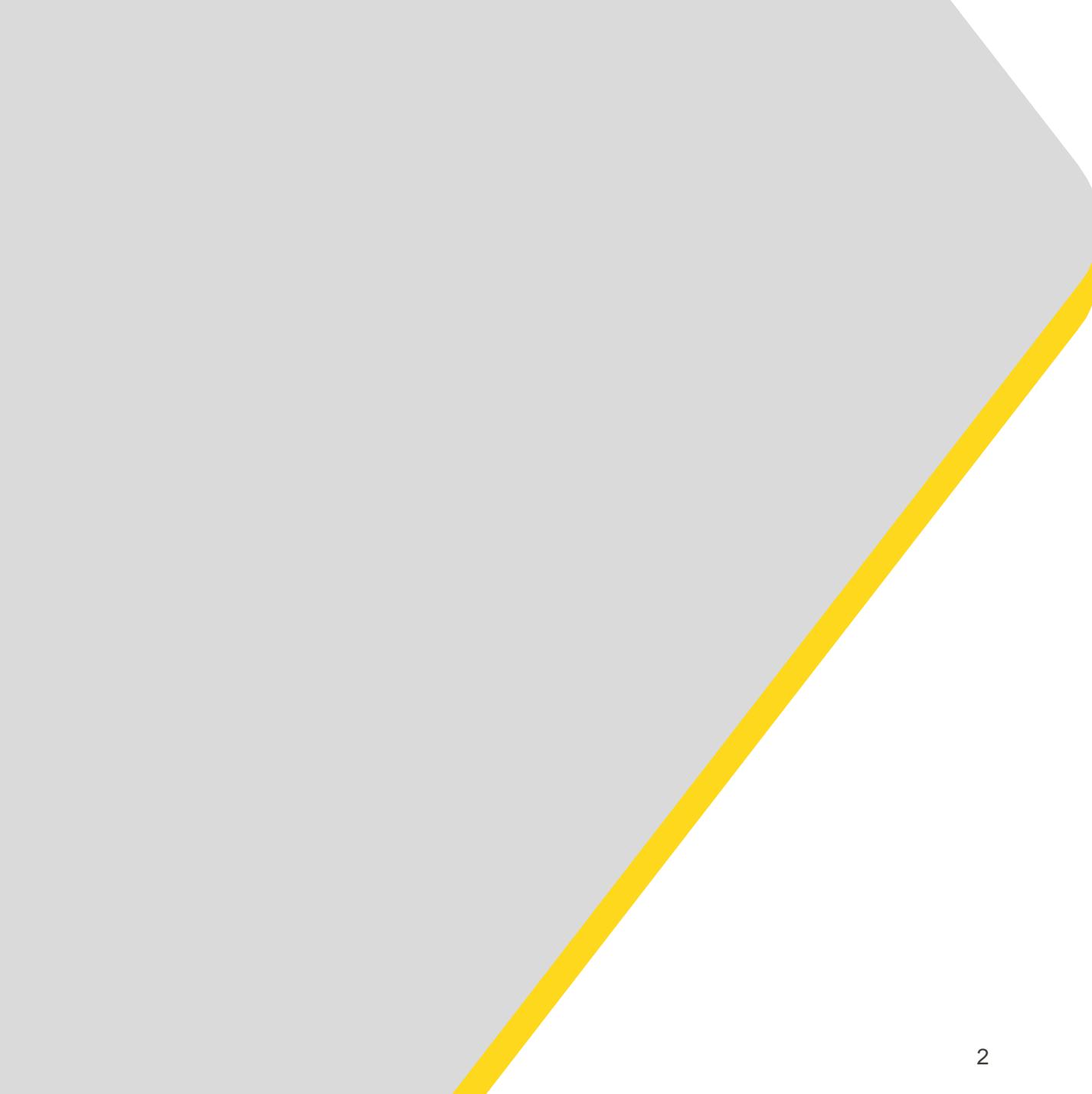




GOLDER

Passive Gas System Design

PRESENTED BY BRYAN WELDON P.E.



Passive System Overview 01

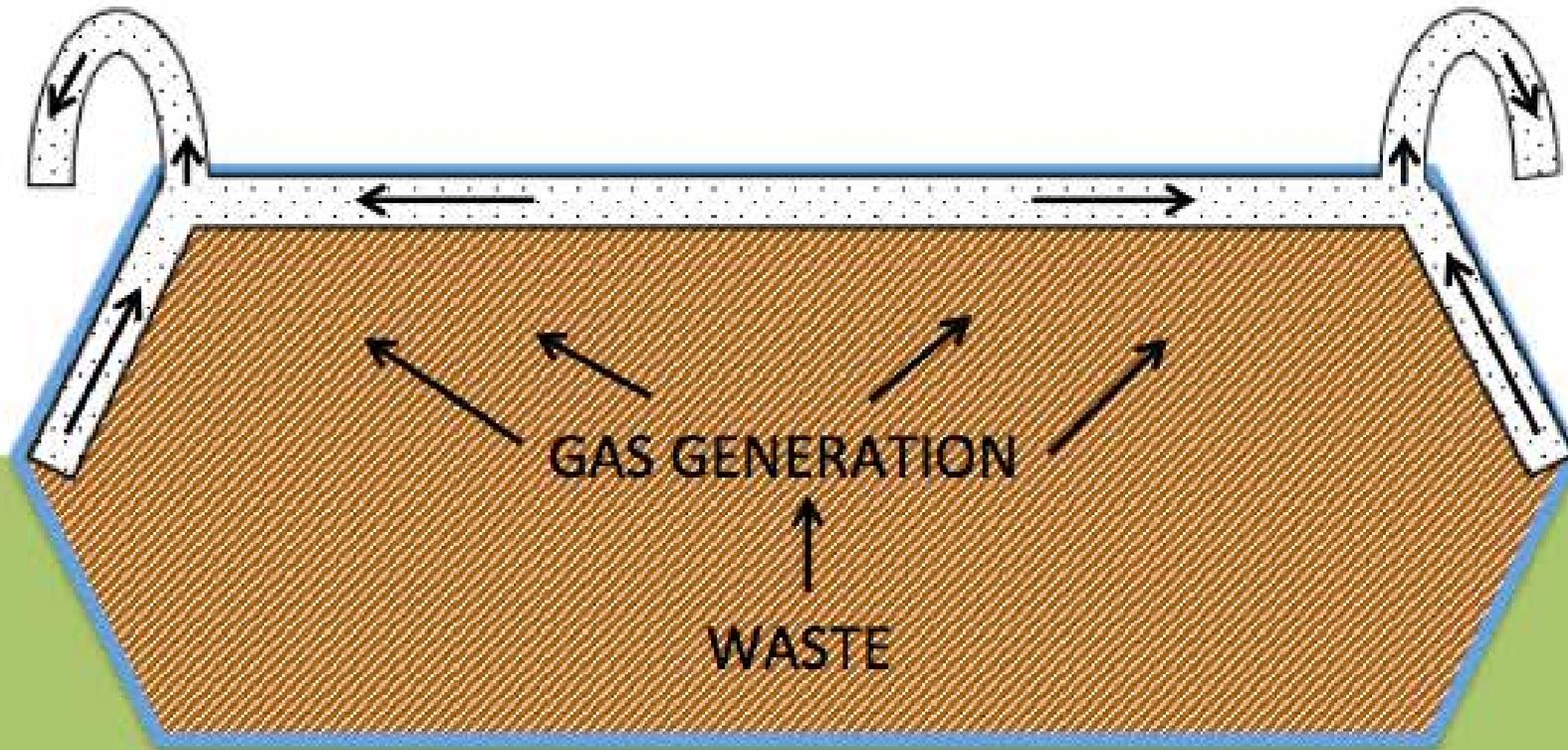
Passive Components 02

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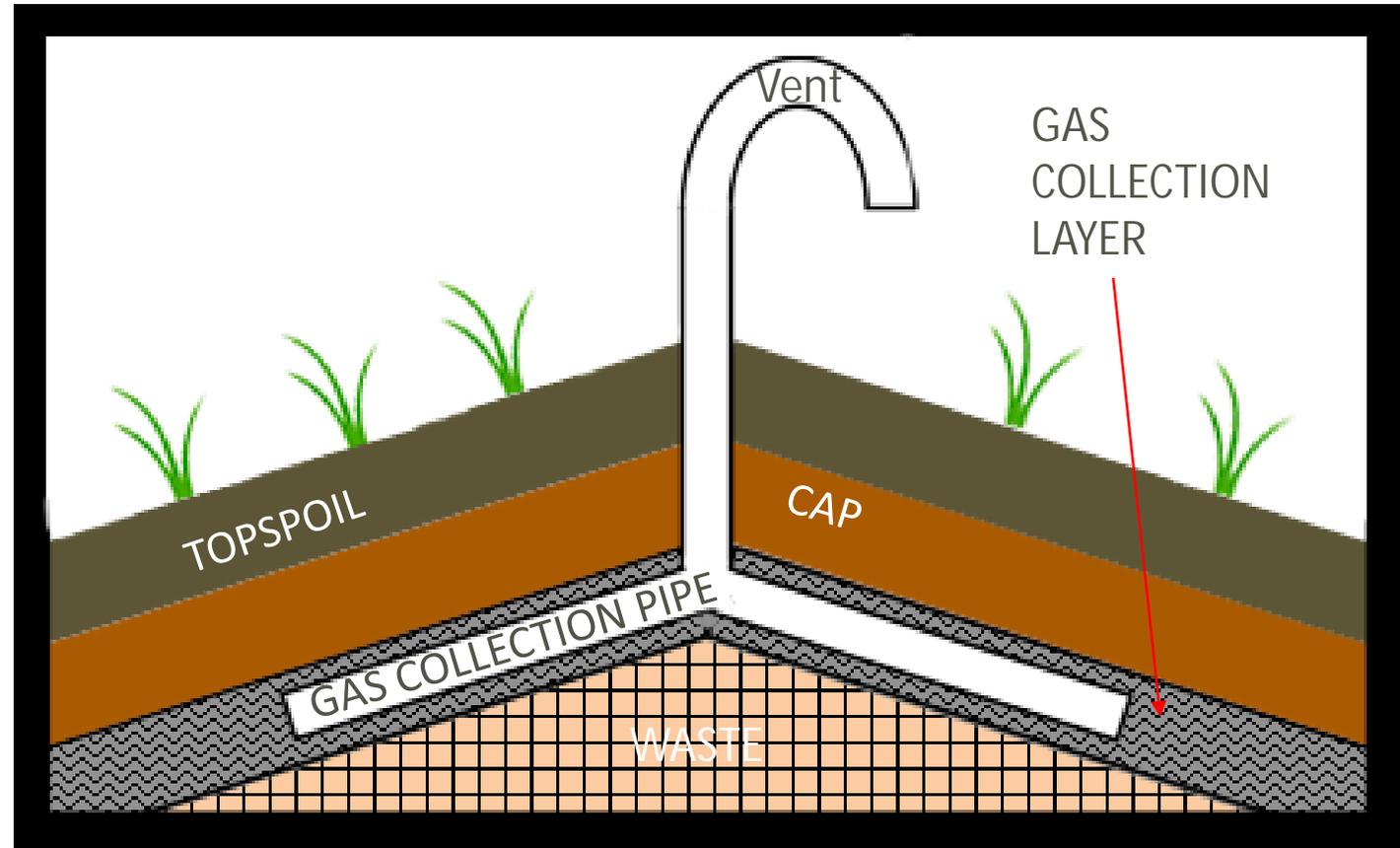
Passive System Overview

Passive Gas System



Passive Gas System

- Usually not Installed until Final Cap Construction
- Should be Designed with New Cell Construction
- If Landfill Expands in Future, May Require Active System



Passive Components

Passive Components

GAS CONVEYANCE PIPEWORK



- Installed Under the Cap
- Almost Entirely Perforated/Slotted Pipework
- Pipework Buried in Drainage Aggregate Pipework
- Similar to Active System, Best Practice to Maintain Grade
- Pipe Sizes and Vents Designed to Handle Gas Generation Rates

Passive Components

SOLAR FLARES

- Install in Gas Vents
- Localized Gas Flaring
- Operate with Low Flows
- Operate at Ambient Pressure or Low Vacuum
- Difficult to Operate in Cold Weather Climates
 - Heat Pads, Insulation and Running Power



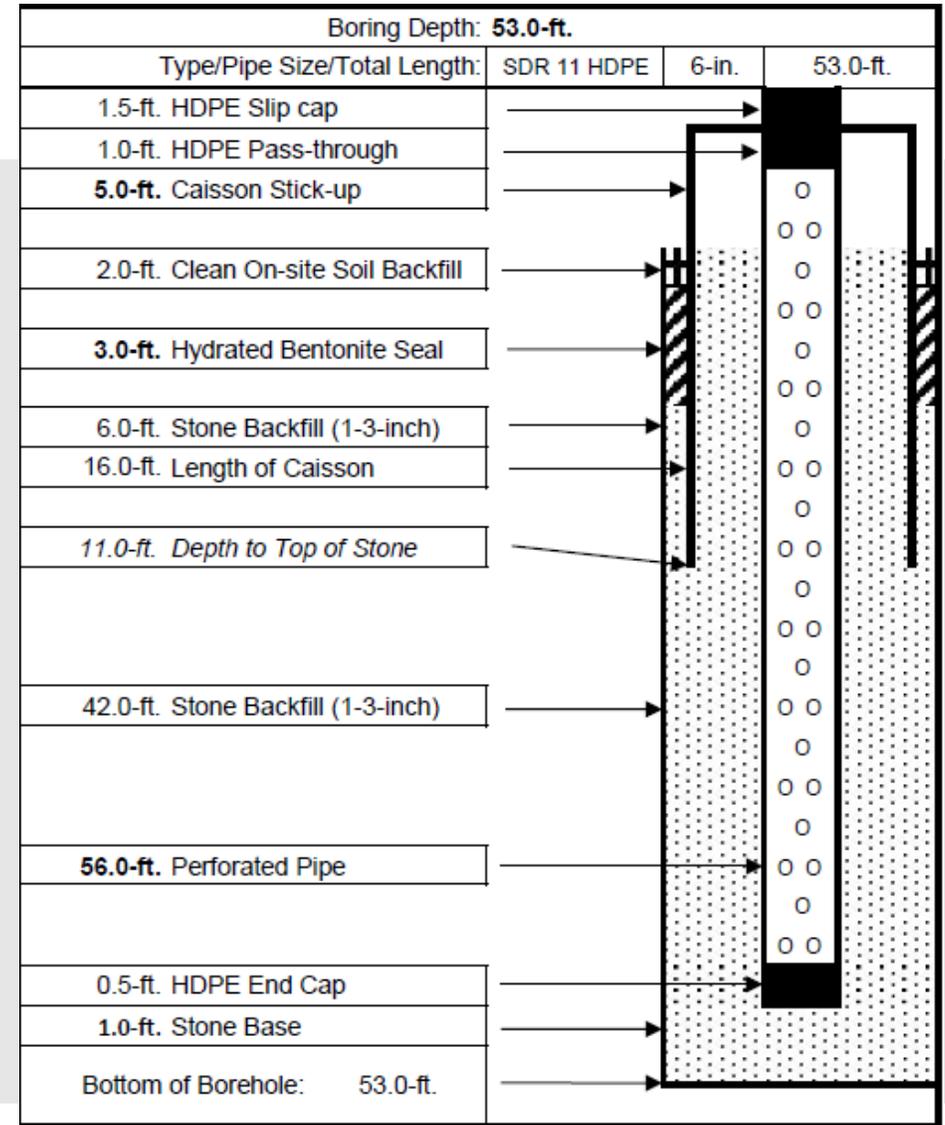
Source: solar-spark.com

Integrating and Upgrading

Integration and Upgrading

INTERMEDIATE GAS VENTING

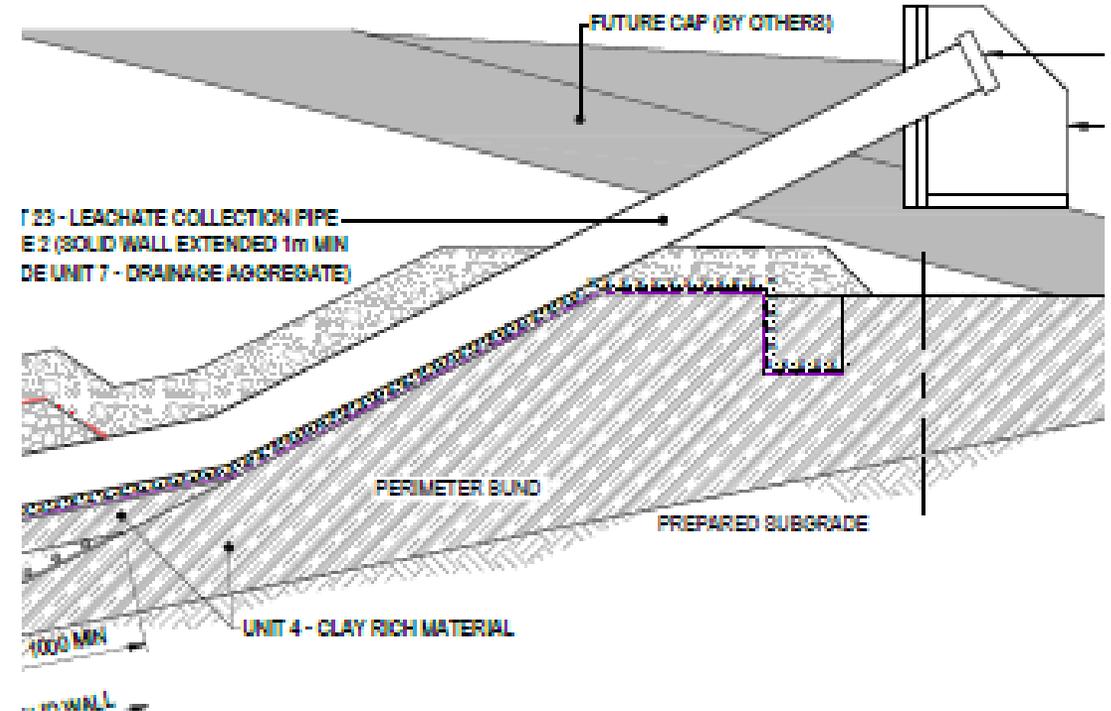
- Caisson Wells
 - Extended up as waste is filled around it
 - Self draining if tied into leachate drainage layer
 - Can connect to passive gas vents to allow deep gas extraction and migration control
- Horizontal Wells
 - Used for intermediate venting before final cover
 - Can be connected to final vents



Integrating and Upgrading

CONNECTING BLOWER TO LEACHATE OR PASSIVE VENTS

- Not a Preferred Method of Gas Extraction
- Need to Design Isolation Valves and Blank Flanges to Limit Air Infiltration
- Consider Condensate Drainage Sumps
- Use Wellhead to Regulate Flow Through Leachate Pipework



Questions