 tons over last year. ➢ TSMC's Hsinchu plant meets the standard process recovery rate > 85%. ➢ Set up new backup wells during water shortage period.
3.9.3	Actions towards achieving best practice, related to targets in terms of water quality shall be implemented.	TSMC improves the efficiency of water pollution prevention and control and strengthens the removal of wastewater pollutants. TSMC's Hsinchu plant uses ammonia nitrogen, Cu+, TMAH, COD, and TUa as KPIs, and implements 8 projects to achieve short, medium and long-term goals.
3.9.4	Actions towards achieving best practice, related to targets in terms of the site's maintenance of Important Water-Related Areas shall be implemented.	A detention pond is set up in Hsinchu Science and Technology Park. TSMC Hsinchu plant has set up groundwater monitoring wells to collect groundwater quality and monitor the groundwater quality in the buffer zone. TSMC's Hsinchu plant also sets chemical storage management procedures as follows: ■ Special chemical storage tanks are regularly maintained as required ■ Leak sensors are installed on chemical banks, and regular maintenance is carried out according to the type ■ The chemical embankment is installed with emergency sump and regularly maintained ■ Regular maintenance of the sump on the road where the tanker travels ■ Daily on-site inspection The TSMC Hsinchu plant has established ecological characteristics and determined the survival state around the plants. Government agencies regularly monitor the water quality of Keya River. Government agencies also manage water conservation promotion activities.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
3.9.5	Actions towards achieving best practice related to targets in terms of WASH shall be implemented.	The tap water source of TSMC's Hsinchu plant is processed and supplied by Baoshan Water Purification Plant. The Taiwan Water Company conducts regular inspections of water quality every season to confirm the water quality supplied to the community. TSMC's Hsinchu plant provides employees with sufficient and safe drinking water, clean toilets (in compliance with WBCSD standards and occupational safety and hygiene facility rules), and warm water for winter washing. As a precaution against COVID-19, the facility provides handwashing facilities to protect employee health and avoid contact. Set up disabled toilets that are better than specified requirements. There are "men's and women's toilets" on every floor of the factory. There are 524 urinals, 219 squatting toilets and 683 toilets in the whole factory. The number of inductive hand washing faucets is 623. Compared with the requirements of building regulations, the quantity meets the requirements and is better than the requirements of the regulations.
4	**Evaluate (core)**	
4.1	**Evaluate the site's performance in light of its actions and targets from its water stewardship plan and demonstrate its contribution to achieving water stewardship outcomes.**	
4.1.1	Performance against targets in the site's water stewardship plan and the contribution to achieving water stewardship outcomes shall be evaluated.	The recovery rate of wastewater from the Hsinchu factory area needs to be >85%. Since 2017, it has reached more than 85%, and its water quality needs to meet the acceptance standards stipulated by the Hsinchu Science Park Wastewater Treatment Plant. 2021 goals and 2020 results: ➢The concentration of discharged water is lower than the management standard of the Bureau of Science and Technology (<500 ppm). ➢ The concentration of ammonia nitrogen discharge water is lower than the management standard of the Bureau of Science and Technology (<30 ppm). ➢ The concentration of TMAH discharge water is far lower than the management standard of the Bureau of Science and Technology (<30 ppm). In 110 years, 5 factories have been able to control <1ppm stably. ➢ The concentration of Cu discharge water is far lower than the management standard of the Science and Technology Administration Bureau (<1 ppm). In 110 years, 7 factories have stably controlled <0.2ppm. safe water environment ➢Industrial and people's livelihood water - The water company regularly tests the water quality every quarter to ensure that there is no doubt that the water supply for people's livelihood in the factory area. ➢Drinking water quality control - The water dispenser in the factory is maintained and replaced every month, and the E. coli is checked once every two months. Each inspection is 1/6 of the total number of units, which is better than Taiwan regulations Safely achieve sustainable water management outcomes. ➢Ecological restoration of near-natural forests and rare species.

Indicator	Details (Core)	Evidence Reviewed/Document Reference
4.1.2	Value creation resulting from the water stewardship plan shall be evaluated.	TSMC's Hsinchu Plant implements the water diversion project, which can save 21.64 million tap water costs each year, and can also supply 448,200 people in Hsinchu City with tap water for 13.1 days.
4.1.3	The shared value benefits in the catchment shall be identified and where applicable, quantified.	The quality of wastewater in the Hsinchu plant area is lower than the acceptance standard of the sewage treatment plant in Hsinchu Science Park, which reduces the load of the sewage treatment plant and helps reduce the load of the watershed. Let watershed manufacturers share their experience in water conservation and ecological protection of watersheds.
4.2	**Evaluate the impacts of water-related emergency incidents (including extreme events), if any occurred, and determine the effectiveness of corrective and preventative measures.**	
4.2.1	A written annual review and (where appropriate) root-cause analysis of the year's emergency incident(s) shall be prepared and the site's response to the incident(s) shall be evaluated and proposed preventative and corrective actions and mitigations against future incidents shall be identified.	There will be no environmental incidents at the TSMC Hsinchu plant in 2021.
4.3	**Evaluate stakeholders' consultation feedback regarding the site's water stewardship performance, including the effectiveness of the site's engagement process.**	
4.3.1	Consultation efforts with stakeholders on the site's water stewardship performance shall be identified.	Level of stakeholders interested: the highest is "Safe drinking water and sanitary environment". The lowest is "Healthy water environment". The level of TSMC actions: the highest is "Water pollution prevention". The lowest is "Healthy water environment". The stakeholder consultation meeting on 27th October 2021. Therefore, an **Observation 08** is raised for this indicator.
4.4	**Evaluate and update the site's water stewardship plan, incorporating the information obtained from the evaluation process in the context of continual improvement.**	
4.4.1	The site's water stewardship plan shall be modified and adapted to incorporate any relevant information and lessons learned from the evaluations in this step and these changes shall be identified.	TSMC consolidated water management plan (include objectives, regulations... etc.) will be communicated in AWS group meeting and management review meeting of senior executives to confirm whether adjustments are needed. The water related targets will be updated in CSR Report annually. The water related regulations will be reviewed periodically.
5	**Communicate & Disclose (core)**	
5.1	**Disclose water-related internal governance of the site's management, including the positions of those accountable for legal compliance with water-related local laws and regulations.**	
5.1.1	The site's water-related internal governance, including positions of those accountable for compliance with water-related laws and regulations shall be disclosed.	The water-related internal governance is announced in TSMC website "Climate sustainability related declarations and reports "webpage. The AWS Report also can be download from the webpage. The AWS Report released the water management organization, responsible person and unit and accountability to water management. TSMC ESG weblink: https://esg.tsmc.com/csr/ch/resources/documents.html

Indicator	Details (Core)	Evidence Reviewed/Document Reference
5.2	**Communicate the water stewardship plan with relevant stakeholders.**	
5.2.1	The water stewardship plan, including how the water stewardship plan contributes to AWS Standard outcomes, shall be communicated to relevant stakeholders.	se CSR Report to communicate with stakeholders. The current implement actions are the same as the five major promotion results of AWS that described in the CSR report.
5.3	**Disclose annual site water stewardship summary, including the relevant information about the site's annual water stewardship performance and results against the site's targets.**	
5.3.1	A summary of the site's water stewardship performance, including quantified performance against targets, shall be disclosed annually at a minimum.	TSMC released the AWS report and stated the 2020 water resources management goals and performance of the Hsinchu plant. Water consumption per unit of production is 47.4% lower than the "30% reduction" target. The water pollution index was reduced by 91.8%, which was better than the target of "50% better than the water effluent standard". TSMC publishes target results every year and tracks suppliers' water-saving effects. All information is published annually in the Corporate Social Responsibility Report.
5.4	**Disclose efforts to collectively address shared water challenges, including: associated efforts to address the challenges; engagement with stakeholders; and co-ordination with public-sector agencies.**	
5.4.1	The site's shared water-related challenges and efforts made to address these challenges shall be disclosed.	TSMC plants take action to address stakeholder-related water challenges, including: ➢ Flood: set waterproof door ➢ Drought resistance: (1) Promote water saving and water recycling; (2) Cooperate with stakeholders to carry out water saving activities; (3) Strengthen the preparation of backup water sources and water trucks. ➢ Unstable water supply: (1) Utilization and development of reclaimed water; (2) Establish and improve the monitoring system of water supply status.
5.4.2	Efforts made by the site to engage stakeholders and coordinate and support public-sector agencies shall be identified.	Hsinchu factory inspection results F5/F12A/F12B plant no violations of water-related laws and regulations. The TSMC Hsinchu plant shared the groundwater well monitoring report with the Hsinchu Science Park Bureau.
5.5	**Communicate transparency in water-related compliance: make any site water-related compliance violations available upon request as well as any corrective actions the site has taken to prevent future occurrences.**	
5.5.1	Any site water-related compliance violations and associated corrections shall be disclosed.	Hsinchu factory inspection results F5/F12A/F12B plant no violations of water-related laws and regulations.
5.5.2	Necessary corrective actions taken by the site to prevent future occurrences shall be disclosed if applicable.	Although TSMC Hsinchu Plant has not violated water-related laws and regulations in the past 5 years, it still complies with "A-RMS-01-03-029 Factory Environmental and Occupational Safety Management System Internal Control Operation Process".
5.5.3	Any site water-related violation that may pose significant risk and threat to human or ecosystem health shall be immediately communicated to relevant public agencies and disclosed.	TSMC sets (1) the emergency response process for abnormal WWTP equipment, (2) emergency response process for abnormal discharge of rain gutter, and (3) emergency response process for abnormal discharge of domestic sewage. When the incident occurred, TSMC will follow above to communicated with authorities.

6.2 ADVANCED-LEVEL AWS INDICATORS

SGS also conducted a benchmarking exercise for TSMC Fab 5, F12A and F12B Plant's performance against the AWS Advanced-Level Criteria. The evaluation results are presented in the following Table 6.2.

Table 6.2 Evidence Reviewed by SGS Against Advanced-Level AWS Criteria

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
1	**Gather and Understand (advanced)**		
1.4.3	The embedded water use of primary inputs in catchment(s) of origin shall be quantified. (7 points)	The main raw materials of TSMC's Hsinchu plant are divided into wafers and related auxiliary raw materials. According to the water footprint inventory, raw material water consumption is calculated based on wafer yield multiplied by intensity. The packing, bulk gas, and wafer raw materials of TSMC Hsinchu Plant are directly included in the calculation, and the proportion of chemicals/gas usage is greater than 0.5%. TSMC's Hsinchu plant has five major raw material suppliers located within the watershed, and the remaining suppliers are located outside the watershed.	7
1.5.8	Efforts by the site to support and undertake catchment level water-related data collection shall be identified. (4-7 points)	Inside site—government units test the water quality before and after the operation of the runoff water and the confluence of the runoff streams. The government unit inspects the water quality of the discharge water, the point where the discharge water meets, the upper reaches of Nanmen Creek and the upper and lower reaches of Keya Creek. Off-Site - Collect and monitor groundwater quality autonomously. The background water quality of groundwater complies with the monitoring standards and the proportion of meeting the monitoring standards reaches 91.5%.	6
1.5.9	The adequacy of WASH provision within the catchments of origin of primary inputs shall be identified. (4 points)	According to the global assessment results of the International Environmental Performance Index (EPI), among 179 countries, Taiwan ranks 32nd with a score of 72.4, Japan ranks 17th with a score of 95, South Korea ranks 23rd with a score of 90.7, and the United States ranks 23rd with a score of 90.7. Ranked 26th with 86.1 points. The water quality ranking of raw material supplier WASH is relatively complete. According to the water footprint survey data of the Hsinchu plant, the raw material origin counties and cities are located in Taoyuan City, Hsinchu County/City, Taichung City, and Tainan City. The penetration rate of tap water supply in 2020 is quite sufficient. According to the water footprint survey data of the Hsinchu plant, the penetration rate of sewage and sewers in the counties and cities where the raw materials are sourced is higher than the national average.	4

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		According to the website of Taiwan Water Supply Company to check the quality of tap water, the water quality of water purification plants in various regions of Taiwan must meet the drinking water quality standards.	
1.6.3	Future water issues shall be identified, including anticipated impacts and trends. (3 points)	Future water risk issues: the trend of drought in the short-term; the shortage of water resources in the long-term. Short-Term Risks: Drought • In 2021, severe drought will hit the western part of Taiwan's main island. The Central Disaster Response Center was established by the Ministry of Economic Affairs on 2021/3/24. The center regularly checks water conditions, strengthens water source scheduling, and formulates emergency measures. • Adjust the water saving rate of the plant according to the central policy: 13%(4/23)→15%(5/7)→17%(5/14)→7%(6/7)→5%(6/22) 2021/6/22 Central Disaster Response Center opened • During this catastrophic drought, the water in the plant area was supplemented by water trucks, which could still meet the demand. Forecast of water conditions in major water supply reservoirs in Hsinchu: Although the water conditions have recovered, TSMC's Hsinchu plant still needs to pay close attention to the subsequent rainfall. Long-term trend: make full use of and actively develop reclaimed water plants and north-south water transfer. Internal improvement: water tanker scheduling. Water saving: On-site water saving cases from 2018 to 2021. Use a climate change risk and opportunity matrix to predict future water risks. For future water risk - predicting future water risk through the climate change risk and opportunity matrix, the Zhuchang area has problems that are faced in the short/medium term. Risk assessment and analysis of the impact of drought, TSMC has established a complete water regime monitoring mechanism to deal with the identified risks.	3
1.6.4	Potential water-related social impacts from the site shall be identified, resulting in a social impact assessment with a particular focus on water.	Taiwan calculates the added value of each factory based on its percentage of annual revenue, efficiency of electricity, water and carbon emissions. The research on the relationship between TSMC's use of domestic resources to Taiwan's economic and social contribution and carbon emissions in 2020 lists TSMC's use of domestic resources and the value created from 2018 to 2020. The added value created by TSMC using 1 ton of water is NT$14,698, which is 12.4 times the national average and 3.4 times the industry average.	4
2	**Commit and Plan (advanced)**		
2.1.2	A statement that explicitly covers all requirements set out in Indicator 2.1.1 and is signed by the	TSMC's environmental policy was signed by Chairman Dr. Mark Liu.	1

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
	organization's senior-most executive or governance body and publicly disclosed shall be identified. (1 point)	Each plant manager also signed a commitment to water management to comply with all AWS standards. The commitment has been displayed on the TSMC ESG website. https://esg.tsmc.com/download/file/esg_aws_c.pdf	
2.3.3	The site's partnership/water stewardship activities with other sites within the same catchment (which may or may not be under the same organisational ownership) shall be identified and described. (4 points)	In response to the water shortage in early 2021, an emergency plan will be implemented according to the water consumption situation. Hold meetings with government agencies such as the Hsinchu Science Park Bureau, Taiwan Water Company, and the Environmental Protection Agency to discuss actions that need to be taken. On October 14, 2020, the water supply was yellow, and a water shortage emergency meeting was held. The yellow light action includes (1) 5% water saving, (2) establishment of water wheel source inventory, 3) water replenishment drill In 2021/6, respond to the water restriction requirements, meet the 17% water restriction requirements, and save 10% of water independently. It still needs 7 % hydration (3,841CMD). The total water saving rate is 17.4% The Hsinchu Plant conducts water resource planning and development, and plans a total of water-carrying plans, 12 hours a day, four days a week, up to the weekly water saving rate set by the Science and Technology Administration. Due to the efforts of all parties and TSMC factories, it will be relieved after 2021/06/07.	4
2.3.4	The site's partnership/water stewardship activities with other sites in another catchment(s) (either under same corporate structure or with another corporate site) shall be identified. (4 points)	In response to the water shortage in early 2021, contingency plan was implemented according to the water conditions. Held meeting with Hsinchu Science Park Bureau, Taiwan Water Corporation and the Environmental Protection Agency and other government agency to discuss required actions. The cooperation and water saving experience sharing stakeholder include: ■ Government agencies ■ Neighbourhood ■ Industry sectors (including industry park plants) ■ Upstream/downstream supply chain and customers ■ Academic groups ■ Non-governmental environmental groups A total of 64 plants partnerships ■ A total of 27 cooperation/visit/activity in the same river basin from 2015 to 2019 ■ A total of 37 cooperation / visits / activities in different basins from 2013 to 2019 The monthly meeting of the TSMC plant water platform is held every month, and the deputy managers of all TSMC water treatment divisions in Taiwan are called to discuss various topics and develop them horizontally. In 2022, the integrated procurement of water trucks and water sources will be carried out according to the joint dispatch mode, and the existing manufacturers will be integrated procurement and contracting procedures.	4

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
2.3.5	Stakeholder consensus shall be sought on the site's water stewardship plan. Consensus should be achieved on at least one target. A list of targets that have consensus and in which stakeholders are involved shall be identified. (7 points)	During 27th Oct. 2021 AWS stakeholder meeting, the questions raised by participants regarding concerns issues and water challenges had been reached consensus. ■ Reuse of water resources: the new expansion plant in Hsinchu Science Park Baoshan base uses 100% reclaimed water and the reclaimed water plant is being established. ■ Reuse of water resources: The recycling rate of the plant is >85%, which saves water and reduces the waste of water resources. TSMC uses 1 drop of water 3.5 times. ■ Concerns about water pollution: TSMC focuses on waste reduction and discharge wastewater pollution factor reduction to be friendly to the environment. Due to the severe water conditions in 2020~2021, the Water Resources Agency, MOEA requested major water users (over 1,000CMD) must achieve water saving 17%. The result is saving 17.06%.	7
2.4.2	A plan to mitigate or adapt to water risks associated with climate change projections developed in co-ordination with relevant public-sector and infrastructure agencies shall be identified. (6 points)	The Hsinchu Science Park Bureau expects to use 100% recycled water by 2030. 98,000 tons of water per day will be supplied through the reclaimed water plant, Zhubei and Keya Water Resource Centers. Backup water pipeline connecting Taoyuan area and Hsinchu area. Bureau of Science and Technology: 2021/07/16 Bamboo Branch Baoshan Phase 2 EIA passed the preliminary review. EPD Letter 110/8/6 (EPD Comprehensive Document No. 1101109750), 119 Phased goals and methods for using 100% recycled water. The establishment of the reclaimed water plant can relieve the water supply pressure of the bamboo family FAB12A and FAB12B. Water Resources Department: Hsinchu Hexingxi Flood Detention Pond will provide 23,000 cubic meters of flood detention capacity, which will effectively solve the problem of flooding in the area, and install a water monitoring system to protect the surrounding area of six hectares and more than 1,000 people .	6
3	**Stewardship strategy and plan (advanced)**		
3.1.3	Evidence of improvements in water governance capacity from a site-selected baseline date shall be identified. (2 points)	Water quality sustainable water management results: ● Expansion of biological treatment system ● Renewal of processing facilities to improve processing efficiency ● CuCMP Keeping going ● Resin copper extraction project ● Find copper in liquid ● TMAH resin tower adsorption system ● Expansion of biological treatment system ● Expansion of biological treatment system ● Machine drainage diversion ● Improve the acute toxicity of flowing water organisms in the plant area (spine movement) ● Thing) TUa<1	2

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		Water balance: ● MAU-R system construction ● ADWR system implementation ● BG wastewater recycling Improved water efficiency ● Except for RD Fab, the water consumption per unit product is lower than the world WSC standard (9.97 L/cm2) ● All districts in Taiwan are below the world WSC standard on average ● AP3 reached 1.96 L/cm2 in 2020 The process recovery rate maintains the standard 85% or more Set up AWS organizational structure, water management organizational structure Water map- Online system water supply status and water quality monitoring -The TSMC School of Facility provides basic skills training for new recruits, engineers and associate managers conduct on-the-job expertise. -Training of wastewater specialists Set up wastewater personnel: FAB 5/2, FAB 12A/11, FAB 12B/7. Reduce wastewater discharge index year by year and reduce wastewater treatment costs. FAB 5: ammonia nitrogen is reduced by 64% compared with 2014, copper ion is reduced by 52.5% compared with 2014, TMAH is reduced by 44% compared with 2014, and COD is reduced by 22.3% compared with 2014. FAB 12A: Ammonia nitrogen reduced by 93% compared with 2014, copper ion reduced by 92.4% compared with 2014, TMAH reduced by 89% compared with 2014, COD reduced by 7% compared with 2014, TUa<1, FAB 12B: ammonia nitrogen reduced by 94.5% compared with 2014, copper ion Compared with 2014, it is reduced by 95.1%, TMAH is reduced by 99.5% compared with 2014, COD <500ppm, TUa <1. Reduce the water consumption per unit product (liter/12-inch wafer equivalent - the number of masks), except for RD Fab (FAB 12B) in 2020, the water consumption per unit product is lower than the world WSC standard of 9.97 L/cm2, FAB 2&5: 7.89L /cm2, FAB 12A: 7.31L/cm2, FAB 12B: 60.9L/cm2. Water management measures include: waste sulfuric acid recovery, copper recovery, NH3 recovery, (NH4)2SO4 recovery, etc.	
3.1.4	Evidence from a representative range of stakeholders showing consensus that the site is seen as positively contributing to the good water governance of the catchment shall be identified. (2 points)	TSMC's water management requirements for suppliers: ▪ The supplier's water saving target is 4.5 million tons in 2021 and 35 million tons in 2030, disclosed in the corporate social responsibility report. TSMC tracks suppliers' water-saving effects and target achievement every year. By the end of 2021, suppliers have saved a total of 2.13 million tons of water. Presenting sustainable water management results Improvement of water management capabilities: Water map online system water conditions, establishment of new recruit training (factory college), special personnel setting and training.	2

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		Excellent deeds related to water management in the factory area, FAB 5: Qualified in 2019 Cleaner Production Assessment, FAB 12A: Qualified in 2019 Cleaner Production Assessment, 2016 Excellent Enterprise in Ammonia Nitrogen Wastewater Reduction, 2016 Excellent Water/Energy Conservation Personnel, FAB 12B: 2019 Excellent Enterprise Award for Waste Reduction and Circular Economy (Scrap Copper Recycling), 2019 Energy Conservation Benchmark Award. Guide suppliers to carry out water saving actions. It is estimated that the cumulative amount of water saving by suppliers will reach 4.5 million tons in 2021, and the first stage of water saving by suppliers in 2020 will be 2.13 million tons. Stakeholders - Bamboo Branch Administration: In response to water constraints, the manufacturers in the area are invited to achieve voluntary water saving (5%) & biological acute toxicity (vertebral/daphnia) in the plant's running water Tua<1 & get the best water-saving manufacturers and share relevant water-saving stories & Bamboo Branch/Longtan Park Tree Planting Legacy Project, a total of 1,934 trees were planted.	
3.3.4	The total volume of water voluntarily re-allocated (from site water savings) for social, cultural and environmental needs shall be quantified.	TSMC transfers smart irrigation technology to the Ministry of Economic Affairs to rescues water resources on 23rd April 2021. Due to water conditions are severe, TSMC saves water ahead of schedule, and increases the amount of water trucks to transport more water started from 21st May 2021. In line with the needs of the Bureau of Science and Technology, the water consumption will be revised down to voluntarily redistribute water resources. When the water situation is severe in 2021, save 17% of water in advance and redistribute water resources.	6
3.5.2	Evidence of completed restoration of non-functioning or severely degraded Important Water-Related Areas including where appropriate cultural values from a site-selected baseline date shall be identified. Restored areas may be outside of the site, but within the catchment. (6 points)	The architectural design of the TSMC Hsinchu plant covers the artistic conception of mountains, flowing water, and mountains, and establishes green belts to protect and regenerate the diversity of native species and biological growth. Maintain and protect species with greening outside the factory area. ▪ In-plant maintenance and maintenance for chemical management, greening planting, ecological pool, native species conservation/firefly restoration/biodiversity ▪ Groundwater quality collection Bamboo family P1/P3/P4, P5, P6, P7 (water quality monitoring twice a year) Watershed Outer Tree Planting Program TSMC's tree planting legacy plan. ▪ Cooperate with the contractor to expand the tree planting plan from the Zhuke Park to the entire Taoyuan City and Hsinchu City. The first phase is currently being implemented. ▪ Planted 2,025 native trees, of which 1,939 have been completed (95.6% completion rate).	6

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
3.5.3	Evidence from a representative range of stakeholders showing consensus that the site is seen as positively contributing to the healthy status of Important Water-Related Areas in the catchment shall be identified. (2 points)	(1) In the first half of 2021, the water conditions are severe, and the water conditions in Hsinchu are clear. TSMC Bamboo Plant is actively developing water sources, developing 9 water sources and using a total of 10,000 CMD, reducing the rush to use water resources with local residents and making water resources allocation appropriate. (2) In 2021, there will be a shortage of water in Taiwan. TSMC's Zhuke plant will take contingency measures. Hsinchu area will not implement five or two stoppages, and actively contribute to stakeholders. (3) Due to severe water conditions and increased cooling water consumption due to weather factors, TSMC saves water by 10% in order to meet the 17% water restriction requirement (newly added by Unleash Innovation HFD/AOR is recovered and the C/T Blowdown setting is increased, the original water saving is 8%→10%), and 7% water replenishment (3,841CMD) is still required. (4) In response to the last rainy season and the continued tension of the epidemic, in order to reduce the manpower burden and reduce the risk of personal contact, water loading is carried out 4 days a week, 12 hours a day. It is estimated that a weekly water saving effect of 17.4% can be achieved. Therefore, an **Observation 09** is raised for this indicator.	2
3.6.3	A list of actions taken to support the provision to stakeholders in the catchment of access to safe drinking water, adequate sanitation and hygiene awareness shall be identified. (5 points)	TSMC Charity Foundation and the volunteer society is committed to the companionship and care of rural area children and the elderly inside and outside of the catchment. TSMC assisted stakeholders in the catchment to guided eco-environmental sanitation and assisted in obtaining safe drinking water. Furthermore, outside the catchment (i.e., Hualien/Chiayi County) for Water Pheasant ecological environment and Zengwen Reservoir environmental education. Therefore, an **Observation 10** is raised for this indicator.	5
3.6.4	In catchments where WASH has been identified as a shared water challenge, evidence of efforts taken with relevant public-sector agencies to share information and to advocate for change to address access to safe drinking water and sanitation shall be identified.	In terms of drinking water safety and environmental sanitation, the company cooperated with the Environmental Protection Bureau, the Fire Brigade, the Hsinchu Science Park Bureau, and the Longtan Science Park Sewage Treatment Plant to carry out disaster relief drills with the theme of special emergency drills for sewage treatment plants. Active epidemic prevention is to ensure that stakeholders obtain adequate sanitation and personal hygiene. Dengue fever: Drainage and dredging to drain stagnant water to prevent mosquito breeding. Factories promote government environmental sanitation posters and share TSMC's energy-saving, water-saving and waste-reduction technologies with the industry to maintain industry competitiveness. The shared water challenges faced by factories require clearer information.	4

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
3.7.3	Actions taken to address water related risks and challenges related to indirect water use outside the catchment shall be documented and evaluated. (5-7 points)	TSMC's water consumption consulting achieves efficiency improvements: • Supplier audit year is managed according to "A-RMS-10-02-012 procedure" • Require suppliers to implement water conservation actions and set annual water conservation targets >1.5% • Implemented the S.H.A.R.P. plan for 36 suppliers, with a water saving target of 2.13 million tons in 2020. For example, Changchun Petrochemical saved 1.21 million tons of water. • 60 S.H.A.R.P. The audit will be carried out in 2021 and the estimated water volume is around 4.5 million tonnes. Addressing risks and challenges beyond the basin requires more robust and articulated solutions. The first phase of the supplier's annual water saving target in 2020 was set at 2.13 million tons (achieved), the cumulative water saving in 2021 is expected to be 4.5 million tons, and the long-term plan for the cumulative water saving in 2030 is 35 million tons to demonstrate supplier resilience.	5
3.9.6	Achievement of identified best practice related to targets in terms of good water governance shall be quantified. (8 points)	Promote various water-saving and environmental protection measures to achieve good water resources management results. Maintain good water efficiency: (1) Water consumption per unit product decreases year by year, (2) Process recovery rate remains above 85% Invite government agencies, industries (including park manufacturers), upstream and downstream supply chains, academic groups, and non-governmental environmental groups to visit the factory and exchange water-saving experience. Presented in the form of water management performance awards and violations: F5 109 & 110 won the "Excellent Environmental Protection Specialized Technical Personnel Award" by the Science and Technology Administration F12B won the "Excellent Environmental Protection Specialized Technical Personnel Award" by the Science and Technology Administration in 109, and won the "Model Environmental Protection Specialized and Technical Personnel" of the EPD in 2019 There are no related penalties in 2020.	8
3.9.7	Achievement of identified best practice related to targets in terms of sustainable water balance shall be quantified. (8 points)	Comparing the water use efficiency and process recovery rate of the Zhuke plant with the global average, the water consumption per unit of product in the F12B (P6/P7) plant in 2020 increased by 13.8% compared with 2019, with no reduction performance. Therefore, an **Observation 11** is raised for this indicator.	0
3.9.8	Achievement of identified best practices related to targets in terms of water quality shall be quantified. (8 points)	TSMC improves the efficiency of water pollution prevention and control and strengthens the removal of wastewater pollutants. TSMC's Hsinchu plant takes ammonia nitrogen, Cu+, TMAH, COD, and TUa as KPIs, and implements 8 projects to achieve short, medium and long-term goals.	8

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		The water quality of each plant meets the management standards, and improvement plans and results are provided. Progress disclosed in the CSR report.	
3.9.9	Achievement of identified best practices related to targets in terms of the site's maintenance of Important Water-Related Areas have been implemented. (8 points)	Hsinchu Science and Technology Park sets up a detention pond. Groundwater monitoring wells are set up in the TSMC Hsinchu plant to collect groundwater quality and monitor the groundwater quality in the buffer zone. TSMC's Hsinchu plant has also set chemical storage management procedures as follows: ■ Special chemical storage tanks are regularly maintained as required ■ Leak sensors are installed on chemical banks, and regular maintenance is carried out according to the type ■ The chemical embankment is installed with emergency sump and regularly maintained ■ Regular maintenance of the sump on the road where the tanker travels ■ Daily on-site inspection The TSMC Hsinchu plant area established ecological features and determined the survival state around the plants. Government agencies regularly monitor the water quality of Keya Creek and manage water conservation promotion activities. Shows the relative contribution to the goal of maintaining important water-related areas based on stakeholder expectations for TSMC's water use. Therefore, an **Observation 12** is raised for this indicator.	8
3.9.10	Achievement of identified best practice related to targets in terms of WASH shall be quantified. (4 points)	TSMC's Hsinchu plant provides employees with sufficient and safe drinking water, clean toilets (in compliance with WBCSD standards and occupational safety and hygiene facility rules), and warm water for winter washing. As a precaution against COVID-19, the facility provides handwashing facilities to protect employee health and avoid contact. Set up disabled toilets that are better than specified requirements. There are "men's and women's toilets" on every floor of the factory. There are 524 urinals, 219 squatting toilets and 683 toilets in the whole factory. The number of inductive hand washing faucets is 623. Compared with the requirements of building regulations, the quantity meets the requirements and is better than the requirements of the regulations.	4
3.9.11	A list of efforts to spread best practices shall be identified. (3 points)	Promote various water-saving and environmental protection measures to achieve good water resources management results. Invite government agencies, industries (including park manufacturers), upstream and downstream supply chains, academic groups, and non-governmental environmental groups to visit the factory and exchange water-saving experience.	3

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		From 2014 to 2019, there were 40 visits and exchanges, including 40 in different watersheds. Due to COVID-19, there are no related water resource management promotion activities at the Hsinchu site. Therefore, it has no relevant significant and positive contribution to the organization and stakeholders. Please continue to strengthen in the future.	
3.9.12	A list of collective action efforts, including the organizations involved, positions of responsible persons of other entities involved, and a description of the role played by the site shall be identified. (8-14 points)	TSMC has carried out a number of water conservation activities. The relevant medical records and evidence were verified. There are 2 events in 2020 (1) Confirm that a water shortage emergency response meeting has been held on 2020/10/14 in advance to prepare for the water demand when the water conditions are severe, and supply water from areas with sufficient water, so that the water demand for local people's livelihood will not be affected when the water conditions are severe (2) In response to the water shortage period in advance at the end of 2020, the Central Disaster Response Center requires the industrial water saving to be increased to more than 7%, and the Science and Technology Administration convened the park manufacturers to adopt corresponding water saving measures to respond earlier. Therefore, an **Observation 13** is raised for this indicator.	8
3.9.13	Evidence of the quantified improvement that has resulted from the collective action relative to a site-selected baseline date shall be identified and evidence from an appropriate range of stakeholders linked to the collective action (including both those implementing the action and those affected by the action) that the site is materially and positively contributing to the achievement of the collective action shall be identified. (3-10 points)	On November 8, 2018, a water-saving verification demonstration event was held - sharing TSMC's water-saving technology with the industry to maintain industrial competitiveness and environmental sustainability. TSMC explained the factory's water conservation strategy and implementation of wastewater recycling. Thirty people from different industries attended the day. Verification of Industrial Water Saving Experience Sharing Session——The Industrial Water Saving Experience Sharing Session held on August 23, 2017 by the Department of Water Resources of the Ministry of Economic Affairs. A total of 93 people from the industry participated. There are no related activities in 2020. Therefore, an **Observation 13** is raised for this indicator.	0
4	**Evaluate (advanced)**		
4.1.4	A governance or executive-level review, including discussion of shared water challenges, water risks, and opportunities, and any water-related cost savings or benefits realized, and any relevant incidents shall be identified. (3 points)	Continue to implement daily water saving and water shortage adjustment to manage and control the risk of water shortage. From March 1, 2021 to now, in cooperation with the Hsinchu Science Park Bureau, we have implemented independent water saving in response to water conditions, and the water saving effect is better than 5%. The Hsinchu Science Park Bureau plans to set an average daily water consumption of 4,791 tons in August 2020. After the implementation of the water-saving plan, the average daily water consumption was 4,192 tons, saving 12.5% of water.	0

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
		Maintain good water efficiency and reduce water consumption per unit of product. The AP3 plant reached 1.96 L/cm2 in 2020, better than the Taiwanese average of 7.93 L/cm2. In 2020, the process recovery rate of the Hsinchu factory area will reach 88.0%, which is in line with the target to remain above 85%. TSMC integrates internal and external resources, develops reclaimed water technology, and continues to implement process water saving and reclaimed water utilization. The senior management (director) of each plant in Hsinchu has no record of discussions on the risks, opportunities and related benefits of organizing water management. Therefore, an **Observation 14** is raised for this indicator.	
4.3.2	The site's efforts to address shared water challenges shall be evaluated by stakeholders. This shall include stakeholder reviewing of the site's efforts across all five outcome areas, and their suggestions for continual improvement. (6 points)	TSMC identified seven shared water challenges, both internal and external. External shared water challenges are water scarcity and water outflows. The internal shared water challenges are (1) shortage of water supply due to drought, and (2) risk of river water quality due to increased river pollution index (RPI) of effluent. Section Chief Su of the Construction Management Office of the Planning and Design Section of the Hsinchu Science Park Bureau said: TSMC cooperates with this bureau, especially TSMC actively cooperates with the new plant to save water, saving water when the water situation is severe. The director of the sewage treatment plant of Hsinchu Science Park Bureau said: The discharge water quality of TSMC factories is far below the acceptance standards of sewage treatment plants. It facilitates dilution of the water and helps reduce the load on the sewage treatment plant. When sewage is discharged from the sewage treatment plant into the watershed, the water quality of the watershed is diluted. Transcripts of interviews with Hsinchu Science Park Bureau wastewater treatment plant managers need to include how they evaluated TSMC's efforts in wastewater discharge quality to demonstrate that stakeholders have evaluated TSMC's efforts to collectively address water challenges. Stakeholder feedback mainly includes two items, for sustainable water balance, health of important water-related areas Relevant feedback TSMC has already responded, but they are all ongoing, and no new improvement actions have been added.	6
5	**Communicate & Disclose (advanced)**		
5.3.2	The site's efforts to implement the AWS Standard shall be disclosed in the organization's annual report. (1 point)	TSMC disclosed AWS Report in ESG Report. The performance result also released in AWS annual report. In the ESG Report indicated below effort: ● the volunteers are dedicated to promoting water conservation knowledge. ● Wastewater diversion, recycling system, wastewater treatment, recycling and reuse (silicon products, copper rods).	1

Indicator	Details (AWS Advanced-Level Criteria)	Evidence	Score
5.3.3	Benefits to the site and stakeholders from implementation of the AWS Standard shall be quantified in the organization's annual report. (1 points)	In the TSMC AWS Report, TSMC stated there are five benefits to implement AWS: Promoting AWS will have five benefits for TSMC's water use ● Good water management ● Sustainable water balance ● Good water quality control ● Confirmation of maintaining the same watershed water quality ● Safe drinking water and environmental sanitation guarantee In the 2020 ESG Report, it is only stated that the Hsinchu factory will be certified to AWS standards, and cannot actually confirm the benefits obtained by implementing AWS standards. Therefore, an **Observation 15** is raised for this indicator.	0

7 AUDIT FINDINGSCONCLUSIONS AND RECOMMANDATIONS

During the audit, findings were presented for a total of 8 basic indicators and 7 advanced indicators, all of which were classified as observations. They are considered to partially meet the AWS Core Standard requirements and require some minor adjustments to the documentation in order to be considered fully compliant. Because they are all classified as observation, TSMC will only reply to the revised practice and plan, and the actual confirmation will be confirmed at the next visit. Table 7.1 below shows the details of the minor nonconformities and required new information.

Table 7.1 Observations Raised during the AWS Audit Process

No.	Type	Ref.	Details	Response by TSMC's Fab 5, F12A and F12B plants	Relevant Reference
1	Observations	01OBS	Indicator 1.2.1 Please confirm the respondents of the water management questionnaire for CSR stakeholders, and revise the questionnaire recovery rate and the results of the questionnaire.	The object of the revised questionnaire survey is not the relevant persons listed in the company's CSR, and the actual questionnaire recovery rate is 16%, and 2 questionnaires were answered in July and 6 questionnaires were received on October 27.	
2	Observations	02OBS	Indicator 1.2.2 Please clarify how the organization judges the impact potential of sustainable water management in the watershed.	List stakeholders to judge their influence by relevance.	
3	Observations	03OBS	Indicator 1.3.3 F12A P4/P5 plant water balance chart discharge value is wrong in July 2021. Please fix.	The organization has revised the process recovery rate/emission rate/plant-wide recovery rate.	
4	Observations	04OBS	Indicator 1.4.1 The water risk identification method for raw materials cannot present the impact judgment of the use of raw materials on the organization's water risk. Please comprehensively review the appropriateness of water risk identification methods for raw materials.	At present, the weight of the raw materials in the factory has been used as an enumeration, and the packing/bull gas/wafer/chemicals & gases are listed. The pollution factor contributed by each raw material corresponds to the proportion of the TSMC, which will be discussed in the future. Effects on pollutants effluxed by TSMC.	
5	Observations	05OBS	Indicator 1.8.2	The organization has supplemented the company CSR information of UMC/AUO/Samsung/intel/Global, etc.	

No.	Type	Ref.	Details	Response by TSMC's Fab 5, F12A and F12B plants	Relevant Reference
			Please supplement the organization and related industries or watershed's practical effectiveness in reducing total water consumption.		
6	Observations	06OBS	Indicator 2.1.1 It is suggested that the communication of stakeholders or the collection of opinions should be more solidly implemented.	At present, the opinions of stakeholders are collected through the distribution of questionnaires and feedback.	
7	Observations	07OBS	Indicator 3.1.1 In 2020, the target of water consumption per unit product was reduced by 10%, but the actual value was 8.9%, which was not reached. The target value in 2021 has been adjusted to 9%. Please continue to track the achievement of the target.	The data is the water consumption target of the company's CSR, and the water consumption target of the entire tsmc. In the future, each plant area will be the main focus to track the implementation of the target.	
8	Observations	08OBS	Indicator 4.3.1 In view of the low recovery rate of the AWS stakeholder survey results, please strengthen the survey recovery status in the future.	In the future, the distribution and recovery of questionnaires will follow up the questionnaires for those who are more relevant.	
9	Observations	09OBS	Indicator 3.5.3 Please provide additional information on stakeholder health contributions for critical water areas.	Due to the drought in 2020 and water shortage, TSMC is committed to finding new water sources, such as the Hushan drought wells/Banxin water plant/groundwater at various construction sites, to reduce the use of tap water and keep Hsinchu citizens' livelihood water unaffected.	
10	Observations	10OBS	Indicator 3.6.3 Please strengthen the WASH-related actions of stakeholders in the basin.	(1) TSMC assisted local residents with hot water baths during the Hualien earthquake. (2) Due to the impact of the COVID-19 epidemic on people's health, TSMC has established an in-plant questionnaire inquiry mechanism/manufacturer cross-regional control/disinfection supplies are set up throughout the plant/TSMC employees and manufacturers are grouped into A/B groups to avoid mutual influence and infection.	
11	Observations	11OBS	Indicator 3.9.7	Because F12B (P6/P7) is RD FAB, the output of wafers is small, and the characteristics of the plant	

No.	Type	Ref.	Details	Response by TSMC's Fab 5, F12A and F12B plants	Relevant Reference
			The water consumption per unit of product in the F12B (P6/P7) plant area in 2020 increased by 13.8% compared with 2019, with no reduction performance.	are different, but the reduction performance can be seen from the entire Hsinchu F5/F12A/F12B.	
12	Observations	12OBS	Indicator 3.9.9 No quantitative/qualitative evidence of relative contribution to the maintenance of important water-related regional goals.	It is difficult to provide quantitative and qualitative evidence for TSMC's contribution to important water-related areas, but it is far below the index managed by the Hsinchu Science Administration. It can be speculated that it has effectively reduced ecological loading and reduced the treatment burden of sewage treatment plants. . During the visit to the sewage treatment plant, the Hsinchu Science Administration mentioned that TSMC's external discharge water is a good dilution for the sewage treatment plant.	
13	Observations	13OBS	Indicator 3.9.12/3.9.13 Hsinchu Factory will cooperate with 2 activities in 2020, but the promotion is only for visiting activities. The significant and positive contribution to the organization and stakeholders is weak, please continue to strengthen it in the future.	In 2020, due to the epidemic, the nature of the visit will be mainly promotional. In the future, there will be more interactive exchange and learning activities as the epidemic slows down.	
14	Observations	14OBS	Indicator 4.1.4 The senior management (plant manager) of each plant in Hsinchu has no relevant discussion records on the risks, opportunities and related benefits of organizing water management.	There is no special evaluation for the management of AWS executives. There is a report on the management at the safety committee, and the AWS report is also approved by the director-level officer.	
15	Observations	15OBS	Indicator 5.3.3 In the 2020 ESG Report, it is only stated that the Hsinchu factory will be certified to AWS standards, and cannot actually confirm the benefits of implementing AWS standards.	This program is required to list the benefits of AWS implementation in future certifications.	

8 SUMMARY

Based on the review of documents submitted by TSMC's F5/F12A/F12B plants, interviews with management and employees of TSMC's F5/F12A/F12B plants, interviews with local stakeholders and on-site observations, TSMC's F5/F12A/F12B plants Pay attention to the importance of water resource management. A lot of effort and work went into preparing for the AWS certification audit.

During the audit process, 8 basic indicators and 7 advanced indicators that meet the requirements of AWS core standards are proposed. While they are considered compliant with the AWS Core Standard requirements, there are subtle differences that require some minor adjustments to the documentation to be considered fully compliant. We will further determine their compliance with AWS standards when we conduct a surveillance evaluation in 2022.

In addition, according to the compliance evaluation of TSMC's F5/F12A/F12B plant and AWS advanced level standard, TSMC's F5/F12A/F12B plant has a cumulative advanced level standard score of 124, reaching the AWS Platinum level.

9 OPPORTUNITIES FOR IMPROVEMENT

For the initial compliance assessment of TSMC F5/F12A/F12B plants to AWS standards, more attention is needed to the planning and implementation documented to date. In the current data, less attention is paid to the performance of TSMC's F5/F12A/F12B plants. Because this verification is the first year for TSMC F5/F12A/F12B factory to conduct AWS standard verification. Therefore, more clear information on the performance of water management is expected.

Therefore, in addition to following up on implementing a corrective action plan to address all observations, future audits will assess the performance of TSMC's F5/F12A/F12B plants against AWS standard metrics, and how it is monitored and presented for compliance.

Therefore, SGS recommends that TSMC F5/F12A/F12B fabs develop practical methods to monitor their performance against AWS standard metrics and keep relevant records for future review.

10 CONCLUSION AND RECOMMANDATIONS

Given the review of evidence presented and the site observation performed at TSMC's F5/F12A/F12B plants, SGS recommends that TSMC's F5/F12A/F12B plants be awarded the AWS Platinum Certified status with a surveillance audit interval of annual frequency.

11 REFERENCE

REF001: AWS-(Step1) - AP03_wmc

REF002: AWS-(Step2) - AP03_wmc

REF003 AWS-(Step3) - AP03_wmc

REF004: AWS-(Step4) - AP03_wmc

REF005: AWS-(Step5) - AP03_wmc