PHASED TRACK OPTIONS

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PHASED TRACK OPTIONS
BACKGROUND

- Revised Draft 2020 Business Plan proposed phased track approach
  - Initially on 119-mile Madera to Poplar Avenue for system testing
  - Then on Merced and Bakersfield extensions for interim service
- Basis for proposal
  - Defer portion of initial capital and maintenance costs
  - Manage cash flow and deliver operating segment within available funding
  - Without diminishing operational performance or safety
- Authority has received questions about this approach
  - Purpose today is to provide additional information; and
  - Answer Board member questions.
- Going forward, staff proposes further evaluation of the concept
  - Conduct additional analysis on issues and trade-offs both near and long-term
  - Evaluation will be further informed by Track & Systems bids (due in June 2021)

SINGLE-TRACK ALTERNATIVE
BENEFITS

- Single-track option allows the Authority to defer significant capital costs
- Maintenance costs for single-track will be lower
- Passing tracks at stations and key locations along route
- Operational performance will not be diminished
  - » Still meets Merced to Bakersfield Interim Service Plan Requirements
  - » Still provides 18 trains per day, 90-100 minute travel time savings, reliability
- Second track will be installed as travel demands require or when system extended beyond Merced/Bakersfield
- Actual capital costs will be determined by the Track and Systems bids due July 2021
  - » Authority requested bidders to submit two options: (1) two lines installed simultaneously; and (2) installing them in two phases.

HIGH-SPEED TRAINS ON SINGLE-TRACK
AROUND THE WORLD

USA (planned)

- Brightline West (formerly Xpress West)

Spain (in-service)

- Valladolid:Venta de Banos – Palencia – Leon

Germany (in-service)

- DB ICE: Weddel Loop in northern Germany

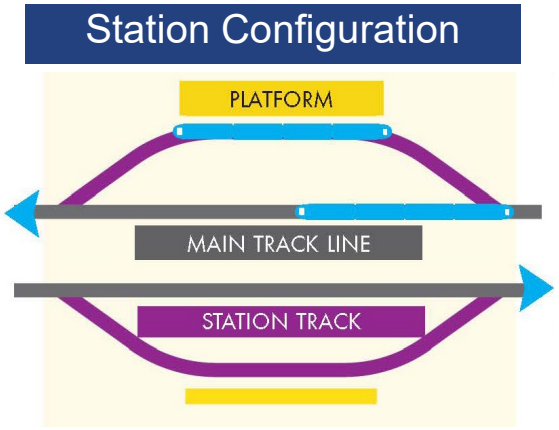
France (in-service)

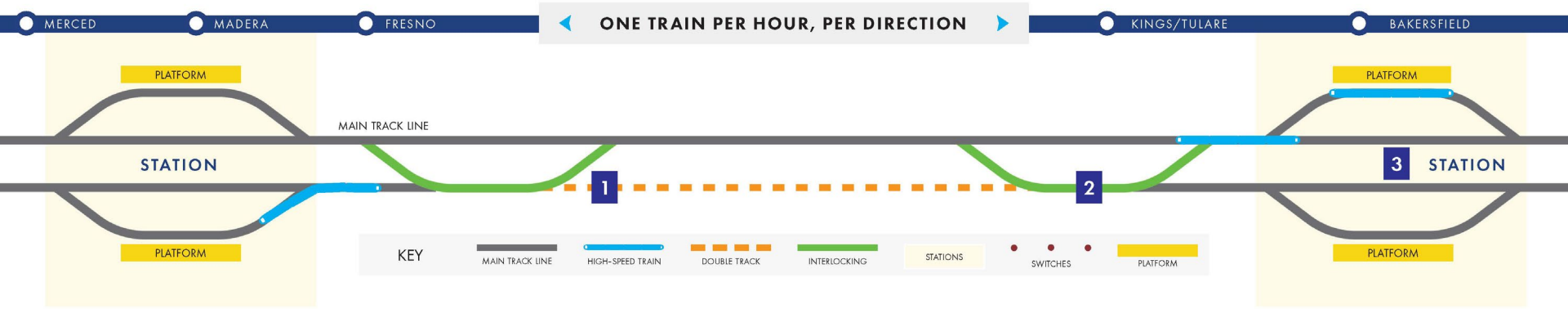
- TGV: Dole to Vallorbe (part of the line from Paris to Lausanne)

SINGLE-TRACK ALTERNATIVE

ALIGNMENT CONFIGURATION

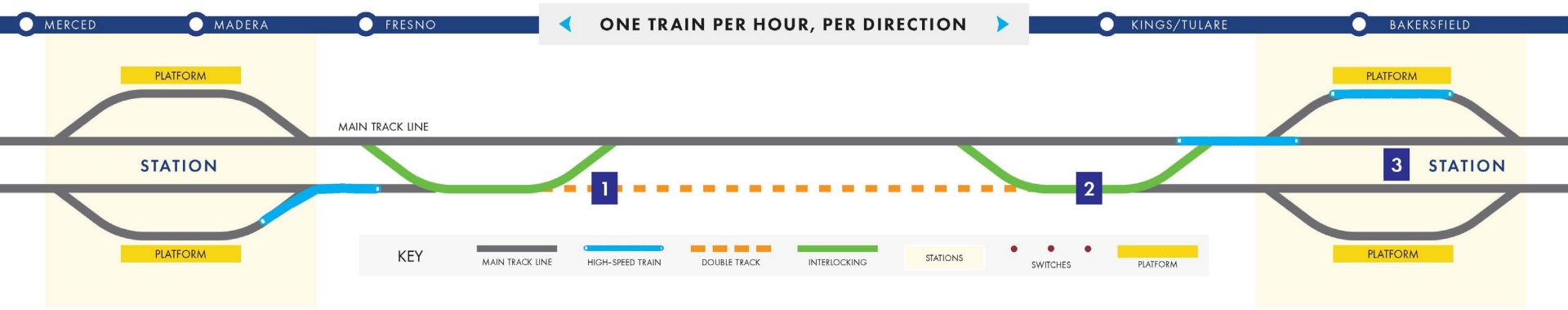
- **All trains are scheduled to meet and pass at one of six locations**
- **Specifically, four stations and two Maintenance of Way (MOW) sites that will have full final build-out**
- **Four stations: Merced, Madera, Kings Tulare and Bakersfield**
  - These stations will have four tracks -- two station tracks/two mainline tracks
- **Two MOW sites: south end of Fresno and Corcoran**
  - These MOW sites will have two mainline tracks
- **Single track will be installed between these six locations**





SINGLE-TRACK ALTERNATIVE
OPERATION AND MAINTENANCE

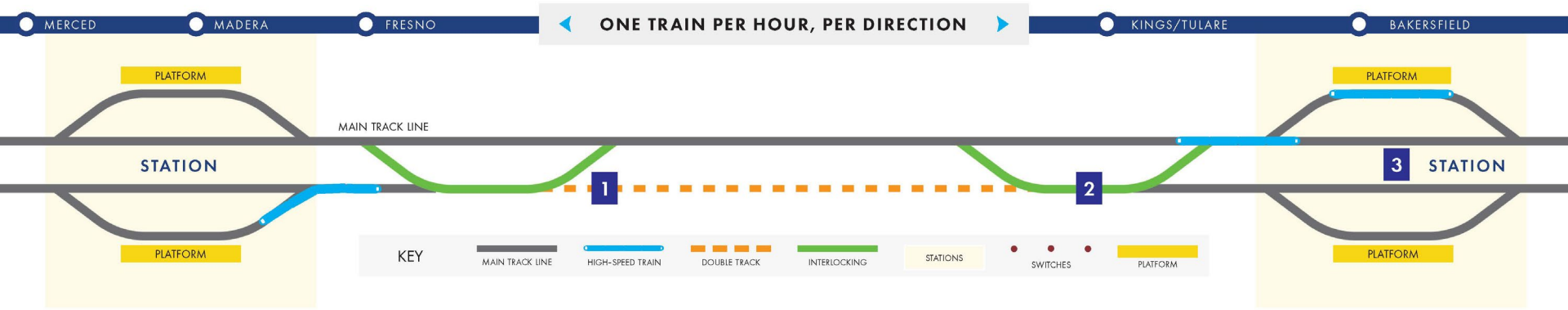
- **Single-track configuration supports the service plan**
  - » Developed by Early Train Operator and presented in 2018 and Draft 2020 Business Plans
  - » One train per hour per direction for eighteen hours per day
  - » Maintenance will take place during non-service hours – from 11 p.m. to 5 a.m.
- **Trains will pass each other at station locations**
- **Trains will operate at speeds up to 220 mph**



SINGLE-TRACK ALTERNATIVE

SAFETY

- **The double-track and single-track configurations are equally safe**
- **A state of the art, fail safe, signal and communication system is being installed**
  - » The system is continuously self-monitoring
  - » Trains are automatically stopped in case of a system abnormality
- **Both configurations allow bi-directional operations on all tracks**
- **The signal system will be tested and certified as safe for operation by:**
  - » The Track and Systems design builder;
  - » An independent safety assessor; and
  - » The Federal Railroad Administration.
- **This type of signal system and certification approach is -- and has been-- used on high-speed rail systems around the world (Europe and Asia)**



SINGLE-TRACK ALTERNATIVE

SLIGHT IMPACT ON RIDERSHIP

Annual Ridership	Demand Model Output				Estimates - Pro-Rating Approach
					(1)(2)
Service	2017 Existing	2029 No Build	**2029 HSR**	2029 Downside	**2029 Single Track 220 mph 5% Pad**
HSR	---	---	**2,049,000**	1,656,000	**1,895,000**
San Joaquins	1,103,000	1,778,000	**3,111,000**	2,983,000	**3,075,000**
ACE	1,503,000	2,191,000	**4,572,000**	4,394,000	**4,529,000**
Thruway Bus BFD	258,000	341,000	**668,000**	594,000	**645,000**
Other Thruway Bus	470,000	587,000	**1,441,000**	1,395,000	**1,462,000**
Total System	2,606,000	3,969,000	**8,776,000**	8,283,000	**8,558,000**
	Total System	Difference vs. 2029 HSR		**-493,000**	**-218,000**
		Percent Difference		-5.6%	-2.5%
	HSR	Difference vs. 2029 HSR		**-393,000**	**-154,000**
		Percent Difference		-19.2%	-7.5%

Important Notes and Caveats:

(1) The numbers are based on a pro-rating approach of impacts to trip time, transfer time, reliability of connections and reliability of operation and represent order of magnitude estimates only. Actual demand model runs are required to evaluate changes of the single-track operation in detail on HSR and connecting services.
The numbers do not reflect the potential of lower on-time-performance of HSR services and related reductions of ridership due to single track operation.
(2) Different assumptions as compared to 2029 HSR Base Case: Assumes transfer time of 9 minutes in Merced (instead of 10 minutes), 76 minute end-to-end trip time instead of 82 minutes, 95% of connections can be made within the given transfer time and passengers do not fully value the pulse schedule and the transfer perception factor is set at 1.0 instead of 0.95.
Actual demand model runs are required to evaluate impacts of the single-track operation in detail on HSR and connecting services.

SINGLE-TRACK ALTERNATIVE

SLIGHT IMPACT ON REVENUE

Annual Revenue (2019 Dollars)	Demand Model Output				Estimates - Pro-Rating Approach
					(1)(2)
Service	2017 Existing	2029 No Build	**2029 HSR**	2029 Downside	**2029 Single Track 220 mph 5% Pad**
HSR	---	---	**$37,820,000**	$29,788,000	**$34,978,000**
San Joaquins	$24,280,000	$33,104,000	**$62,458,000**	$59,503,000	**$61,735,000**
ACE	$9,975,000	$14,607,000	**$45,265,000**	$42,536,000	**$44,839,000**
Thruway Bus BFD	$3,398,000	$4,498,000	**$8,799,000**	$7,816,000	**$8,496,000**
Other Thruway Bus	$7,515,000	$9,383,000	**$24,492,000**	$23,715,000	**$24,849,000**
Total System	$45,168,000	$61,592,000	**$178,834,000**	$163,358,000	**$174,897,000**
	Total System		Difference vs. 2029 HSR	**-$15,476,000**	**-$3,937,000**
			Percent Difference	-8.7%	-2.2%
	HSR		Difference vs. 2029 HSR	**-$8,032,000**	**-$2,842,000**
			Percent Difference	-21.2%	-7.5%

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SINGLE-TRACK ALTERNATIVE

BENEFITS, RISKS & TRADE-OFFS

- **Single-track configuration benefits**
  - » Deferral of initial capital construction cost – saves $1 billion

    Capital savings can be used to progress construction on other elements
  - » Lower initial maintenance costs – 150 fewer miles of track to maintain until second track is built
  - » Slightly faster construction of Merced to Bakersfield line

    Not necessary to install approximately 150 miles of track
- **The single-track approach will be constructed to facilitate the installation of the second track by including:**
  - » All switches and interlockings;
  - » Final station configuration; and
  - » Providing tail tracks to minimize service interruptions during second track installation.

SINGLE-TRACK ALTERNATIVE

BENEFITS, RISKS & TRADE-OFFS

- **Single-track trade-offs and risks**
  - On-time passenger transfers at Merced becomes more critical for overall high-speed train reliability
  - Connections at Merced between San Joaquins, ACE and high-speed trains will need to be optimized to ensure reliable 10 minute transfers are achieved
  - Service delays on single-track sections could create reliability issues but new trains, new infrastructure with high reliability minimizes this risk to acceptable levels
  - Construction of the second track at a later time will cost more due to:

    Escalation/inflation; and

    Constructing adjacent to an operating railroad which is less efficient.

SINGLE-TRACK ALTERNATIVE

BENEFITS, RISKS & TRADE-OFFS

- **Double-track benefits**
  - » Increased operational flexibility allows greater opportunity to recover from service delays which corresponds to greater train schedule reliability.
  - » Second track costs will be lower if installed concurrently in a greenfield construction environment.
- **Double-track trade-offs/risk**
  - » Initial higher capital costs; and
  - » Higher maintenance costs for infrastructure not needed for initial service.

SINGLE-TRACK ALTERNATIVE

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