Sandy Mush 10 MW Technical Feasibility Study

Fully Islanded AI Data Center Campus | Merced County California

Document control	Current basis
Prepared by	Parasol IoT LLC dba Parasol Elite Power
Project	Sandy Mush Phase I AIDC
Program capacity	10 MW IT load in two independent 5 MW compute paths
Site	Approximately 75 acres in Merced County, California
Power model	Fully islanded, non-grid-connected and non-exporting onsite power system
Management target	February 2027 completion, subject to permits, releases and the conditions in this study
Study date	October 10, 2026
Version	v1.0

Purpose: This study evaluates the technical feasibility of developing the first 10 MW phase of the Sandy Mush AI data center campus using Parasol Elite Power's fully islanded generation, storage, 800 V DC distribution, liquid cooling, water-treatment and diverse-fiber architecture. It does not evaluate project economics, customer pricing or the revenue of the AI and token platforms.

Technical conclusion: The Sandy Mush Phase I concept is technically feasible and is suitable to advance into detailed engineering, permit submission, vendor guarantees and construction planning. The 75-acre site provides adequate land for the initial sub-20-acre operating campus and future expansion. The current architecture provides substantial generation and storage redundancy for a 10 MW IT load. Final feasibility remains conditional on site survey and geotechnical evidence, air and land-use approvals, fuel and natural-gas supply studies, verified water rights and recharge approvals, fire and life-safety design, executed fiber service, and vendor-backed performance guarantees.

Schedule conclusion: February 2027 remains a management target rather than an independently validated contractual COD in this study. It can be protected only if the required permit pathway, early-work authority, equipment releases and site mobilization are already sufficiently advanced. The design itself is feasible; the principal schedule exposure is approval and field execution, not the ability to configure the required equipment.

Executive Summary

Sandy Mush is planned as a modular 10 MW IT campus formed by two independent 5 MW AIDC paths. The critical load is supplied through a battery-first 800 V DC architecture. Two 7 MW pyrolysis modules provide the normal generation source. Two independent natural-gas backup plants, each planned at seven 2 MW units, provide separate reserve paths. Two independent 15 MW / 30 MWh

critical BESS blocks stabilize and distribute the power delivered to their assigned 5 MW compute paths.

The project is intentionally fully islanded: no utility-grid interconnection, no export and no sale or distribution of electricity outside the project property. Approximately 1 MW of solar is planned for auxiliary and parasitic loads, supported by a separate 10 MW / 20 MWh auxiliary BESS. The final design must reconcile gross and net generator output, plant parasitic load, BESS usable energy, rack power, cooling demand and all auxiliary loads in one approved power balance.

Liquid cooling is paired with closed-circuit heat rejection and onsite water treatment. The current concept draws permitted irrigation water from the canal or distribution system, treats it for cooling use and returns eligible water to the aquifer through an approved recharge system. This is a low-net-water-use objective, not yet a guaranteed WUE or water-right conclusion. It requires an approved water balance, source agreement, treatment design, hydrogeologic study and agency authorization.

1 Project Boundaries and Design Basis

Control item	Current technical basis
Phase I capacity	10 MW full IT load in two modular 5 MW compute paths.
Compute platform	NVIDIA Vera Rubin-class liquid-cooled AI compute; final rack, server, network and power configuration subject to executed supply documents.
Electrical architecture	Battery-first DC system with an 800 V DC distribution basis and independent Path A and Path B critical power trains.
Grid relationship	Fully islanded, non-grid-connected and non-exporting onsite power system.
Reliability intent	Tier IV-aligned fault-tolerant objective; no Uptime Institute or other formal certification is claimed by this study.
Site	Approximately 75 acres; Phase I operating footprint planned below 20 acres, with approximately 55 acres retained for expansion, agriculture and buffers.
Target completion	February 2027 management target, contingent on approvals, procurement release, early works and the integrated baseline.
Financial boundary	Capital cost, revenue, financing, project value and platform economics are outside this technical study.

2 Site and Civil Feasibility

Area	Current assessment	Required evidence before construction release
Land area and expansion	The approximately 75-acre site provides adequate planning area for the sub-20-acre Phase I campus, green berm, agriculture, stormwater functions and future expansion.	Boundary and topographic survey, title/easement review, final setbacks and a controlled master site plan.

Area	Current assessment	Required evidence before construction release
Grading and drainage	A greenfield layout is feasible, but equipment pads, roads, stormwater retention and recharge features require site-specific levels and drainage design.	Geotechnical investigation, grading/drainage plan, flood review, erosion control and civil IFC package.
Access and logistics	The current concept uses controlled access from the Highway 59 side and a Sandy Mush Road egress, with internal heavy-haul and fire routes.	Agency-approved access, turning templates, bridge/road load checks, crane and laydown plan, and emergency access review.
Visual and security buffer	A landscaped green berm and perimeter controls can screen the operating campus and separate the secured AIDC from agricultural and public-facing areas.	Final berm sections, drainage effects, sight-distance review, fencing, lighting, camera and access-control design.
Agricultural integration	The retained land can support greenhouse, crop research and beneficial biochar use without occupying the secured AIDC core.	Agricultural operating plan, soil and biochar criteria, access separation and environmental-health review.
Fire and emergency response	Containerized equipment and separated plant zones allow a defensible fire strategy.	Fire-flow basis, apparatus access, separation distances, hazardous-material inventory, suppression strategy and authority approval.

Site conclusion: No land-area fatal flaw is identified. The physical program is compatible with the available acreage, but the master plan must be converted from conceptual placement into surveyed civil, fire, logistics and environmental drawings.

3 Integrated Power Architecture

System	Planning basis	Feasibility condition
Primary pyrolysis generation	2 × 7 MW modules; 14 MW aggregate installed generation.	OEM-guaranteed net electrical output after parasitic load, feedstock heat and mass balance, emissions, availability, maintenance and startup requirements.
Backup gas Plant A	7 × 2 MW natural-gas generators; 14 MW installed.	Firm gas capacity and pressure, emissions permits, net site ratings, maintenance reserve, acoustic treatment and approved operating sequence.
Backup gas Plant B	7 × 2 MW natural-gas generators; separate 14 MW installed path.	Physical and controls independence sufficient to avoid common-mode failure, subject to final gas and balance-of-plant design.
Critical BESS A	15 MW / 30 MWh; assigned to the 5 MW AIDC Path A.	Usable energy, degradation, fault contribution, fire protection, thermal design, warranty and grid-forming controls verified.
Critical BESS B	15 MW / 30 MWh; assigned to the 5 MW AIDC Path B.	Independent protection and control path with no unapproved common-mode equipment.

System	Planning basis	Feasibility condition
Solar and auxiliary storage	Approximately 1 MW solar for auxiliary/parasitic loads with a separate 10 MW / 20 MWh auxiliary BESS.	Final PV yield, auxiliary-load profile, BESS duty cycle, siting and protection coordination.
800 V DC distribution	Battery-first DC-DC delivery from conditioned energy storage to liquid-cooled compute.	NVIDIA/server input requirements, grounding, isolation, protection, fault management, connectors, bus ratings, certification and safe maintenance method.
EMS and protection	Coordinated dispatch, source switching, state-of-charge control, load shedding and monitoring.	Approved operating philosophy, black-start sequence, failure-mode logic, cybersecurity, point list and hardware-in-the-loop validation.

Power-balance requirement: The final BOD must publish gross generation, guaranteed net generation, parasitic load, cooling and water-system load, auxiliary load, usable BESS power and energy, and the full 10 MW IT boundary. The present installed-capacity concept provides sufficient headroom for detailed engineering, but nameplate totals alone are not an acceptance basis.

4 Reliability and Operating Modes

Mode	Required operating response	Verification
Normal operation	Pyrolysis supplies the campus through the independent BESS paths; batteries regulate power quality and protect the compute load.	Steady-state power balance, thermal limits, state-of-charge strategy and 72-hour endurance test at the agreed load.
Primary-source trip	BESS carries the critical load without interruption while the assigned natural-gas reserve sequence starts and stabilizes.	Measured ride-through, start time, transition quality and no-break compute-load evidence.
Single generator unavailable	Remaining units and storage maintain the protected load within the approved reserve policy.	N-1 capacity and maintenance-case test or validated simulation.
BESS path fault	The failed path isolates without propagating to the other 5 MW path; recovery follows the approved degraded-mode procedure.	Selective coordination, protection tests and L5 failure-mode scenario.
Black start	Controls establish the DC and auxiliary systems in a safe sequence before compute is restored.	Approved black-start script, timed test, restart priorities and stable return to service.
Fuel interruption	Onsite feedstock inventory, gas reserve strategy and storage dispatch maintain the defined autonomy.	Contracted supply, inventory minimums, transport plan and autonomy model.

A Tier IV-aligned objective requires more than excess capacity. The detailed design must demonstrate fault tolerance, maintainability and the absence of common-mode failures across fuel, controls, cooling, fire protection, communications and DC distribution.

5 Cooling and Water Strategy

Function	Current concept	Required design evidence
Rack cooling	Direct liquid cooling through CDU-managed secondary loops serving Vera Rubin-class racks.	Final rack heat load, flow, pressure, temperature, chemistry, redundancy and connector requirements.
Heat rejection	Closed-circuit cooling tower and chiller arrangement; current planning basis allows approximately 24 MWth of heat-rejection capacity.	Coincident heat balance, ambient design day, approach temperatures, pump power, redundancy, plume/noise and freeze/heat protection.
Source water	Permitted irrigation-canal or canal-distribution water, subject to availability and agreement.	Water-source agreement, seasonal capacity, raw-water quality, conveyance and backup source.
Treatment	Onsite pretreatment and purification for cooling make-up and system-quality requirements.	Process design, recovery rate, chemical use, waste stream, storage, monitoring and operator plan.
Recharge	Eligible treated water returned to the aquifer through an approved recharge system.	Water-right analysis, hydrogeologic study, recharge suitability, agency approvals, monitoring and accounting.
Efficiency	Low-net-water-use objective; WUE target to be fixed after the approved water balance and operating boundary are complete.	Defined WUE boundary and units, meters, baseline, design model and operational verification period.

Water conclusion: The closed-loop treatment and recharge concept is technically credible but is not self-executing. Canal supply, reuse and aquifer recharge each require separate legal, environmental and technical confirmation. The project should not claim a guaranteed WUE or net-zero water result until the approved balance and monitoring plan support it.

6 Compute Fiber and Controls Interfaces

Interface	Current basis	Closeout requirement
Compute	Full 10 MW IT load using NVIDIA Vera Rubin-class liquid-cooled systems.	Final rack count, rack density, 800 V DC input, network, maintenance and delivery schedule.
Fiber	Two planned 800G provider-diverse paths, identified in the current site plan as AT&T north and VAST south.	Executed service orders, confirmed physical route diversity, entrance facilities, meet-me rooms, testing and service-ready dates.
AI platform	U.S.-hosted platform services are operational loads and customers of the compute environment, not power-system acceptance equipment.	Secure U.S. servers, deployment architecture, customer agreements, cybersecurity and operational readiness.

Interface	Current basis	Closeout requirement
Controls	EMS, BMS, DCIM, fire, cooling and OEM controls integrated into one monitored environment.	System ownership matrix, network segregation, time synchronization, alarm routing, data retention, remote access and cyber incident response.

7 Permitting and Approval Path

Authority or workstream	Project relevance	Evidence required
Merced County Planning and Development Services	Land use, zoning confirmation, CEQA pathway, site development and conditions of approval.	Written zoning/use determination, application status, environmental review path and approved site plan.
Merced County Building and Safety	Grading, structures, equipment foundations, electrical/mechanical systems and inspections.	Approved plans, issued permits and inspection schedule.
Fire authority	Access, fire flow, hazardous materials, separation, battery and fuel systems, emergency response.	Approved fire/life-safety basis and inspection acceptance.
San Joaquin Valley Air Pollution Control District	Pyrolysis, engines and other emissions units may require Authority to Construct before installation and Permit to Operate after compliant construction and inspection.	Permit applicability meeting, complete applications, issued ATCs, commissioning conditions and operating permits.
Water and recharge authorities	Canal-water supply, treatment residuals, discharge/reuse and groundwater recharge.	Supply agreement, water-right and recharge pathway, GSA coordination, hydrogeologic approval and monitoring plan.
Environmental and hazardous materials	Stormwater, waste, chemicals, fuels, spill control, biological/cultural resources and construction impacts.	Applicable studies, plans, permits, notifications and operating records.
Utility boundary	No electric-grid interconnection or export is planned.	Documented islanded one-line, physical non-export design and operating procedures consistent with land-use conditions.

Permitting conclusion: The fully islanded electrical model removes utility interconnection as a project dependency, but it does not remove land-use, building, fire, air, water, environmental or operating-permit requirements. Early agency alignment is the controlling schedule action.

8 Delivery Schedule and February 2027 Target

The February 2027 target requires a true fast-track program with prior design and vendor work credited, permit packages submitted immediately, approved early works and modular equipment arriving in installation sequence. The following plan is a management-control framework and must be replaced by the approved integrated baseline.

Control window	Principal work	Go or no-go evidence
October 2026	Freeze Phase I BOD, survey/geotechnical scope, agency matrix, air-permit basis, water/recharge concept, equipment guarantees and construction packages.	Written permit path, released long-lead packages and executable early-work plan.
November 2026	Mobilize approved civil works; roads, drainage, pads, berm, security, undergrounds and prefabrication; close factory submittals.	Issued permits/authorizations for affected work and accepted foundations/embedded interfaces.
December 2026	Set modular generation, BESS, AIDC, cooling and water equipment in approved sequence; install primary electrical and mechanical interfaces.	Major equipment onsite, damage-free and released to installation.
January 2027	Complete DC distribution, gas and biomass balance of plant, cooling/water, fiber entrance, controls, fire systems and L2/L3 startup.	Zone mechanical completion, energized auxiliary systems and commissioning turnover.
February 2027	Black start, no-break transfer, endurance, failure-mode, cooling, water, fiber and full-load integrated testing; training and handover.	Authority acceptance, critical defects closed and approved COD/operational acceptance.

Schedule assessment: The design can be delivered modularly, but the February 2027 date carries high approval and execution risk unless the air, land-use, building, fire and water pathways are already materially advanced. If any required permit prevents early equipment installation, the integrated schedule must be rebaselined promptly rather than compressing safety or acceptance testing.

9 Performance Testing and Acceptance Basis

System or metric	Proposed acceptance basis	Required proof
IT capacity	10 MW full IT load across two 5 MW paths.	Approved boundary, rack schedule and sustained-load evidence.
Primary generation	Guaranteed net output and availability of the 2 × 7 MW pyrolysis plant.	FAT/SAT, emissions compliance, parasitic-load measurement and endurance test.
Gas backup	Each 14 MW plant meets the approved reserve and transition duty.	Start, step-load, endurance, emissions, noise and fuel/gas-condition testing.
Critical BESS	Each 15 MW / 30 MWh path meets usable power, energy, ride-through and grid-forming requirements.	Capacity, discharge/recharge, thermal, fire, protection and transition tests.
800 V DC	Stable protected DC voltage and selective fault isolation through all operating modes.	Voltage quality, fault, isolation, grounding, protection and load-step testing.
Cooling	Maintain rack inlet and coolant conditions at the approved design-day and failure cases.	Flow, temperature, pressure, water quality, heat rejection and failure-mode tests.

System or metric	Proposed acceptance basis	Required proof
Water and recharge	Operate within approved source, treatment, reuse/recharge and monitoring conditions.	Water balance, meter validation, treatment performance and agency-required sampling.
Integrated system	No-break ride-through, black start, source loss, path isolation, control and alarm sequences.	Approved L4/L5 scripts, witnesses, 72-hour endurance or other agreed duration, and critical-defect closure.

10 Technical Risk Register

Risk	Status	Primary effect	Owner	Immediate action
Air permits not issued before installation	Red	Pyrolysis/engine setting or operation delayed.	SPV / environmental lead	Meet Valley Air District and submit complete ATC packages.
Water right or recharge path incomplete	Red	Cooling-water strategy cannot be approved.	SPV / water consultant	Secure source agreement and agency/hydrogeologic determination.
February 2027 baseline unvalidated	Red	False confidence and compressed testing.	Project controls	Issue logic-linked permit/procurement/construction baseline.
Pyrolysis net output or feedstock basis differs	Amber	Primary capacity and autonomy reduced.	Parasol / OEM	Obtain guaranteed heat/mass balance and feedstock specification.
Gas supply is not firm	Amber	Backup capacity unavailable at design conditions.	SPV / gas utility	Complete pressure, capacity, route and tariff/service study.
800 V DC interfaces not certified	Amber	Redesign, listing or acceptance delay.	Parasol / compute OEM	Freeze interface and certification plan with equipment suppliers and AHJ.
Common-mode controls or cooling failure	Amber	Both 5 MW paths affected.	Engineering / commissioning	Independent-path review and failure-mode testing.
Fiber routes share common infrastructure	Amber	Loss of true route diversity.	Network lead	Obtain route maps and physical-diversity attestation.
Fire strategy incomplete	Red	Permit or occupancy delay.	Fire engineer / AHJ	Pre-application review and complete hazardous-material inventory.

11 Immediate Decision and Evidence Checklist

- Approve the Phase I BOD, full 10 MW IT boundary and complete auxiliary-load power balance.
- Issue the boundary/topographic survey, geotechnical report, grading basis and controlled master site plan.
- Obtain written zoning/use and CEQA-path confirmation and a complete County permit matrix.
- Complete the Valley Air District permit-applicability review and submit required ATC applications before affected equipment is brought onsite.
- Secure the irrigation-water source agreement and define the water-right, treatment and groundwater-recharge approval path.

- Obtain OEM guarantees for pyrolysis net output, gas-generator site rating, BESS usable capacity and DC interface performance.
- Freeze the 800 V DC protection, grounding, isolation, certification and maintenance concept with the compute supplier and AHJ.
- Execute fiber service orders and verify physical north/south route diversity and ready-for-service dates.
- Approve L1-L5 scripts, the 72-hour endurance basis, load simulation, witness plan and critical-defect rules.
- Issue a logic-linked baseline showing whether the February 2027 target remains achievable after permit and equipment-release status is verified.

Conclusion: Sandy Mush Phase I is technically feasible as a 10 MW, two-path, fully islanded AIDC campus. The proposed 2 × 7 MW pyrolysis plant, two independent 14 MW natural-gas reserve plants, dual 15 MW / 30 MWh critical BESS paths, 800 V DC distribution, liquid cooling, separate solar/auxiliary storage, diverse fiber and water-treatment/recharge concept provide a strong basis for detailed engineering. No technical fatal flaw is identified at the current concept stage. The project should proceed through permitting and IFC development with particular focus on air approvals, water rights and recharge, net power guarantees, common-mode-failure elimination, fire/life safety, fiber diversity and a realistic integrated schedule.

Reference Basis

Project basis reviewed: current Sandy Mush interactive campus map; Parasol management basis of design; Parasol manufacturing and project profile; current power, storage, cooling, water and fiber planning assumptions. Superseded early biomass and BESS concepts were not used as the controlling design basis.

Official permitting references reviewed October 10, 2026:

Merced County Development Services: https://www.countyofmerced.com/3339/Development-Services

Merced County Building and Safety: https://www.countyofmerced.com/639/Building-Safety

San Joaquin Valley Air Pollution Control District permitting: https://www.valleyair.org/permitting/

California Department of Water Resources groundwater recharge: https://water.ca.gov/Programs/Groundwater-Management