

DEPARTMENT OF
ECOLOGY
State of Washington

**Stormwater Management Manual
for Western Washington**



August 2012



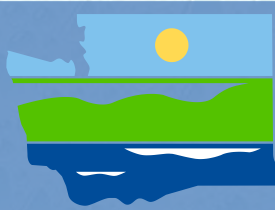
DEPARTMENT OF
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through 05-10-033)

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Low Impact Development Process (MR #5)

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Background on LID in Western WA

- PCHB Requirements from 2007 Permits
- Two LID Advisory Committees
- Expanded MR #5
 - LID Performance Standard
 - List Option
- More than just on-Site BMPs

Issuance Date: August 1, 2012
Effective Date: August 1, 2013
Expiration Date: July 31, 2018


Phase I Municipal Stormwater Permit

National Pollutant Discharge Elimination System and
State Waste Discharge General Permit
for discharges from
Large and Medium Municipal Separate Storm Sewer Systems

State of Washington
Department of Ecology
Olympia, Washington 98504-7600

In compliance with the provisions of
The State of Washington Water Pollution Control Law
Chapter 90.48 Revised Code of Washington
and
The Federal Water Pollution Control Act
(The Clean Water Act)
Title 33 United States Code, Section 1251 et seq.

Until this permit expires, is modified, or revoked, Permittees that have properly obtained coverage under this permit are authorized to discharge to waters of the state in accordance with the special and general conditions which follow.

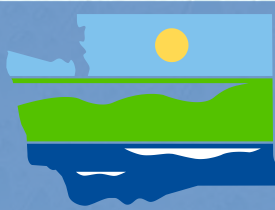

Kelly Susewind, P.E., P.G.
Water Quality Program Manager
Department of Ecology



Evaluate Site Conditions (Vol. I, 3.1.1)

- Survey
- Site Layout
- Soils Report
 - Infiltration Rate(s)
 - Soil Suitability Criteria
- Distance to Ground Water

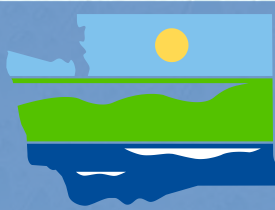




Recommended Infiltration Testing



- Small PIT Test
- Large PIT Test
- Grain Size
 - D_{10} , D_{60} , D_{90}
- Local jurisdictions can accept other



Permanent Stormwater Control Plan (Vol. I, 3.1.5)

- Level of detail depends on MRs
- Specific Discussion on items to include in submittals for review
 - LID
 - Water Quality
 - Flow Control

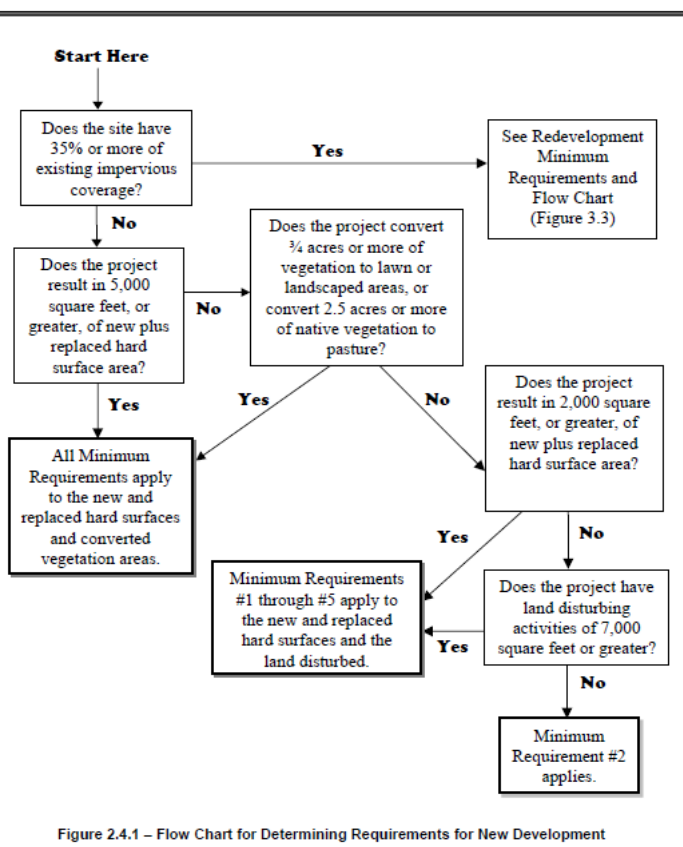
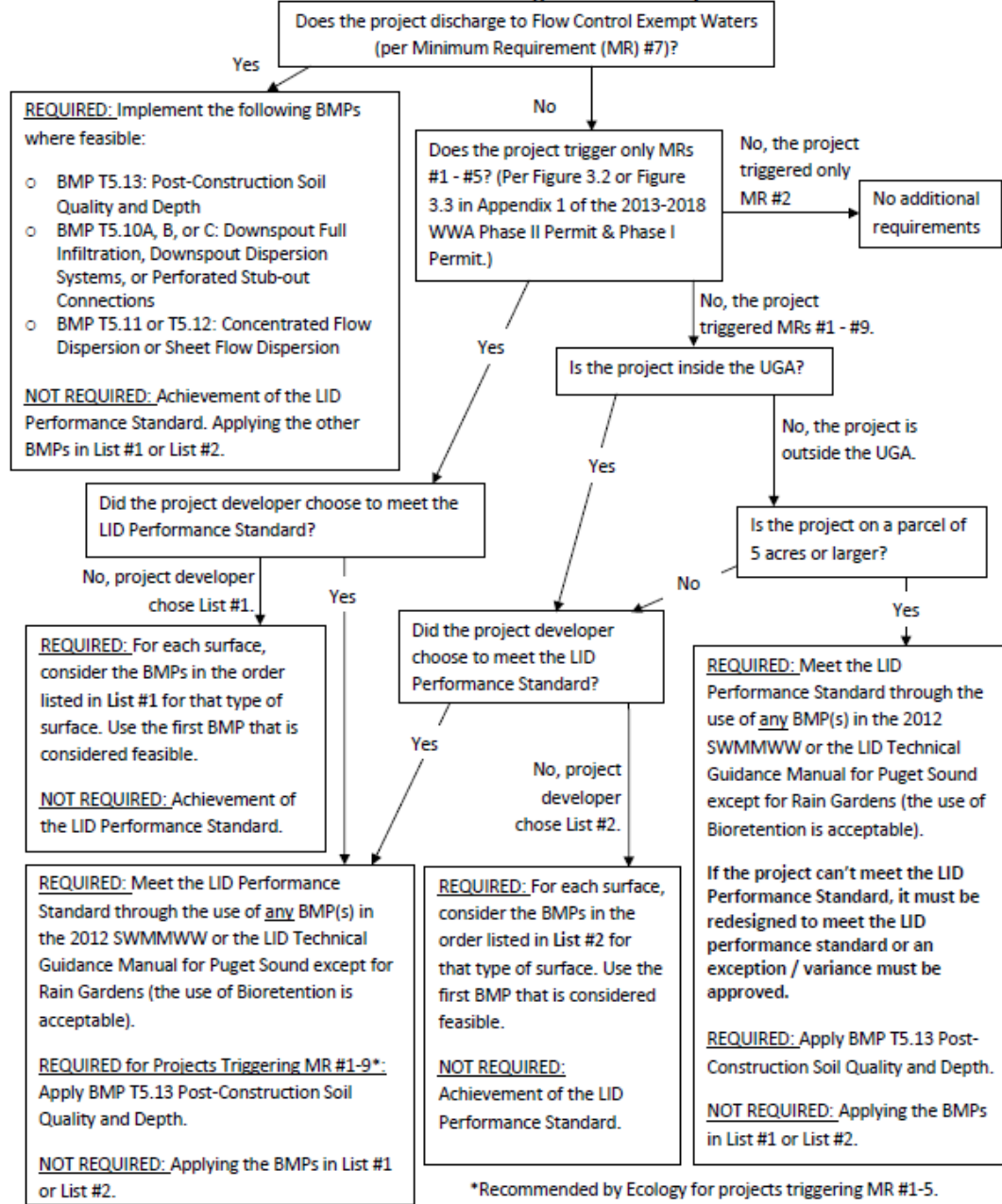
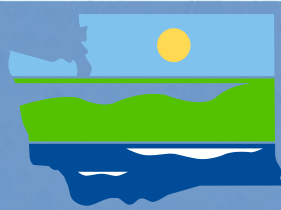


Figure 2.4.1 – Flow Chart for Determining Requirements for New Development

Flow Chart for Determining LID MR #5 Requirements



*Recommended by Ecology for projects triggering MR #1-5.



Paths to Requirements

- **Flow Control Exempt Basins**
- Small Projects MR #1 - #5 only
- Large Projects MR #1 - #9
 - Inside UGA
 - Outside UGA
 - < 5 acres
 - => 5 acres

Flow Chart for Determining LID MR #5 Requirements

Flow Control Exempt Waters

Does the project discharge to Flow Control Exempt Waters (per Minimum Requirement (MR) #7)?

Yes

No

REQUIRED: Implement the following BMPs where feasible:

- BMP T5.13: Post-Construction Soil Quality and Depth
- BMP T5.10A, B, or C: Downspout Full Infiltration, Downspout Dispersion Systems, or Perforated Stub-out Connections
- BMP T5.11 or T5.12: Concentrated Flow Dispersion or Sheet Flow Dispersion

NOT REQUIRED: Achievement of the LID Performance Standard. Applying the other BMPs in List #1 or List #2.

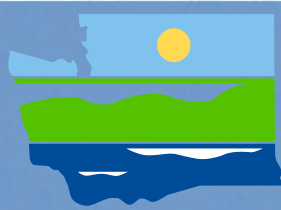
Does the project trigger only MRs #1 - #5? (Per Figure 3.2 or Figure 3.3 in Appendix 1 of the 2013-2018 WWA Phase II Permit & Phase I Permit.)

No, the project triggered only MR #2

No additional requirements

Yes

No, the project triggered MRs #1 - #9.



Paths to Requirements

- Flow Control Exempt Basins
- **Small Projects MR #1 - #5 only**
- Large Projects MR #1 - #9
 - Inside UGA
 - Outside UGA
 - < 5 acres
 - => 5 acres

Flow Chart for Determining LID MR #5 Requirements

Projects subject only to MR #1 - #5

Does the project trigger only MRs #1 - #5? (Per Figure 3.2 or Figure 3.3 in Appendix 1 of the 2013-2018 WWA Phase II Permit & Phase I Permit.)

Yes

Did the project developer choose to meet the LID Performance Standard?

Yes

No, project developer chose List #1.

REQUIRED: For each surface, consider the BMPs in the order listed in **List #1** for that type of surface. Use the first BMP that is considered feasible.

NOT REQUIRED: Achievement of the LID Performance Standard.

REQUIRED: Meet the LID Performance Standard through the use of any BMP(s) in the 2012 SWMMWW or the LID Technical Guidance Manual for Puget Sound except for Rain Gardens (the use of Bioretention is acceptable).

REQUIRED for Projects Triggering MR #1-9*: Apply BMP T5.13 Post-Construction Soil Quality and Depth.

NOT REQUIRED: Applying the BMPs in List #1 or List #2.



List #1

Lawn and
landscaped areas:

• Soil Quality and Depth



Glacial till: high in
runoff and poor turf
quality



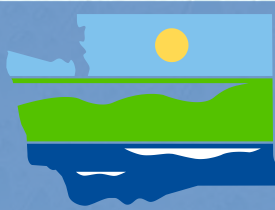
Same soil with 30%
compost added. Up to
50% less runoff. Turf
still healthy 4 years later

Photos: UW Test Plots



A Brief Interlude on Infeasibility Criteria

- BMP Specific
- Listed with BMP Design Criteria
- Applicable to List Options Only

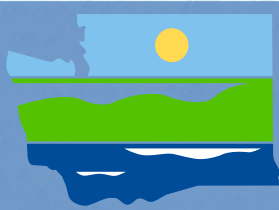


List #1

**Roofs: Consider
in order listed;
use first feasible**

- **Full Dispersion or Downspout Full Infiltration**
- **Rain Gardens or Bioretention**
 - **$\geq 5\%$ of drainage area**
- **Downspout Dispersion Systems**
- **Perforated Stub-out Connections**

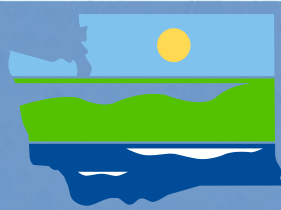




List #1

Other Hard Surfaces (driveways, roads, patios, walks, parking lot) consider in order listed; use first feasible

- **Full Dispersion**
- **Permeable pavement, or Rain Gardens, or Bioretention**
 - **$\geq 5\%$ of drainage area**
- **Sheet Flow Dispersion, or Concentrated Flow Dispersion**



Paths to Requirements

- Flow Control Exempt Basins
- Small Projects MR #1 - #5 only
- Large Projects MR #1 - #9
 - Inside UGA
 - Outside UGA
 - < 5 acres
 - => 5 acres

Flow Chart for Determining LID MR #5 Requirements

Projects subject to MR #1 - #9 inside the UGA or outside the UGA on < 5 acres

Does the project trigger only MRs #1 - #5? (Per Figure 3.2 or Figure 3.3 in Appendix 1 of the 2013-2018 WWA Phase II Permit & Phase I Permit.)

Is the project inside the UGA?

No, the project triggered MRs #1 - #9.

Yes

Did the project developer choose to meet the LID Performance Standard?

No, project developer chose List #2.

Yes

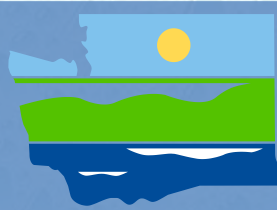
REQUIRED: Meet the LID Performance Standard through the use of any BMP(s) in the 2012 SWMMWW or the LID Technical Guidance Manual for Puget Sound except for Rain Gardens (the use of Bioretention is acceptable).

REQUIRED for Projects Triggering MR #1-9*: Apply BMP T5.13 Post-Construction Soil Quality and Depth.

NOT REQUIRED: Applying the BMPs in List #1 or List #2.

REQUIRED: For each surface, consider the BMPs in the order listed in **List #2** for that type of surface. Use the first BMP that is considered feasible.

NOT REQUIRED: Achievement of the LID Performance Standard.



List #2

Lawn and
landscaped areas:

• Soil Quality and Depth

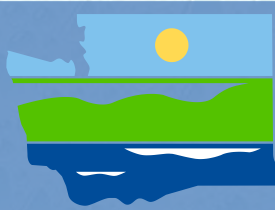


Glacial till: high in
runoff and poor turf
quality



Same soil with 30%
compost added. Up to
50% less runoff. Turf
still healthy 4 years later

Photos: UW Test Plots



List #2

**Roofs: Consider
in order listed;
use first feasible**

- **Full Dispersion or Downspout Full Infiltration**
- ~~Rain Gardens or Bioretention~~
 - **$\geq 5\%$ of drainage area**
- **Downspout Dispersion Systems**
- **Perforated Stub-out Connections**





List #2

Other Hard Surfaces consider in order listed; use first feasible

- **Full Dispersion**
- **Permeable pavement, ~~or~~ Rain Gardens, ~~or~~**
- **Bioretention**
 - **$\geq 5\%$ of drainage area**
- **Sheet Flow Dispersion, or Concentrated Flow Dispersion**



Paths to Requirements

- Flow Control Exempt Basins
- Small Projects MR #1 - #5 only
- **Large Projects MR #1 - #9**
 - Inside UGA
 - **Outside UGA**
 - < 5 acres
 - => 5 acres

Flow Chart for Determining LID MR #5 Requirements

Projects subject to MR #1 - #9 outside the UGA on a parcel ≥ 5 acres

Does the project trigger only MRs #1 - #5? (Per Figure 3.2 or Figure 3.3 in Appendix 1 of the 2013-2018 WWA Phase II Permit & Phase I Permit.)

No, the project triggered MRs #1 - #9.

Is the project inside the UGA?

No, the project is outside the UGA

Is the project on a parcel of 5 acres or larger?

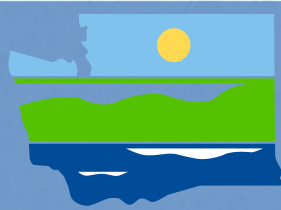
Yes

REQUIRED: Meet the LID Performance Standard through the use of any BMP(s) in the 2012 SWMMWW or the LID Technical Guidance Manual for Puget Sound except for Rain Gardens (the use of Bioretention is acceptable).

If the project can't meet the LID Performance Standard, it must be redesigned to meet the LID performance standard or an exception / variance must be approved.

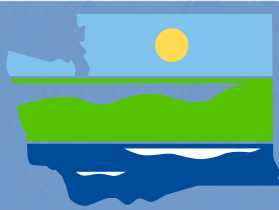
REQUIRED: Apply BMP T5.13 Post-Construction Soil Quality and Depth.

NOT REQUIRED: Applying the BMPs in List #1 or List #2.



Projects Triggering MR #1 - #9

Project Type & Location	Requirement
<p>Development (new or redevelopment) on any parcel inside the UGA, or development outside the UGA on a parcel less than 5 acres</p>	<p>LID Performance Standard and BMP T5.13</p> <p>OR</p> <p>List #2</p> <p>(applicant option)</p>
<p>Development (new or redevelopment) outside the UGA on a parcel of 5 acres or larger</p>	<p>LID Performance Standard and BMP T5.13</p>



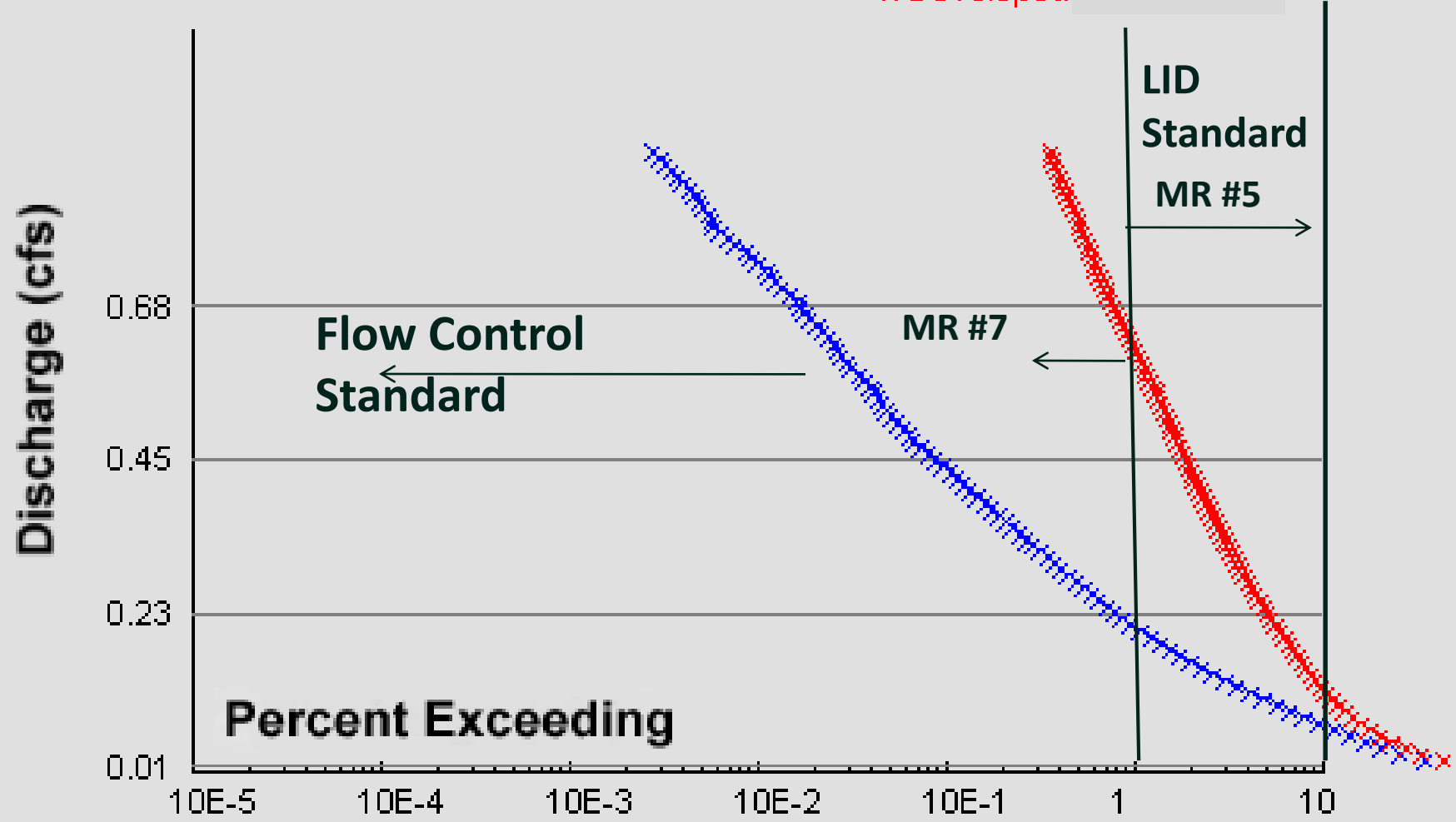
LID Performance Standard vs Flow Control Standard

**LID Performance Standard
addresses the lower, more
frequent stormwater flows
(8% of 2-year through 50%
of the 2-year)**

**Flow Control Standard
addresses the higher, less
frequent stormwater flows
(50% of the 2-year through
the full 50-year)**

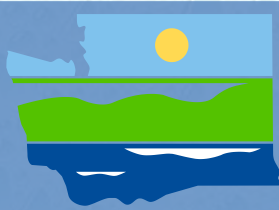
LID Std: Control durations from
8% of 2-yr through 50% of 2-year

x Predeveloped
x Developed





**Don't forget Minimum Requirements
#6 (Water Quality Treatment) and
#7 (Flow Control) during the review**



Additional Jurisdictional Requirements

- Inspections and Maintenance
- Covenants for On-site BMPs
- Right-of-entry for O&M
- Tracking of new BMPs





Training on Manual by Ecology is Coming

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A bright sun is positioned in the upper right corner of the image, casting a starburst effect across the clear blue sky. The lower half of the image is filled with soft, white, fluffy clouds. The text 'Q & A' is centered in the middle of the frame, rendered in a bold, yellow, sans-serif font.

Q & A