synapse

Olds Council Information Session

Connecting High-Performance Compute to Enterprise-Grade Power.

Jason van Gaal, P.Eng
Synapse Data Center

Management Team

Jason van Gaal

FOUNDER / CEO
P.Eng

Three Time Data Center Founder

15+ years of on time delivery

Paul Cornellier

VP OF PLANT OPERATIONS
P.Eng

15+ years of Oil, NG and Plant design/operation experience in Alberta and BC

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VP OF ENGINEERING
P.Eng, M.Eng

25 years of international engineering at hyperscale facilities

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VP OF DC OPERATIONS
B.Eng

25 years of data center operations management for Fortune 50

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FINANCE TEAM
Managing Partner

Private Equity with $10B+ AUM and 20 years investing in infrastructure

ENGAGED TO START UPON CONTRACT SIGNING

Provincial Compliance

NOISE A professional Noise Impact Assessment (NIA) is being conducted. The Project will be designed to meet or exceed AUC Rule 012 noise limits at the nearest residences. Mitigation measures may include acoustic lagging, silencers, and strategic building orientation.

AIR QUALITY The facility will utilize advanced emission-control technology. An Air Quality Assessment is underway to ensure compliance with the Alberta Ambient Air Quality Objectives (AAAQO).

TRAFFIC During construction, there will be an increase in local traffic. We are working with ATEC/Town of Olds to develop a Traffic Management Plan to ensure safety and minimize disruption on local roads.

WATER USAGE The data center and natural gas plant will each utilize a closed-loop cooling system to minimize water consumption saving 100s of millions of liters per year in water consumption compared to comparable designs.

VISUALS The facility will be designed with neutral colors. The project adheres to all municipal bylaw setback requirements.

Normal and Emergency Operations

Normal 99%+

Emergency <1%

Strategic Site Layout

OPTIMIZED FOR NOISE, EMISSIONS AND AESTHETICS:

- **North East**–Well situated for prevailing winds
- **Road Setback**–Maximized acoustic and emissions distance
- **Sound Umbrella**–Data centers provide natural sound barrier

Average Facility Sound Pressure Level

62 dB 

without Noise Control

Range of 70 dB to 55 dB

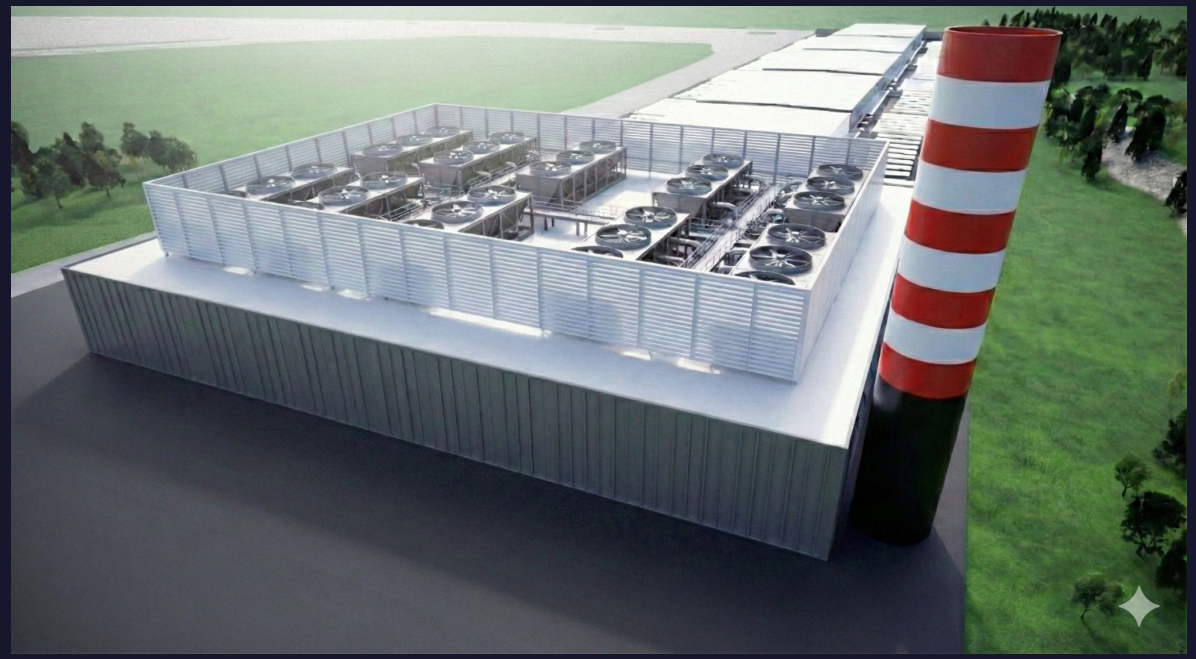
25dB increase vs Ambient

Noise - Source Level Control

65 dB The Standard For Quiet Power

Stopping the sound before it starts

- **Target Output**
  - Normal - 65 db or less(10m)
  - Emergency - 75 db or less(10m)
- **Hush-Enclosures**-Secondary sound insulation for high output noise sources
- **Precision Mounts**-Specialized dampening to eliminate structural vibration



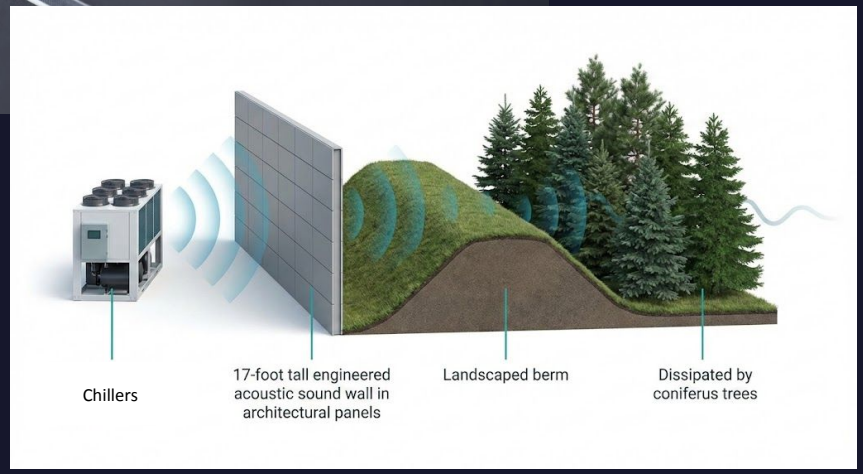
Chiller and Generator Example

Noise -Multi-layer Suppression

Engineered Barriers. Natural Buffers

Nature and engineers working together to neutralize noise.

- **Data Centers**
- **Sound Walls**
- **Earthen Berms**
- **Coniferous Screening**



Average Facility Sound Pressure Level

37.5 dB 

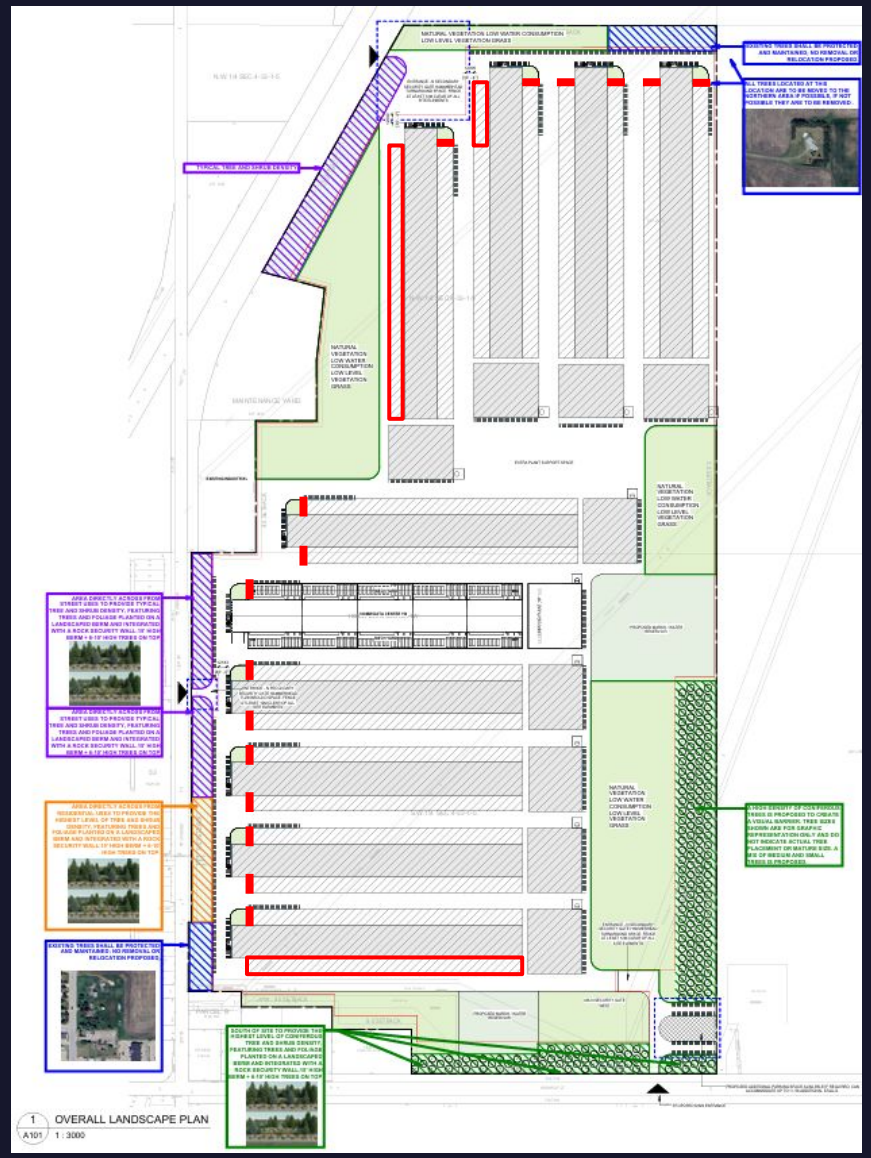
with Noise Control

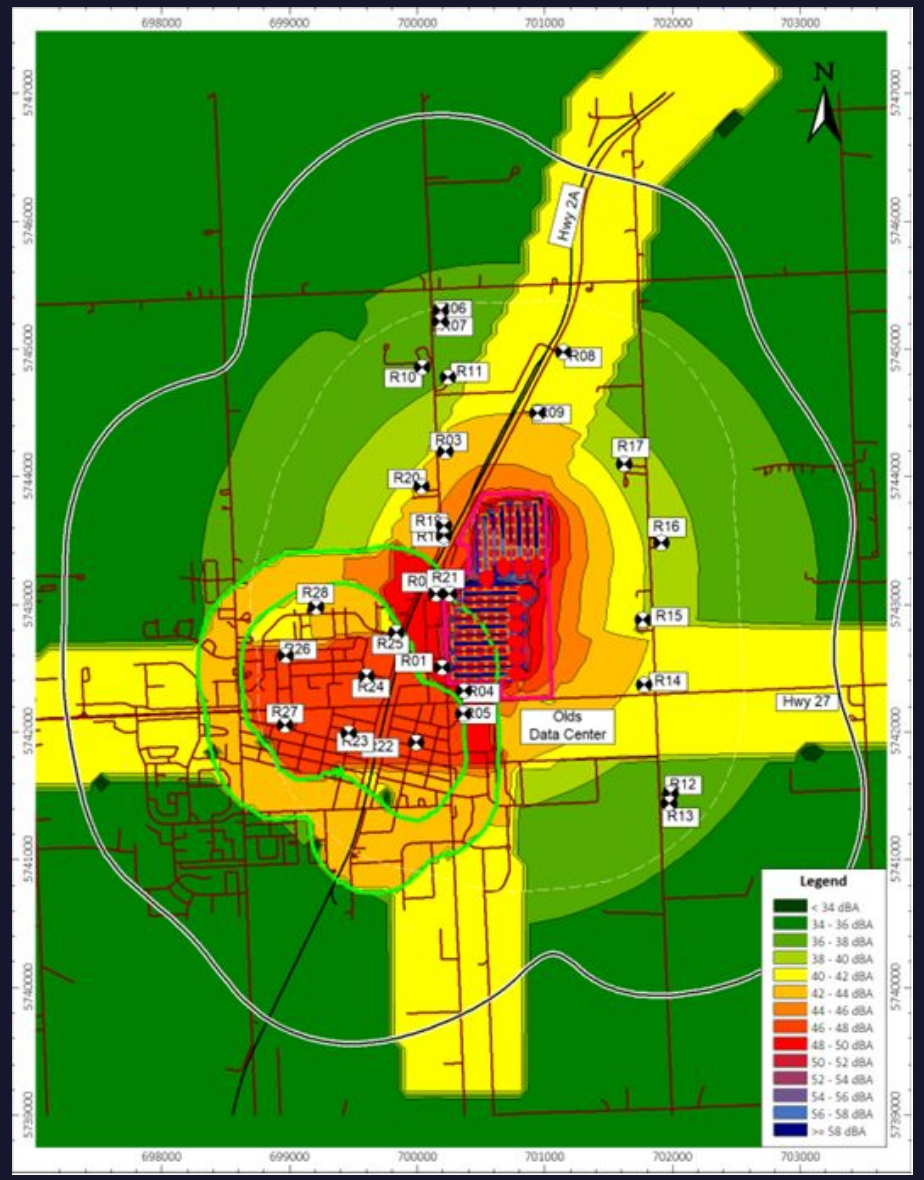
*berms and trees not yet included
**wind blowing worse case direction
***chillers at full load on hot summer day

Range of 45 dB to 31 dB

2.6dB increase vs Ambient

Noise - Details





Model shows average 2.6 dBA increase – 3 to 5 dBA audible by most humans

Berm Landscaping

Dense Coniferous

Normal Coniferous

Air Emissions- Wind Info

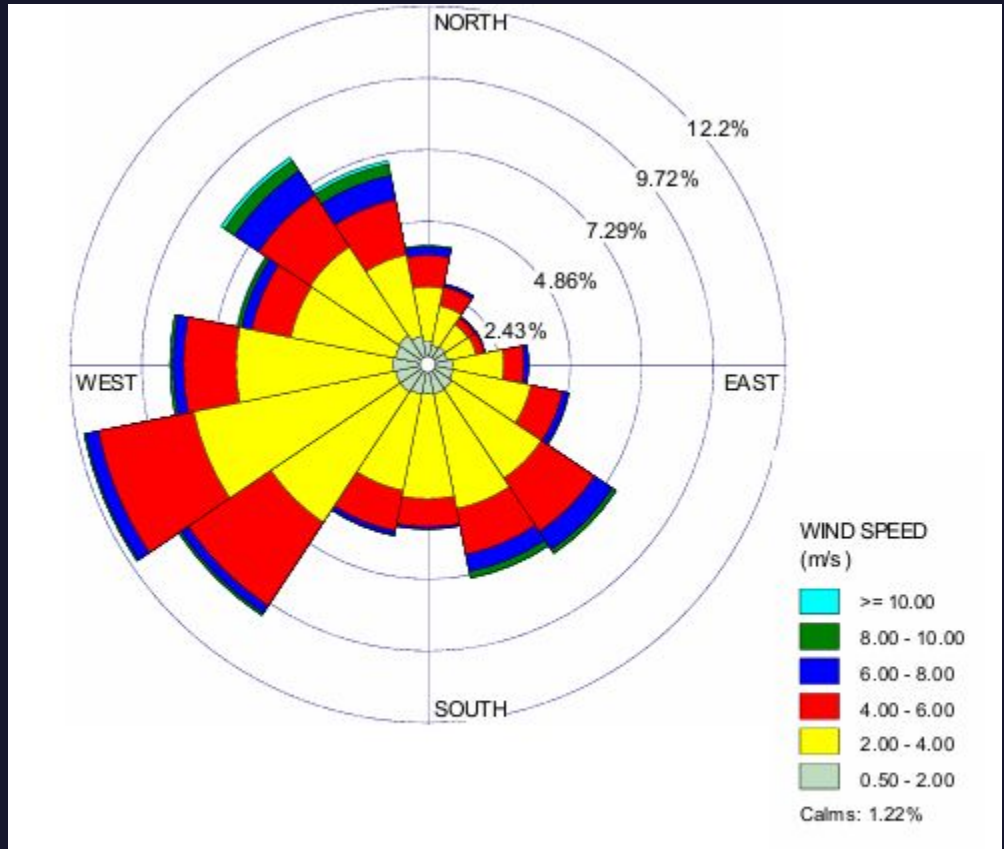


Figure 1 Windrose indicating the frequency of wind direction and wind speeds in the area.

Air Emissions- Worse Case Thresholds

Averaging Period	Predicted NO_x ($\mu g/m^3$)	Predicted NO_2[(a)] ($\mu g/m^3$)	Background NO_2 Concentrations ($\mu g/m^3$)	Predicted NO_2 with Background ($\mu g/m^3$)	AAAQO ($\mu g/m^3$)	Isopleth Figure No.	Location of Maximum	
							Distance (m)	Direction
Case 1: Normal Operation								
One-Hour[(b)]	128.9	102.7	9.0	111.7	**300**	5	2906	NNE
Annual[(c)]	2.5	1.0	3.7	4.7	**45**	6	261	ESE
Case 2: Normal Operation without HRSG								
One-Hour[(b)]	128.9	102.7	9.0	111.7	**300**	7	2906	NNE
Annual[(c)]	2.5	1.9	3.7	5.6	**45**	8	2884	NE
Case 3: Normal Operation with Emergency Backup Generator Testing								
One-Hour[(b)]	128.9	102.7	9.0	111.7	**300**	9	2906	NNE
Case 4a: Total Emergency Backup Generation at ISR of 0.083								
One-Hour[(b)]	2191.9	452.5	9.0	**461.5**	**450**[(d)]	10	920	SSE
Case 4b: Total Emergency Backup Generation at ISR of 0.15								
One-Hour[(b)]	2191.9	526.4	9.0	**535.4**	**450**[(d)]	11	793	NNE

[(a)] NO_2 concentrations predicted using PVMRM as outlined in the 2021 Alberta AQMG
[(b)] Ninth-highest one-hour average predicted concentration as per the 2021 Alberta AQMG
[(c)] Maximum predicted annual concentration as per the 2021 Alberta AQMG
[(d)] Non-routine upset tolerance for NO_2 as described in Section 3.1.2.2 of the *Guidance for Interpreting Regulatory Air Quality Modelling Assessments*

Worse Case – Wind Blowing Worst Direction

- **Normal Operations (99%+/year)** – Operating more than 60% below threshold
- **Emergency Operations** – 2 to 20% over threshold
  - **With Wind Considered** – Estimated 2.2 hours/year

Increasing NG Supply Robustness

Near Term – >200MW

- **Power Plant Redundancy** – Ability to cross connect for planned and unplanned maintenance
- **Natural Gas Producer Redundancy** – Sourcing from multiple natural gas providers

Future Considerations

- **Diverse Pipelines** – Multiple feeds to site
- **Provider Diversity** – Connecting to ATCO/NGTL
- **Strategic Reserves** – Exploring LNG and underground storage

Water Consumption

Status	Plant	Staff
Commissioning	900m^3/month 9000m^3(total)	N/A
Normal Operations	20m^3/day	40m^3/day

Glycol Loop Maintenance

- Treated/balanced in operation (not purged)
- Any plant wastewater brought off regulating ministry approved disposal

Economic Impact

1,000 PERMANENT JOBS Roles in engineering, IT, and site operations

LOCAL ENERGY Buying energy from local natural gas plants stabilizes plants long-term

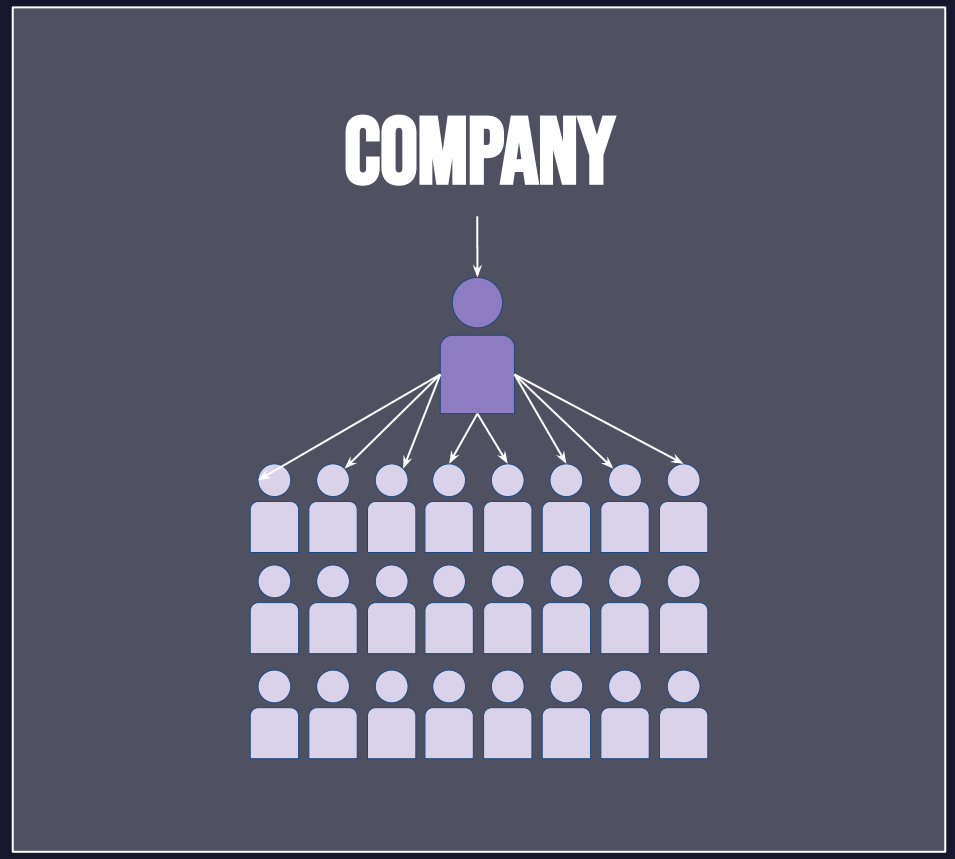
WORKFORCE DEVELOPMENT Exploring partnerships with local colleges to provide youth with training

2,000 CONSTRUCTION JOBS A multi-year construction pipeline provides long-term stability for regional tradespeople

7,000 JOBS CREATED Each direct job creates six jobs **Based on 6:1 employment multiplier industry model, PWC Report*

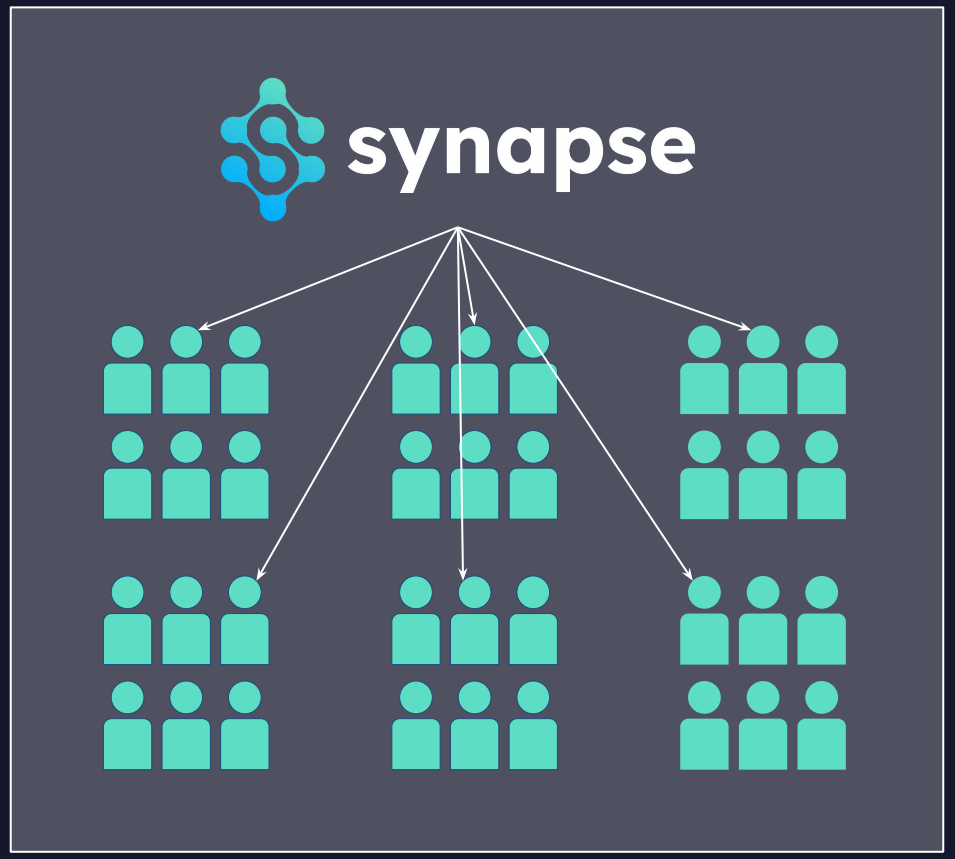
Construction: Job Creation

HIRING A GENERAL CONTRACTOR



Tend to hire their own network of workers, which may not always be local

BEING THE GENERAL CONTRACTOR



Will hire each sub trade directly, helping small local contractors to compete

Training Program

How we hire locally:

- **2-4 week dedicated training program;** gain specialized, industry-specific knowledge from data center experts
- **Integration period;** apply what you've learned by working independently while being supported and mentored.
- **Career development;** become an expert and help train others

Q&A

Deploying Hyperscale Standards with Community Integrity

synapse

synapsedatacenter.com

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