



# Directional Stability Under Braking Transitional Arrangements

## Discussion Paper

15 January 2021

---

## Contents

- 1. Project summary .....3
  - 1.1 Purpose .....3
  - 1.2 Project background.....3
- 2. Business and policy context.....5
- 3. Proposed transitional arrangements .....5
  - 3.1 Summary of proposed transitional arrangements.....6
  - 3.3 Modified Design Approvals .....6
  - 3.4 New vehicle/s added to an existing Vehicle Approval.....7
  - 3.5 Existing Vehicle Approvals .....7
  - 3.6 Old trailer/s added to an existing Vehicle Approval .....8
  - 3.7 Old hauling units added to a Vehicle Approval .....8
- 4. Key impacts .....8
  - 4.1 Braking Compatibility .....8
- 5. Benefits .....9
- 6. Notification of transitional arrangements .....9
- 7. Recommendation .....10

## Tables

- Table 1. Approved amendments to the DSUB standard.....3
- Table 3. Summary of proposed transitional arrangements .....6
- Table 4. Braking technology benefits .....9

## Appendices

- Appendix A – Abbreviations
- Appendix B - References

# 1. Project summary

## 1.1 Purpose

To provide a summary of the transitional arrangements being developed for the revised Performance Based Standards (PBS) Directional Stability Under Braking (DSUB) Standard as part of the NHVR’s PBS Review Project, including the potential risks and implications of implementation.

## 1.2 Project background

At the May 2018 meeting of the former Transport and Infrastructure Council, the outcomes of the National Transport Commission’s PBS Marketplace project were endorsed. This project outlined four recommendations, one of which was for the NHVR to complete a review of the PBS Standards. To deliver on this recommendation, the NHVR commenced the PBS Review Project and contracted consultant Dr John de Pont from TERNZ Transport Research Ltd (TERNZ Transport), to undertake a review of the first three standards, including the DSUB performance requirements.

In November 2019, Ministers endorsed the recommended amendments to this standard that were proposed by the NHVR in alignment with the recommendations from TERNZ Transport, noting that the NHVR would develop a set of transitional arrangements to manage the impact the change may have on older vehicles.

Table 1 outlines the ministerial approved amendments to the DSUB PBS Standard.

**Table 1. Approved amendments to the DSUB standard**

<p><b>Current standard</b></p>	<p>Three alternative ‘deemed to comply’ provisions:</p> <ol style="list-style-type: none"> <li>1. A vehicle that has a functioning anti-lock brake system that effectively prevents gross wheel lock-up on each axle group (as defined in the definitions) is deemed to comply with the standard; or</li> <li>2. A motor vehicle in a combination vehicle that has a functioning anti-lock brake system that effectively prevents gross wheel lock-up behaviour on the motor vehicle can be ignored when the test or simulation assessment is made. That is, the motor vehicle is deemed-to comply and only the performance of the trailer(s) against the performance standard needs be addressed; or</li> <li>3. A combination vehicle that has a load proportioning brake system (variable proportioning brake system) on each part that has been set to meet the lightly laden compatibility limits in the pending revisions to Australian Design Rules 35 and 38 (Australian Design Rule 35/02 and 38/03) is deemed to comply with this standard. Note that a motor vehicle that has an antilock brake system as described in the preceding paragraph and trailer(s) that meet the lightly laden compatibility limits are deemed to comply with this standard.</li> </ol>
<p><b>Endorsed (by Transport Ministers) amendments to standard</b></p>	<p><b>Compliance with current ADRs</b></p> <p>New PBS vehicles (newly built hauling units and trailers) that are no more than 12 months old and entering the scheme for the first time):</p> <ul style="list-style-type: none"> <li>• Must comply with the latest ADRs.</li> </ul> <p><b>Deemed to comply provision</b></p> <p>Vehicles that are older than 12 months since their manufacture date and are new to the PBS scheme:</p> <ul style="list-style-type: none"> <li>• The hauling unit must be fitted with ABS (as a minimum).</li> <li>• Trailing unit must be fitted with ABS and Roll-over control function that complies with ADR.</li> </ul>

	<p>Vehicles previously approved under the PBS scheme:</p> <ul style="list-style-type: none"> <li>• Approval remains valid and vehicle components can be transferred across VAs without having to upgrade to comply with the latest ADRs.</li> <li>• This provision may be updated as the NHVR implements the 'Transitional Arrangements' relating to the braking safety outcome provisions.</li> </ul> <p>Vehicles exempt from the applicable ADR:</p> <p>A trailer with more than four tyres on each axle or a trailer with more than four axles in a group -</p> <ul style="list-style-type: none"> <li>• Must be fitted with at least ABS that complies with the ADR</li> </ul> <p>A converter dolly -</p> <ul style="list-style-type: none"> <li>• Must be fitted with at least ABS that complies with the ADR</li> <li>• Must be fitted with through wiring between the electrical connectors as required by the ADR</li> </ul>
<p>Summary</p>	<p>The endorsed standard increases the requirements for newly built or newly approved PBS vehicle units to be fitted with the latest safety technologies including:</p> <ul style="list-style-type: none"> <li>• Anti-lock Braking System (ABS) (as a minimum)</li> <li>• Electronic Stability Control (ESC), Electronic Stability Program (ESP), Roll Stability System (RSS), or Roll Stability Program (RSP)</li> </ul> <p>The endorsed standard will also remove the option for Load Proportioning Brake Systems (Variable Proportioning Brake Systems) from the deemed to comply provision.</p> <p>The performance requirements will not change as a result of the amended standard.</p> <p>The NHVR will develop a set of transitional rules to manage the impact the change may have on older vehicles.</p>

The current DSUB standard has been applicable since the commencement of the PBS scheme. This standard is unique in that it has a 'deemed to comply' assessment option as an alternative to the performance requirement.

The 'deemed to comply' path was originally provided as there was confidence that the performance standard would be met if appropriate braking control technology was installed. With new technologies now readily available, the proposed changes will ensure that the original intent and principles of the scheme are met and that PBS vehicles continue to be stable on the road and can manoeuvre safely.

It should be noted that almost 100% of the PBS applications that have been assessed by the NHVR use the 'deemed to comply' assessment option. The existing standard requires PBS vehicles to either have a functioning anti-lock brake system or a load proportioning brake system (variable proportioning brake system). The proposed standard increases the requirements for PBS approved vehicles to be fitted with new technologies (Anti-lock Braking Systems (ABS), Electronic Stability Control (ESC) and Roll Stability Systems (RSS)) and will remove the option for Load Proportioning Brake Systems (Variable Proportioning Brake Systems) from the deemed to comply provision.

To implement the amendments to this standard, the NHVR has developed a set of transitional arrangements. The transitional arrangements for the DSUB standard will be reviewed by the PBS Review Panel (PRP) and consultation will occur with key PBS stakeholders.

## 2. Business and policy context

The proposed DSUB standard will ensure that all PBS vehicles are aligned to the latest safety technologies, as outlined in the Australian Design Rules (ADRs). The current ADRs in place and relevant to this standard are ADR35 or ADR38.

### Australian Design Rule 35/05 – Commercial Vehicle Brake Systems

This standard prescribes the requirements for brakes on commercial motor vehicles and large passenger vehicles to ensure safe braking under normal and emergency conditions. This standard is being progressively phased out between 1 November 2020 and 1 January 2022 and will be replaced by ADR35/06.

Please refer to [Vehicle Standard \(Australian Design Rule 35/05 – Commercial Vehicle Brake Systems\) 2013](#) for additional information.

### Australian Design Rule 35/06 – Commercial Vehicle Brake Systems

This standard prescribes the requirements for brakes on commercial motor vehicles and large passenger vehicles to ensure safe braking under normal and emergency conditions. This standard is being progressively introduced between 1 November 2020 and 1 January 2022 and will be replace ADR35/05.

Please refer to [Vehicle Standard \(Australian Design Rule 35/06 – Commercial Vehicle Brake Systems\) 2018](#) for additional information.

### Australian Design Rule 38/05 – Trailer Brake Systems

The function of this vehicle standard is to specify requirements for braking of trailers under both normal operating and emergency conditions.

Please refer to [Vehicle Standard \(Australian Design Rule 38/05 – Trailer Brake Systems\) 2018](#) for additional information.

As the ADRs are updated, the proposed Directional Stability Under Braking standard will automatically align.

## 3. Proposed transitional arrangements

To provide industry and affected stakeholders with sufficient time to make required business changes as a result of the DSUB standard amendments, the NHVR is proposing to use a staged approach to the implementation.

When developing the staged implementation approach, the NHVR has been guided by the approach applied when introducing changes to Australian Design Rules. This approach focuses on two stages: new designs and all new vehicles that have been adapted to reflect the structure of the PBS scheme.

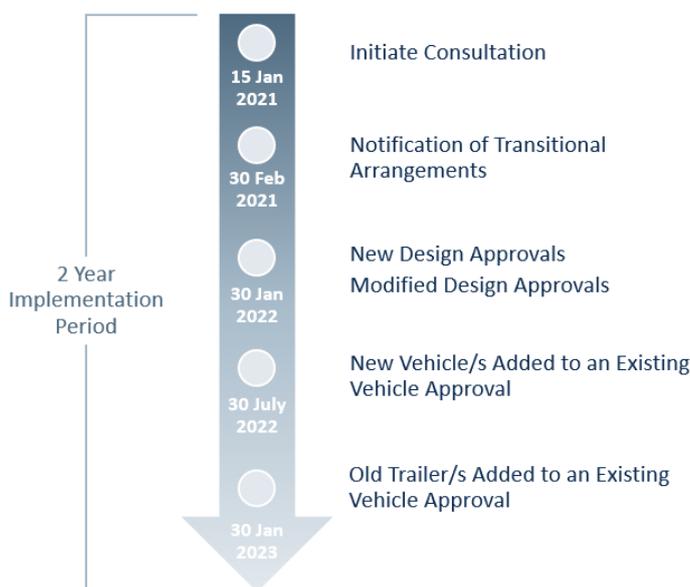


Figure 1. Proposed transitional arrangements timeline

### 3.1 Summary of proposed transitional arrangements

Compliance with current ADRs	Deemed to comply provision	No change	Proposed transition date
New Design Approvals	Vehicles exempt from ADRs (Dollies, more than 4 axles, etc.)	Old hauling units added to a Vehicle Approval	30 January 2022
Amend Design Approvals	Vehicles exempt from ADRs (Dollies, More than 4 axles, etc.)	Existing Vehicle Approvals	30 January 2022
New Vehicle/s added to a Vehicle Approval	Vehicles exempt from ADRs (Dollies, More than 4 axles, etc.)		30 July 2022
Old Trailer/s Added to a Vehicle Approval	Vehicles exempt from ADRs (Dollies, More than 4 axles, etc.)		30 January 2023

Table 2. Summary of proposed transitional arrangements

### 3.2 New Design Approvals

From 30 January 2022, all new DA applications submitted to the NHVR must comply with the amended DSUB standard requirements.

This means that from 30 January 2022, all vehicles that enter the scheme for the first time under a new DA will need to comply with the latest ADRs (ADR35 or ADR38) including ensuring that the combinations are fitted with the latest safety technology such as ABS, ESC and RSS as applicable.

### 3.3 Modified Design Approvals

From 30 January 2022, all applications to modify (amend or vary) a DA must comply with the new DSUB standard requirements.

This means that from 30 January 2022, all vehicles that enter the scheme for the first time under a modified DA will need to comply with the latest ADRs (ADR35 or ADR38). This will ensure that the combinations are fitted with the latest safety technology including ABS, ESC and RSS.

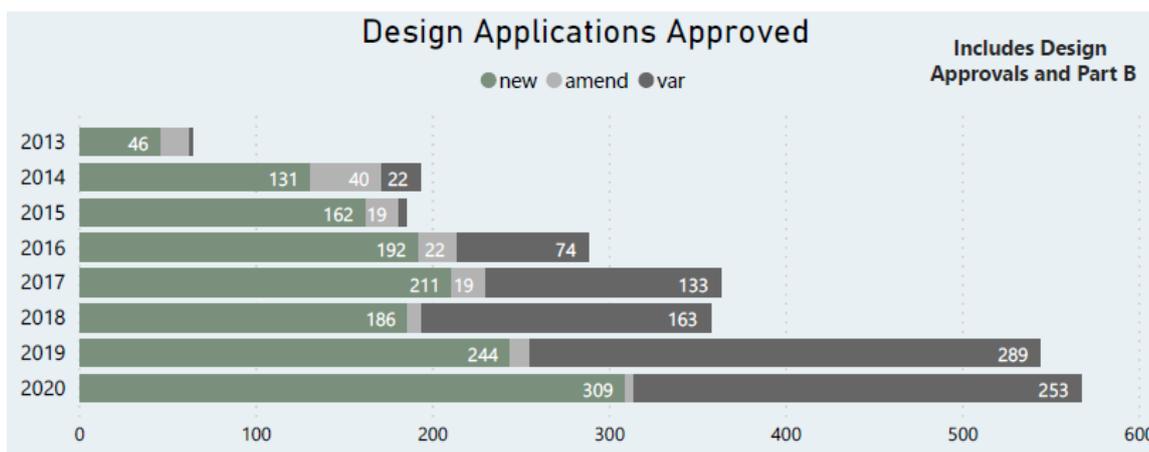


Figure 2. Design Approval Amendments vs Variances

Any changes that are made to DAs to upgrade braking requirements will not require a submission to the PBS Review Panel (PRP).

### Key considerations when modifying DAs

Some existing DAs will have a number of VAs issued to it. The NHVR proposing the following approach if only one variant on the DA requires amending:

- Issue a new separate DA that all relevant VAs (that meet the newer standards) will be issued to.
- Use the current NHVR internal processes to manage changes to DAs, while noting that this process may be updated as part of improvements to business processes.
- Change the VA issuing process where a singular VA would include only one vehicle layout. (This project is currently out of scope for the Standards Review, however, could assist with implementing the required changes).<sup>1</sup>

## 3.4 New vehicle/s added to an existing Vehicle Approval

From 30 July 2022, all component vehicles that have not previously been in the PBS scheme and that are added to a VA must comply with the amended DSUB standard requirements.

This means that from 30 July 2022, all vehicles that enter the scheme for the first time (regardless of their manufacture date) will need to comply with the latest ADRs (ADR35 or ADR38). This will ensure that the combinations are fitted with the latest safety technology including ABS, EBS and RSS.

Newly manufactured vehicles will all be built to the latest ADR standards and will already be fitted with the required braking technology. This means that there will be minimal impact to any new vehicle components being added to a VA as they will already be compliant.

Where the specification of a vehicle being added to a VA is different from that outlined in the DA, updates to the DA will be required.

## 3.5 Existing Vehicle Approvals

The PBS scheme has been operating under the current DSUB standard since 2007 and since then, almost 11,000 heavy vehicle combinations have been approved under PBS, and 8,485 VAs have been issued.

Existing vehicles will not be required to be retrofitted with advanced braking systems provided they operate under the original VA issued for the vehicle.

This will help mitigate:

- costs of retrofitting the majority of the PBS fleet
- time (and cost) implications of having vehicles out of action while being retrofitted
- time needed for PBS Assessors to re-assess majority of the PBS fleet (and removing the cost of this for customers)
- time needed for the PRP to review the updated performance of newly retrofitted vehicles
- processing time needed for the NHVR to update all DAs/VAs with the newly retrofitted vehicles.

---

<sup>1</sup> The proposed approach will aim to 'break down' large VAs so that each vehicle layout is separated and embedded in a 'mini-VA' specific to a particular vehicle layout. VAs are issued by the NHVR based on certification requests submitted to the PBS Team by approved PBS Certifiers (Certifiers). To ensure the new VA process is robust, the PBS certification submission process must also be modified to ensure that it supports the new VA structure. As such, it is proposed that vehicle certification requests are submitted on a per-vehicle-layout basis. This is in contrast with the current system where Certifiers are allowed to submit multiple vehicle layout drawings combinations in a single certification submission. For further information about variations and amendments, please see Design Approval modification process on the NHVR website.

The proposed transitional arrangements also allow PBS vehicles that are already approved to continue operating as is and will allow a gradual transition as vehicle components are replaced or upgraded.

### 3.6 Old trailer/s added to an existing Vehicle Approval

From 30 January 2023, any trailers that are added to a Vehicle Approval must comply with the amended DSUB standard requirements. This means that from 30 January 2023, all **PBS trailers, whether old or new**, will need to comply with the latest ADRs (ADR35 or ADR38). This will ensure the combinations are fitted with the latest safety technology including ABS, EBS and RSS.

Where the specification of a vehicle is being added to a VA is different from that outlined in the DA, updates to the DA will be required.

If a trailer is brought up to the new standard, a DA amendment is required, and the existing corresponding VA is affected. This will continue to be managed internally under the current processes.

### 3.7 Old hauling units added to a Vehicle Approval

If a motor vehicle has been in the PBS scheme prior to 1 July 2022 (Phase 3 implementation) it may continue to be used in PBS combinations without needing to be upgraded to comply with the revised DSUB standard.

This means that if the vehicle was covered by a VA prior to 1 July 2022, it may be added to other VAs without needing to be retrofitted with advanced braking systems.

The hauling unit will need to provide power for the technology that is fitted to the trailer/s. For additional information on how to connect advanced braking systems when operating a combination, please refer to [Vehicle Standards Guide 25 \(VSG-25\) Connecting Advanced Braking Systems in Combination](#).

It is important to note that wheel speed sensors may need to be fitted to the wheel and axle in order to implement the required brake control system technology.

## 4. Key impacts

The NHVR has considered the following key impacts of the proposed transitional arrangements and will aim to minimise any disruption to business operations, while ensuring any impact on safety is considered:

- Time required for PBS Assessors to re-assess any required DAs
- Time required for the PRP to review any required amendments to DAs
- Time required for businesses operating PBS vehicles in their fleet to prepare for these changes
- The cost of retrofitting vehicles with new braking technology
- Braking compatibility
- There are a large range of stakeholder groups with differing views and commercial interests (please refer to Appendix A, PBS Approval Process Summary).

### 4.1 Braking Compatibility

Braking compatibility issues may arise for this standard when mixing heavy vehicle braking technologies that are not necessarily compatible with each other.

To minimise the risk of mismatching braking systems in vehicle combinations, industry associations have developed a guide to help operators understand the requirements for compatible braking systems to their vehicles.

The guide states: “The mixing of brake technologies on heavy vehicle combinations should be implemented with caution. Mixing of brake technology systems can be satisfactorily achieved if the equipment choices and the settings are appropriate.”<sup>2</sup>

---

<sup>2</sup> *Guide to Braking and Stability Performance for Heavy Vehicle Combinations, May 2017.*

## 5. Benefits

The introduction of the new braking standard will ensure the PBS fleet continues to operate at a higher safety performance than available prescriptive alternatives. Each of the required braking technologies has their own individual safety benefits (see Table 4 for additional information).

Braking Technology	Benefits
Anti-lock Braking Systems (ABS)	<p>ABS assists the driver to maintain control of the vehicle and allows the vehicle to come to a more complete stop. It helps to reduce wheel lock up and ensure safety in the event that hard braking is required.</p> <p>ABS also assists with traction control and allows the wheels to have greater traction on the road. This allows for greater safety in unpredictable road conditions.</p> <p>ABS allows the driver to steer while simultaneously braking in order to avoid an incident.</p>
Electronic Stability Control (ESC)	<p>ESC is an active safety motor vehicle safety system that detects and prevents skids and rollovers. It works on dry, wet, icy, and gravel roads, helps drivers manage unexpected road hazards such as black ice or wildlife, and helps drivers 'crash safer' by preventing deadly rollovers and side collisions.<sup>3</sup></p>
Roll Stability Systems (RSS)	<p>RSS assists the driver by automatically intervening if a high rollover risk is detected while driving.</p> <p>If a high rollover risk is detected, RSS works to immediately reduce the vehicle's speed to minimise any potential risk.</p>

**Table 3. Braking technology benefits**

## 6. Notification of transitional arrangements

On 30 February 2021, the NHVR will issue communications to the PBS industry to advise of transitional arrangements, as agreed following industry consultation. The following channels will be used to ensure all PBS stakeholders are properly informed of the changes:

- Direct email
- Website
- NHVR social media
- NHVR 'On the Road' newsletter
- Media release

Key PBS stakeholders:

- PBS Manufacturers
- PBS Suppliers
- PBS Assessors
- PBS Certifiers
- PBS Review Panel
- Jurisdictions and Road Managers
- Associations and Organisations
- Heavy vehicle industry operators

<sup>3</sup> *The Health Benefits of Electronic Stability Control, 2007*

---

## 7. Recommendation

In 2021, the NHVR will collect and consider all feedback received from stakeholders during the consultation period and will then provide an update on the implementation of the Directional Stability Under Braking standard to the relevant ministers, as part of the broader review under the PBS Review Project.

## Appendix A – Abbreviations

Abbreviation	Meaning
ABS	Anti-lock Braking Systems
ADR	Australian Design Rule
BAU	Business as Usual
DA	Design Approval
DSUB	Directional Stability Under Braking (PBS Standard)
ESC	Electronic Stability Control
ESP	Electronic Stability Program
RSP	Roll Stability Program
NHVR	National Heavy Vehicle Regulator
NTC	National Transport Commission
PBS	Performance Based Standards
PRP	PBS Review Panel
RSS	Roll Stability Systems
VA	PBS Vehicle Approval
VIN	Vehicle Identification Number

## Appendix B - References

Ice Cold Auto Repair. (2018, October 21). *The Benefits of Anti-Lock Braking Systems*.

<https://icecoldautorepair.com/>.

<https://icecoldautorepair.com/2018/10/the-benefits-of-anti-lock-braking-systems/>

Cottingham, D. (n.d.). How does anti-lock braking (ABS) work? Drive Knowledge Tests.

<https://www.driverknowledgetests.com/resources/how-does-anti-lock-braking-abs-work/>

Skinner, S. (2019, September 16). TRAILER TECHNOLOGY: TAKING THE EBS LEAD. ATN.

[https://www.fullyloaded.com.au/product-news/1909/trailer-technology-taking-the-ebs-](https://www.fullyloaded.com.au/product-news/1909/trailer-technology-taking-the-ebs-lead#:~:text=EBS%20%E2%80%93%20or%20%22brake%20by%20wire,year%2C%20anti%2Droll%20functions)

[lead#:~:text=EBS%20%E2%80%93%20or%20%22brake%20by%20wire,year%2C%20anti%2Droll%20functions](https://www.fullyloaded.com.au/product-news/1909/trailer-technology-taking-the-ebs-lead#:~:text=EBS%20%E2%80%93%20or%20%22brake%20by%20wire,year%2C%20anti%2Droll%20functions)

TANKER SAFETY: ROLL STABILITY REQUIREMENTS COMMENCE 1 JAN 2019 FOR ALL DG TANKERS THAT USE NSW ROADS.

(2018, December 7). ACAPMAG. [https://acapmag.com.au/2018/12/tanker-safety-roll-stability-requirements-commence-](https://acapmag.com.au/2018/12/tanker-safety-roll-stability-requirements-commence-1-jan-2019-for-all-dg-tankers-that-use-nsw-roads/)

[1-jan-2019-for-all-dg-tankers-that-use-nsw-roads/](https://acapmag.com.au/2018/12/tanker-safety-roll-stability-requirements-commence-1-jan-2019-for-all-dg-tankers-that-use-nsw-roads/)

Industry advisory: fitting of roll stability function on dangerous goods trailers Common questions and answers. (2014,

August 14). ARTSA. [https://www.artsa.com.au/assets/library/2014/artsa\\_advice\\_on\\_retro-](https://www.artsa.com.au/assets/library/2014/artsa_advice_on_retro-fitting_roll_stability_aug_2014.pdf)

[fitting\\_roll\\_stability\\_aug\\_2014.pdf](https://www.artsa.com.au/assets/library/2014/artsa_advice_on_retro-fitting_roll_stability_aug_2014.pdf)

Nicholson, G. (2007, July 18). THE HEALTH BENEFITS OF ELECTRONIC STABILITY CONTROL. British Columbia.

[https://www.health.gov.bc.ca/library/publications/year/2007/conversation\\_on\\_health/media/Electronic\\_Stability\\_Contr](https://www.health.gov.bc.ca/library/publications/year/2007/conversation_on_health/media/Electronic_Stability_Contr)

[ol.pdf](https://www.health.gov.bc.ca/library/publications/year/2007/conversation_on_health/media/Electronic_Stability_Contr)

ALRTA, ARTSA, ATA, CVIAA, HVIA, TIC. (2017, May). GUIDE TO BRAKING AND STABILITY PERFORMANCE FOR HEAVY VEHICLE COMBINATIONS. ARTSA.

[https://artsa.com.au/assets/library/2017/braking\\_advisory\\_web\\_version\\_final\\_2\\_may\\_17.pdf](https://artsa.com.au/assets/library/2017/braking_advisory_web_version_final_2_may_17.pdf)