

Program Policy Letter No. P13-V-12

Examination, Evaluation, and
Effectiveness of Bleeder Systems

Effective Date: December 30, 2013

Implementation Date: April 1, 2014
(following informational meetings)

Note

The examples shown in this presentation are intended to provide visual illustrations of pertinent issues.

The examples do not depict every possible scenario, condition, or mining system used at all mines.

Scope

This Program Policy Letter (PPL) affects underground coal mine operators, miners, and Coal Mine Safety and Health (CMS&H) personnel.

Purpose

MSHA recognizes that guidance is necessary to provide consistency in the application of the standards with regard to travel, examination, evaluation, and means for determining the effectiveness of bleeder systems.

Purpose

Therefore, MSHA is issuing this policy letter to clarify and improve the examination and evaluation of bleeder systems by mine operators in future development and mining activity.

Purpose

It is anticipated that District Managers would not suggest changes to the relevant portions of existing approved ventilation plans absent conditions affecting the safety or health of miners.

Topics Emphasized

- Clarification and uniformity of bleeder system terminology
- Proper evaluation through adequate examinations, including areas where travel is anticipated
- Methane and other gases, dusts, and fumes relative to effective bleeder systems
- Other ventilation plan considerations including bleeder system design

Background

Since 1992, longwall panels have more than doubled in size. Production rates have also increased.

Some present-day longwall panels are more than 4 miles long.

Background

MSHA has identified deficiencies in bleeder systems that involved examination, evaluation, and effectiveness, due in part to the extended size of the worked-out area.

MSHA has determined there is a need for greater focus on safe travel and access to the locations necessary for proper evaluation of bleeder systems.

Background

Recognizing that the mining industry would have an interest in the development of a PPL addressing bleeder system effectiveness, MSHA sponsored a Ventilation Summit at the National Mine Health and Safety Academy on February 21 and 22, 2007.

Background

MSHA conducted a question and answer session during the summit at which a number of issues were raised and received three written comments concerning the draft policy after the conclusion of the summit. MSHA has considered those questions and comments in the development of this PPL.

Background

MSHA accident investigation reports reveal that accumulations of methane-air mixtures within the worked-out area were ignited and resulted in explosions that have caused fatalities and other injuries to miners and/or compromised the safety of the active workings.

Background

Methane accumulations in open areas that are above the explosive limit can also be hazardous since they may become involved in and contribute to the severity of an ignition or explosion that occurs in other areas of the mine and/or may be irrespirable.

Background

MSHA has found water accumulations and roof falls in traveled bleeder entries and other entries and/or rooms that surround the pillared area which have adversely impacted the effectiveness of bleeder systems.

Background

Accidents, near misses, and enforcement history relating to bleeder systems show that a greater emphasis on improved control of water and ground conditions and on safe travel for examinations is needed.

Policy

Title 30 CFR § 75.334(b) requires that during and after pillar recovery a bleeder system shall be used to control the air passing through the area and to continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings and into a return air course or to the surface of the mine.

Policy

A bleeder system includes the area from which pillars are wholly or partially recovered, bleeder entries, bleeder connectors, and all associated ventilation control devices that control the air movement through the area.

Bleeder entries are air courses designed and maintained as part of the bleeder system.

Examination and Evaluation

Examinations provide the means of collecting information needed to evaluate a bleeder system's effectiveness.

To evaluate the effectiveness of bleeder systems, measurements of methane and oxygen concentrations and air quantity, and a test to determine if the air is moving in the proper direction must be made at all locations required in 30 CFR § 75.364(a)(2)(i), (ii), and (iii).

Examination and Evaluation

Under 30 CFR § 75.364(a)(2)(iii), “[a]t least one entry of each set of bleeder entries used as part of a bleeder system under 30 CFR § 75.334 shall be traveled in its entirety.”

Examination and Evaluation

“Measurements of methane and oxygen concentrations and air quantities and a test to determine if the air is moving in the proper direction shall be made at the measurement point locations [MPLs] specified in the mine ventilation plan to determine the effectiveness of the bleeder system.”

Examination and Evaluation

Title 30 CFR § 75.334(c) requires that the approved ventilation plan specify the design and use of bleeder systems; the means to determine the effectiveness of bleeder systems; the means for adequately maintaining bleeder entries free of obstructions, such as from roof falls and standing water; and the location of ventilating devices, such as regulators, stoppings, and bleeder connectors used to control air movement through the area.

Examination and Evaluation

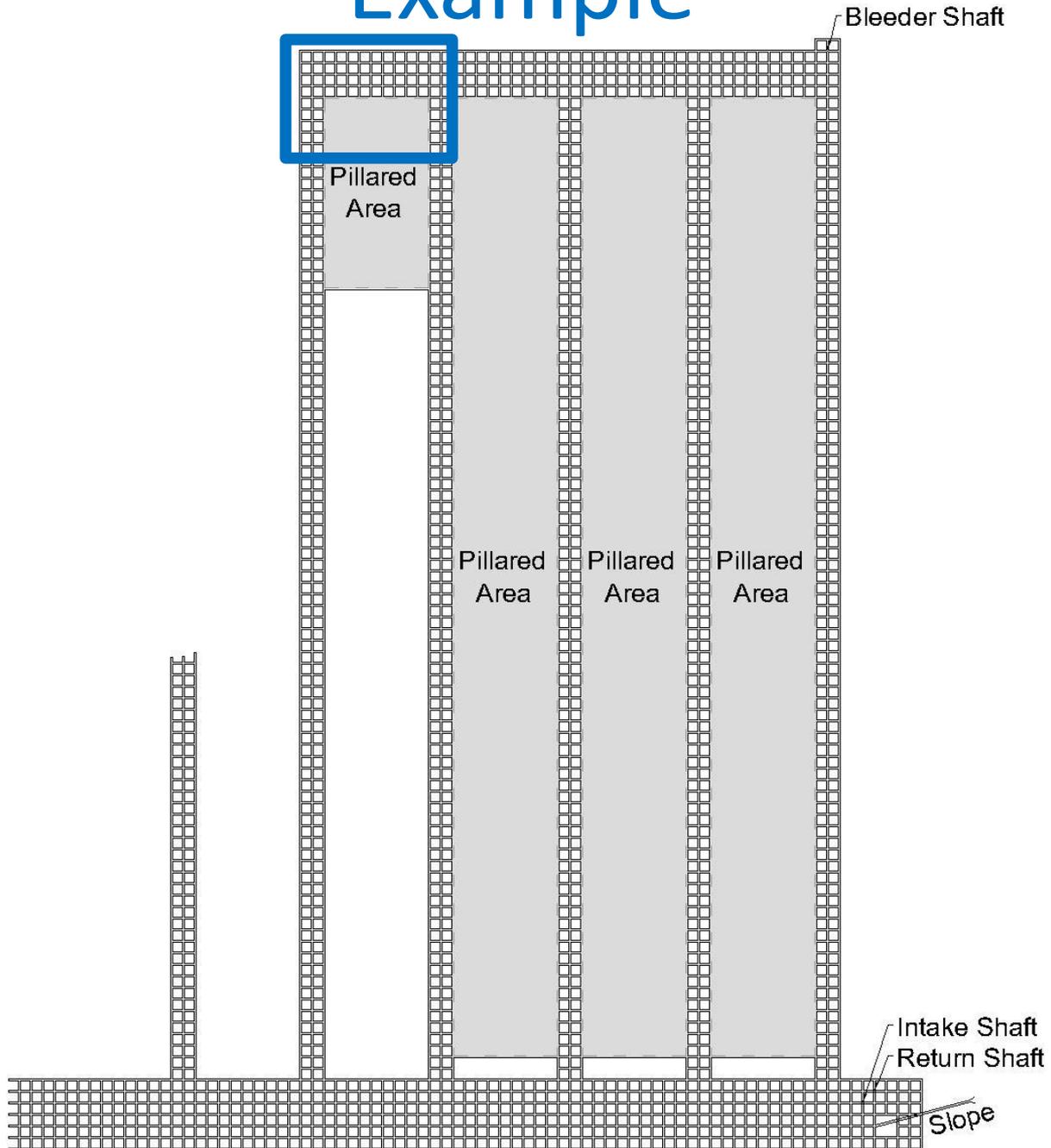
Traveling one entry of each set of bleeder entries provides the means to assure that the bleeder is properly maintained and enables an evaluation of the adequacy of the approved means of maintaining the bleeder entries free of obstructions.

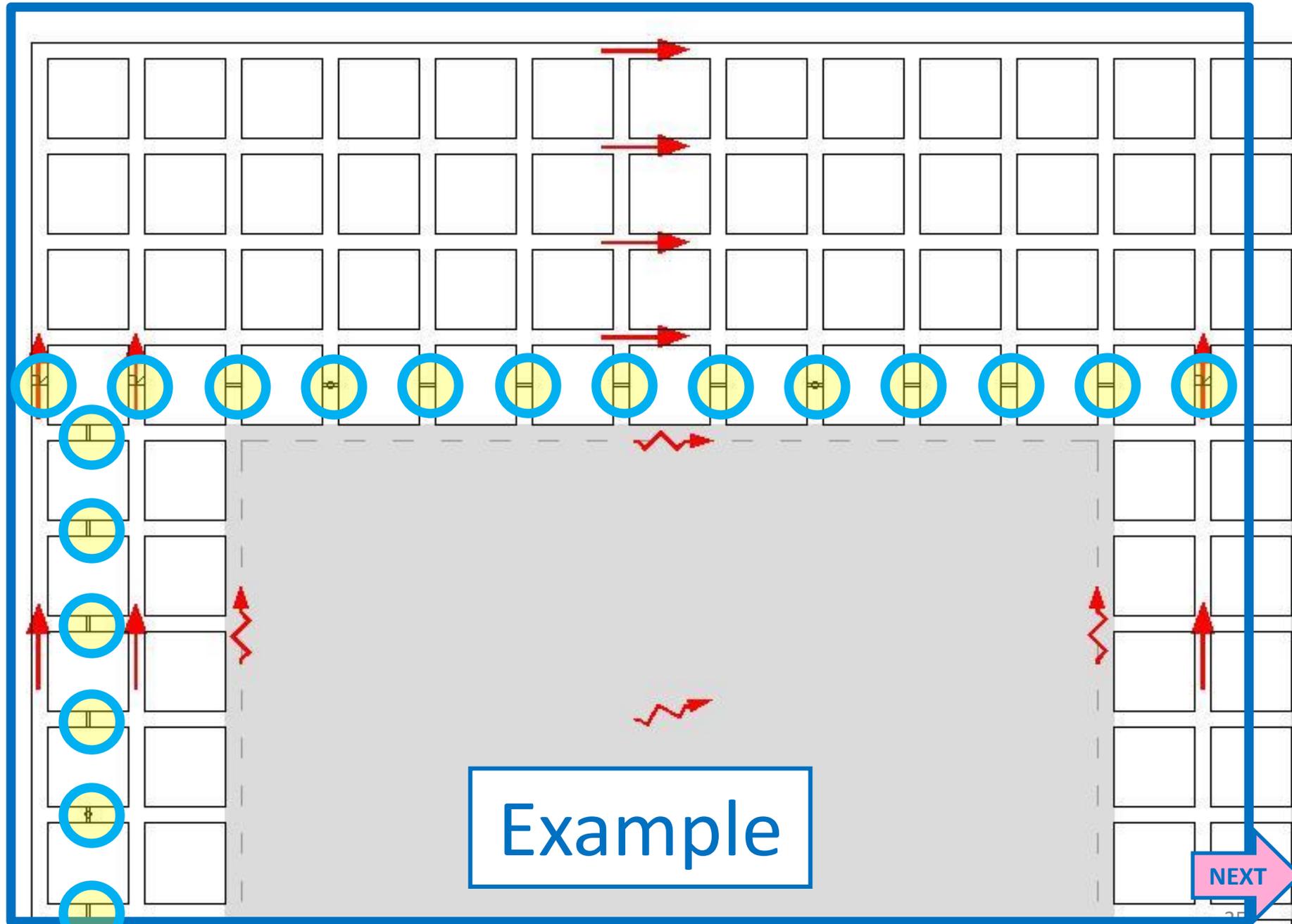
Examination and Evaluation

Routine inspection of the ventilating devices that control airflow in the bleeder system is prudent.

Safe access to such critical ventilating devices is an important consideration in evaluating a mine ventilation plan for approval.

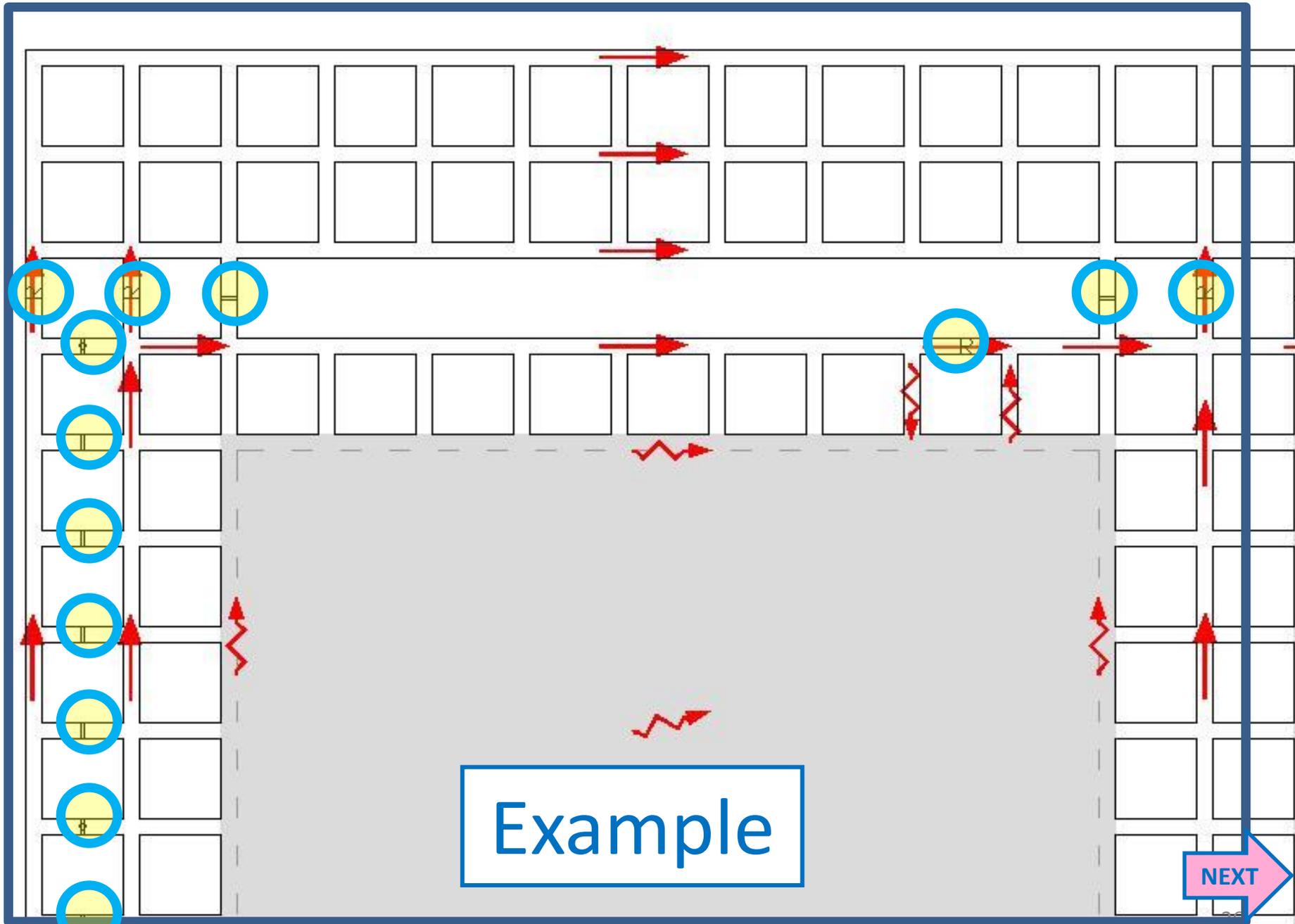
Example





Example

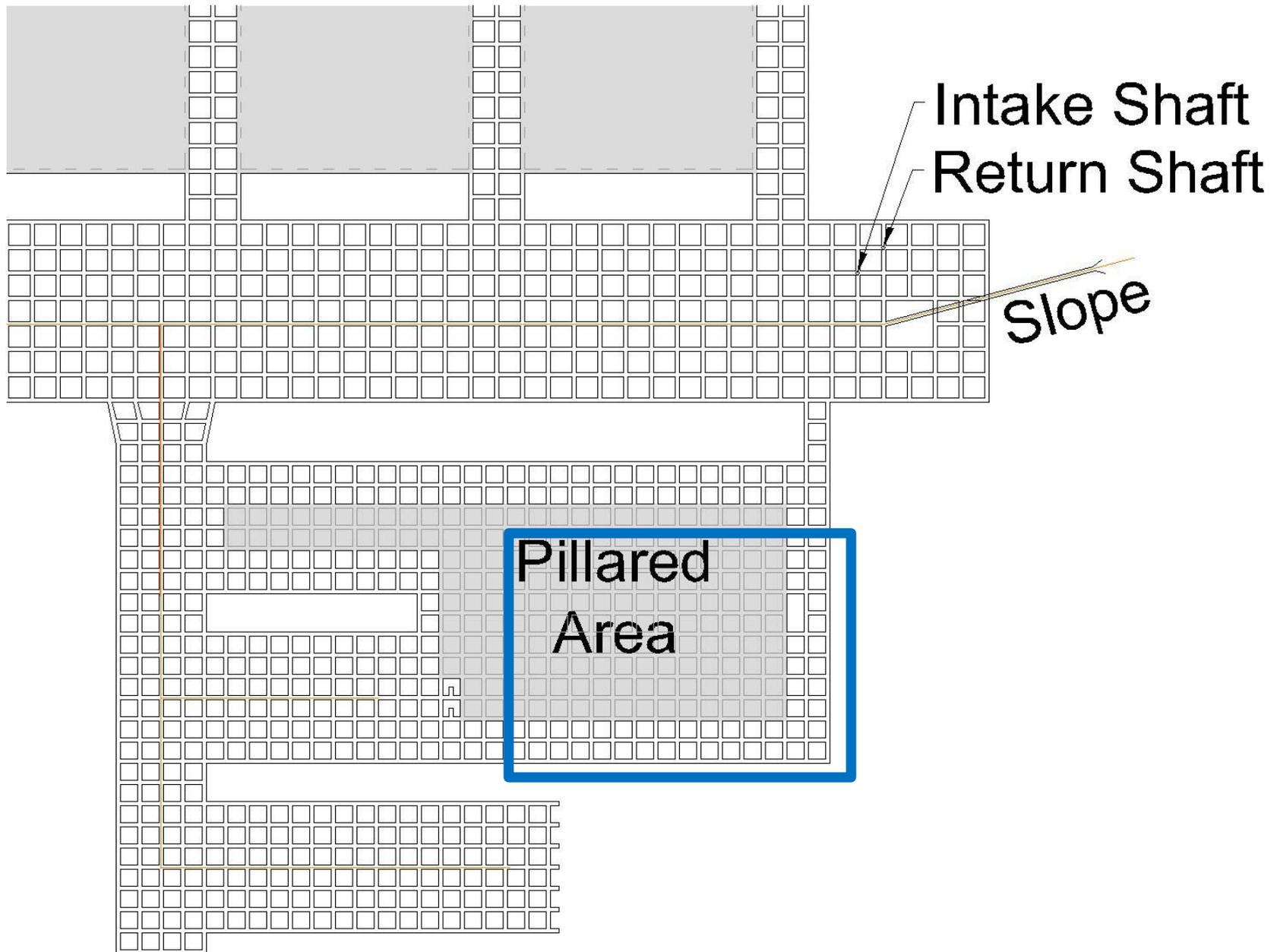
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Example

NEXT

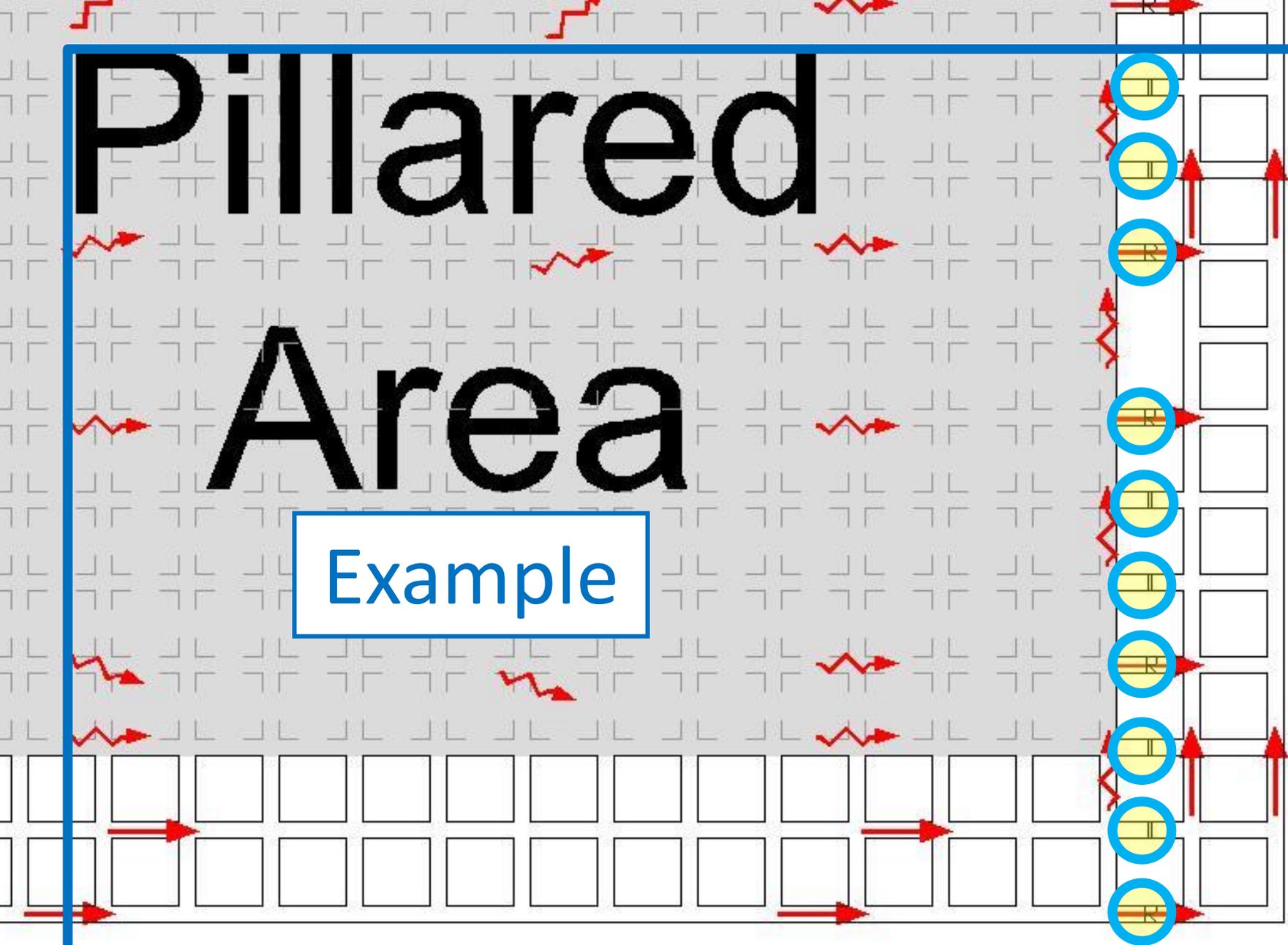
Example



Pillared

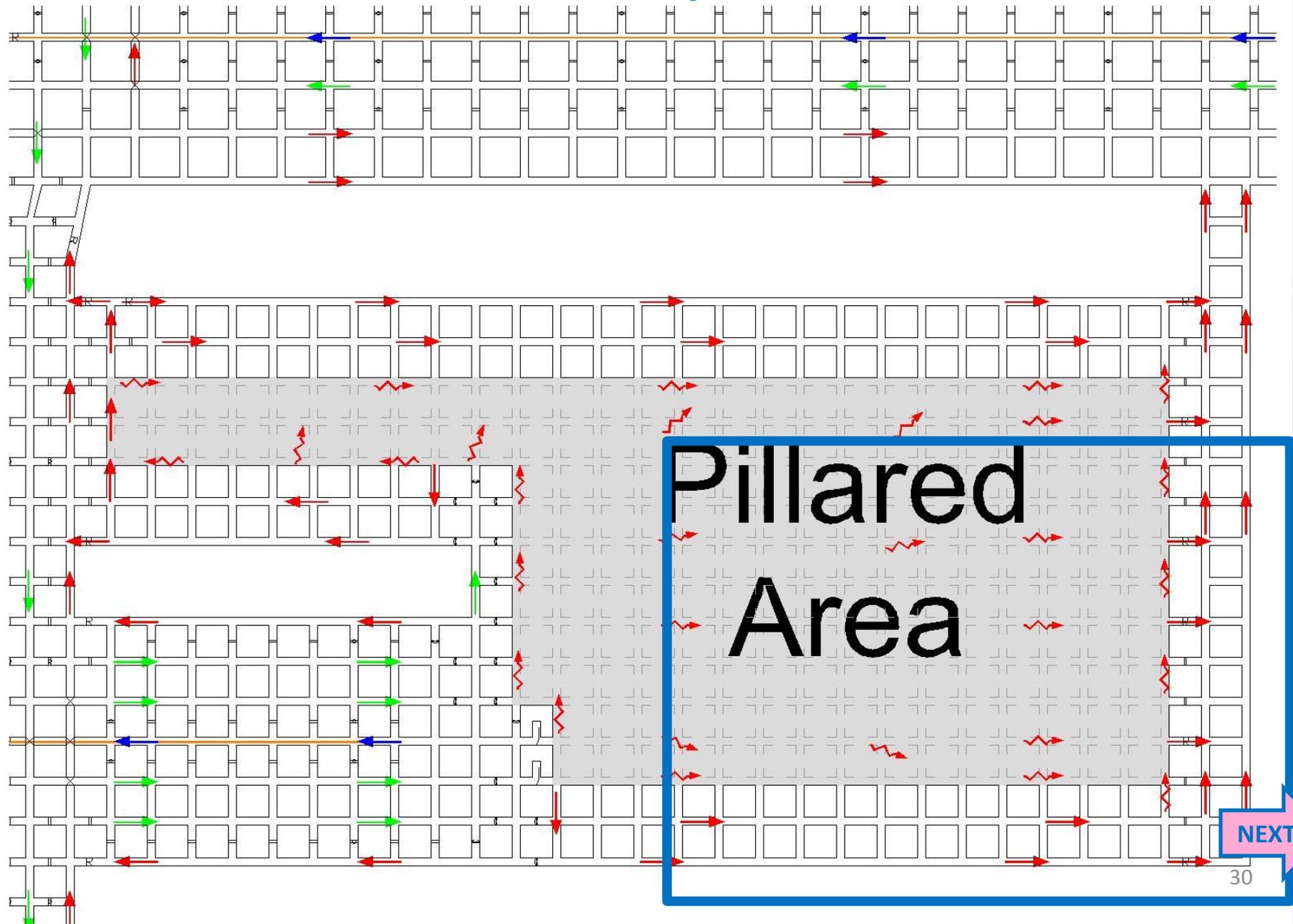
Area

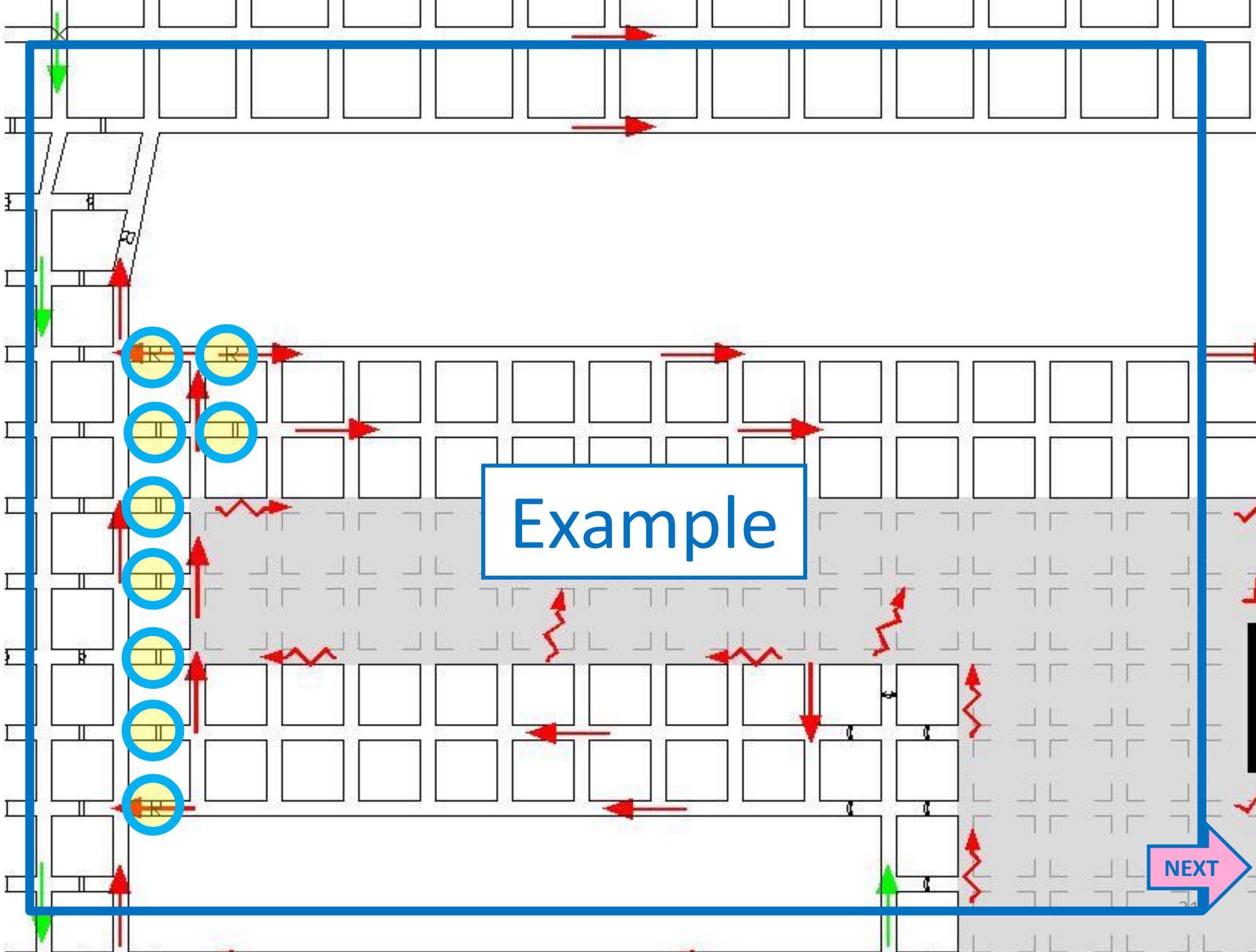
Example



NEXT

Example





Example

NEXT

Examination and Evaluation

Appropriate locations of MPLs enable a determination that the bleeder system is working effectively, providing sufficient ventilation through the worked-out area so as to prevent, to the extent practicable, accumulations of gases, dusts, or fumes within bleeder systems that pose a hazard to the active workings or that have the potential to result in injuries to miners.

Examination and Evaluation

Bleeder systems appropriately designed and adequately maintained for the conditions and mining system at the mine enable safe access to such examination locations until the worked-out area is sealed.

Examination and Evaluation

Title 30 CFR § 75.364(a)(2)(iv) permits an alternative method of bleeder evaluation, in lieu of the requirements of 30 CFR §§ 75.364(a)(2)(i) and 75.364(a)(2)(iii), provided the alternative method results in a proper evaluation of the bleeder system and is approved in the mine ventilation plan.

Examination and Evaluation

MSHA will consider alternative methods, including establishment of evaluation points (EPs), on a mine-by-mine basis.

Examination and Evaluation

In determining if a proposed alternative method of evaluation under this section results in a proper evaluation of the effectiveness of the bleeder system, MSHA District Managers should also consider factors identified in this PPL, including the requirements of 30 CFR §§ 75.364(a)(2)(i) and 75.364(a)(2)(iii), and the conditions and mining system at the mine.

Examination and Evaluation

Title 30 CFR § 75.364(a)(2)(iv) does not permit a means for an alternative method of evaluation in lieu of the requirements of 30 CFR § 75.364(a)(2)(ii).

Examination and Evaluation

Consistent with 30 CFR § 75.370 and current practice, the District Manager has the authority and responsibility, through the plan approval process, to ensure the mine ventilation plan is suitable to the conditions and mining system at the mine.

Examination and Evaluation

MSHA anticipates that a description of the full extent of the worked-out area intended to be ventilated by the bleeder system would be included in the mine ventilation plan as part of the specified design and use of the bleeder system.

Example

That description might be written in the mine ventilation plan: e.g., four longwall panels, each 8,000 feet long and 1,000 feet wide ... etc.

That description might be in the form of a drawing in the mine ventilation plan that shows the number of panels in the bleeder system, the length and width of each panel, as well as other pertinent details.

Example

“Typical” plans should accurately reflect important design criteria, including the number of development entries, the number of bleeder entries, and the number, length, and width of panels ventilated by the bleeder system.

Examination and Evaluation

Other important information includes identification of bleeder entries intended to be examined.

MSHA District Managers should consider this, as well as other, information in making a determination as to whether or not the mine ventilation plan is suitable to the conditions and mining system at the mine.

Pillared Areas and Bleeder Entries

The term “pillared area”, as used in this PPL, is any area where a reduction in pillar size has occurred during retreat mining, including longwall or shortwall mining.

Consistency in Terminology

30 C.F.R §75.201

Definitions.

Pillar recovery. Any reduction in pillar size during retreat mining.

Pillared Areas and Bleeder Entries

The pillared area is comprised of the caved and broken material (rubble), the interstices within the caved material, and the open spaces surrounding the caved material.

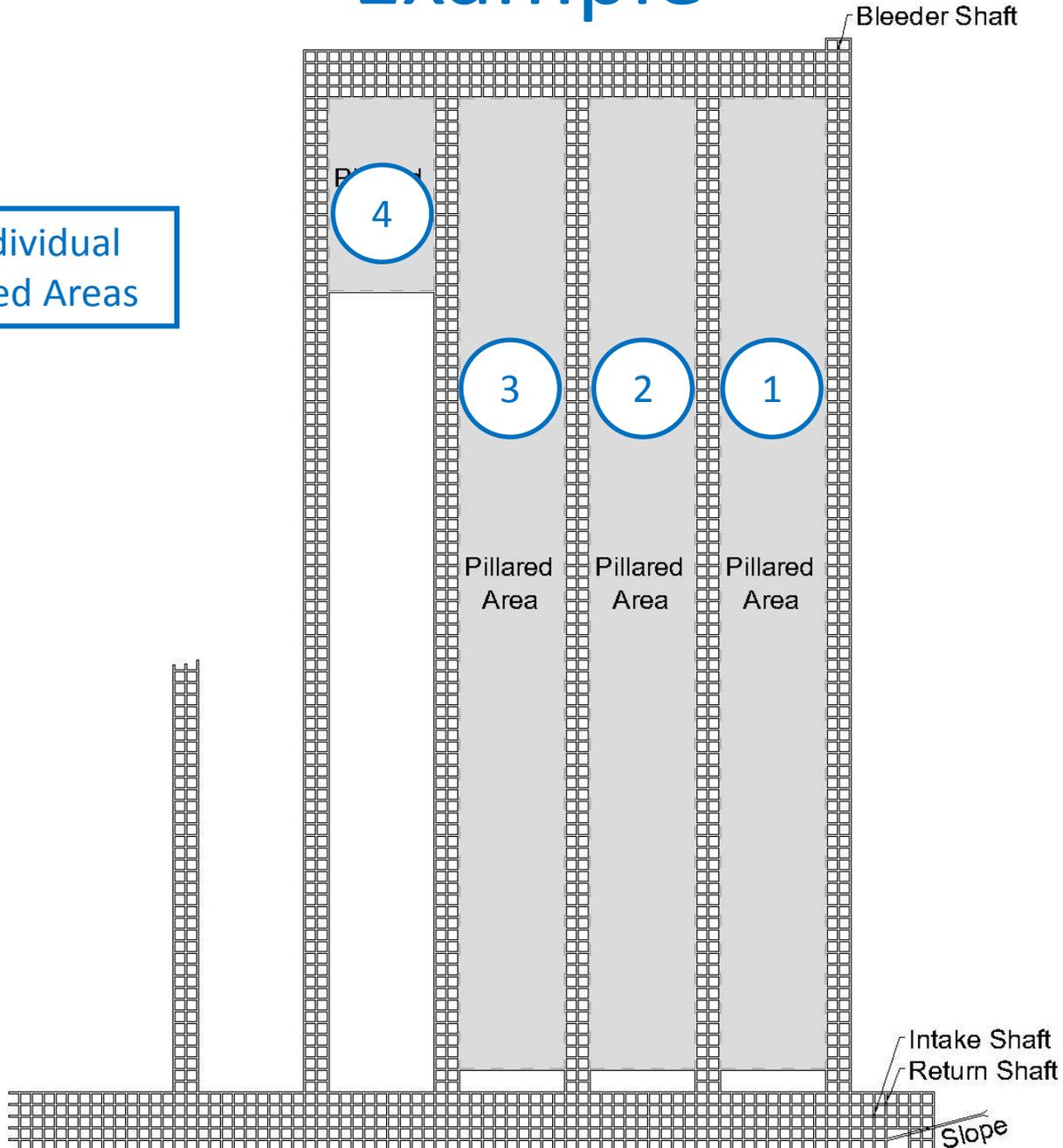
For longwalls or shortwalls, the former recovery face and set-up entry, headgate entry, and tailgate entry consumed by the recovery of the longwall pillar are considered part of the pillared area.

Pillared Areas and Bleeder Entries

The mined out portion of each longwall pillar (panel) is considered an individual and separate pillared area where one or more entries remain between pillared areas of adjacent panels.

Example

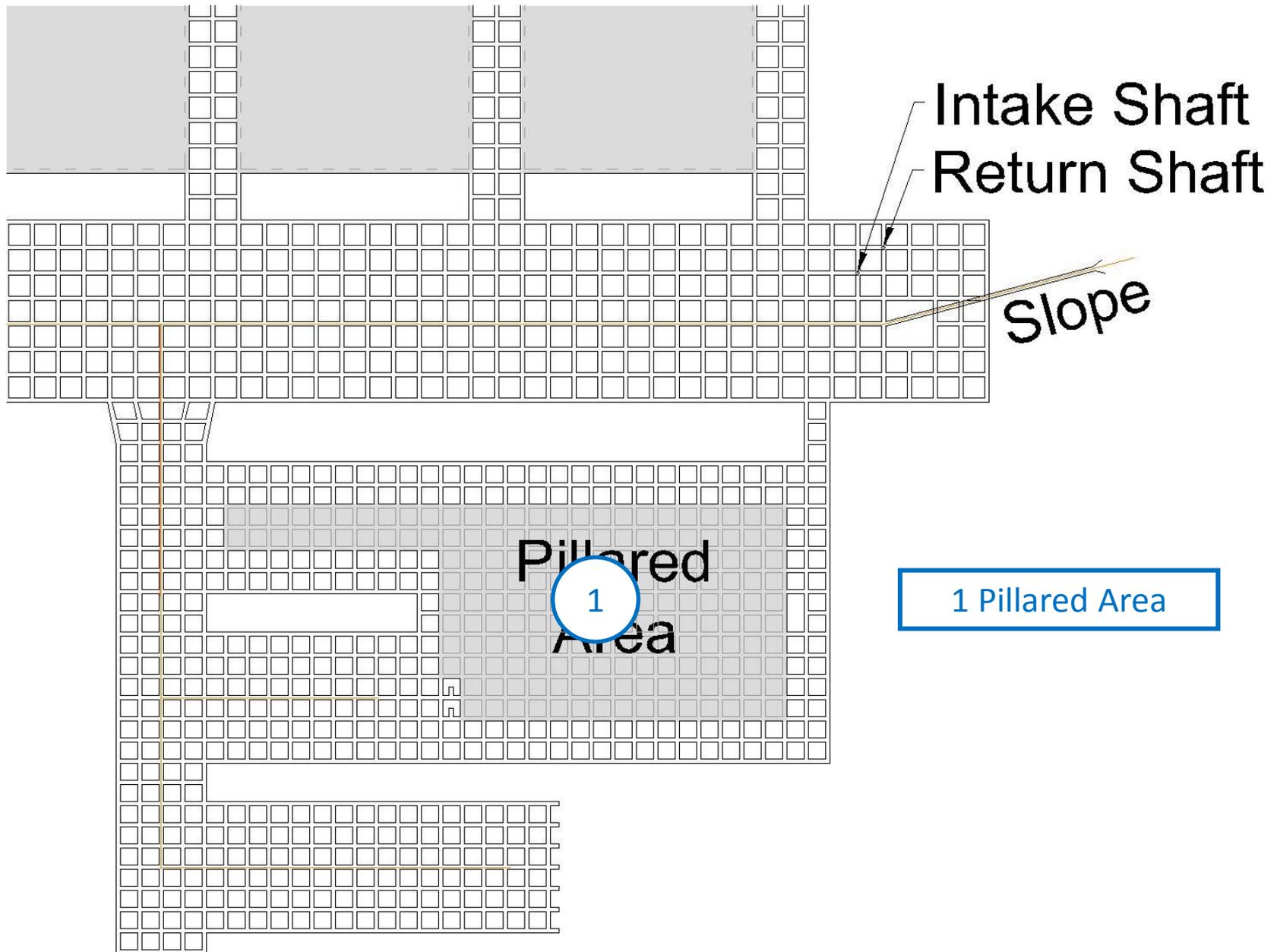
4 Individual Pillared Areas



Pillared Areas and Bleeder Entries

For room and pillar retreat mining, the former entries, rooms and/or crosscuts defined by pillars that were partially or fully recovered during retreat mining are considered part of the pillared area.

Example



Pillared Areas and Bleeder Entries

In certain bleeder system designs, some entries and/or rooms surrounding the pillared area may not have been routinely identified as traveled bleeder entries.

These entries and/or rooms have been commonly referred to as primary internal airflow paths, open areas within the worked-out area, inner bleeders, mine foreman entries, part of the gob, or by other names.

Pillared Areas and Bleeder Entries

However, these entries and/or rooms around the pillared area are an inherent part of many bleeder systems and function as bleeder entries in that gases, dusts, and fumes from the pillared area are moved into and through these entries and/or rooms away from active workings.

Pillared Areas and Bleeder Entries

In reviewing bleeder system designs, MSHA will evaluate whether these entries and/or rooms are bleeder entries, except those which have become a part of the worked-out area between adjacent pillared areas.

In ordinary cases, MSHA anticipates that at least one entry of each set of bleeder entries around the perimeter of the worked-out area should be traveled in its entirety.

Pillared Areas and Bleeder Entries

Because their integrity can be critical to the effectiveness of bleeder systems, mine operators and MSHA District Managers should consider the means for control of ground and water in these entries and/or rooms during the mine ventilation plan submittal, evaluation, approval, and review process.

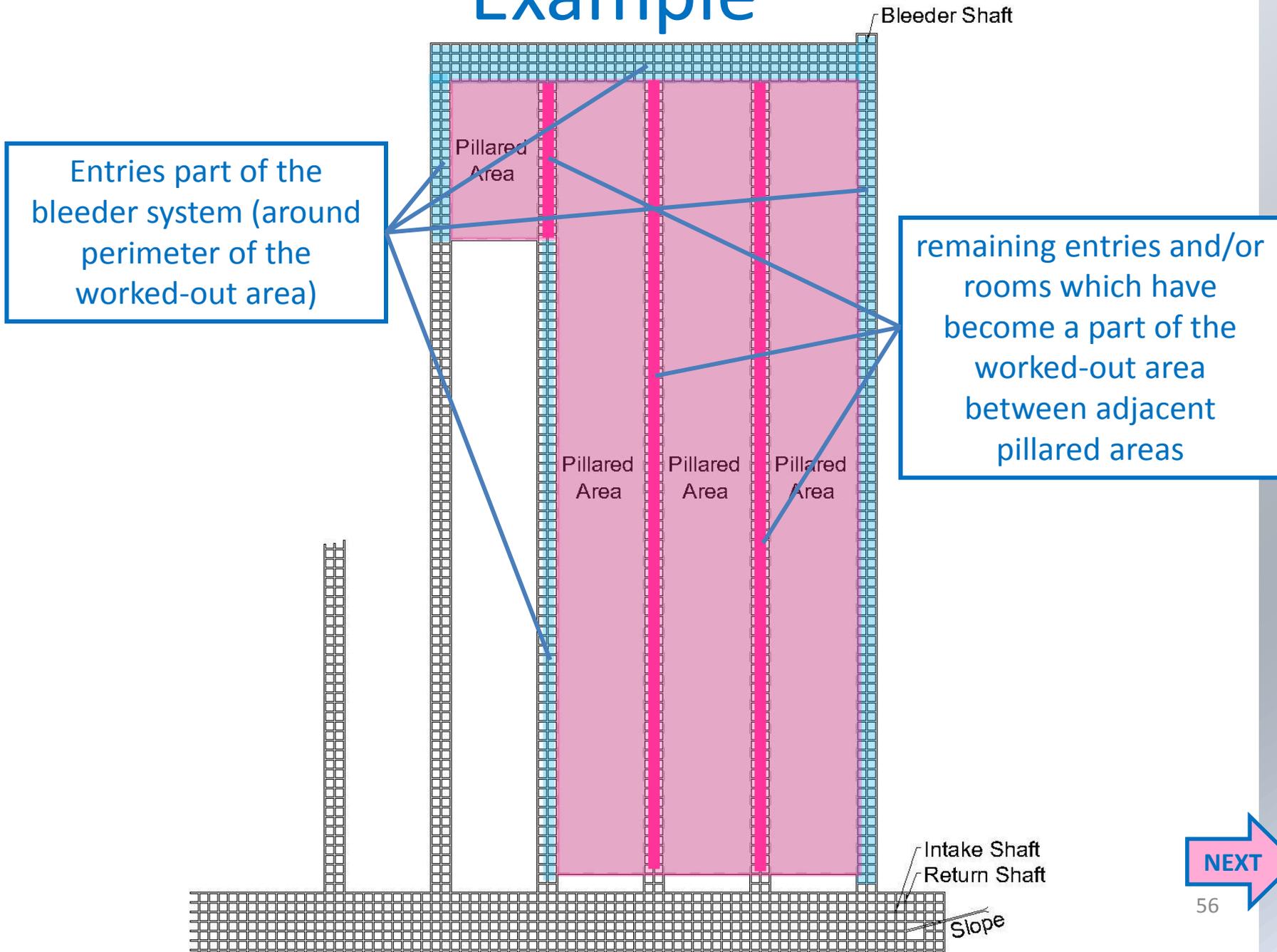
Pillared Areas and Bleeder Entries

Mine operators and MSHA District Managers should also consider the function of such entries and/or rooms in the bleeder system design when assessing the appropriateness of examinations and/or alternative methods of evaluation approved under 30 CFR §§75.364(a)(2)(iii) and (iv), respectively.

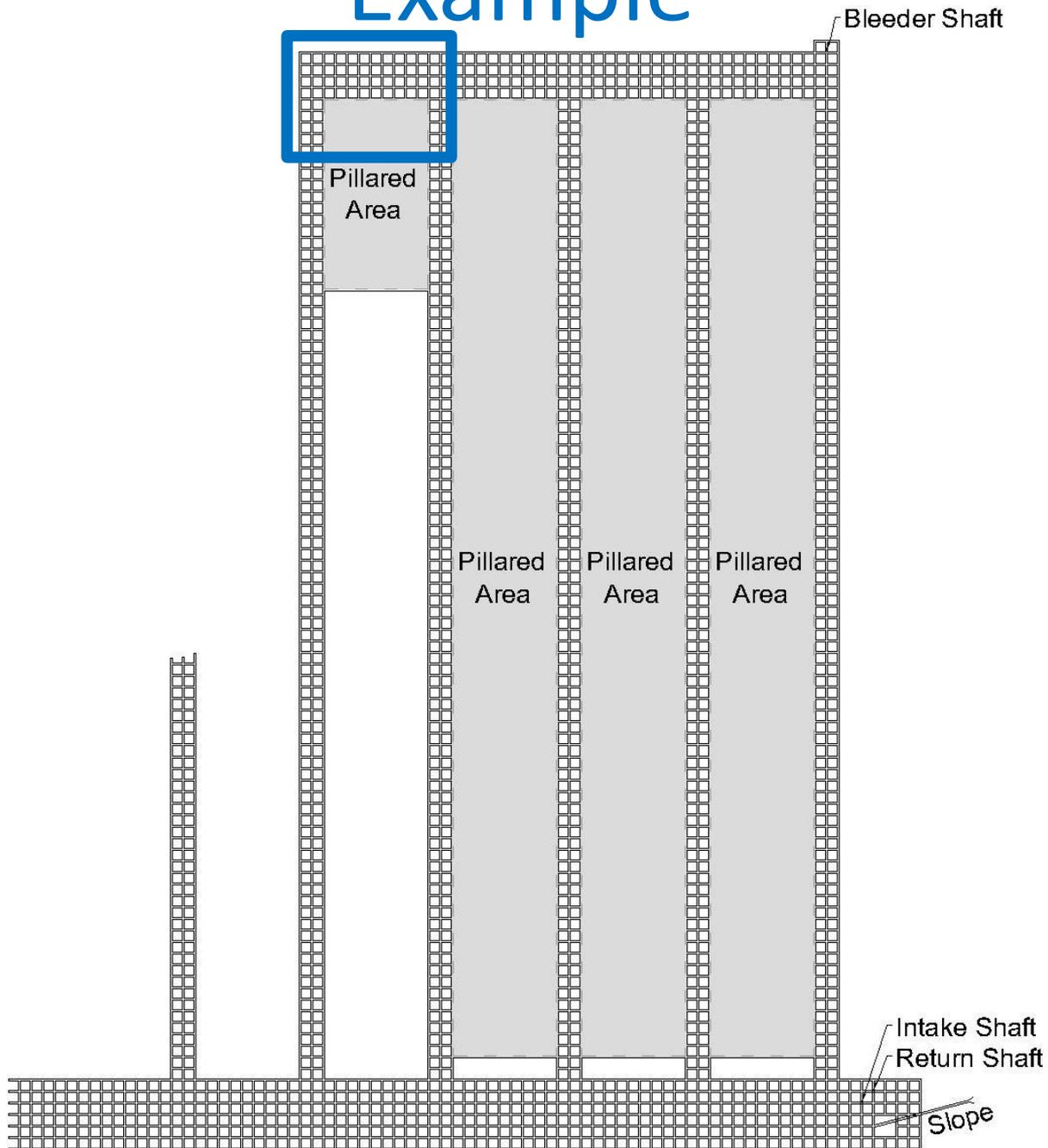
Pillared Areas and Bleeder Entries

The determination as to the extent of travel necessary to conduct a proper examination and evaluation through such entries and/or rooms, and the location of MPLs and/or EPs, will be considered on a case-by-case and mine-by-mine basis.

Example



Example



4 Bleeder Entries in Common – 1 Set

1 Single Bleeder Entry – 1 "Set"

1 Single Bleeder Entry – 1 "Set"

Example



3 Bleeder Entries in Common – 1 Set

1 Single Bleeder Entry – 1 "Set"

1 Single Bleeder Entry – 1 "Set"

1 Single Bleeder Entry – 1 "Set"

Example



3 Bleeder Entries in Common – 1 Set

1 Single Bleeder Entry – 1 “Set”

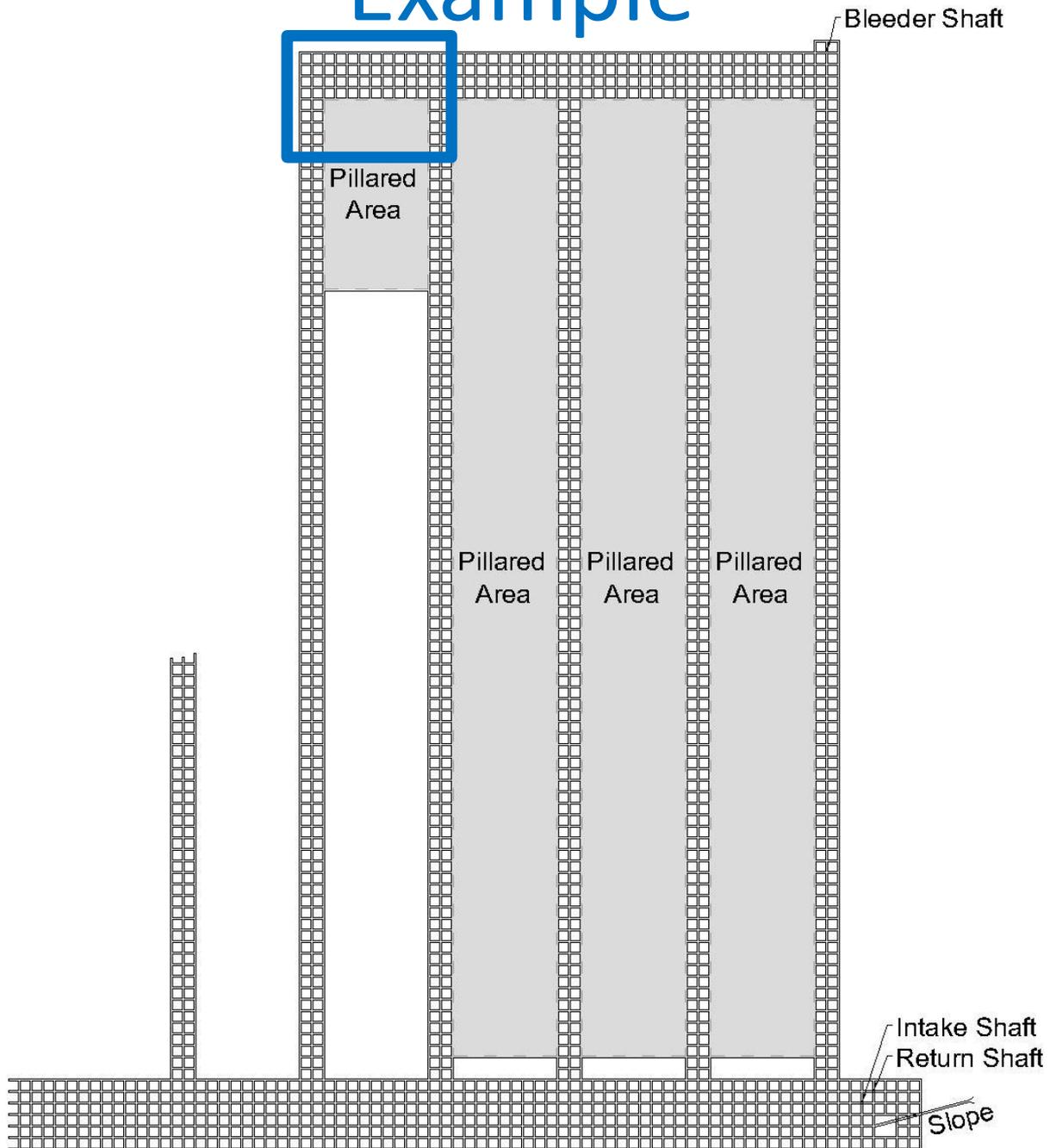
1 Single Bleeder Entry – 1 “Set”

1 Single Bleeder Entry – 1 “Set”

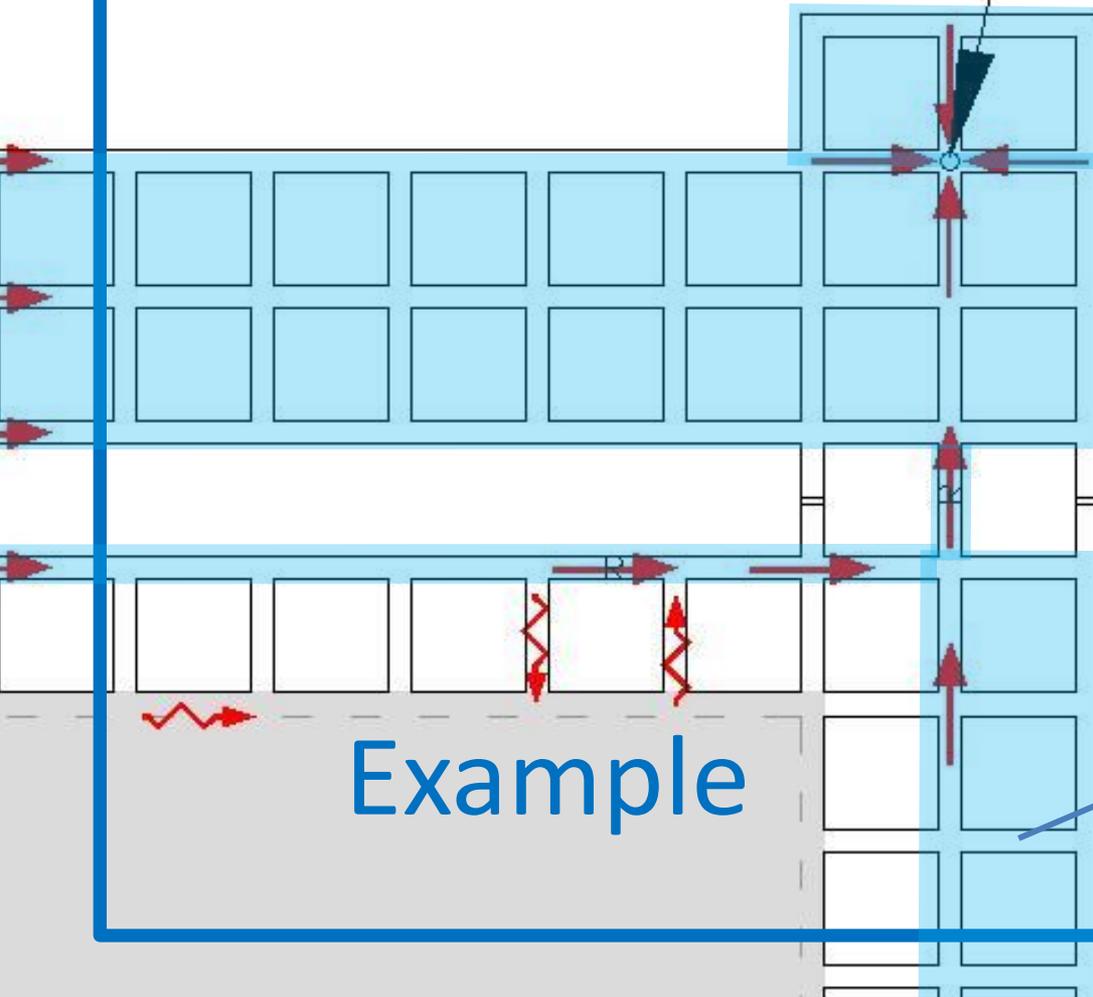
Example



Example



Bleed

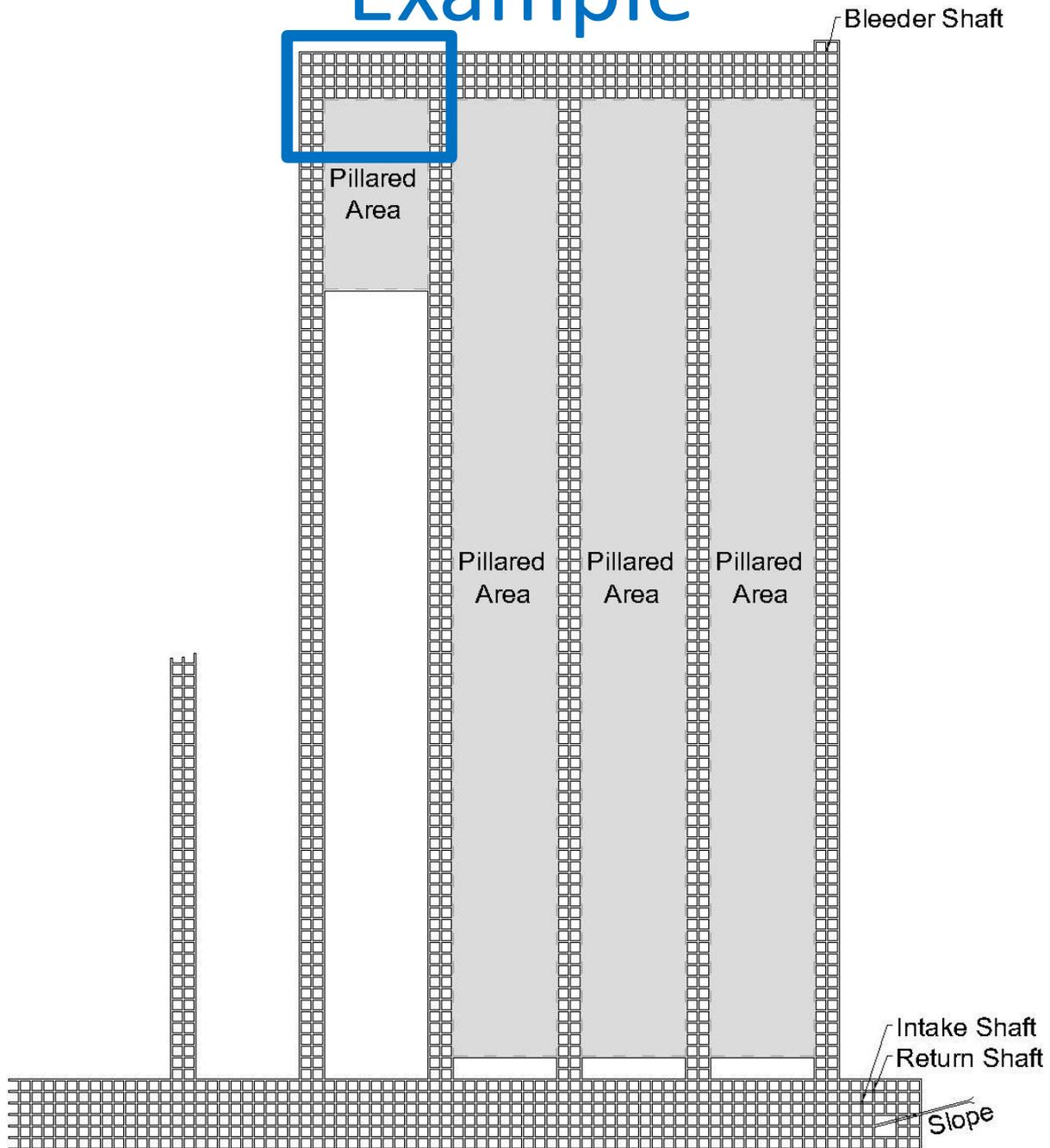


Example

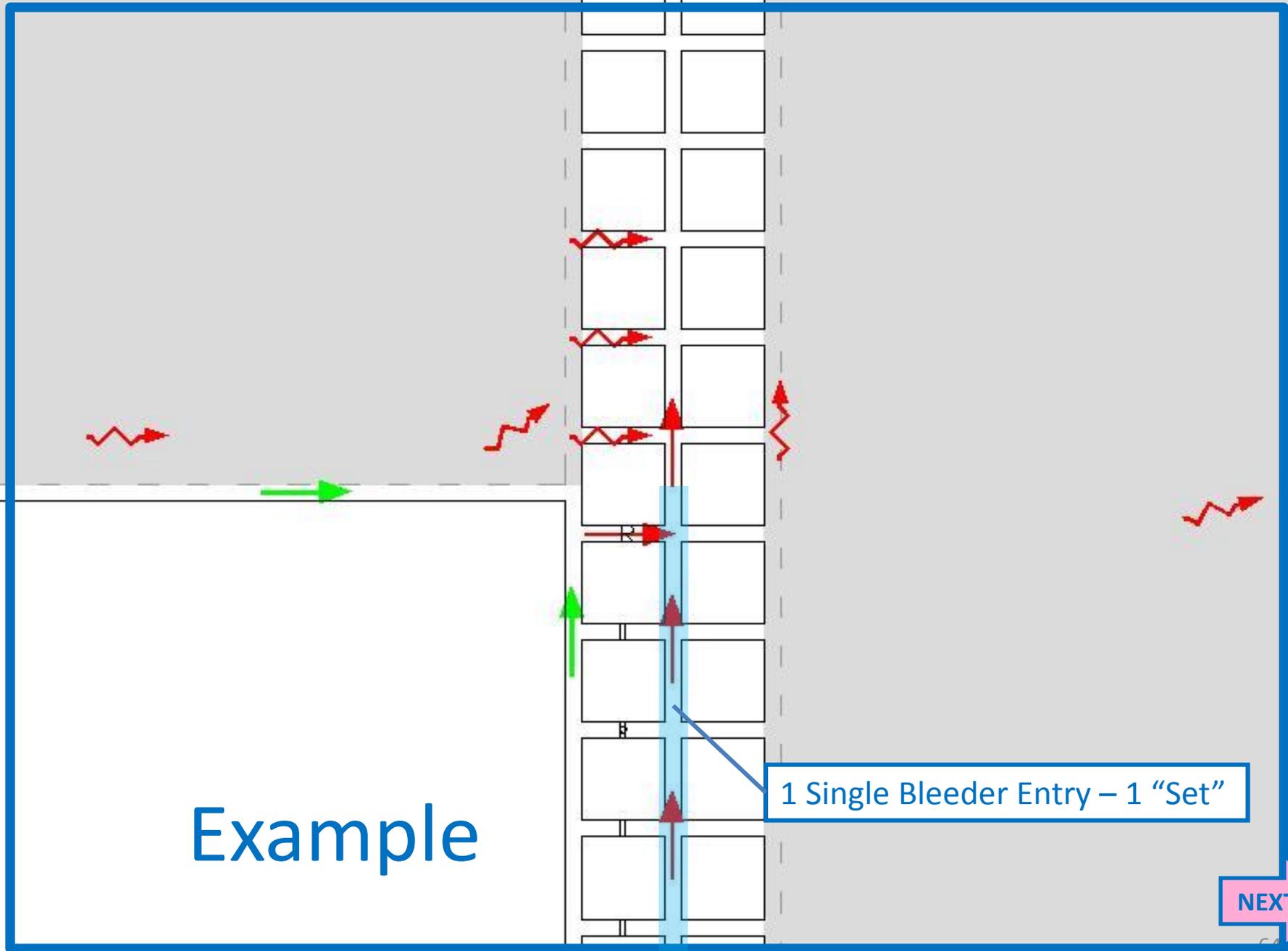
2 Bleeder Entries in
Common - 1 Set

NEXT

Example



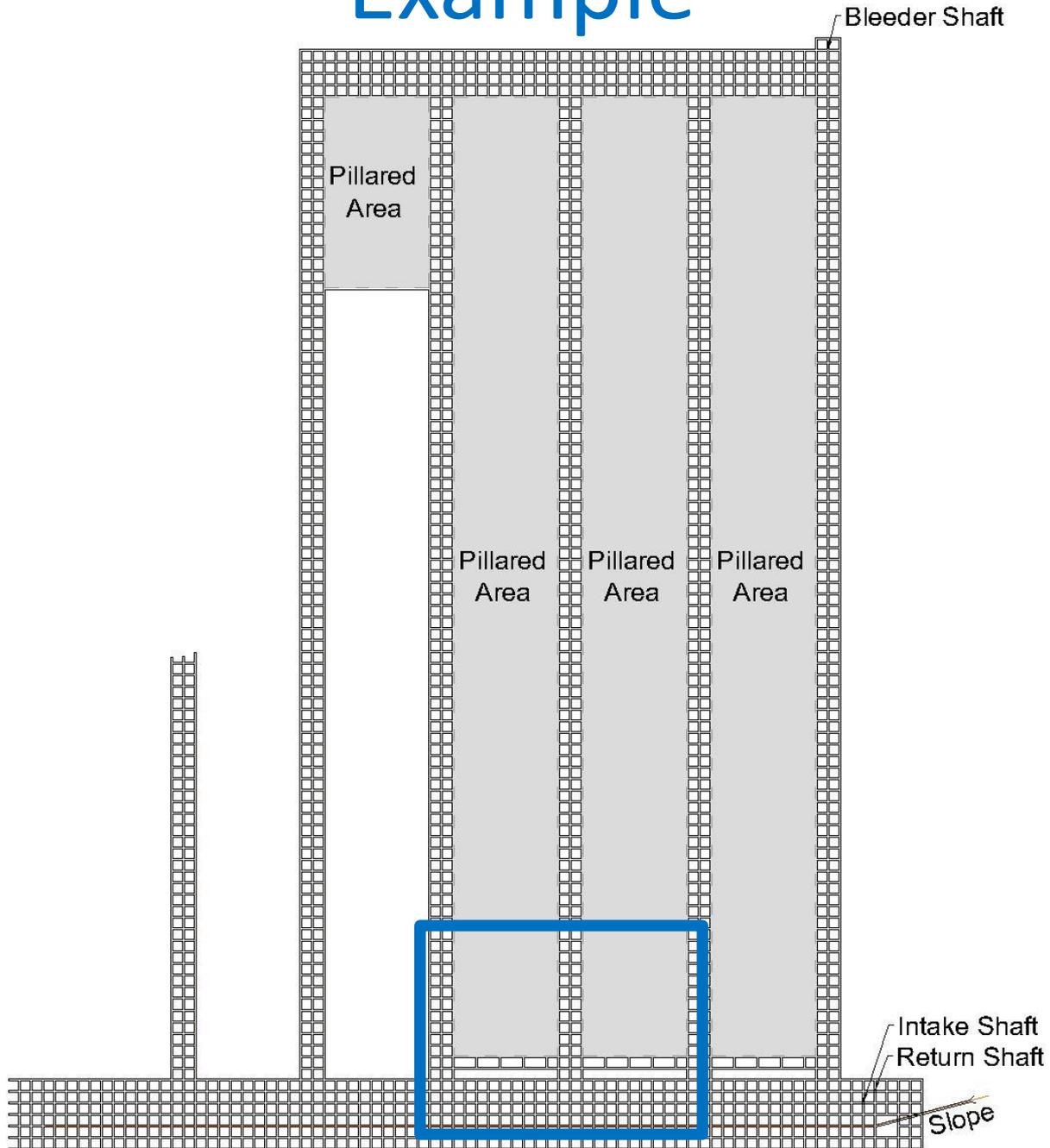
Example



1 Single Bleeder Entry - 1 "Set"

NEXT

Example



The diagram shows a grid of squares. Two vertical columns of squares are shaded gray and labeled "Pillared Area". A horizontal row of squares is shaded light blue and labeled "1 Single Bleeder Entry - 1 'Set'". A thick blue border surrounds the grid. Red arrows with zigzag tails point upwards from the bottom of the grid into the pillared areas. Green arrows point downwards from the top of the grid into the pillared areas. Blue arrows point horizontally along the bleeder entry. A pink arrow labeled "NEXT" points to the right at the bottom right corner.

Pillared Area

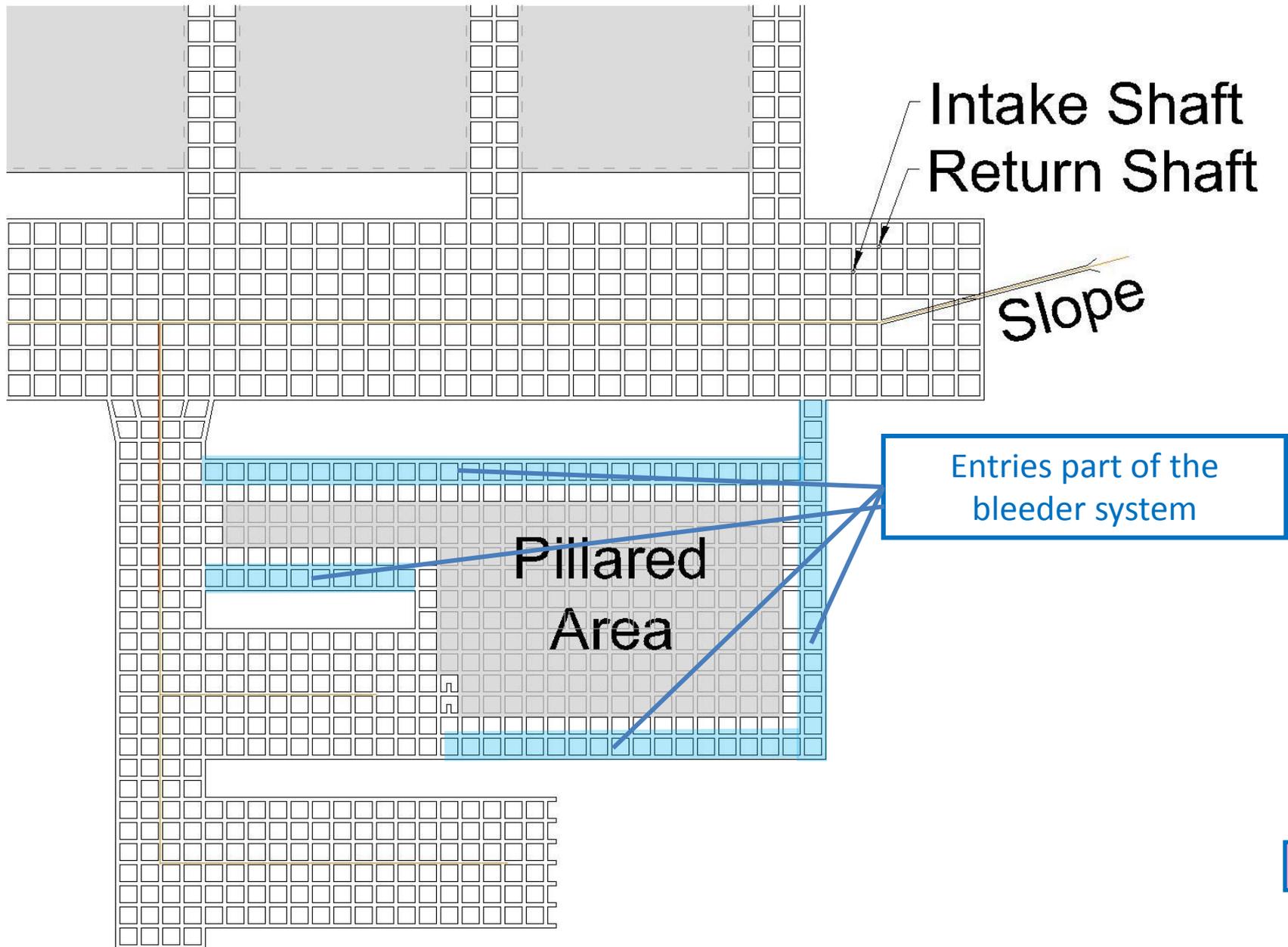
Pillared Area

Example

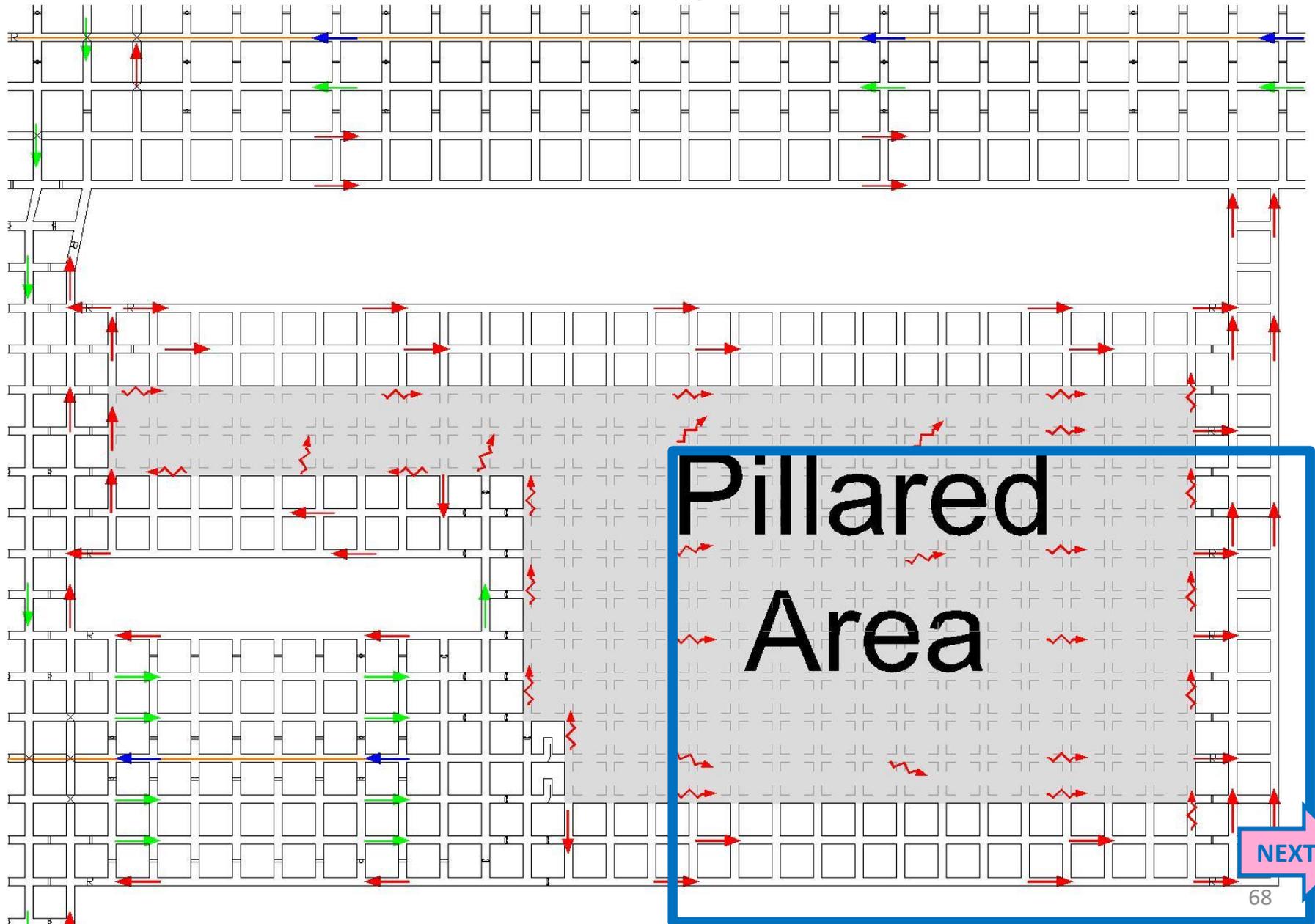
1 Single Bleeder Entry - 1 "Set"

NEXT

Example



Example



NEXT

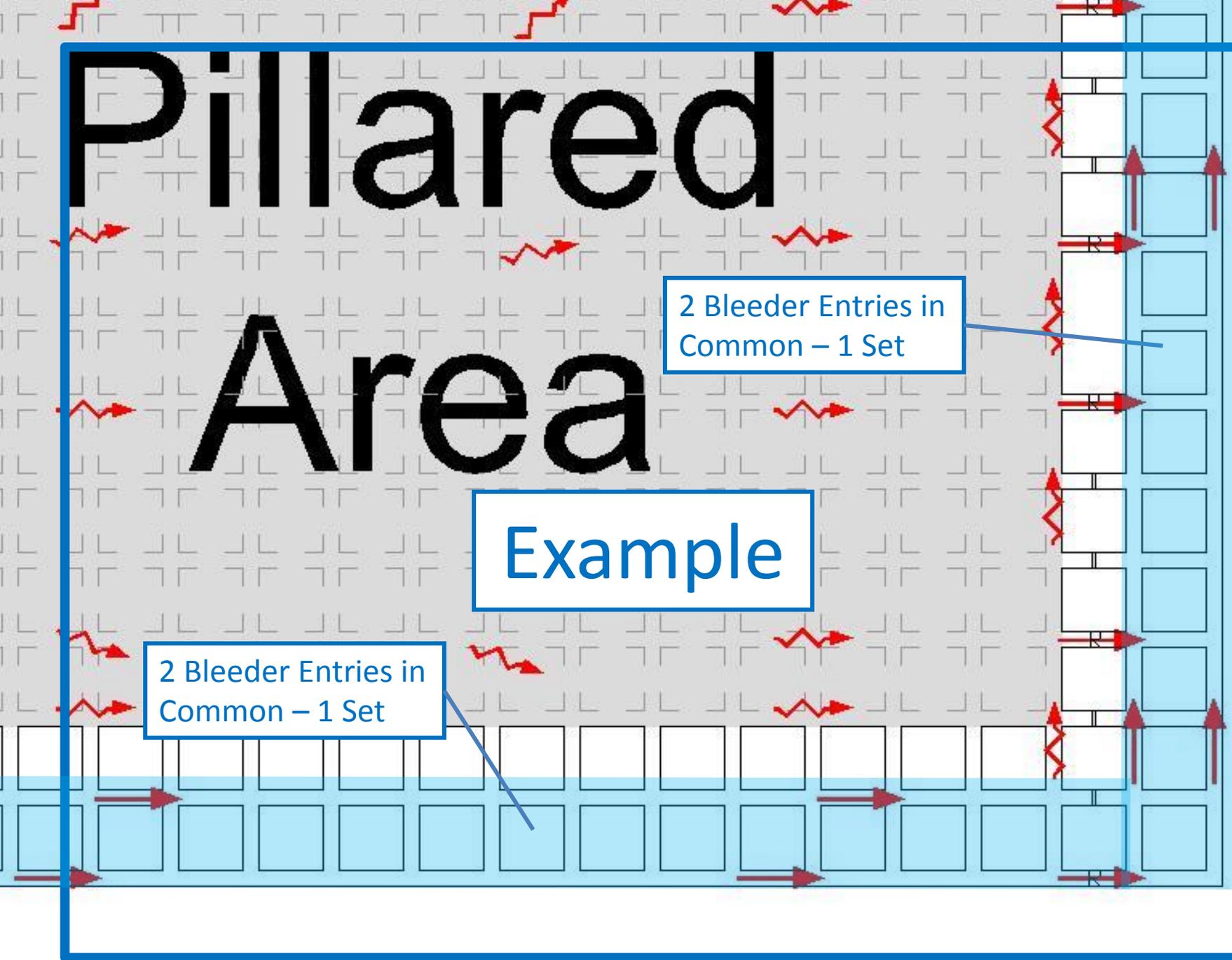
Pillared Area

Area

2 Bleeder Entries in Common – 1 Set

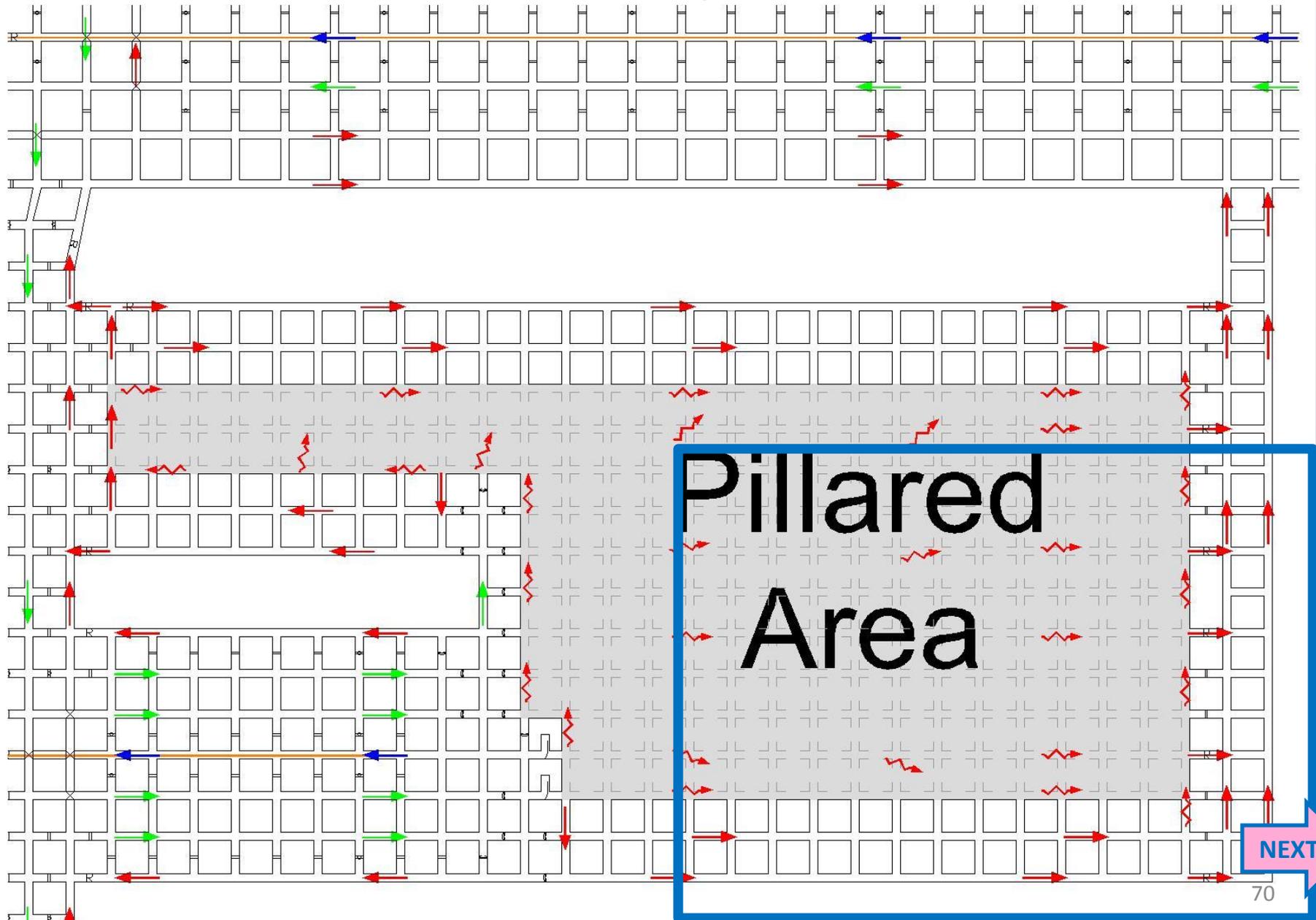
Example

2 Bleeder Entries in Common – 1 Set



NEXT

Example



NEXT

Example

2 Bleeder Entries in Common – 1 Set

2 Bleeder Entries in Common – 1 Set

NEXT

Methane and Other Gases, Dusts, and Fumes

Bleeder systems must control the air passing through the area and continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings, in an effective manner, which also prevents hazardous accumulations.

Methane and Other Gases, Dusts, and Fumes

A bleeder system is intended to ventilate the worked-out area so as to protect active workings from the hazards of methane accumulations and hazardous accumulations of other gases, dusts and fumes.

Methane and Other Gases, Dusts, and Fumes

Methane concentrations within a bleeder system should be evaluated and considered when assessing bleeder system effectiveness.

Accumulations of methane that are explosive, can become explosive when mixed with air, are approaching the explosive range, or are irrespirable, may pose a hazard to the active workings whether they occur in accessible areas or not.

Methane and Other Gases, Dusts, and Fumes

Accumulations of methane that pose a hazard to the active workings are indicative of an ineffective bleeder system.

The location, extent, and composition of the accumulation are some of the considerations in determining whether the accumulation poses a hazard to the active workings.

Methane and Other Gases, Dusts, and Fumes

Each situation should be evaluated on a case-by-case basis.

Methane and Other Gases, Dusts, and Fumes

Although methane accumulations are a primary concern, accumulations of other gases, dusts, or fumes within a bleeder system should also be evaluated when assessing bleeder system effectiveness.

Inadequate ventilation of worked-out areas may result in accumulations of other gases, dusts, or fumes which may pose a hazard to the active workings.

Methane and Other Gases, Dusts, and Fumes

MSHA considers accumulations of other gases, dusts, or fumes within bleeder systems, which have the potential to result in injuries to miners, as indicative of an ineffective bleeder system.

The location, extent, and composition of the accumulation are some of the considerations in determining whether the accumulation poses a hazard to the active workings.

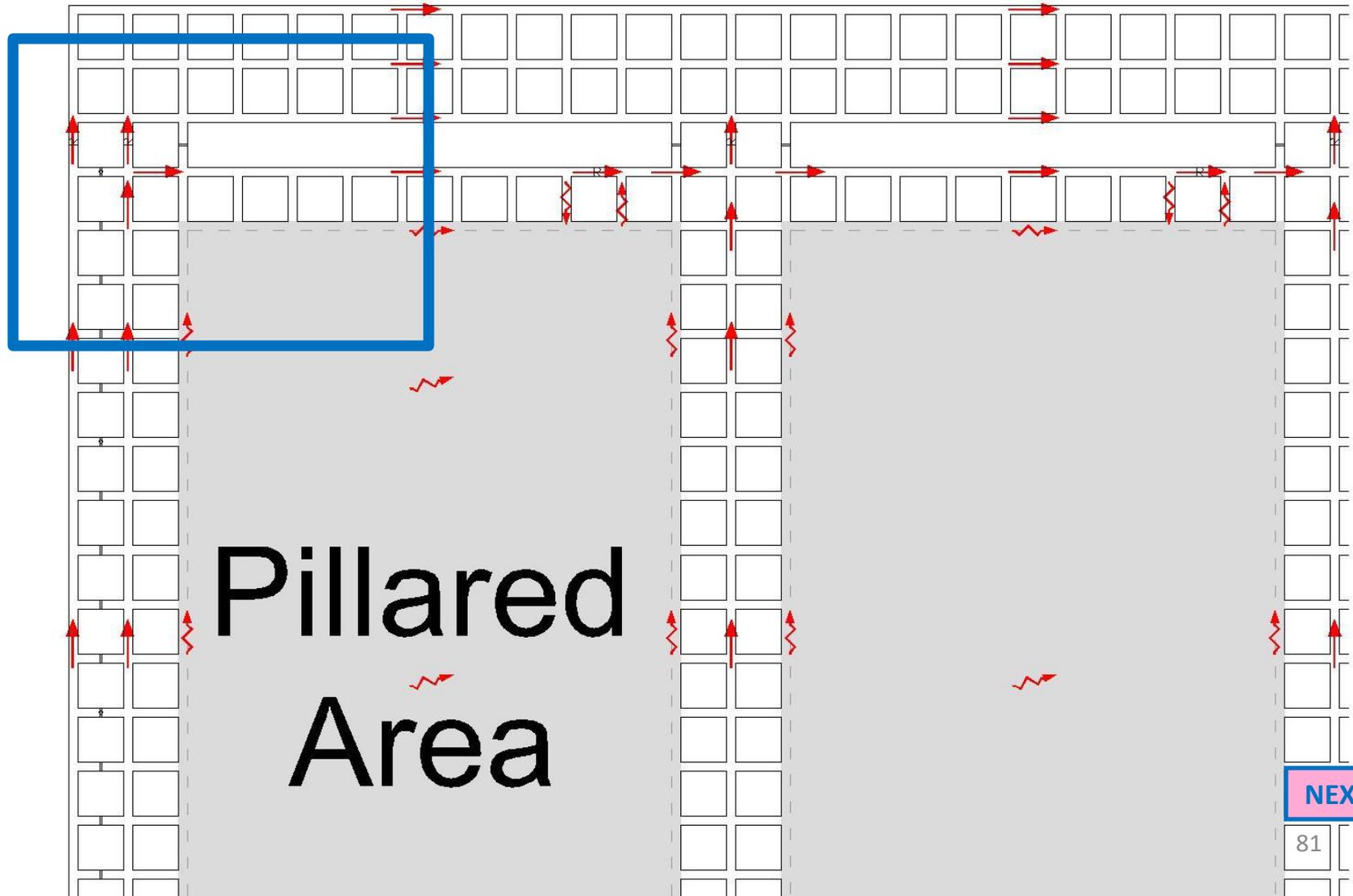
Methane and Other Gases, Dusts, and Fumes

Each situation should be evaluated on a case-by-case basis.

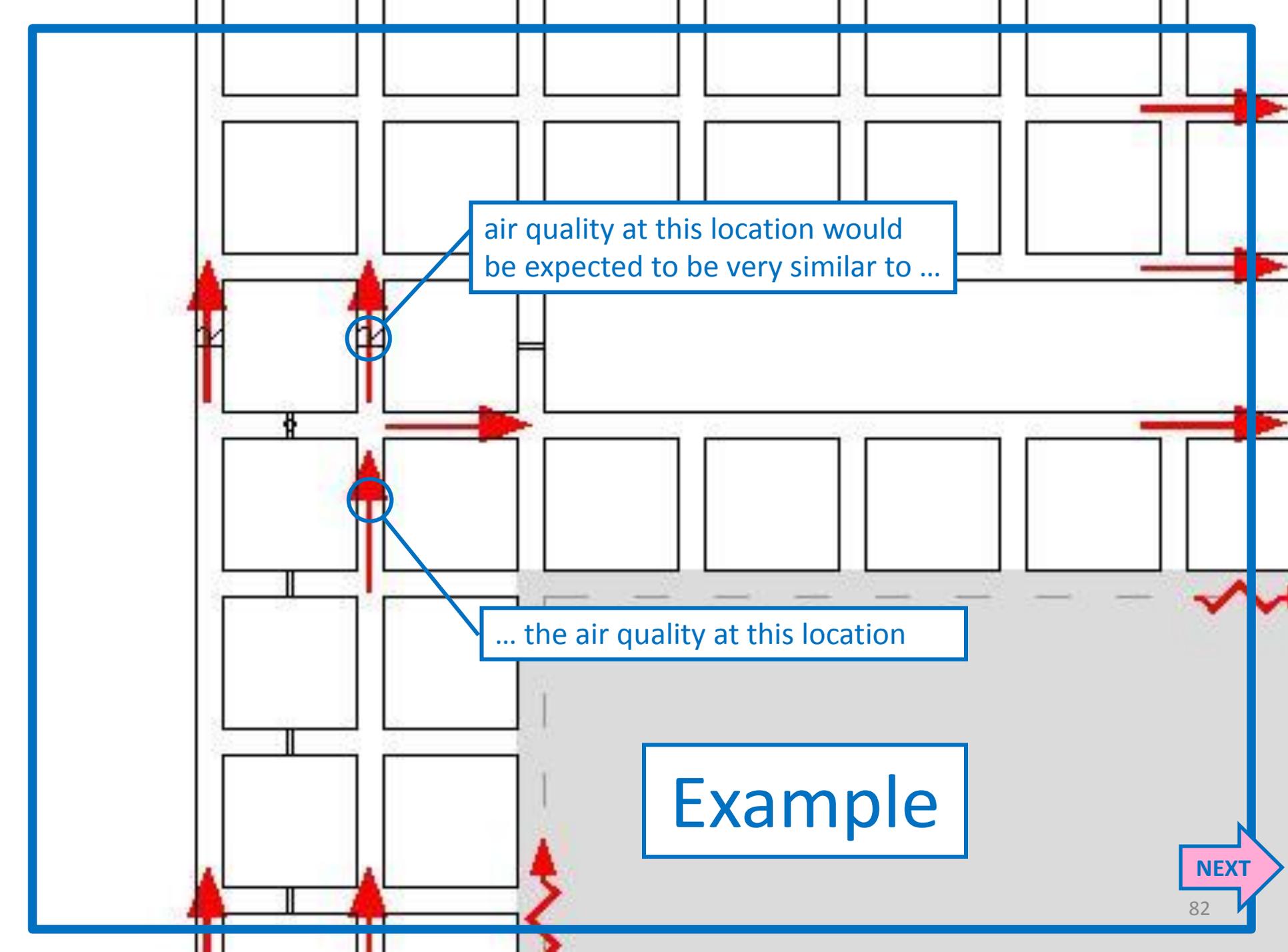
Methane and Other Gases, Dusts, and Fumes

In properly designed and maintained bleeder systems, a correlation exists between the gas concentrations at approved examination locations and the gas concentration in areas within the worked-out area where miners may not normally work or travel.

Example



NEXT

A diagram of a city street grid. The grid consists of several rows and columns of rectangular blocks. Red arrows indicate the direction of air flow: some point upwards from the bottom of blocks, some point horizontally along the streets, and some point downwards from the top of blocks. Two blue circles are placed on the grid, each with a line pointing to a text box. The top box says 'air quality at this location would be expected to be very similar to ...' and the bottom box says '... the air quality at this location'. A large blue box at the bottom right contains the word 'Example'. A pink arrow at the bottom right points to the word 'NEXT'. The page number '82' is in the bottom right corner.

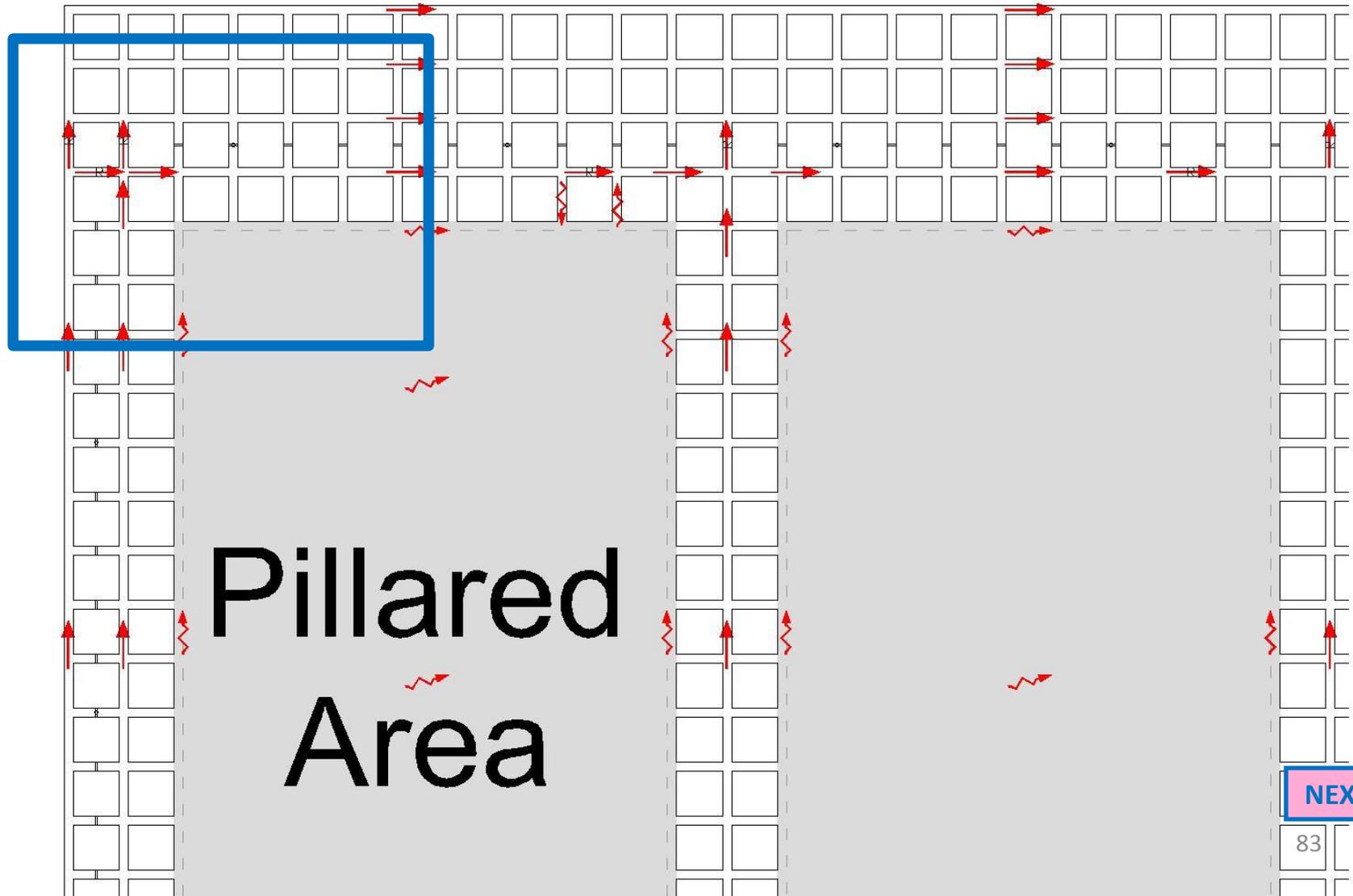
air quality at this location would be expected to be very similar to ...

... the air quality at this location

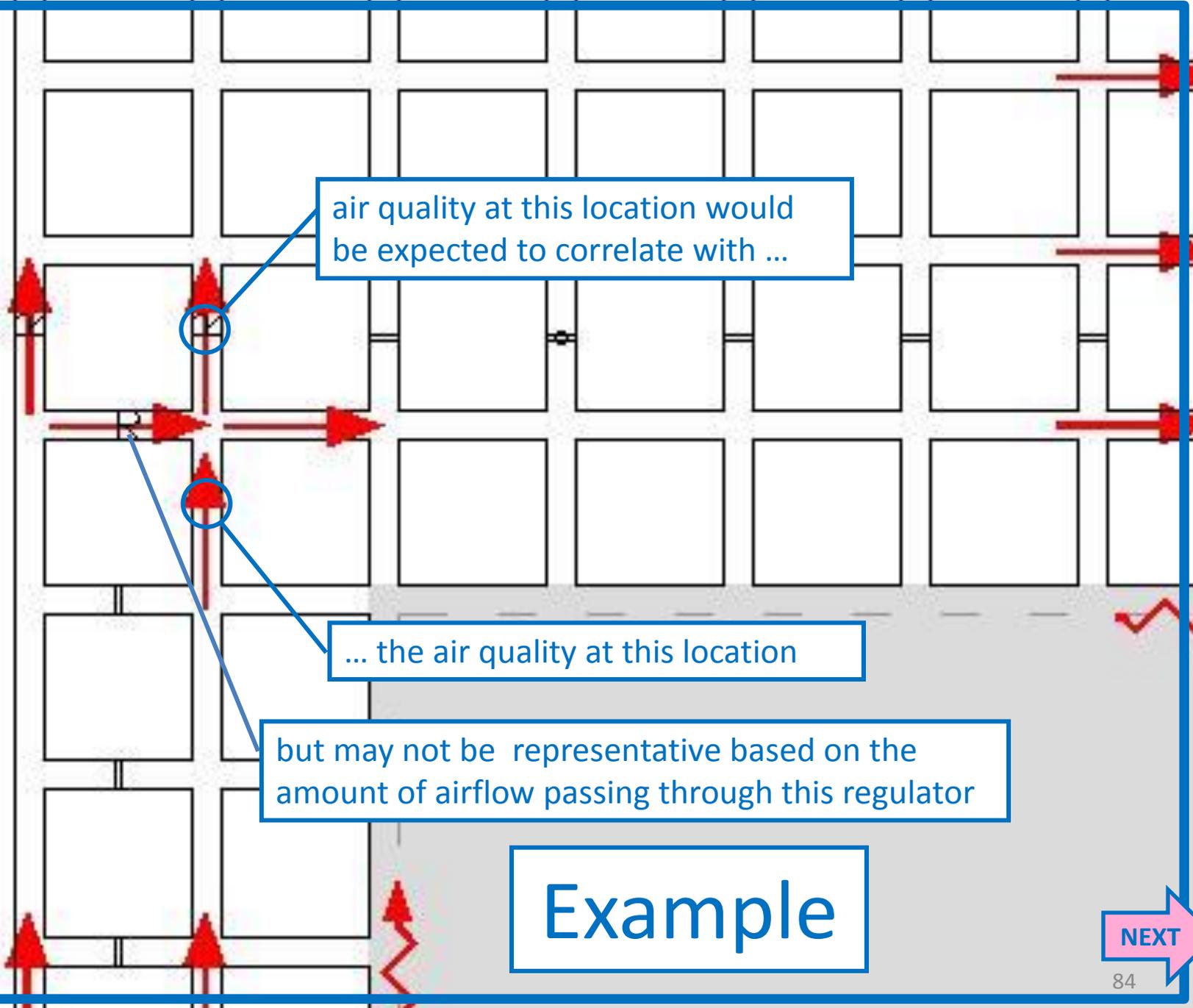
Example

NEXT

Example



NEXT



air quality at this location would be expected to correlate with ...

... the air quality at this location

but may not be representative based on the amount of airflow passing through this regulator

Example

Likewise ...

... air quality at this location would be expected to correlate with ...

... the air quality at this location

but may not be representative based on the amount of airflow passing through this regulator

Example



Methane and Other Gases, Dusts, and Fumes

Gas concentrations that do not appear to be representative of the expected air quality or an improper air direction at approved MPLs, approved EPs, or in bleeder entries are indications that further investigation may be necessary to determine if the bleeder system is still working effectively.

Methane and Other Gases, Dusts, and Fumes

Corrections or adjustments may be necessary to comply with the approved ventilation plan.

If it is determined that the approved examination locations do not result in a proper evaluation of the bleeder system, the approved mine ventilation plan should be revised in order to assure proper evaluation.

Airflow Direction

In order to make a determination as to whether air is moving in the proper direction at the examination locations, as required under 30 CFR §§ 75.364(a)(2)(i), (ii), and (iii), and, if appropriate, at EPs approved as part of an alternative method of evaluation per 30 CFR § 75.364(a)(2)(iv), the proper airflow direction at each of the examination locations and in the bleeder entries must be known.

Airflow Direction

The direction of airflow in the bleeder system, including the worked-out area, is a part of the bleeder system design that is required to be approved in the mine ventilation plan as specified in 30 CFR § 75.371(x).

MSHA anticipates this necessary information would be conveyed by map or diagram and included in the mine ventilation plan.

Airflow Direction

If it cannot be determined whether the bleeder system produces air movement at approved examination locations as required by 30 CFR §§ 75.364(a)(2)(i), (ii), and (iii), and ...

Airflow Direction

... if appropriate, at EPs approved as part of an alternative method of evaluation per 30 CFR § 75.364(a)(2)(iv), and elsewhere in the bleeder system as specified in the approved mine ventilation plan, the bleeder system is not in compliance with the approved mine ventilation plan.

Mine Operators' Responsibility

Nothing in the Program Policy Letter abrogates, alters, or diminishes a mine operator's responsibility under 30 CFR § 75.334(b)(1) to ensure that bleeder systems are effective and maintained so as to control the air passing through the area and to continuously dilute and move methane-air mixtures and other gases, dusts, and fumes from the worked-out area away from active workings and into a return air course or to the surface of the mine.

Mine Operators' Responsibility

Each mine operator has a continuing obligation to evaluate the effectiveness of the bleeder system by a method and at locations appropriate to the circumstances.

Thank You

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MSHA home page, <http://www.msha.gov>