DIY Turbo Install for OEM Replacement
Vehicle: 2008 335i E92 335i AT (N54 engine)
Replacement Turbos: Vargas OEM replacements

Overview: I had a bad front turbo that was causing a lot of oil to burn off in my exhaust. Since I was on a serious budget, I did this myself on jack stands. If you choose to use this, I assume no responsibility for any damages or injuries to your vehicle or body.

If you see that I have missed anything, please let me know. I still have a ton of photos that didn't make the guide I am more than willing to share.

This is my first DIY so I apologize in advance for any errors in the following. If you have any questions, I will do my best to answer them.

I also changed my oil pan gasket in between turbo removal and install. Pretty straight forward, but have pics if anyone needs them.

Resources and other posts I used that may be helpful to you:

1. Radiator flush DIY: http://www.e90post.com/forums/showthread.php?t=551742

2. Single Turbo Install DIY (great for subframe removal): http://www.e90post.com/forums/showthread.php?t=1077600

3. RB Install DIY: https://www.bmwcca.org/forum/index.p...cs-guide.9756/

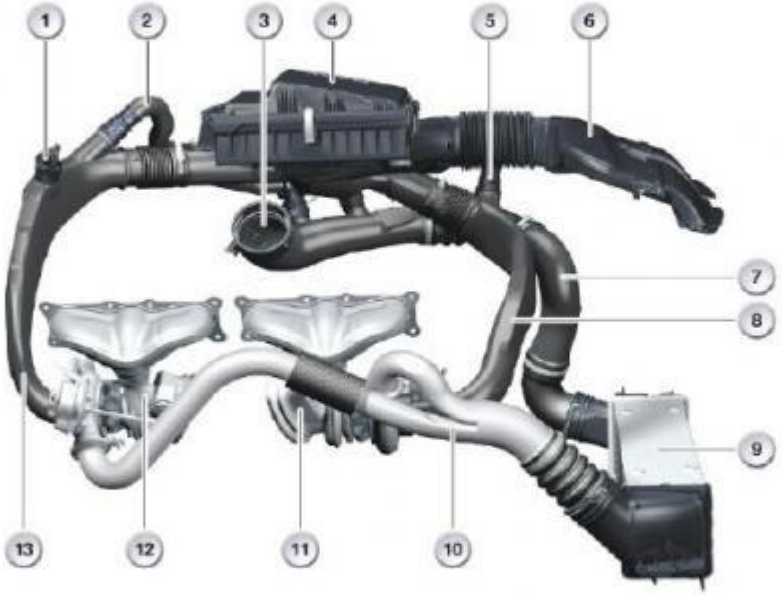
4. Bentley Manual

Prep Work:

1. Place vehicle on jackstands/ramps.
2. Remove all underbelly panels
3. Remove top panels, cabin filter, and valve cover
4. Remove front wheels

Air Management

With regard to the N54 engine, the air intake ducting plays a significant role due to the requirements for a turbocharged engine. In principle, the energy of the escaping exhaust gases is utilized to "precompress" the inducted fresh air and thus introduce a greater air mass into the combustion chamber. This is only possible if the air intake ducting is leak-free and installed properly.



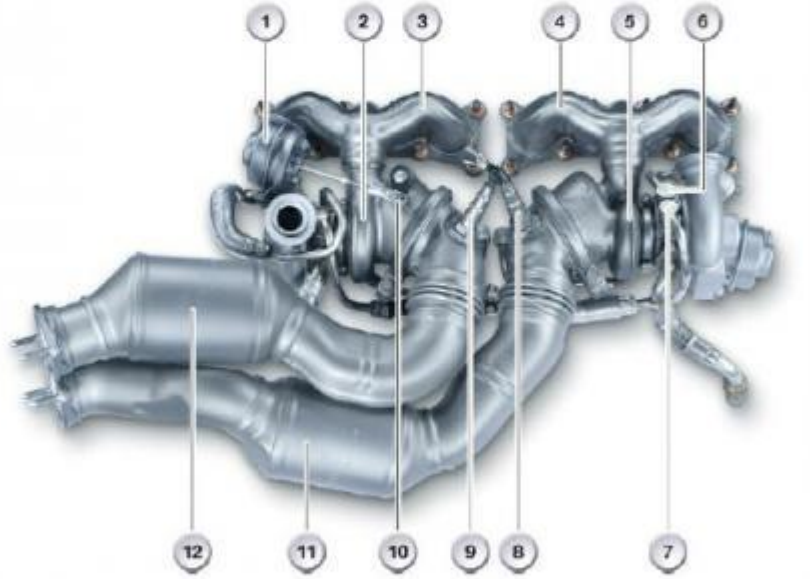
Index	Explanation	Index	Explanation
1	PTC heater, blow-by gases (in turbo mode)	8	Charge air suction line, bank 1
2	Recirculated air line, bank 2	9	Intercooler
3	Connecting flange, throttle valve	10	Charge air manifold
4	Air cleaner	11	Turbocharger, bank 1
5	Recirculated air line, bank 1	12	Turbocharger, bank 2
6	Air-intake snorkel	13	Charge air suction line, bank 2
7	Charge air pressure line		

Bi-turbocharging

Utmost importance is attached to turbocharger response in the N54 engine. A delayed response to the driver's command, i.e. the accelerator-pedal position, is not acceptable. The driver therefore must not experience any so-called "turbo lag".

This requirement is met in the N54 engine with two small turbochargers, which are connected in parallel. Cylinders 1, 2 and 3 (bank 1) drive the first turbocharger (5) while cylinders 4, 5 and 6 (bank 2) drive the second (2).

The advantage of a small turbocharger lies in the fact that, as the turbocharger runs up to speed, the lower moment of inertia of the turbine causes fewer masses to be accelerated, and thus the compressor attains a higher boost pressure in a shorter amount of time.



Index	Explanation	Index	Explanation
1	Wastegate actuator, bank 2	7	Coolant supply
2	Turbocharger, bank 2	8	Planar broad-band oxygen sensor, bank 1
3	Exhaust manifold, bank 2	9	Planar broad-band oxygen sensor, bank 2
4	Exhaust manifold, bank 1	10	Wastegate actuating lever
5	Turbocharger, bank 1	11	Catalytic converter, bank 1
6	Coolant return	12	Catalytic converter, bank 2

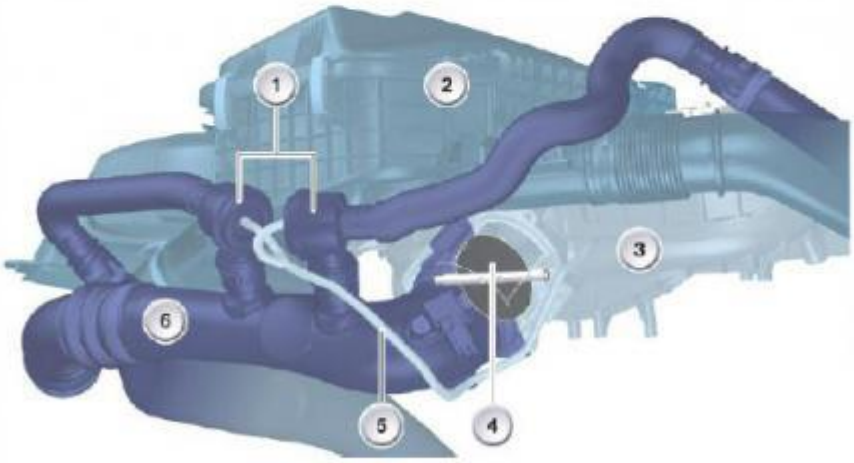
Blow-off Control

The blow-off valves in the N54 engine reduce unwanted peaks in boost pressure which can occur when the throttle valve closes quickly. They therefore have an important function with regard to engine acoustics and help to protect the turbocharger components.

A vacuum pressure is generated in the intake manifold when the throttle valve is closed at high engine speeds. This leads to a build-up of high dynamic pressure after the compressor which cannot escape because the route to the intake manifold is blocked.

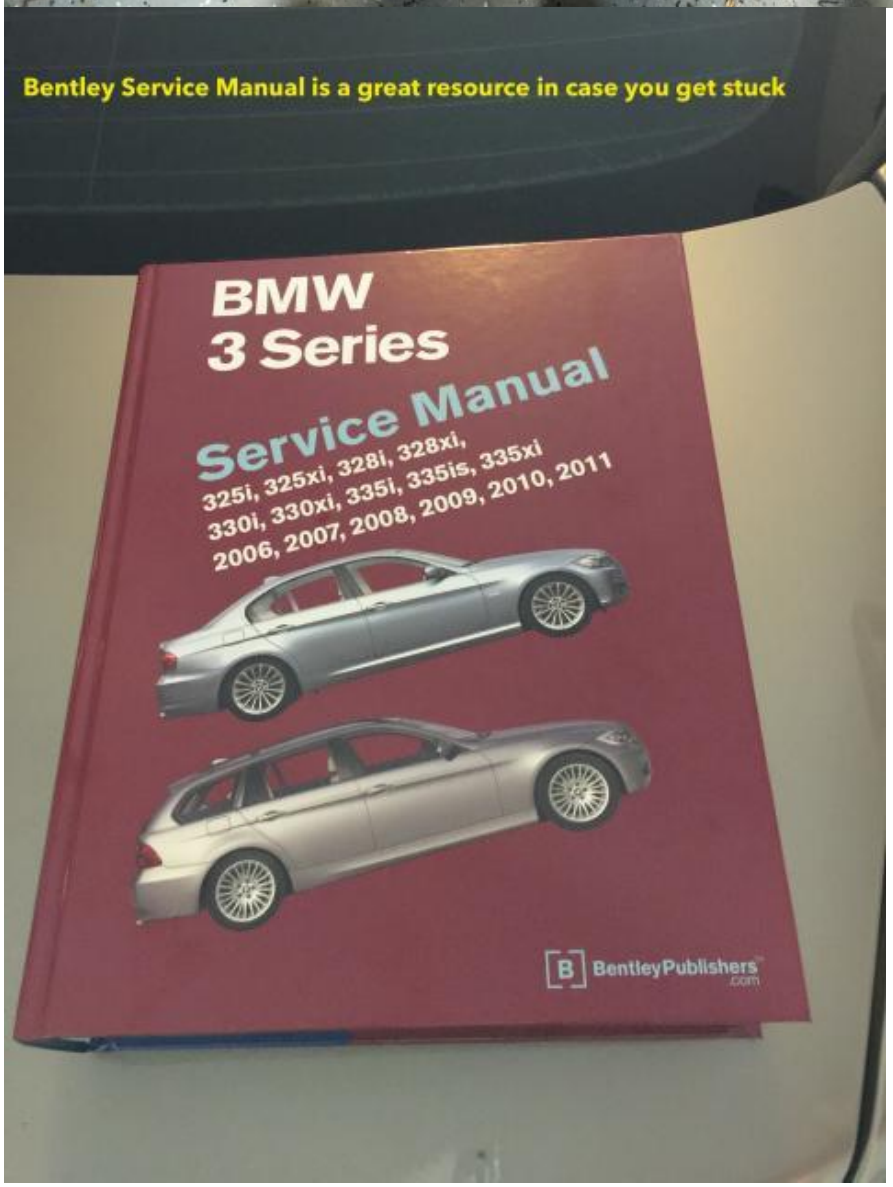
This leads to a "pumping up" of the turbocharger which means that:

- a clearly noticeable, disruptive pumping noise can be heard,
- and this pumping noise is accompanied by a component-damaging load being exerted on the turbocharger, since high-frequency pressure waves exert axial load on the turbocharger bearings



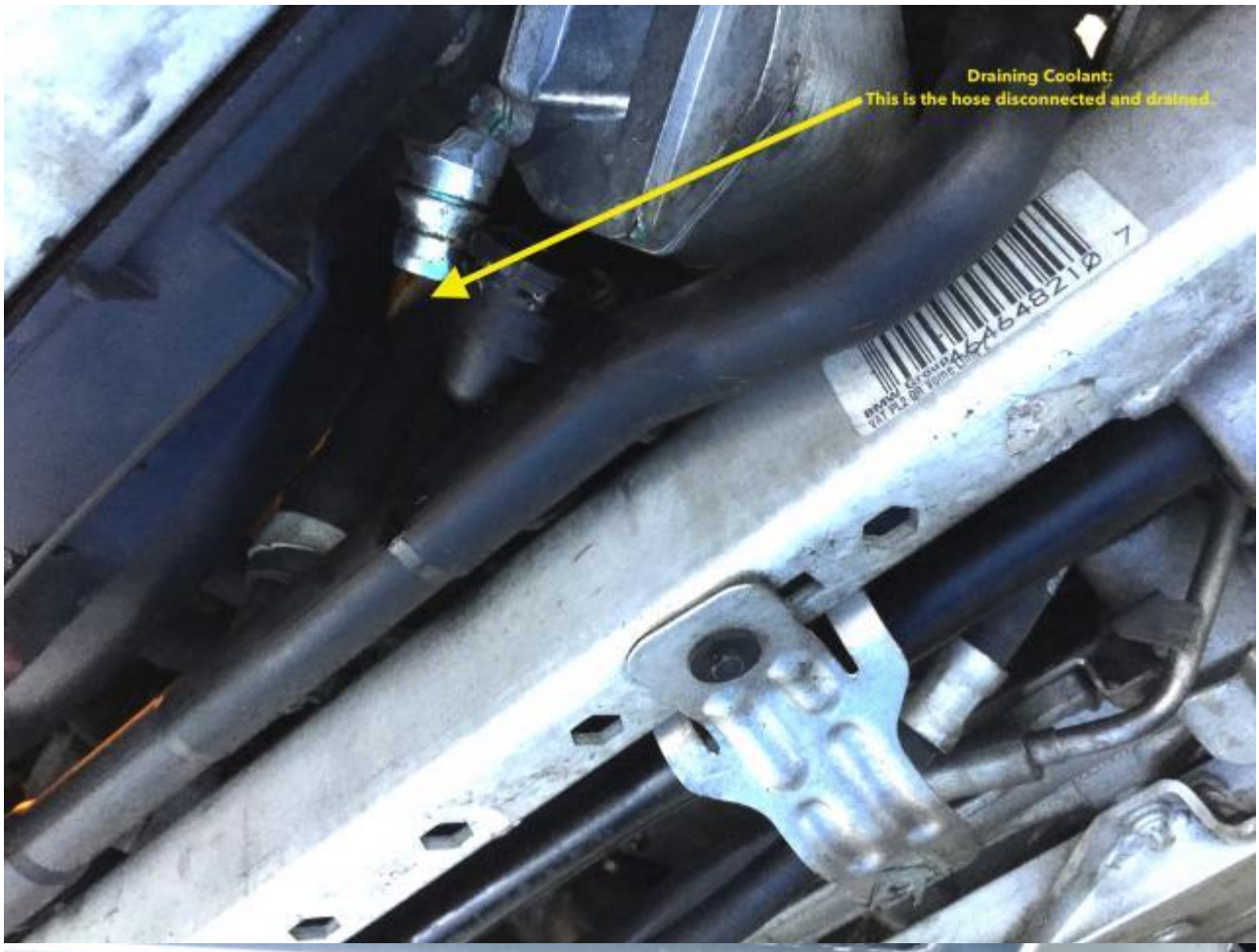
Index	Explanation	Index	Explanation
1	Blow-off valves	5	Throttle valve
2	Air cleaner (ambient pressure)	6	Control line, blow-off valves
3	Intake manifold	7	Charge air pressure line

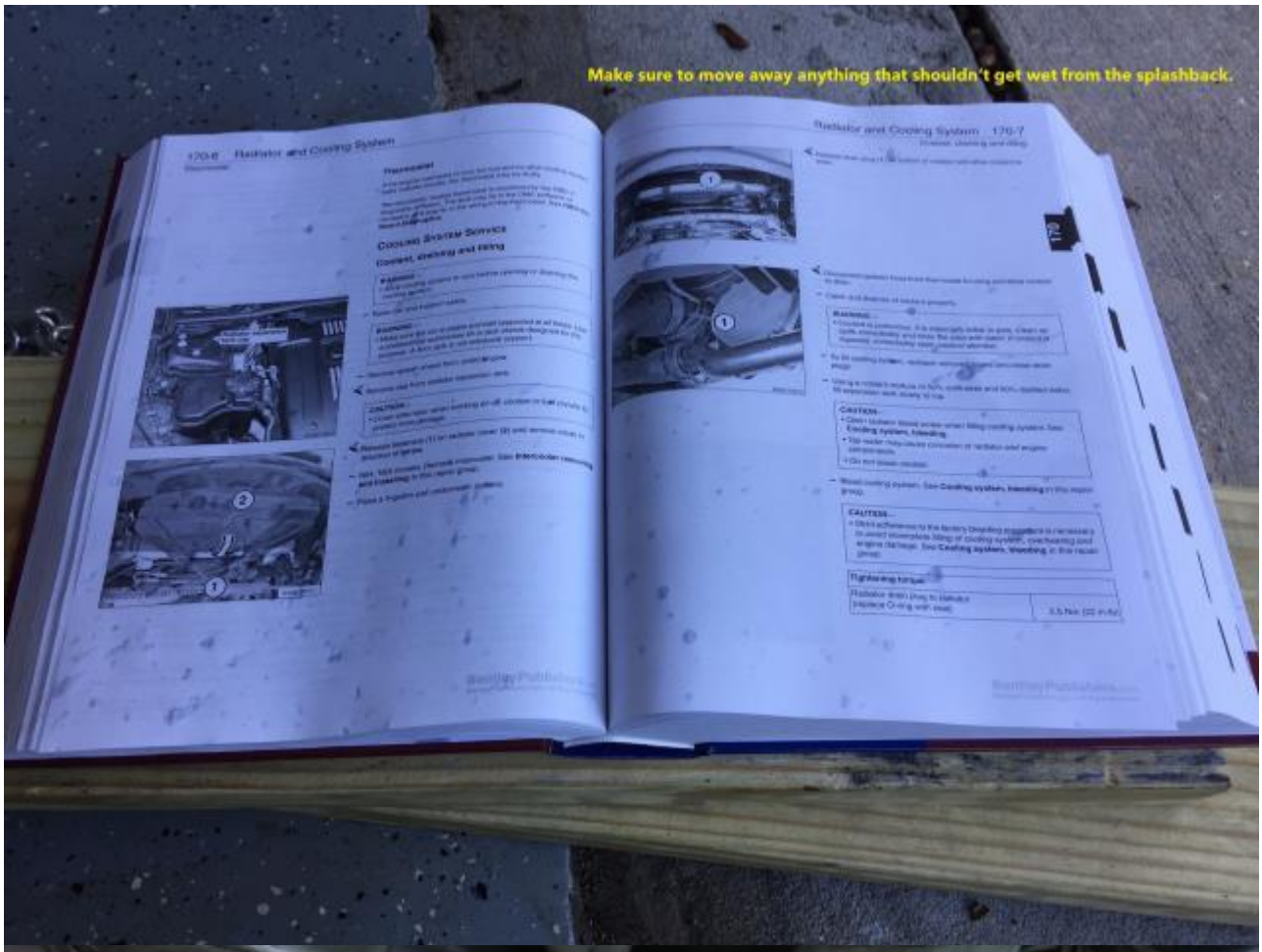

Properly label all of your nuts and bolts


Bentley Service Manual is a great resource in case you get stuck
BMW
3 Series
Service Manual
325i, 325xi, 328i, 328xi,
330i, 330xi, 335i, 335is, 335xi
2006, 2007, 2008, 2009, 2010, 2011
BentleyPublishers.com

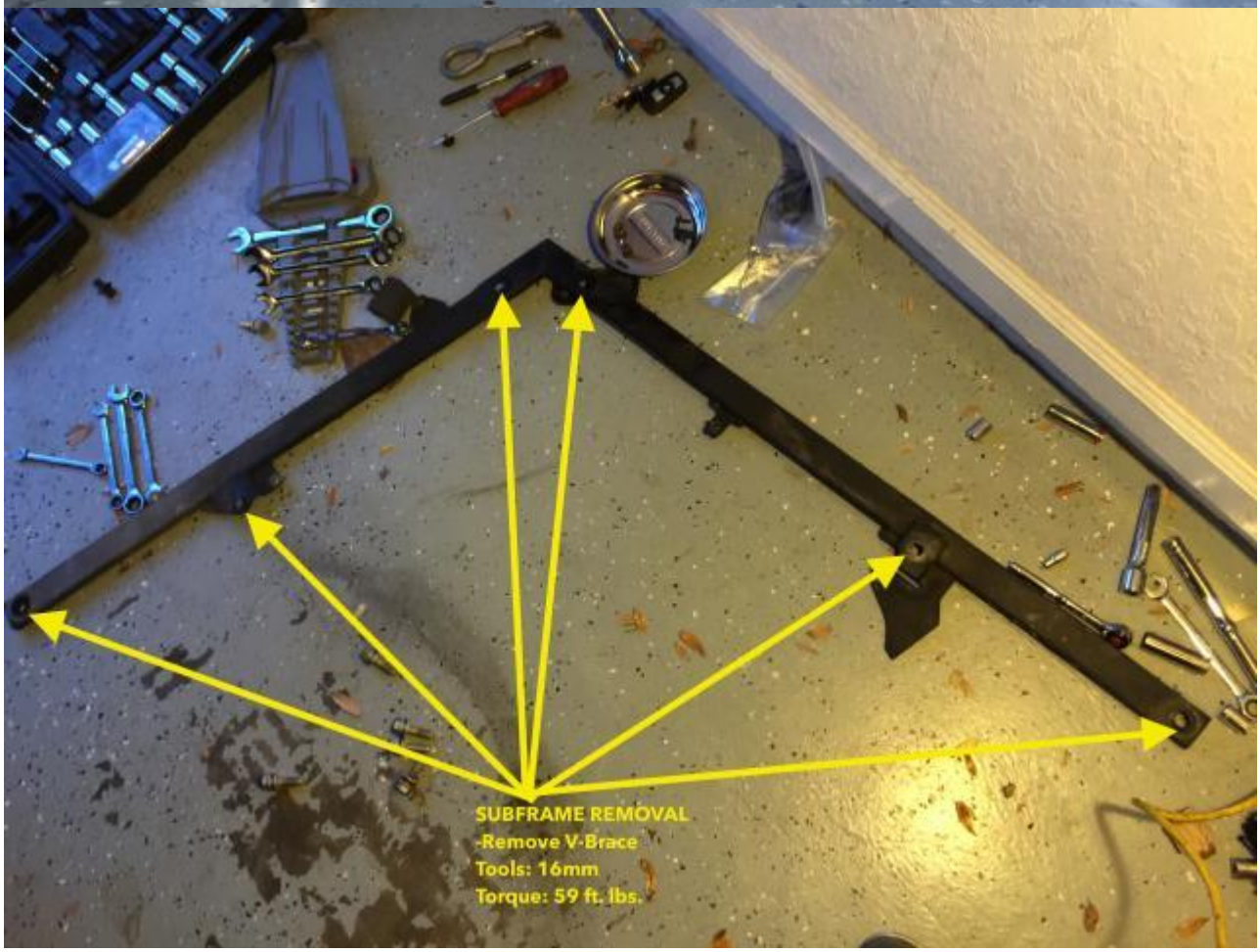

Open cap on radiator expansion tank.

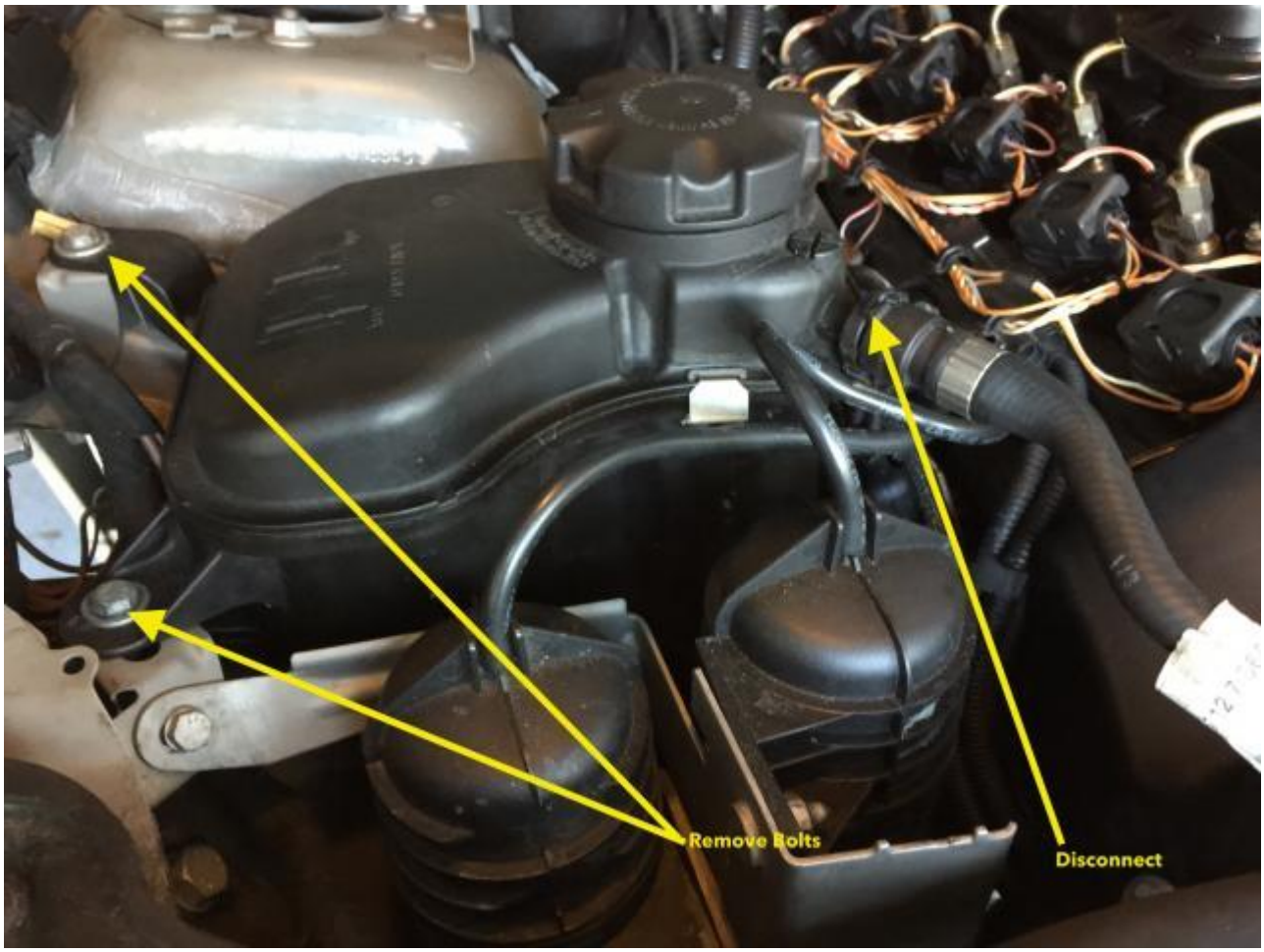

Draining Coolant:
Move this pin down and slide hose off.
Place bucket underneath to catch coolant.

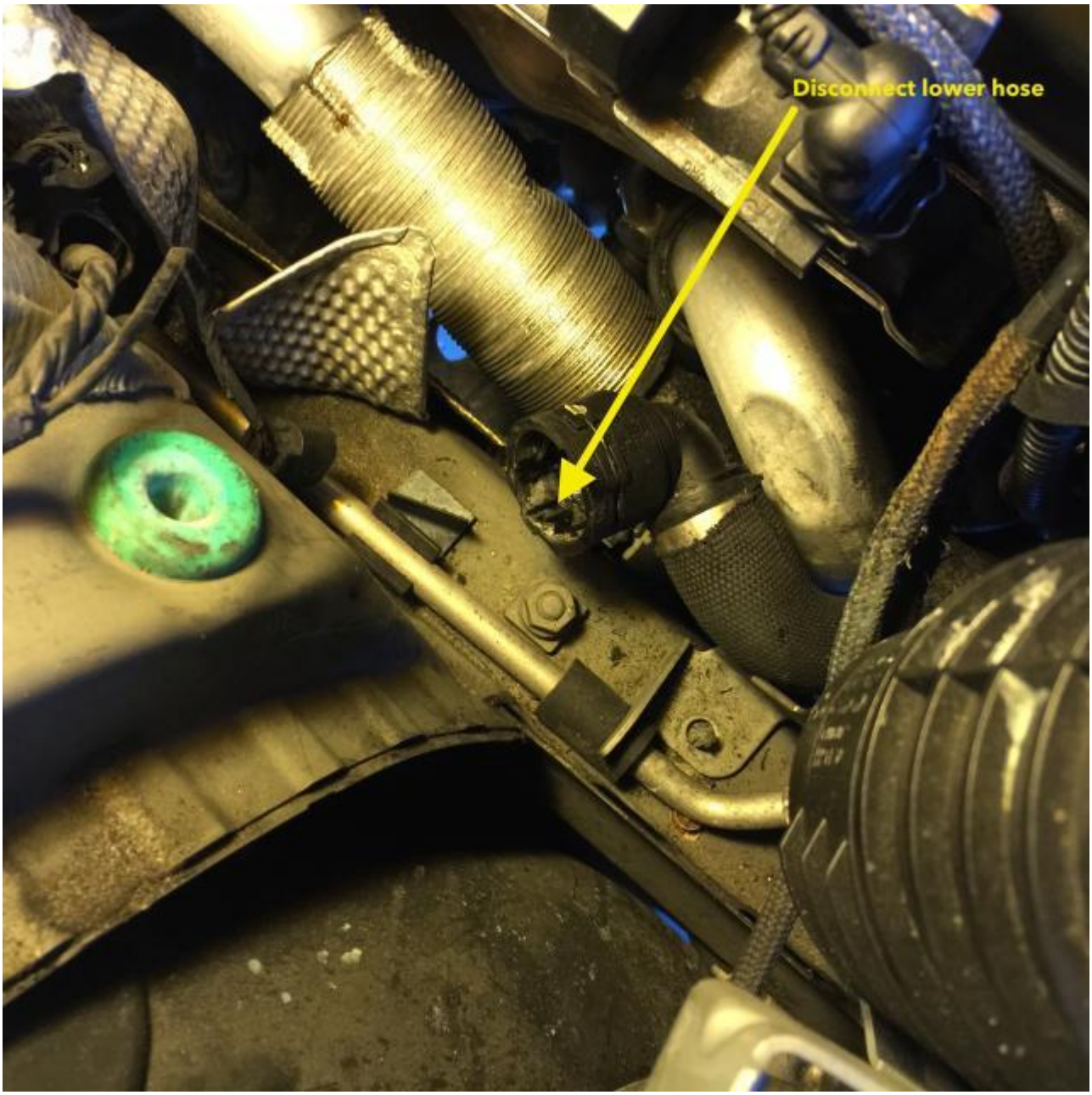

Draining Coolant:
This is the hose disconnected and drained.

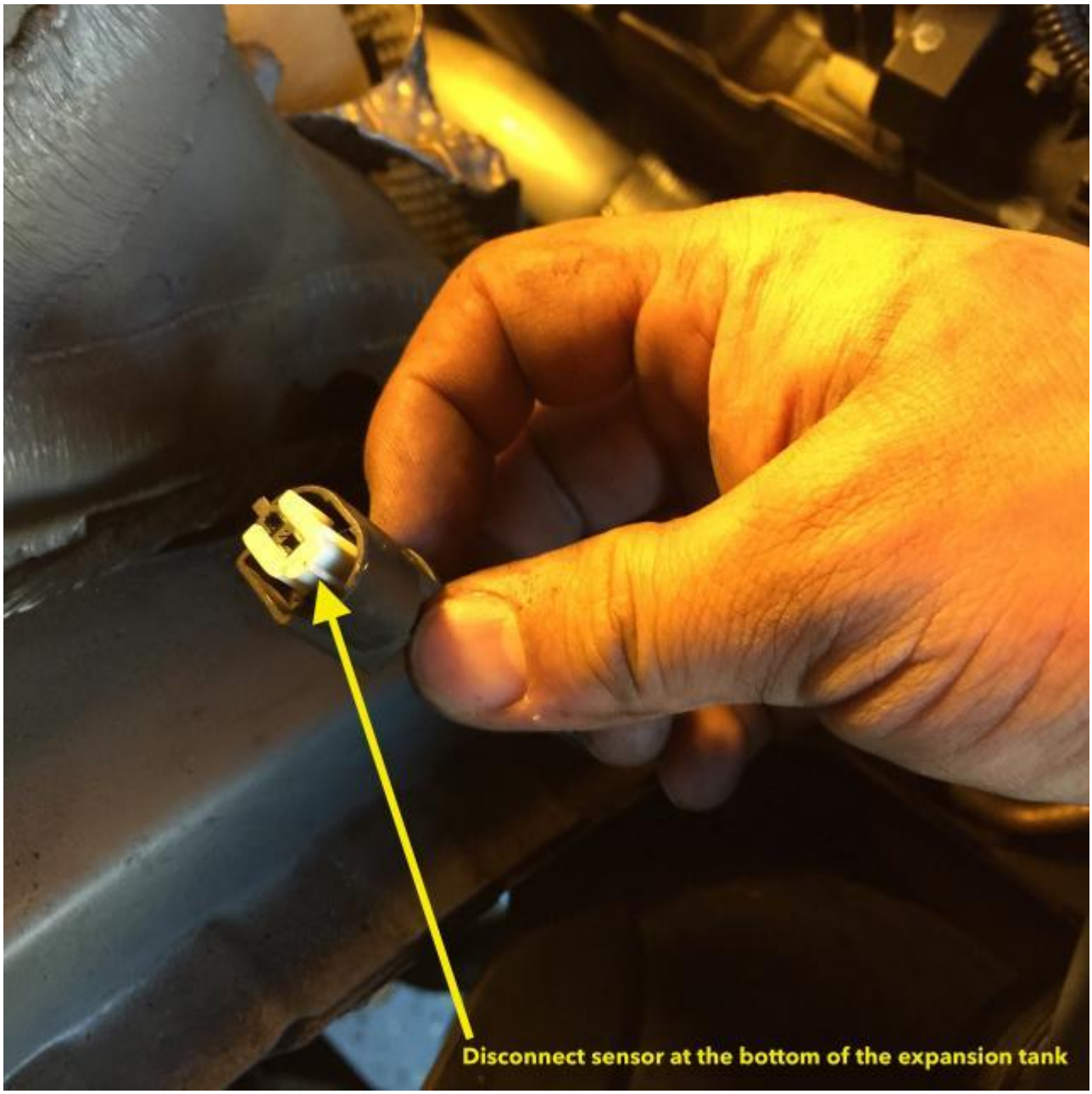

Make sure to move away anything that shouldn't get wet from the splashback.


OIL REMOVAL
-Remove oil drain plug
Tools: 17mm
Torque: 18.5 ft. lbs.

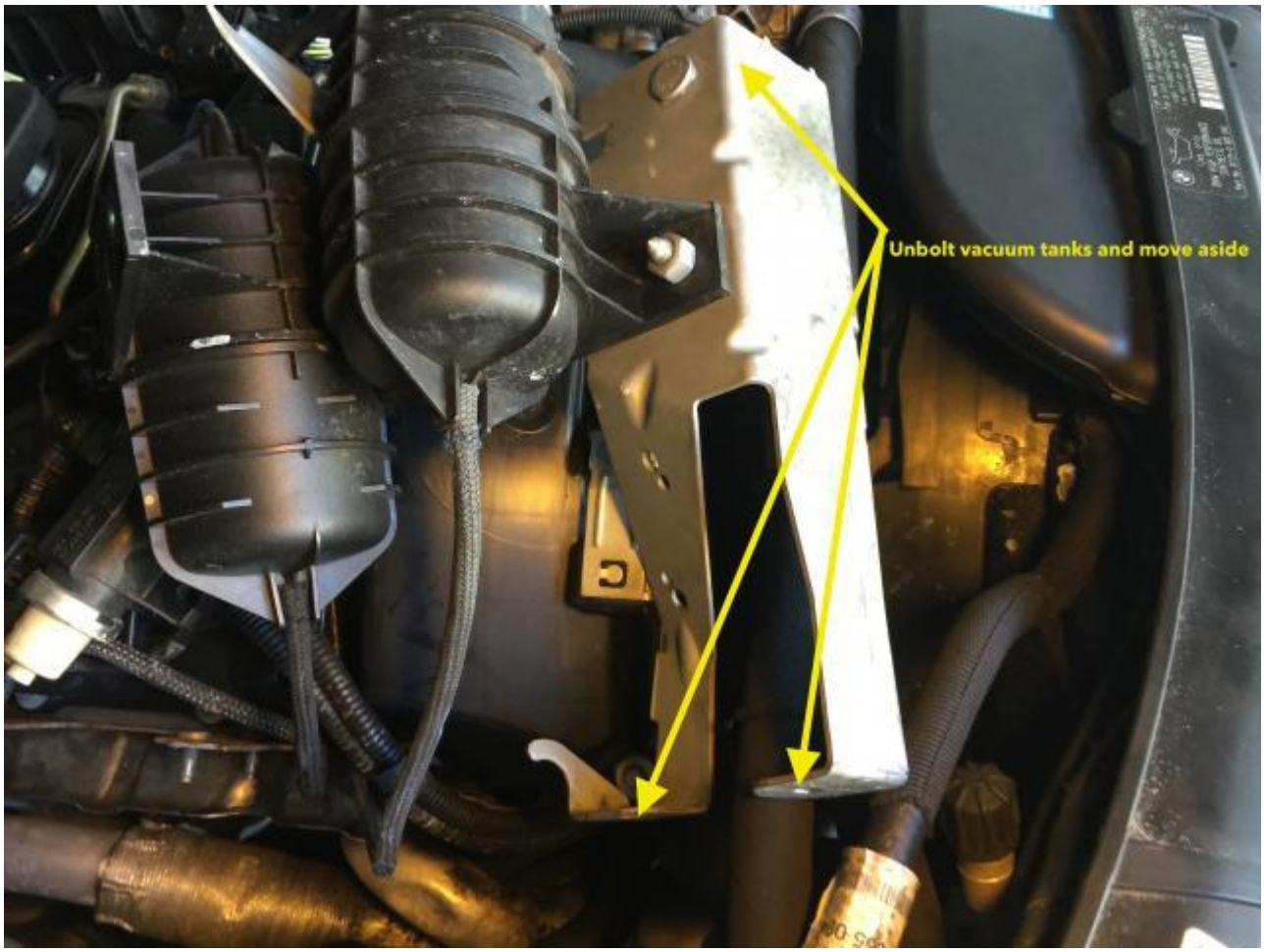

SUBFRAME REMOVAL
-Remove V-Brace
Tools: 16mm
Torque: 59 ft. lbs.

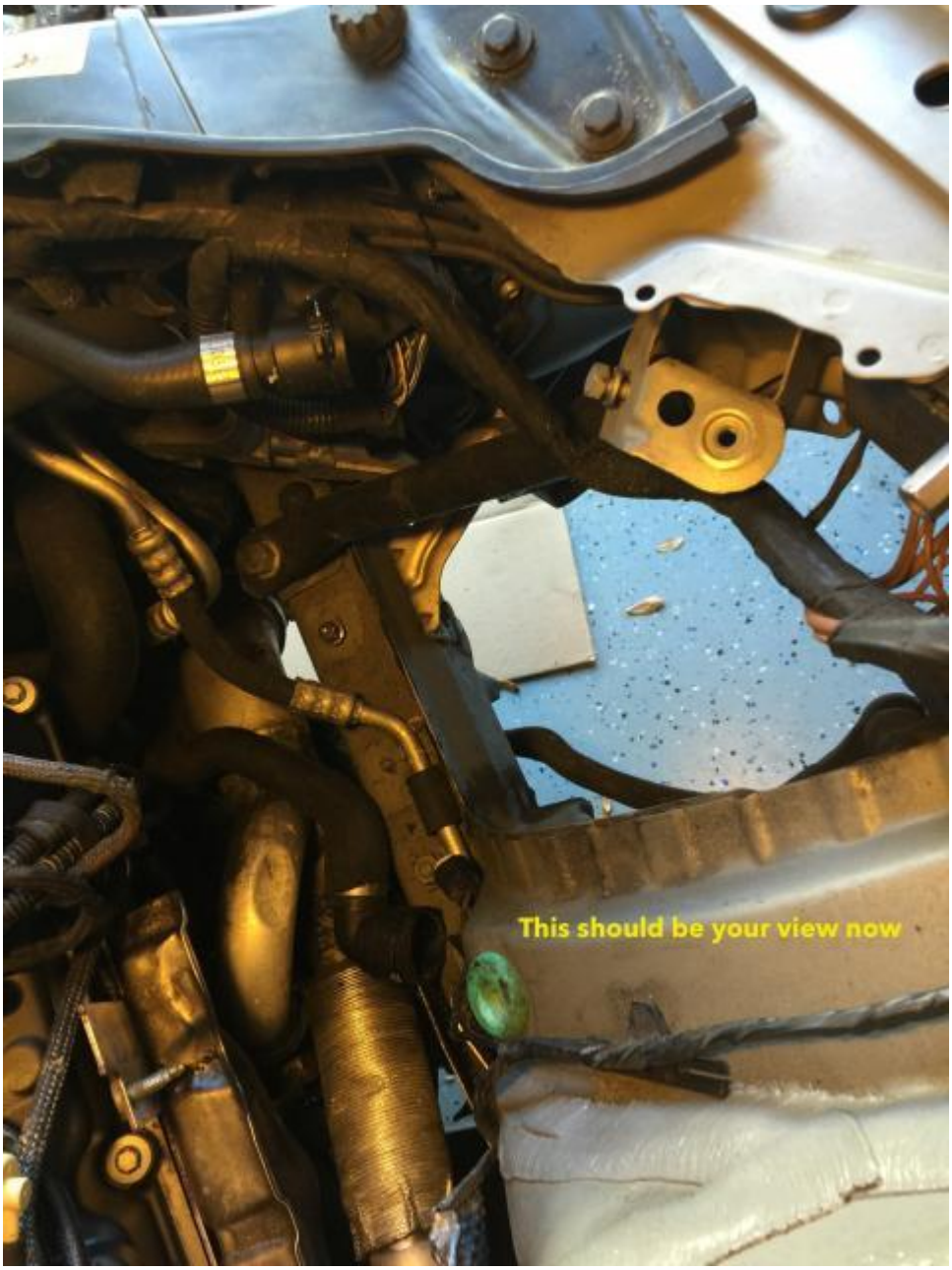

Remove Bolts
Disconnect

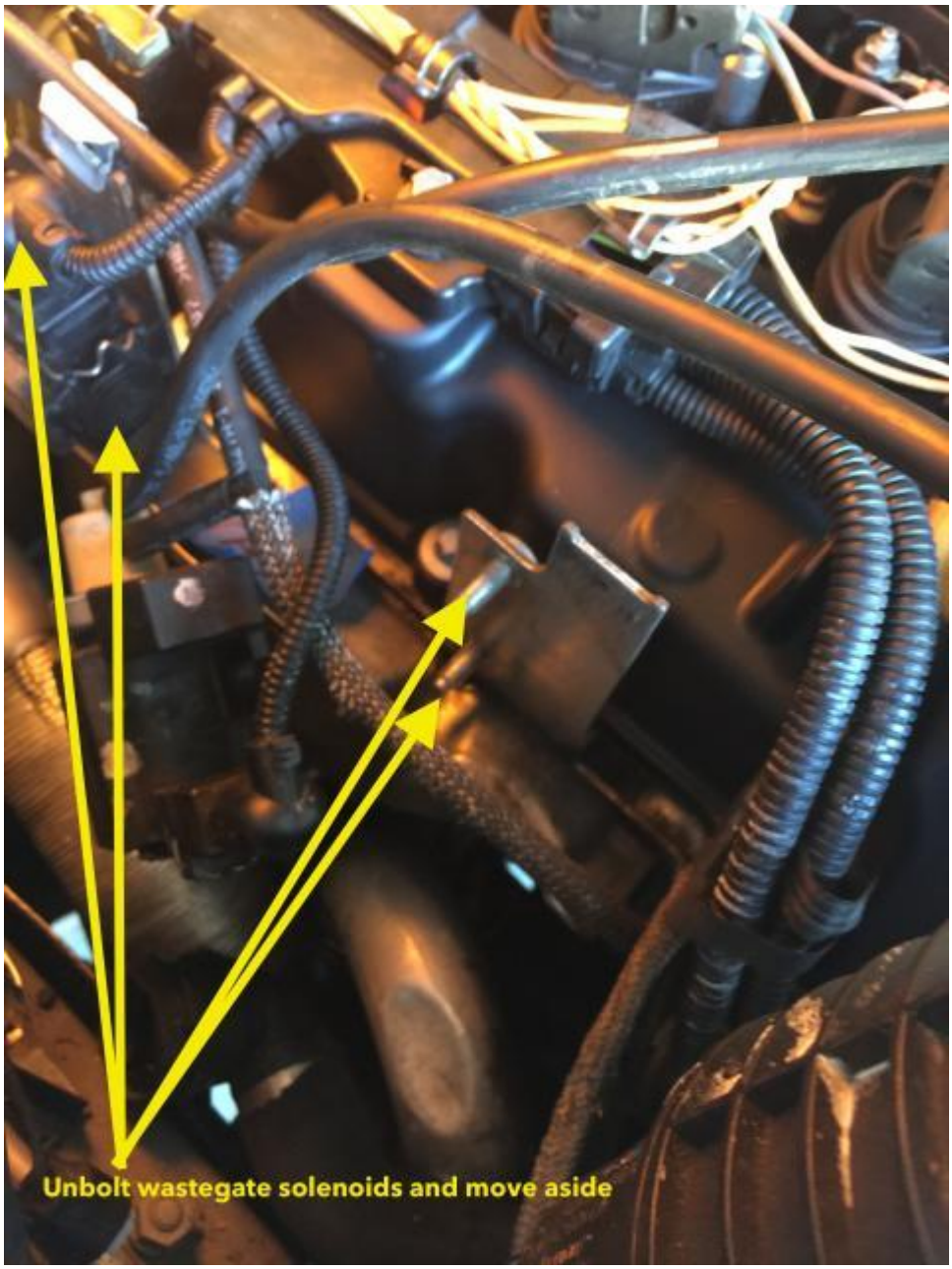

Disconnect lower hose

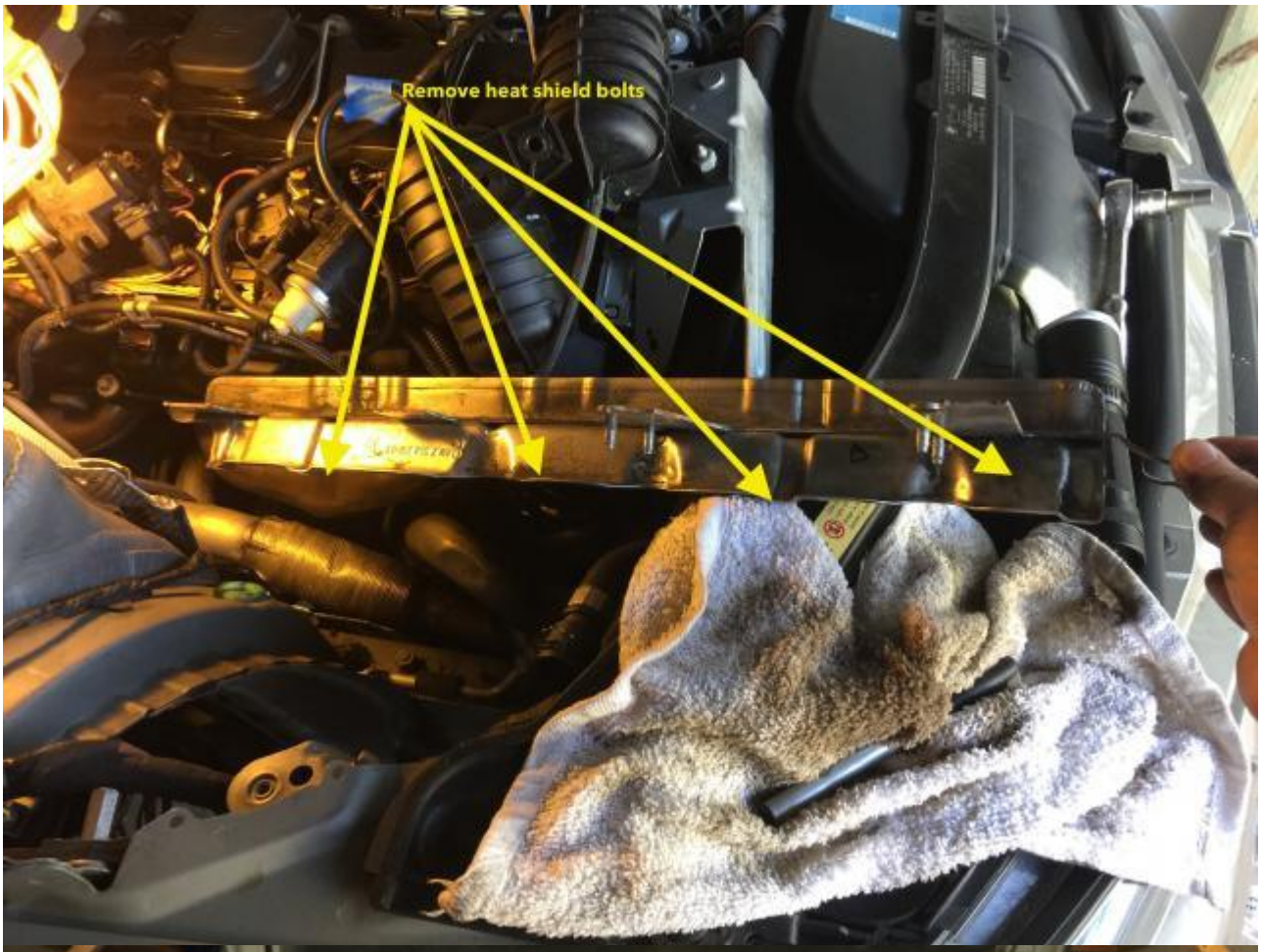

Disconnect sensor at the bottom of the expansion tank


Tank Removed

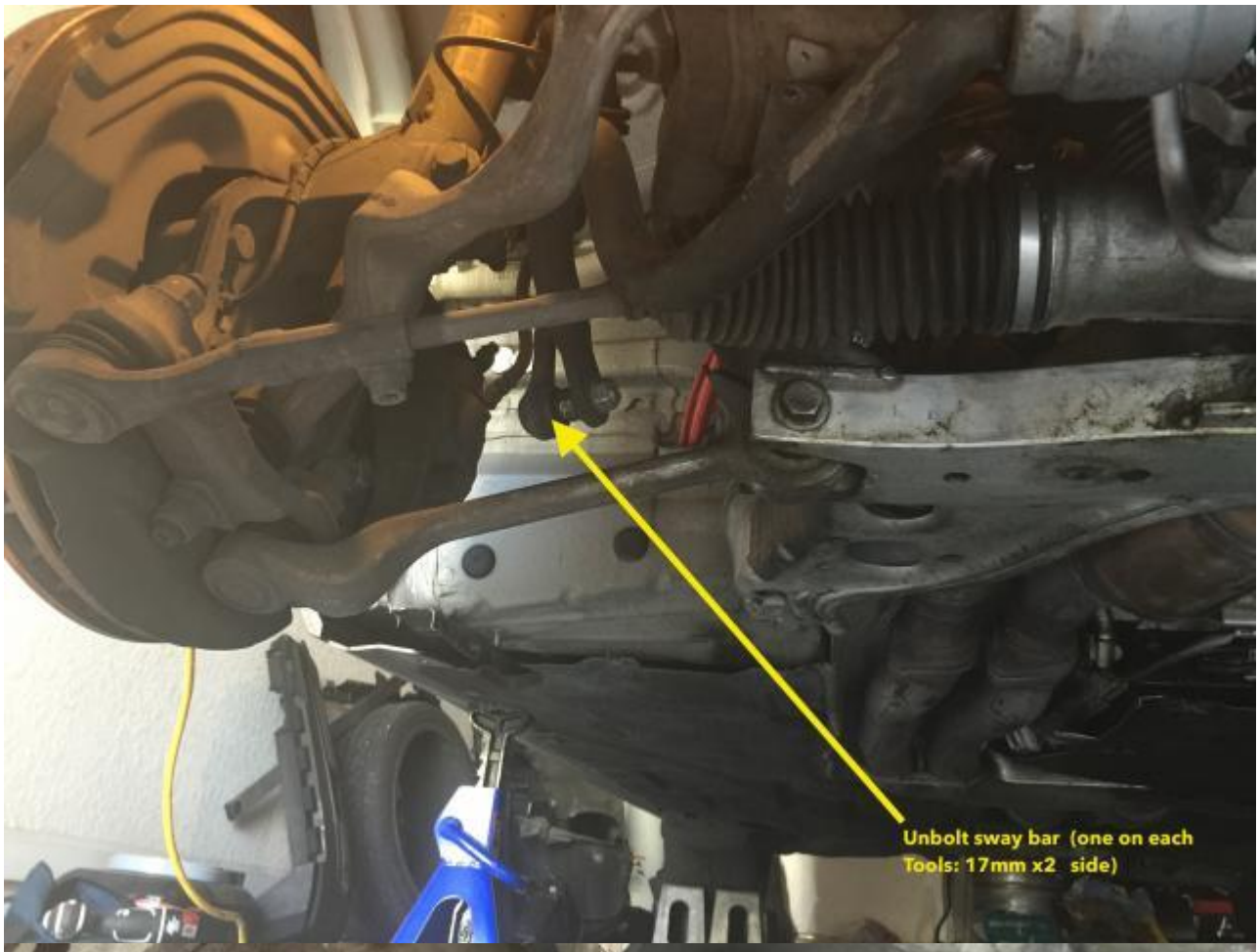

Unbolt vacuum tanks and move aside


This should be your view now


Unbolt wastegate solenoids and move aside


Remove heat shield bolts

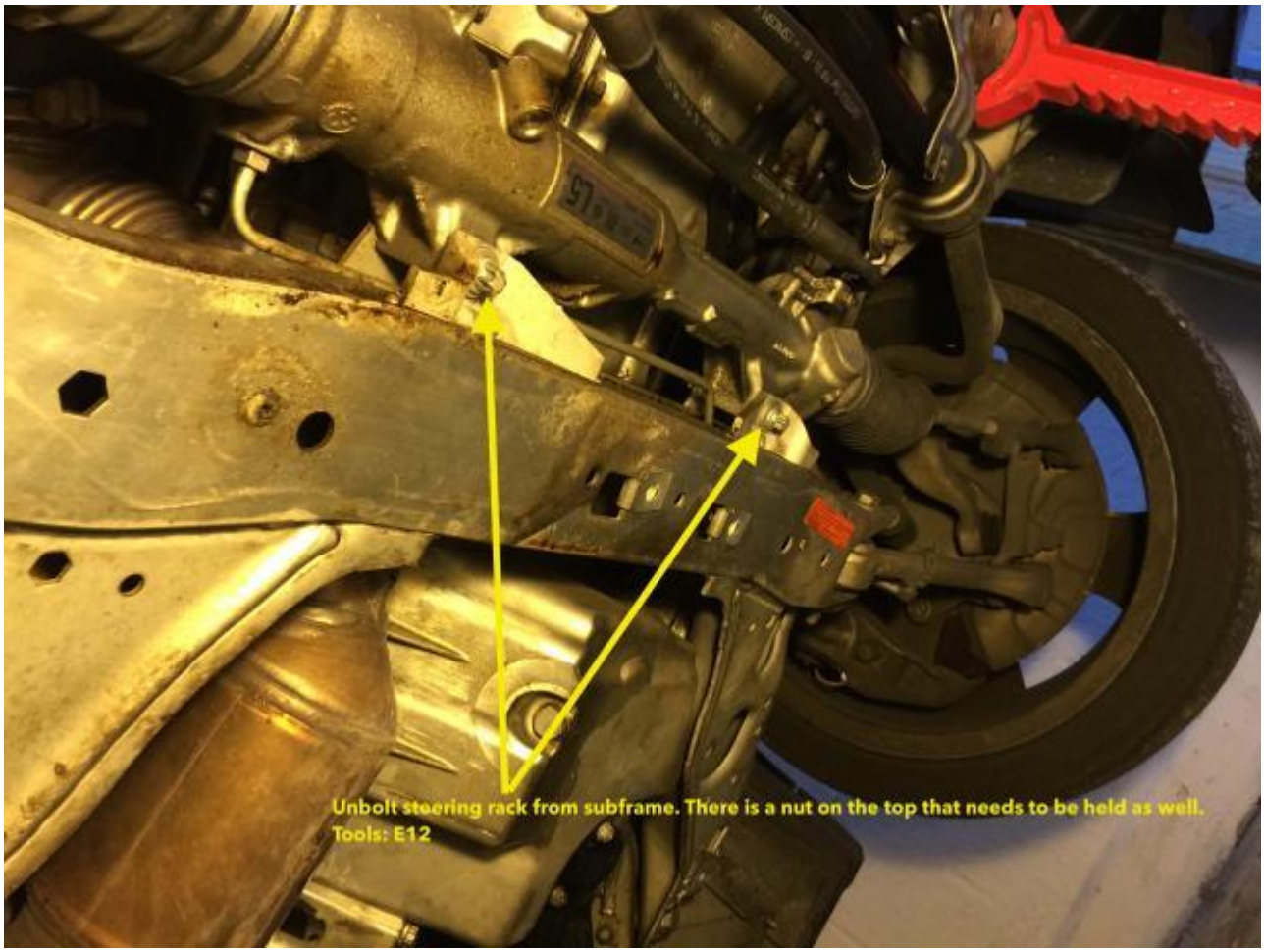

Engine support from Harbor Freight, $80
Wrapped chain around just in case
Use tow bar to support engine


Unbolt sway bar (one on each
Tools: 17mm x2 side)


Unbolt sway bar mounts (one on each side)
Tools: 13mm

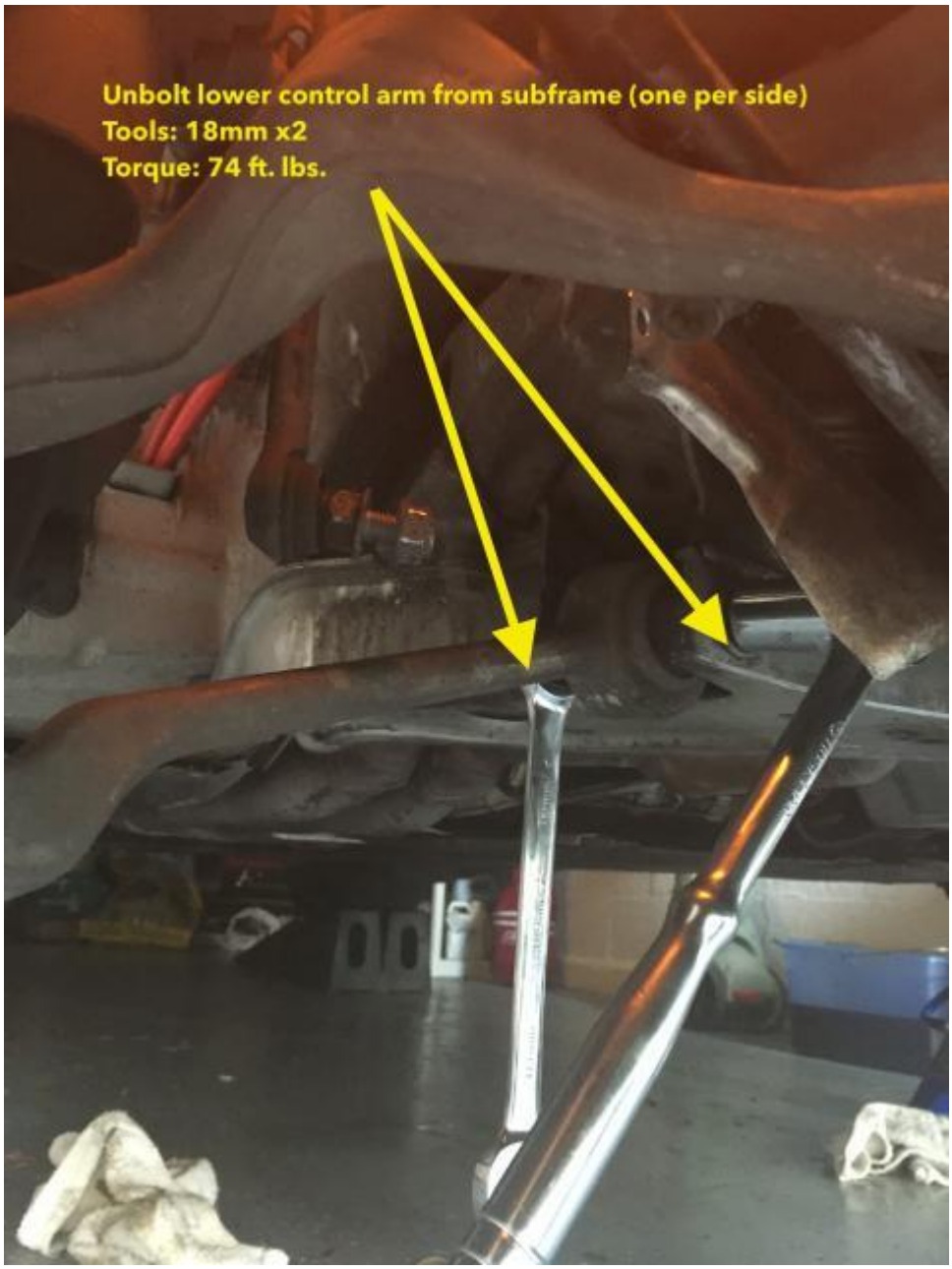

Unbolt steering column from suspension (one per side)
Tools: 16mm

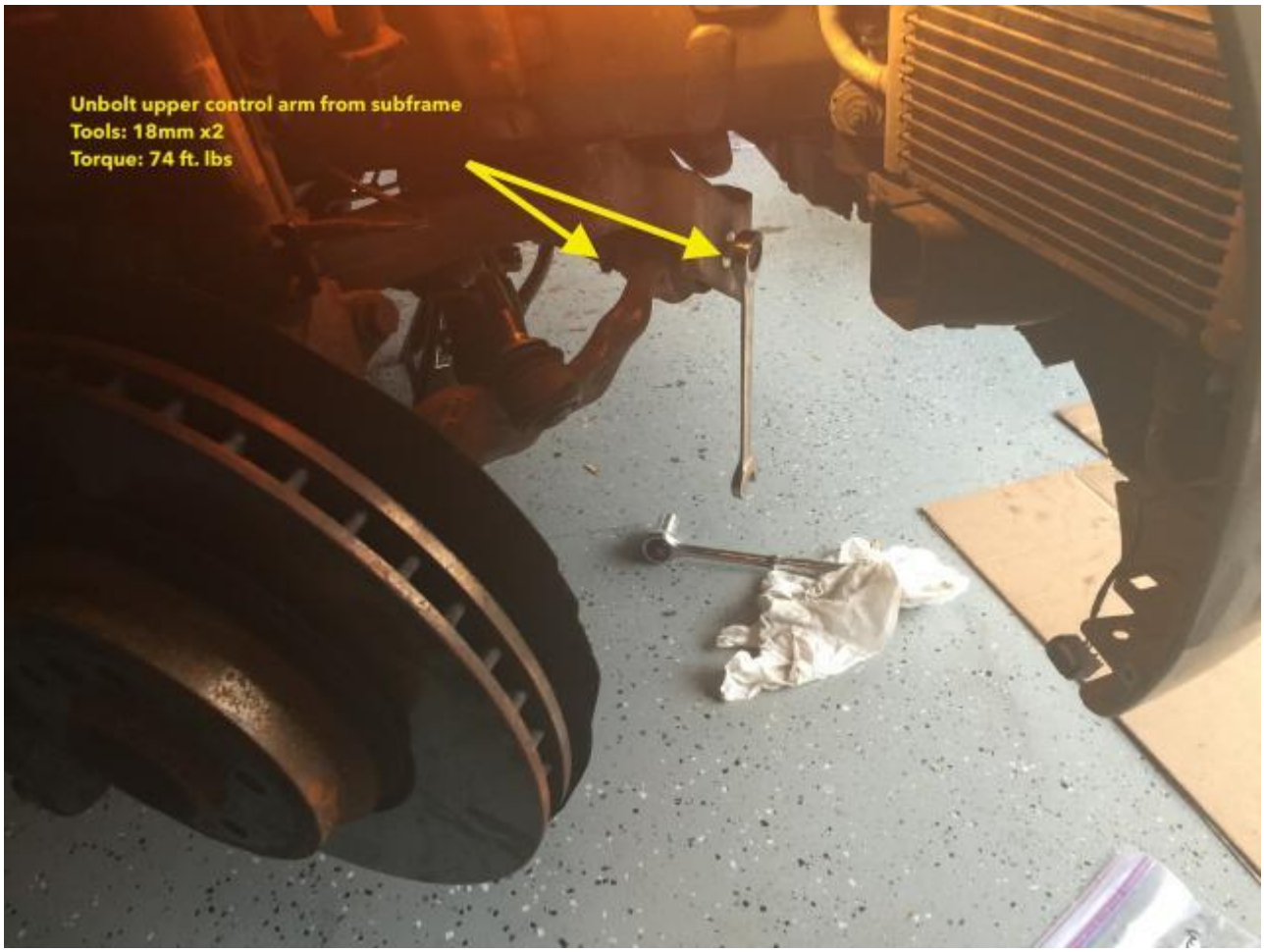

If this nut won't come off, you may need to secure the center bolt while turning the nut.


Unbolt steering rack from subframe. There is a nut on the top that needs to be held as well.
Tools: E12


Don't worry about the other lines connected. This can now be pulled out. Rotate and move to driver's side to get out of the way.

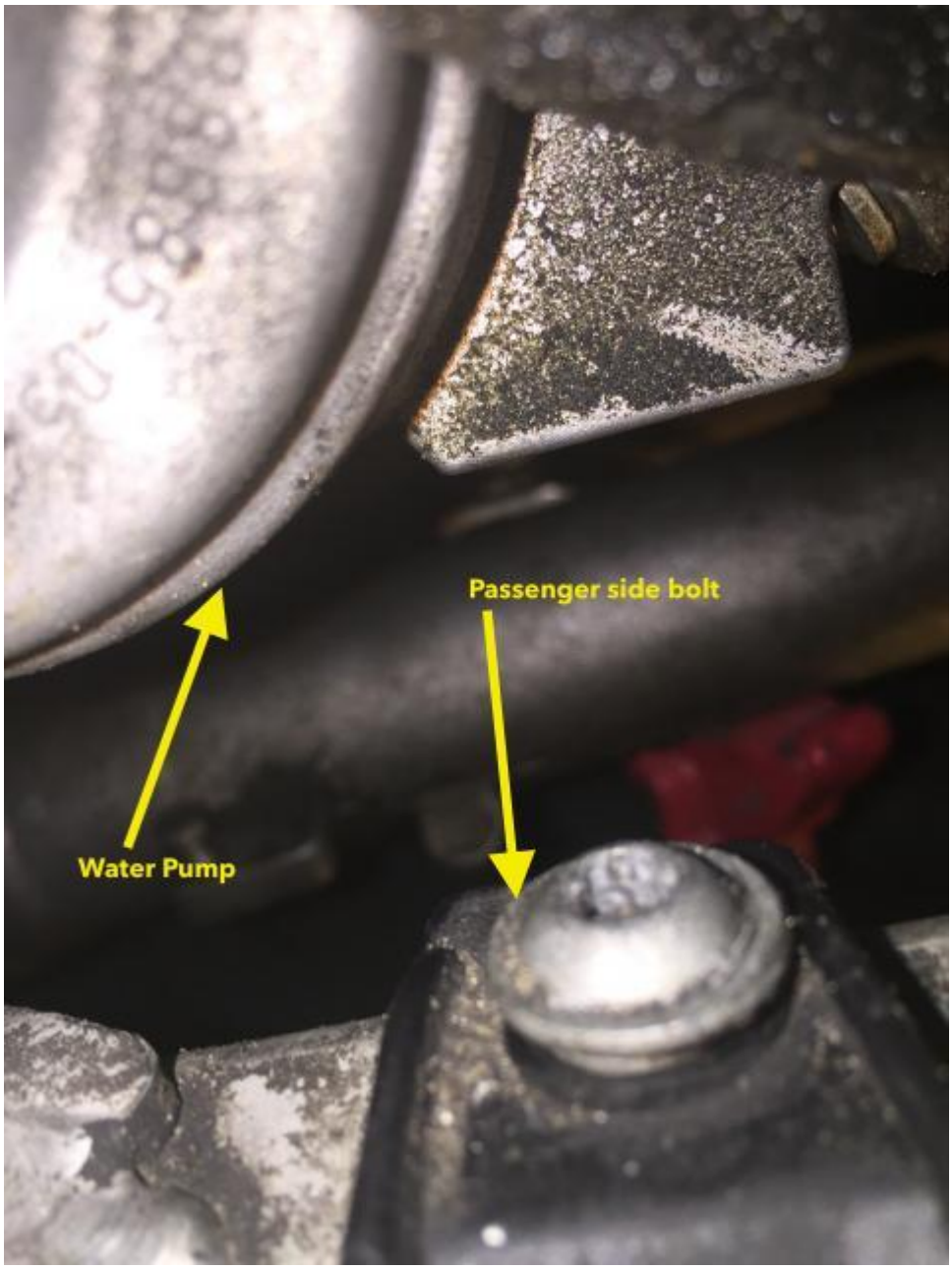

Disconnect harness for headlight positioning sensor.
This is on the driver's side control arm.

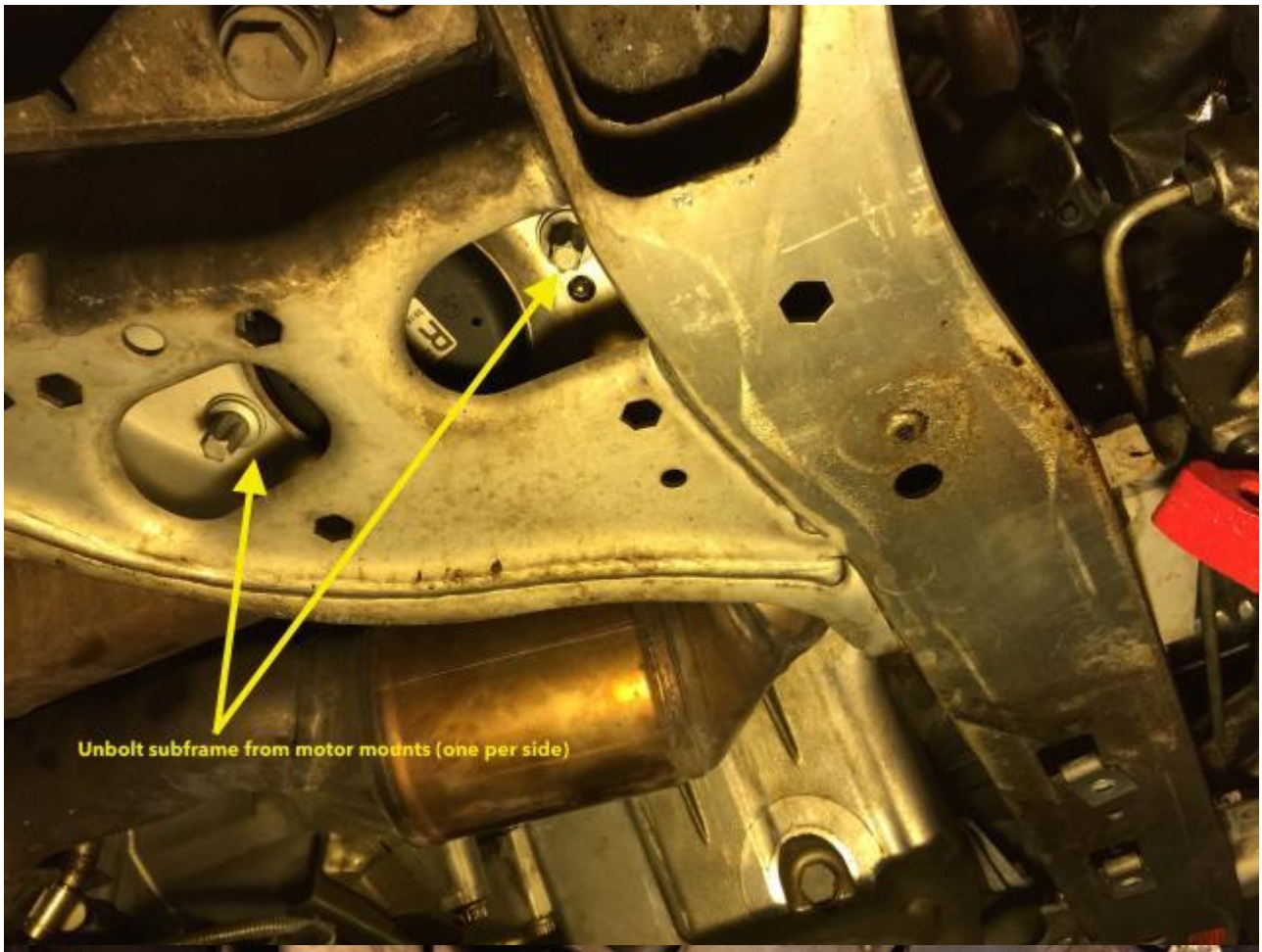

Unbolt lower control arm from subframe (one per side)
Tools: 18mm x2
Torque: 74 ft. lbs.

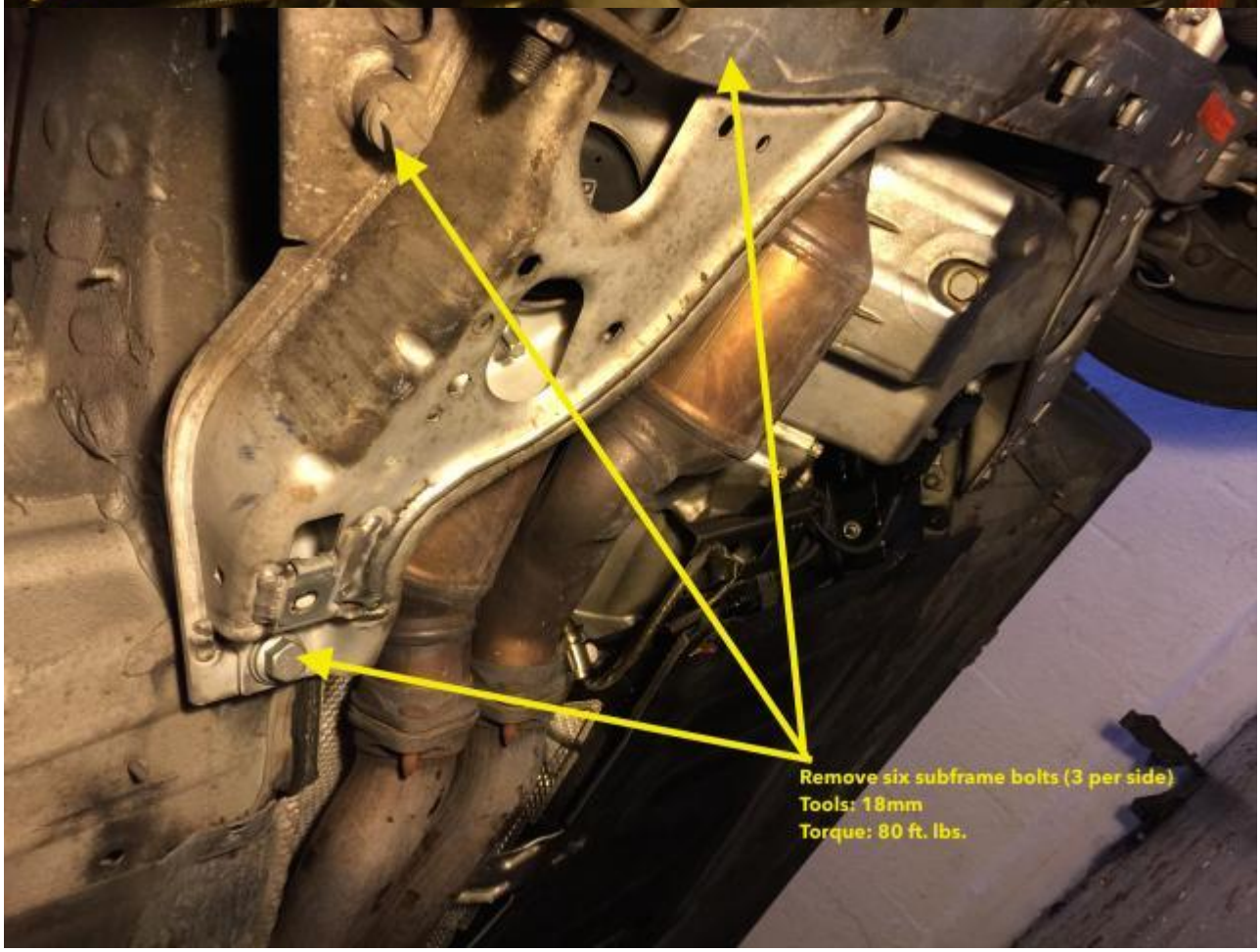

Unbolt upper control arm from subframe
Tools: 18mm x2
Torque: 74 ft. lbs

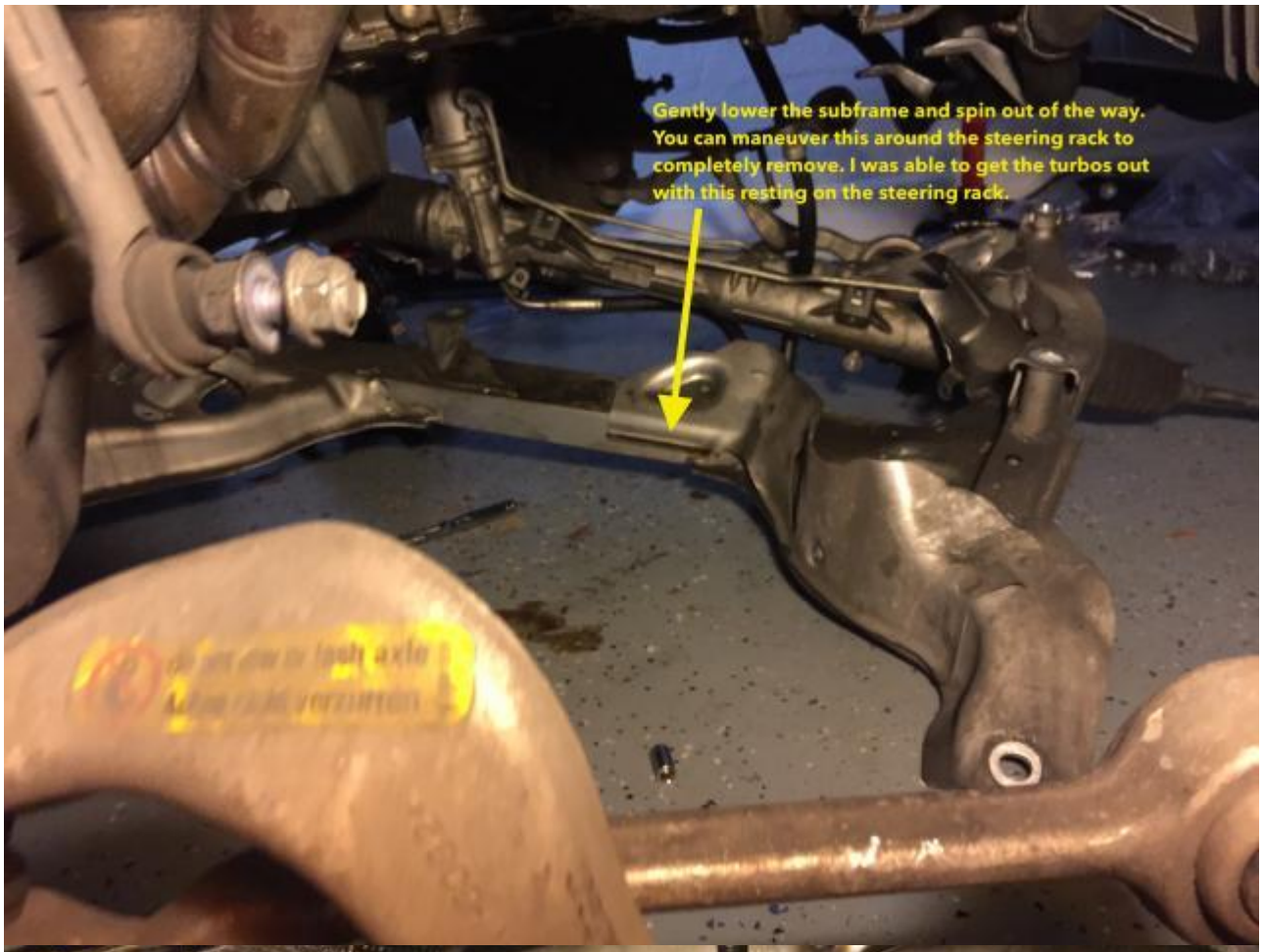

Remove these two braces from the front of the subframe
ProLift

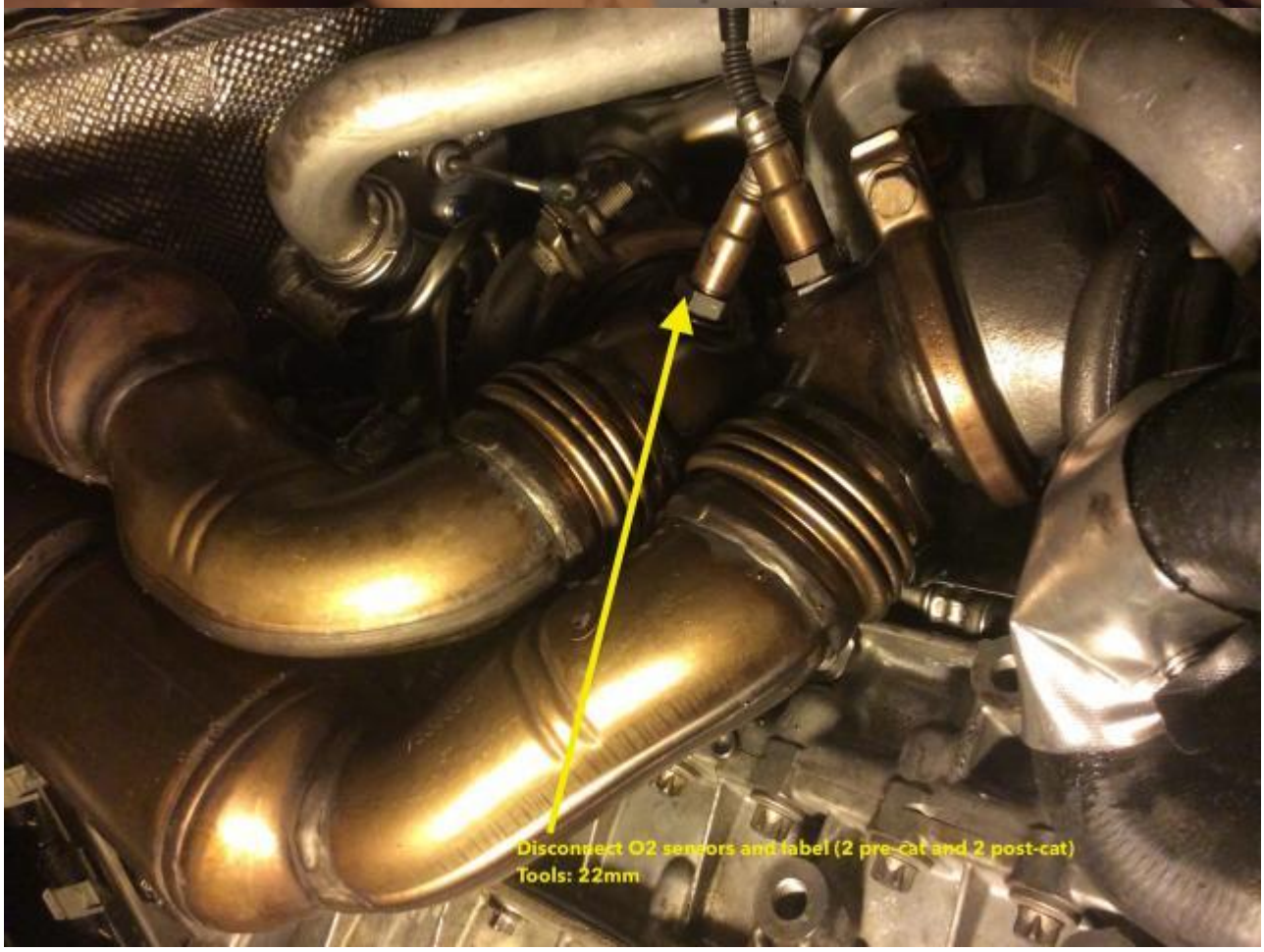
This was a PIA. There are three bolts holding this coolant line to the front of the subframe. If you pull the radiator fan out, you can get to two of these from the top with some extenders. I ended up cutting off the one by the driver's side above the sway bar as it really doesn't serve a crucial role.
Tools: T30

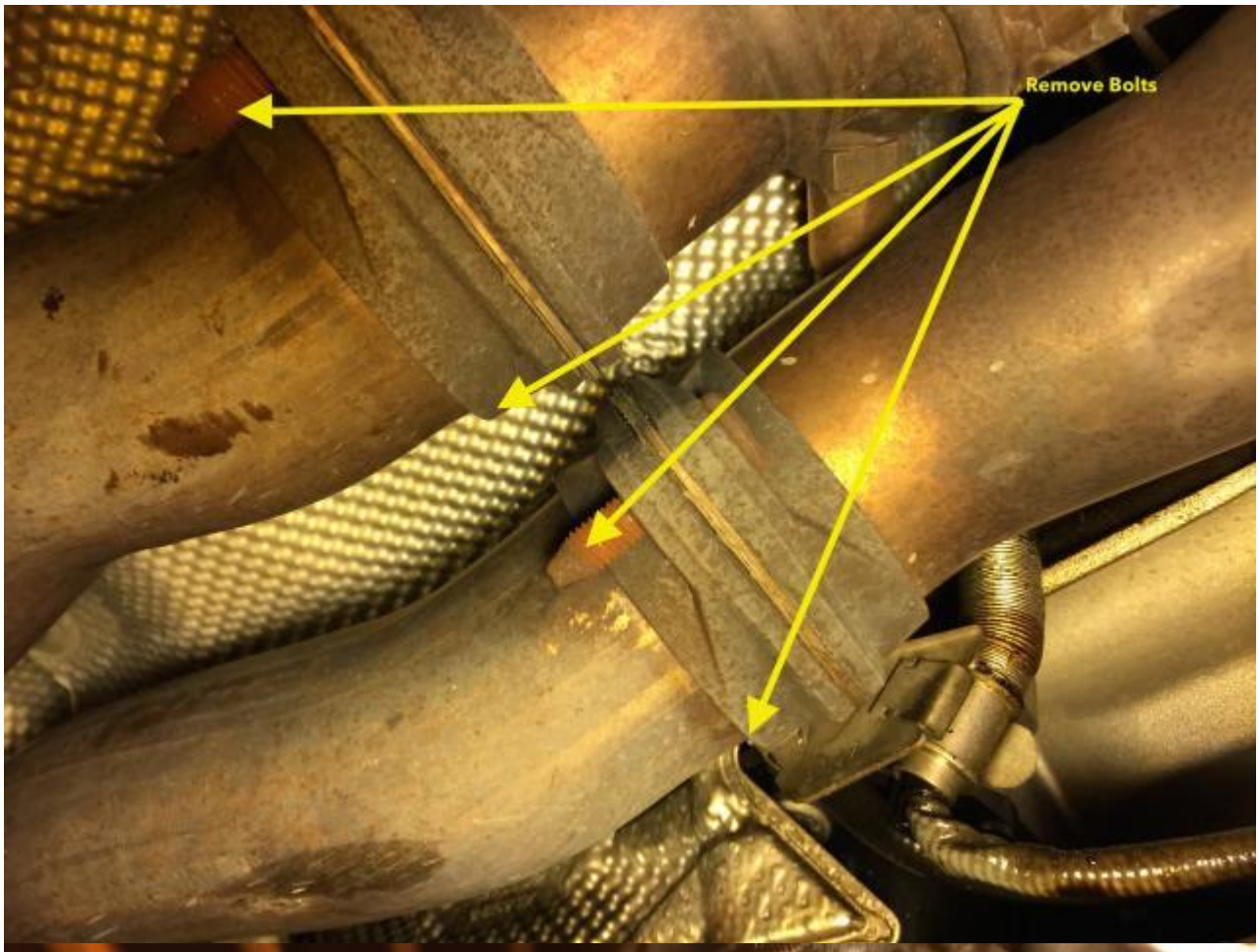

Passenger side bolt
Water Pump

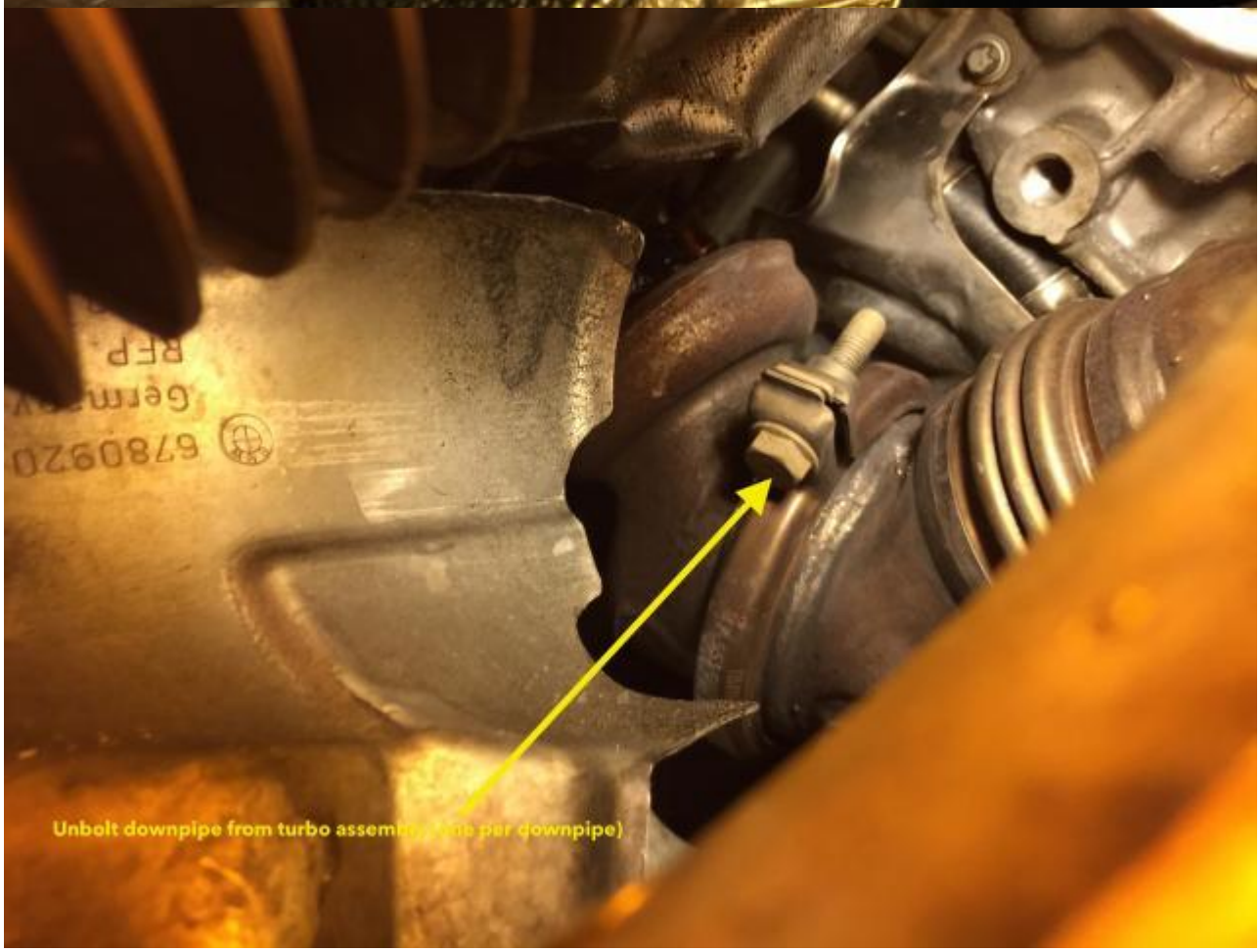

Unbolt subframe from motor mounts (one per side)

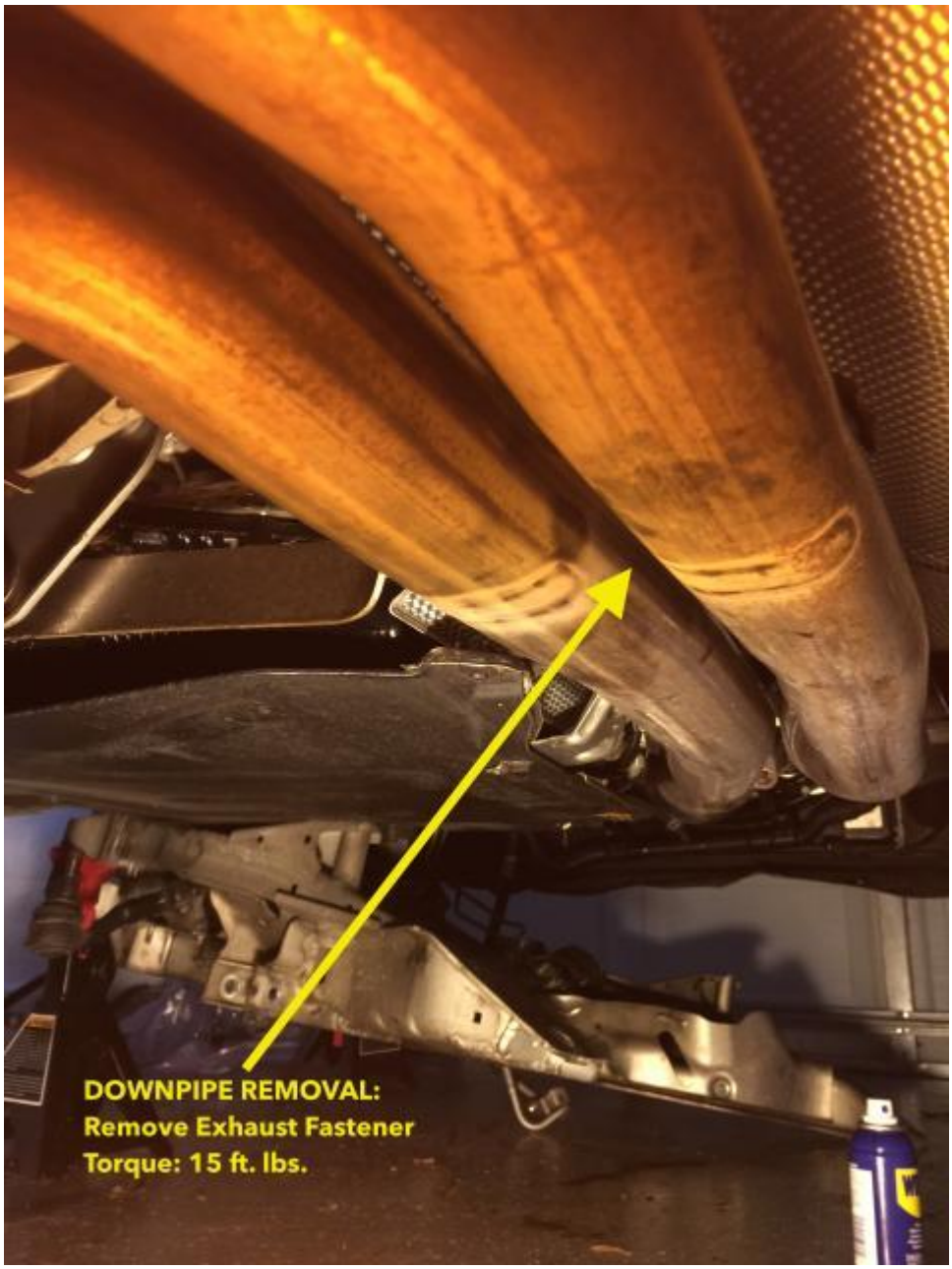

Remove six subframe bolts (3 per side)
Tools: 18mm
Torque: 80 ft. lbs.

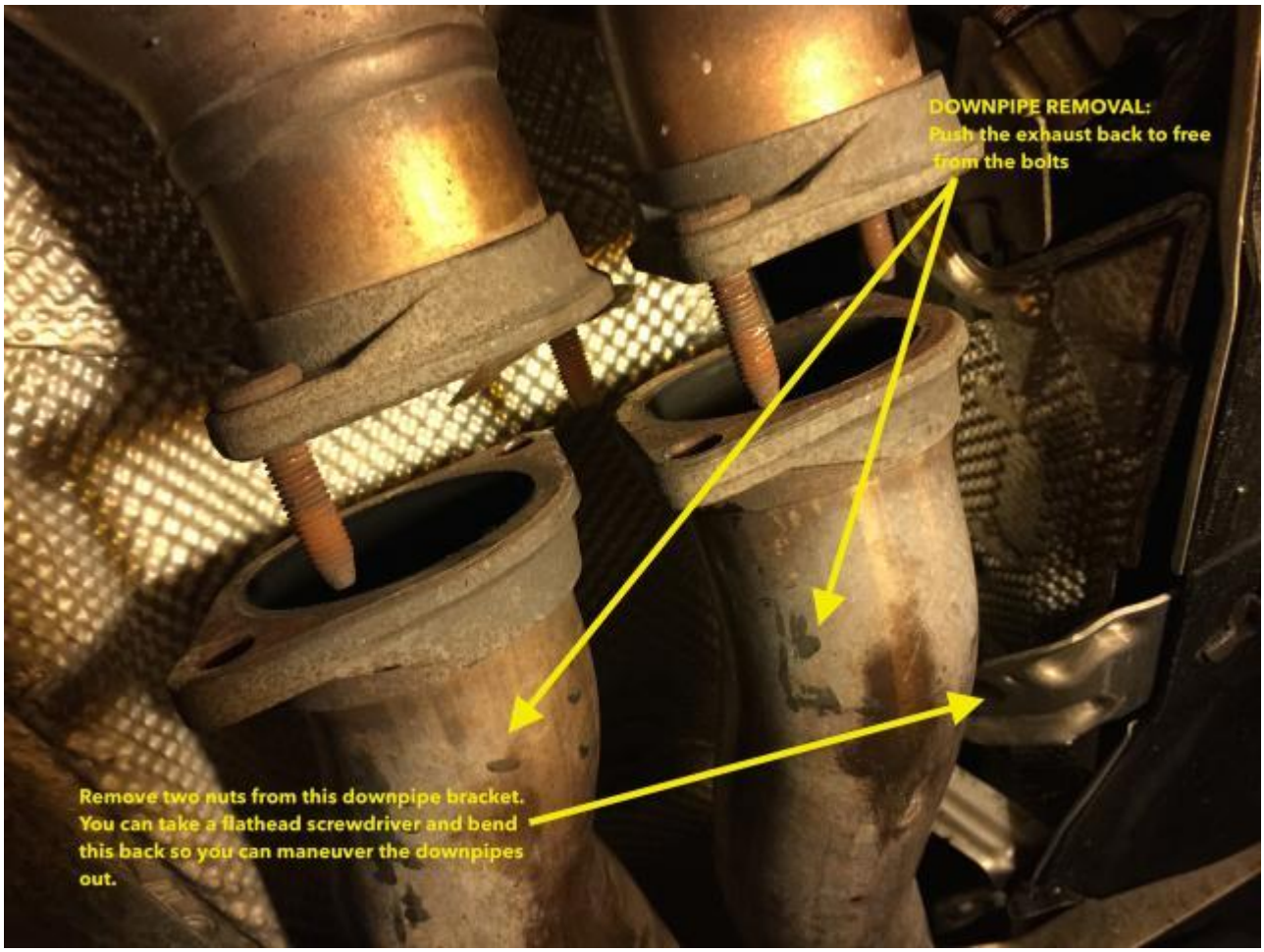

Gently lower the subframe and spin out of the way. You can maneuver this around the steering rack to completely remove. I was able to get the turbos out with this resting on the steering rack.

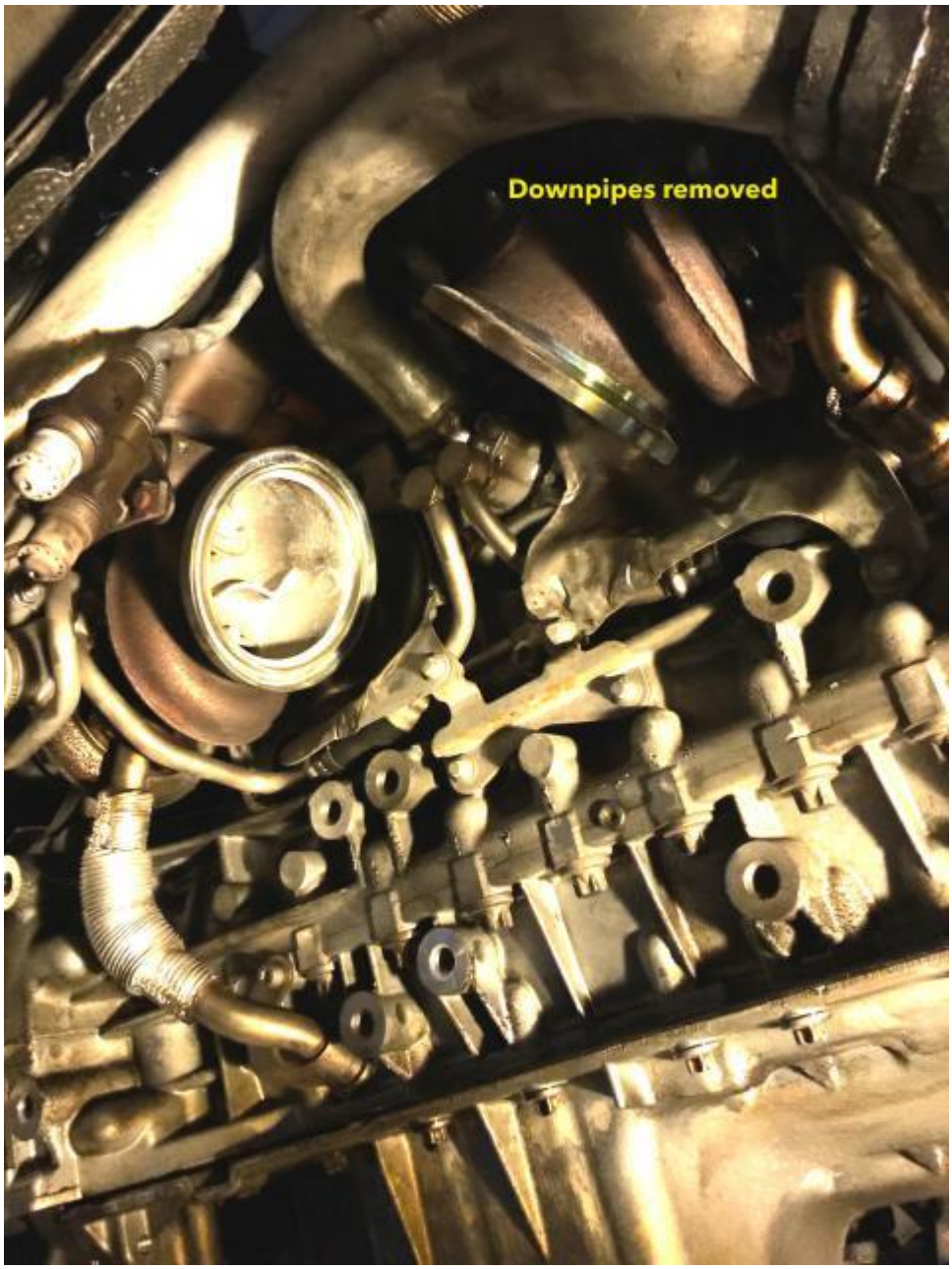

Disconnect O2 sensors and label (2 pre-cat and 2 post-cat)
Tools: 22mm

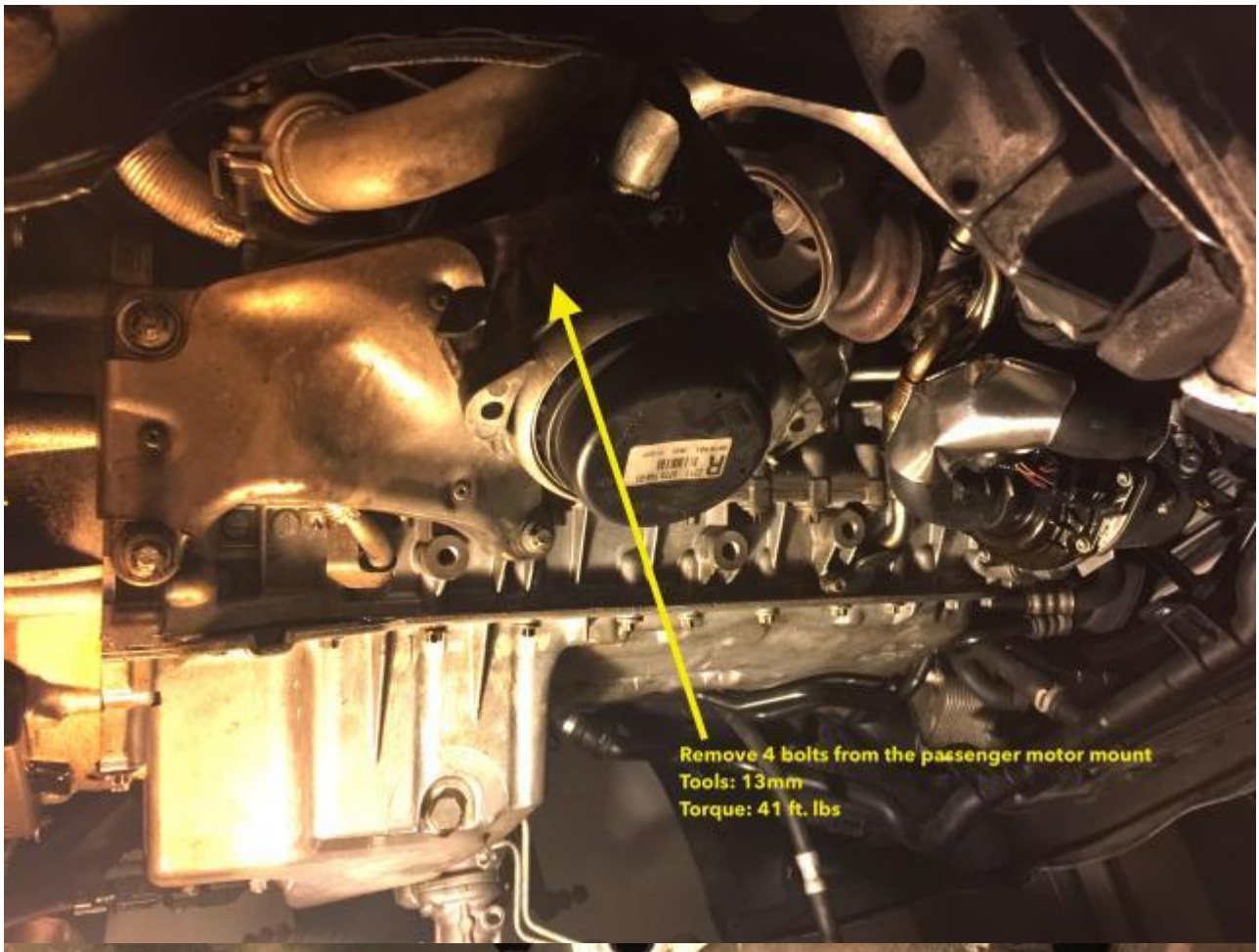

Remove Bolts

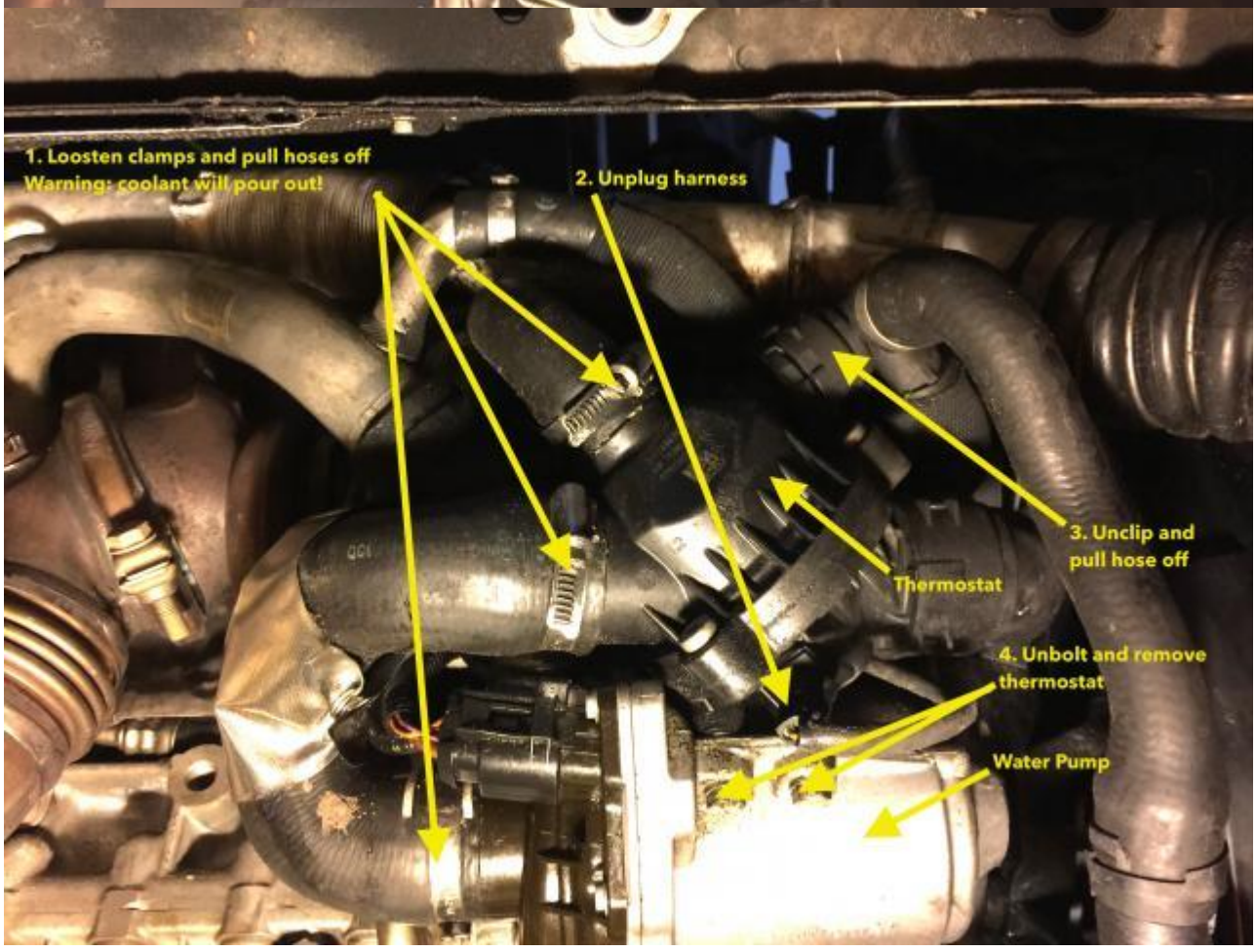

Unbolt downpipe from turbo assembly (4 bolts per downpipe)

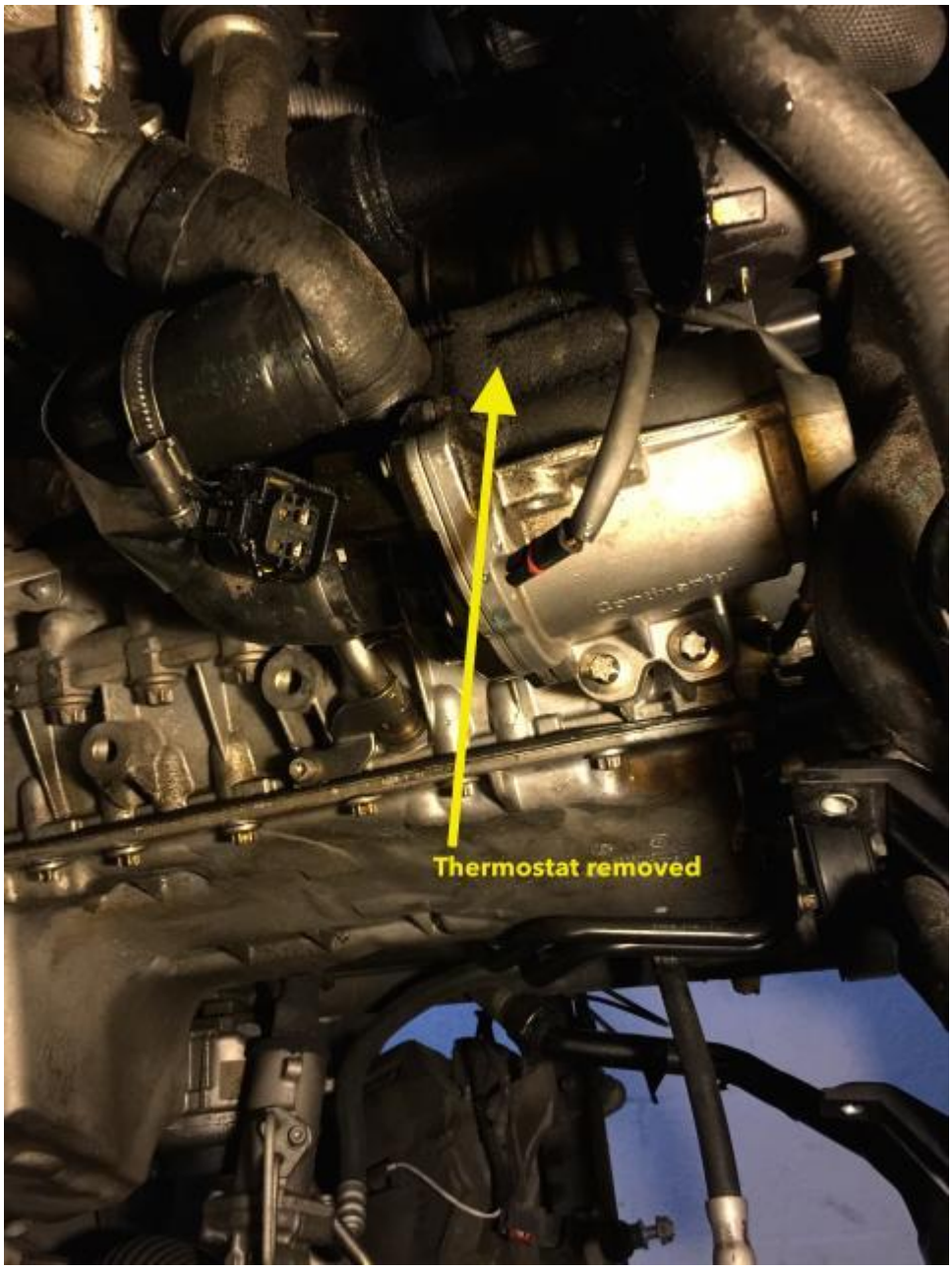

DOWNPIPE REMOVAL:
Remove Exhaust Fastener
Torque: 15 ft. lbs.

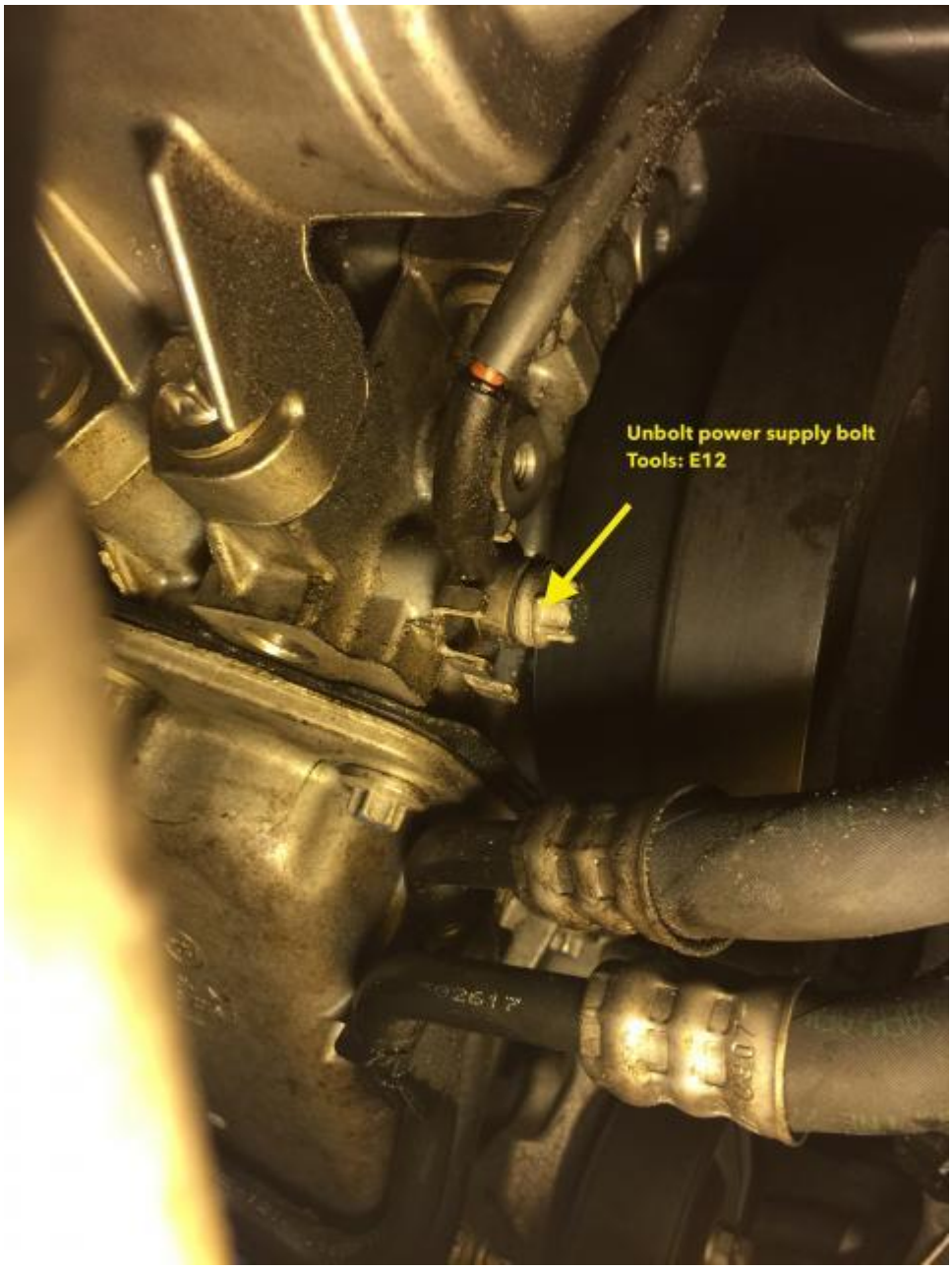

DOWNPIPE REMOVAL:
Push the exhaust back to free from the bolts
Remove two nuts from this downpipe bracket. You can take a flathead screwdriver and bend this back so you can maneuver the downpipes out.

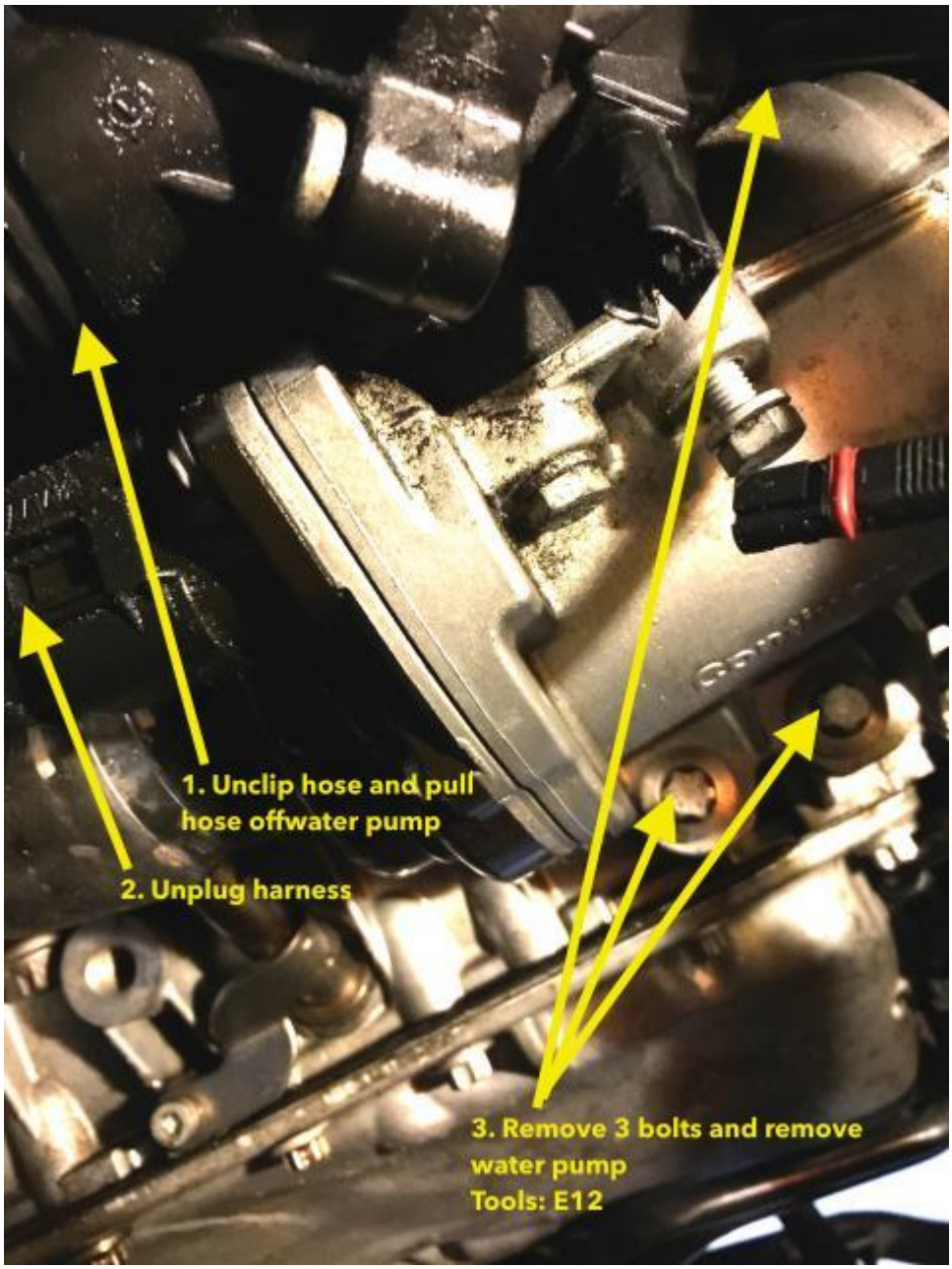

Downpipes removed

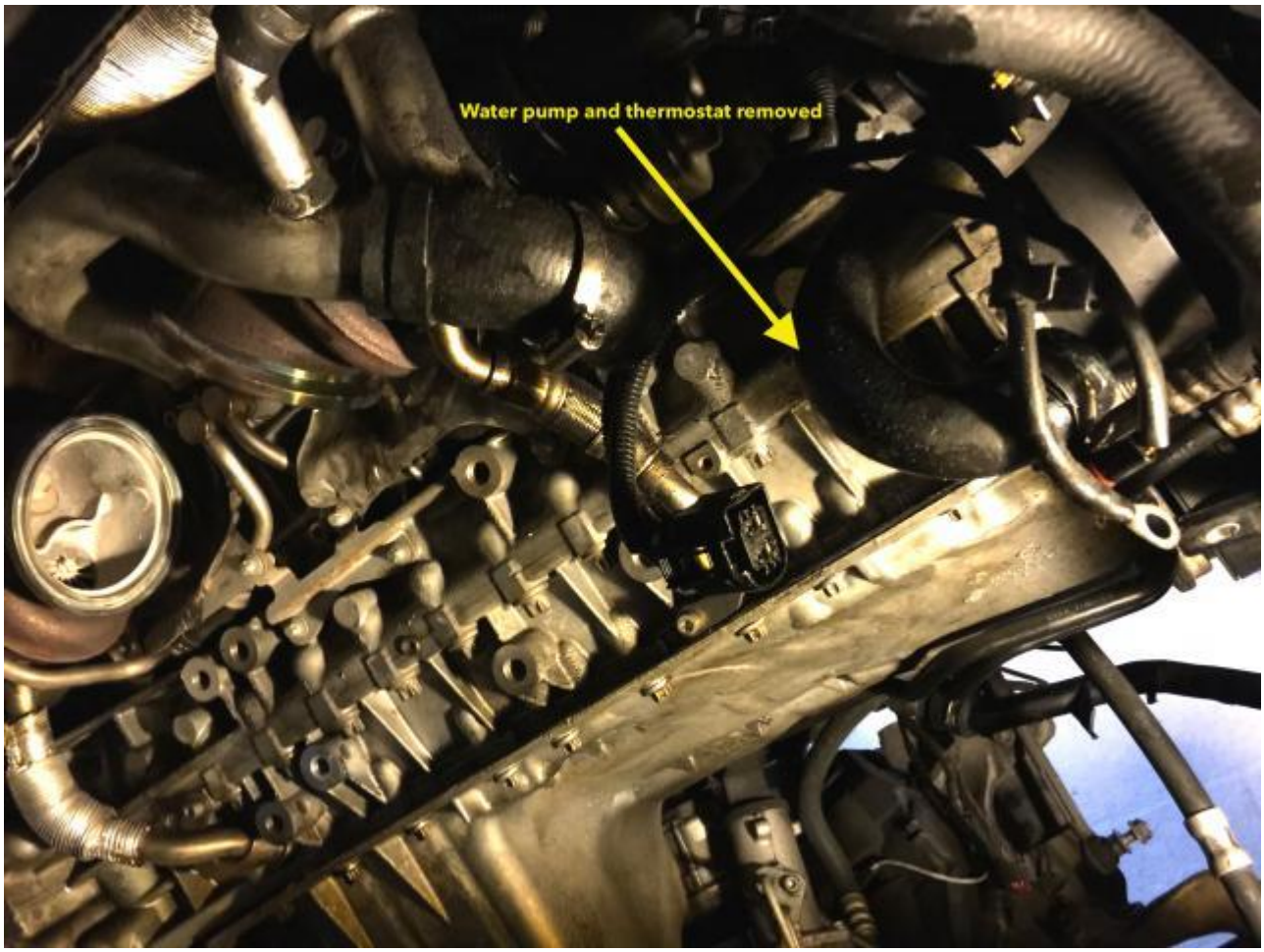

Remove 4 bolts from the passenger motor mount
Tools: 13mm
Torque: 41 ft. lbs


1. Loosten clamps and pull hoses off
Warning: coolant will pour out!
2. Unplug harness
3. Unclip and pull hose off
Thermostat
4. Unbolt and remove thermostat
Water Pump

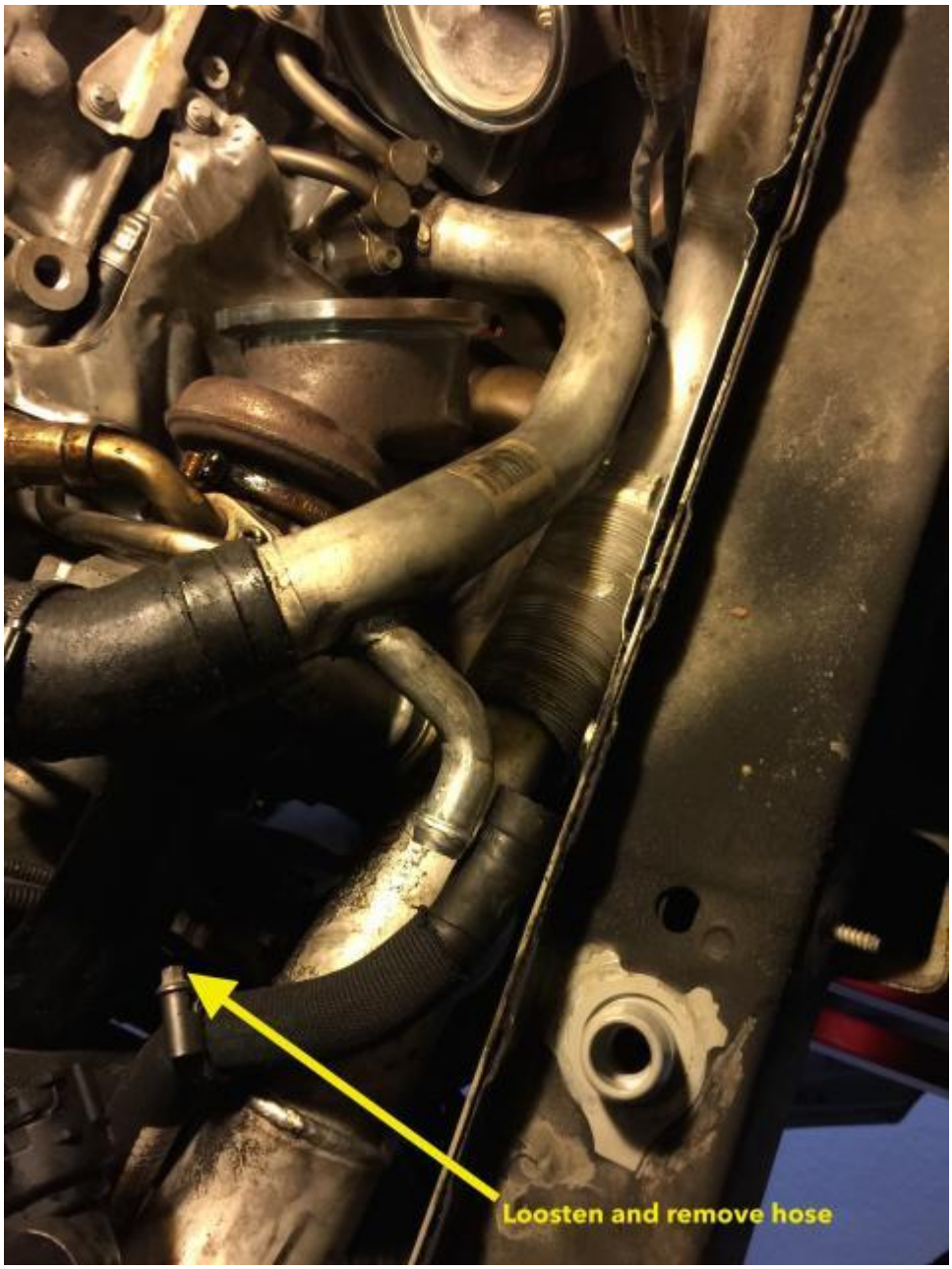

Thermostat removed


Unbolt power supply bolt
Tools: E12

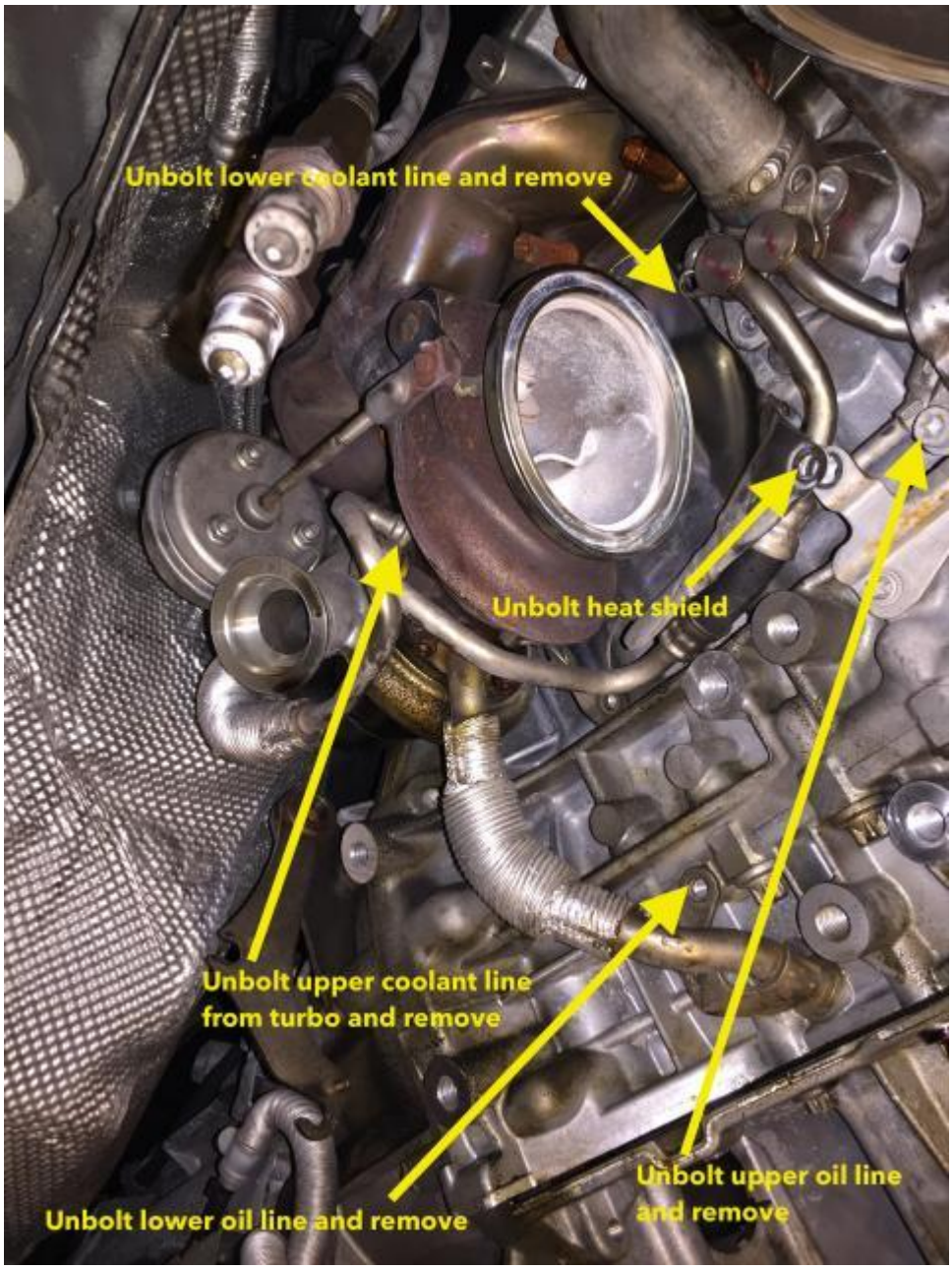

1. Unclip hose and pull hose offwater pump
2. Unplug harness
3. Remove 3 bolts and remove water pump
Tools: E12

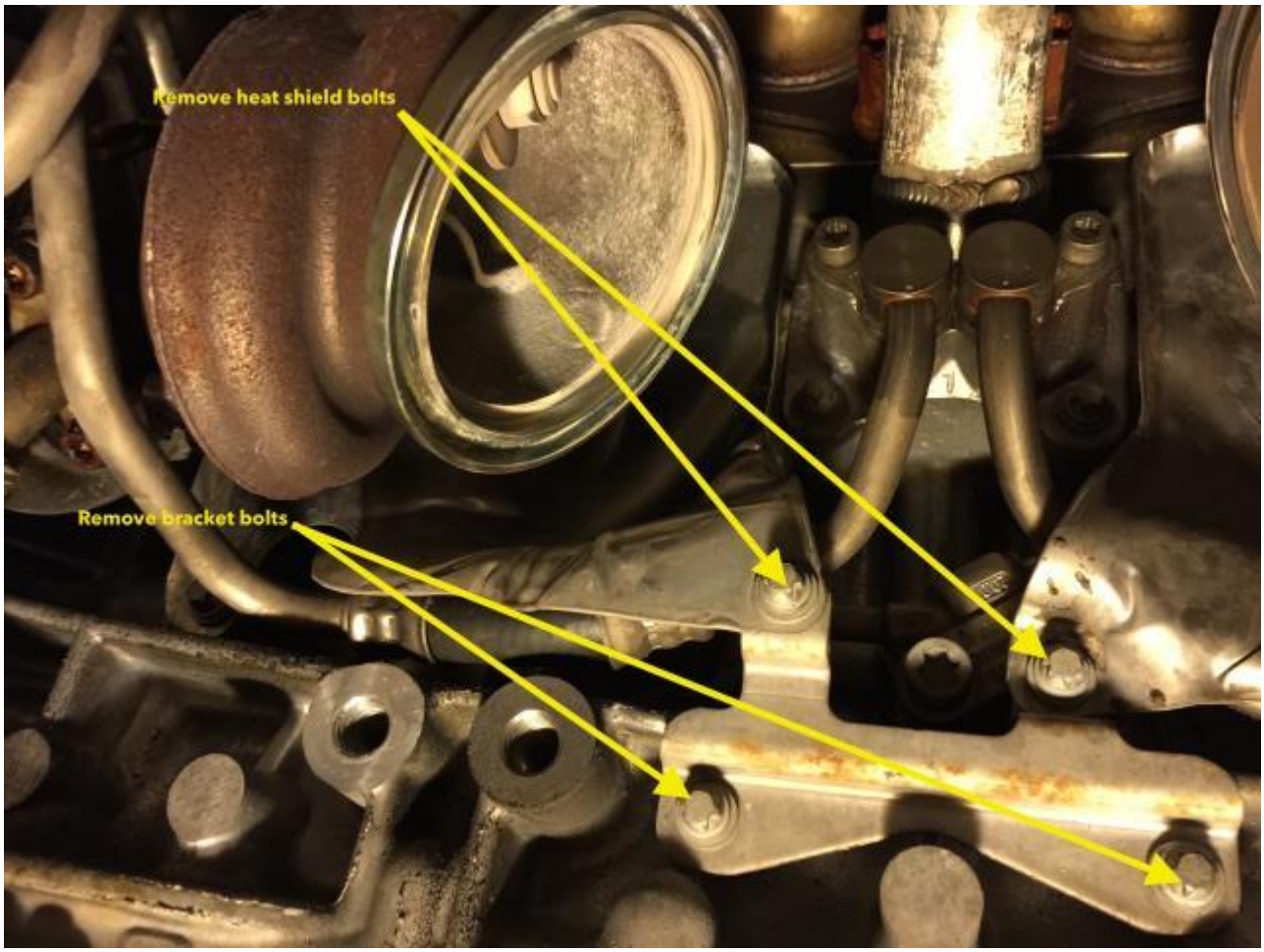

Water pump and thermostat removed

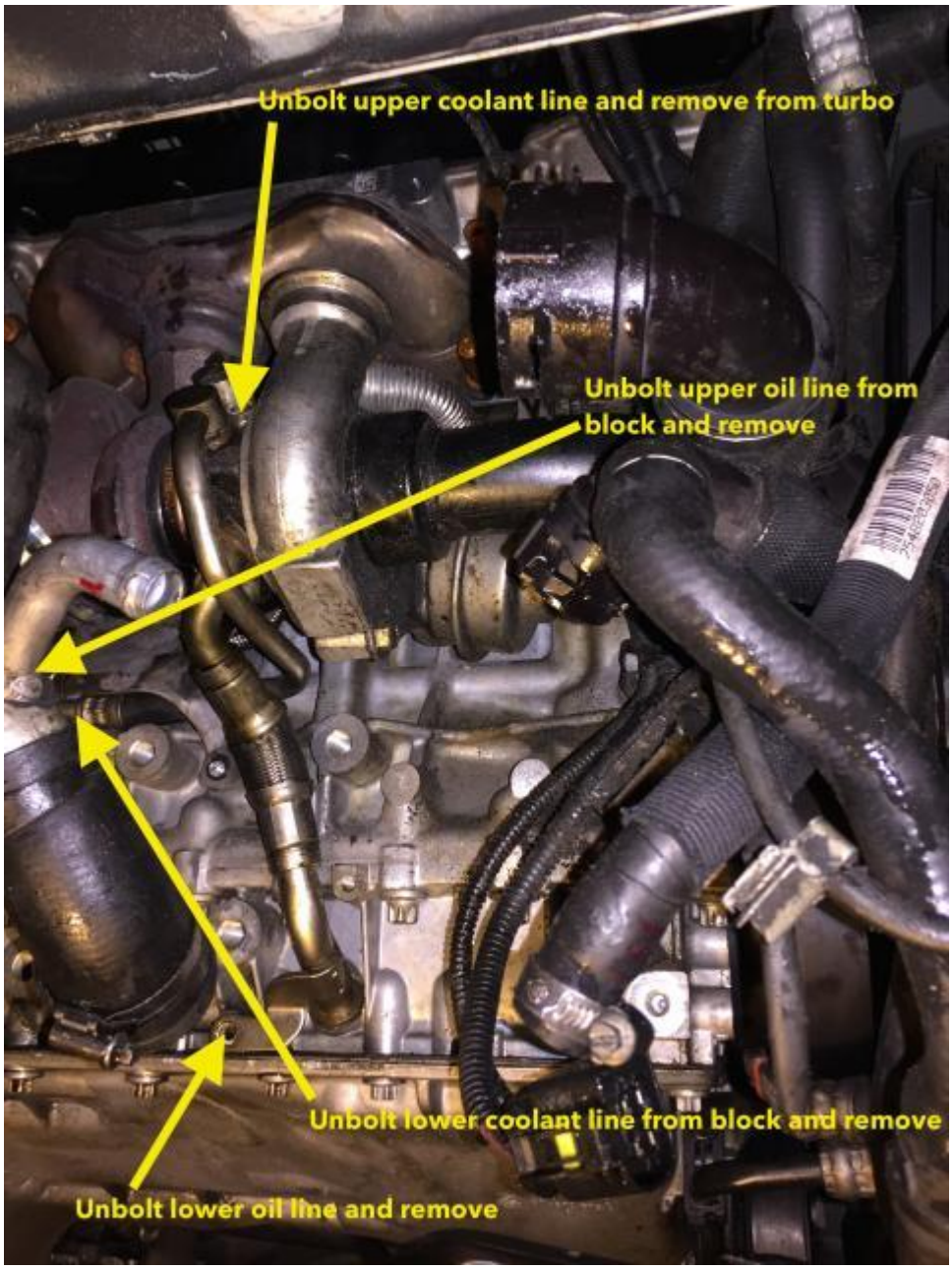

Unbolt clamp from both turbos

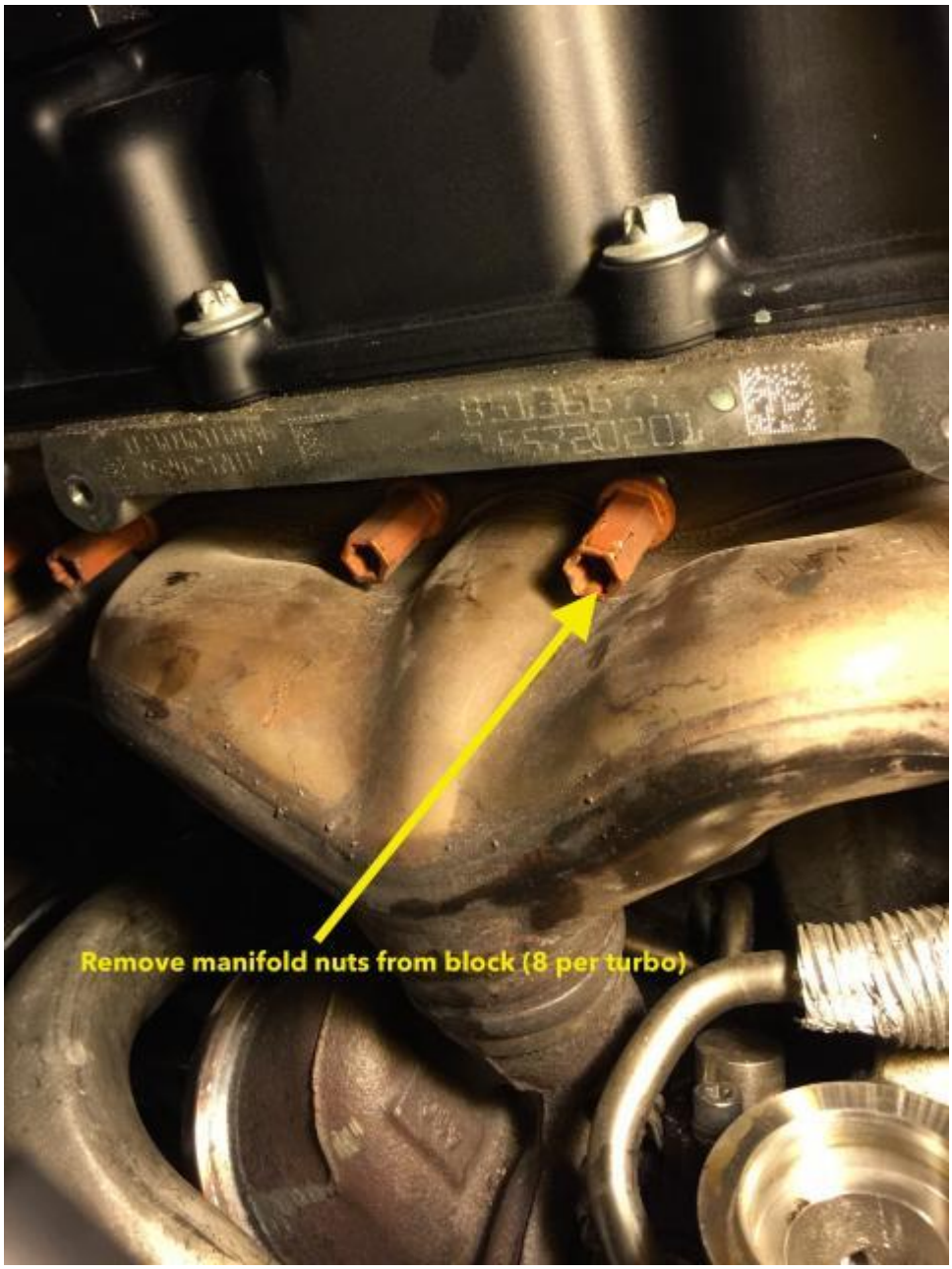

Loosten and remove hose

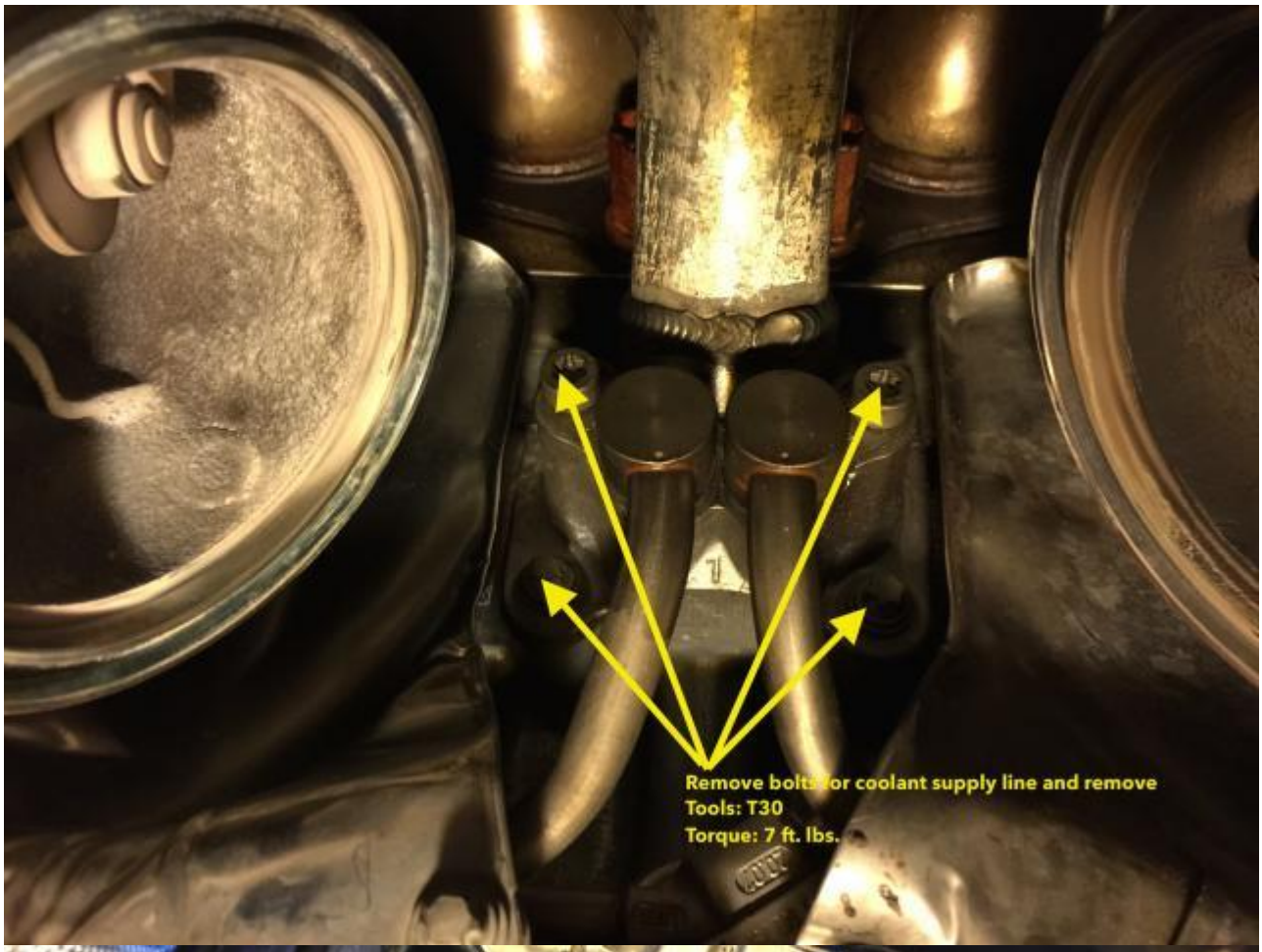

BOSCH
Pull pin up and remove from intercooler

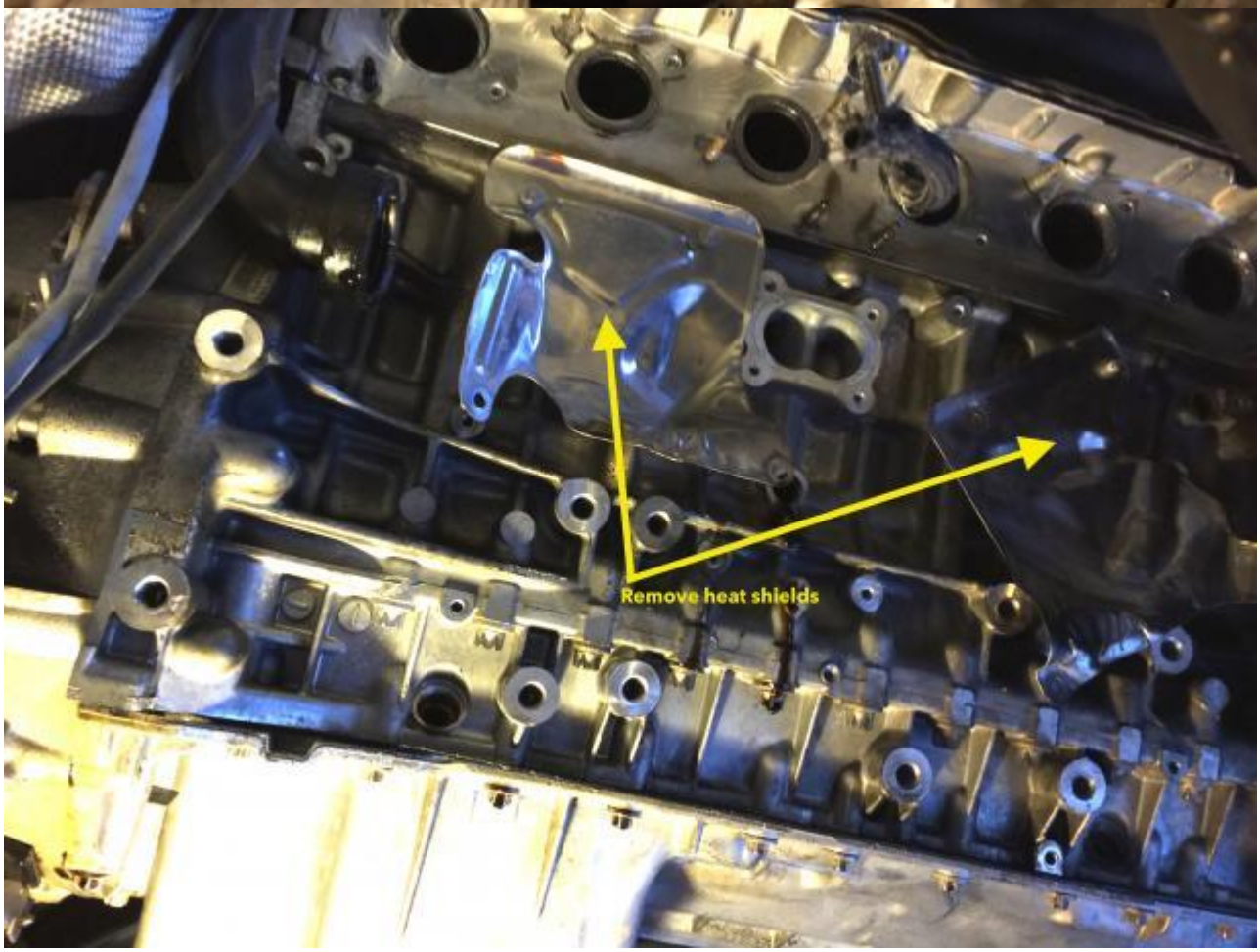

Unbolt lower coolant line and remove
Unbolt heat shield
Unbolt upper coolant line from turbo and remove
Unbolt lower oil line and remove
Unbolt upper oil line and remove

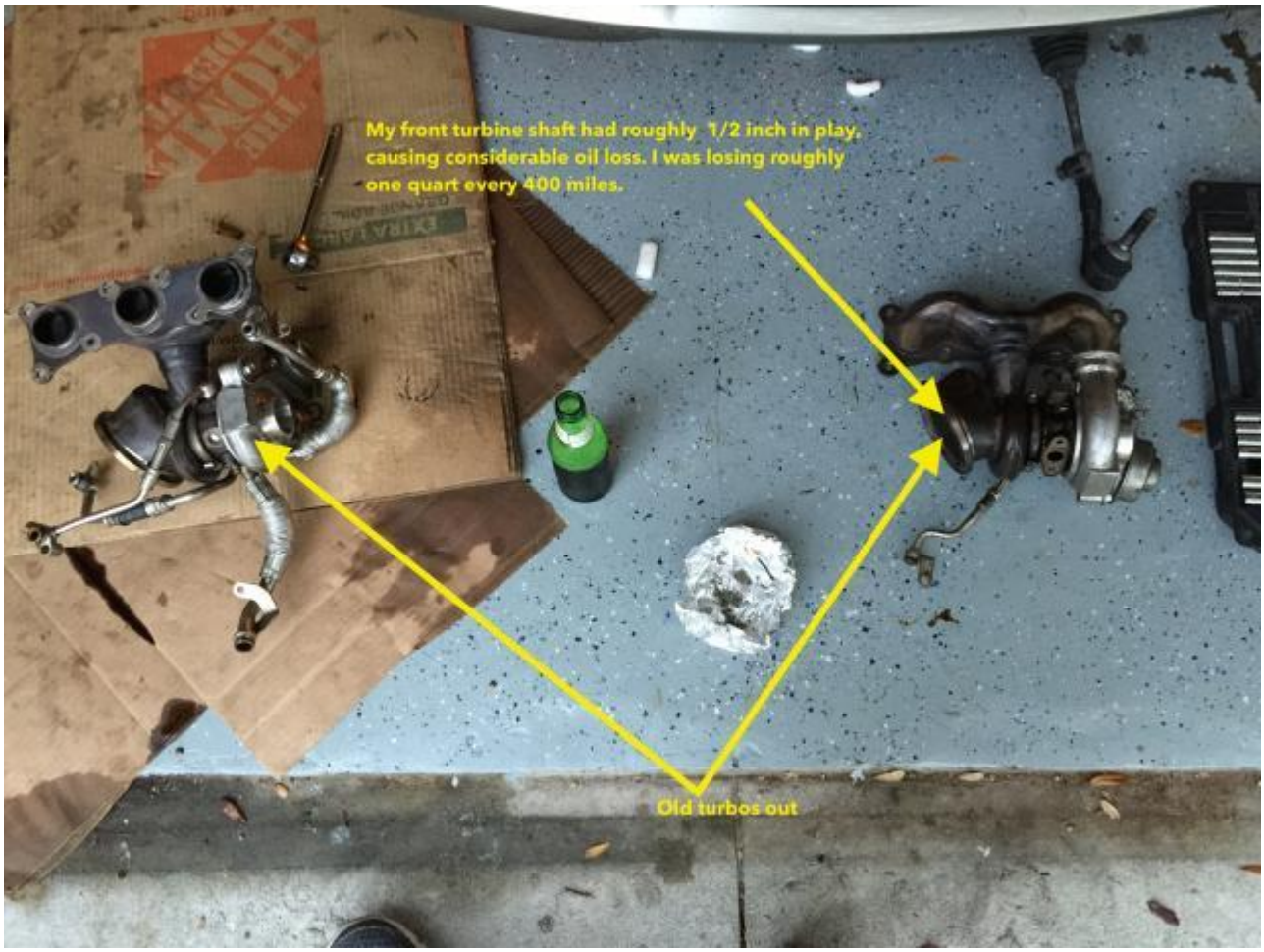

Remove heat shield bolts
Remove bracket bolts


Unbolt upper coolant line and remove from turbo
Unbolt upper oil line from block and remove
Unbolt lower coolant line from block and remove
Unbolt lower oil line and remove

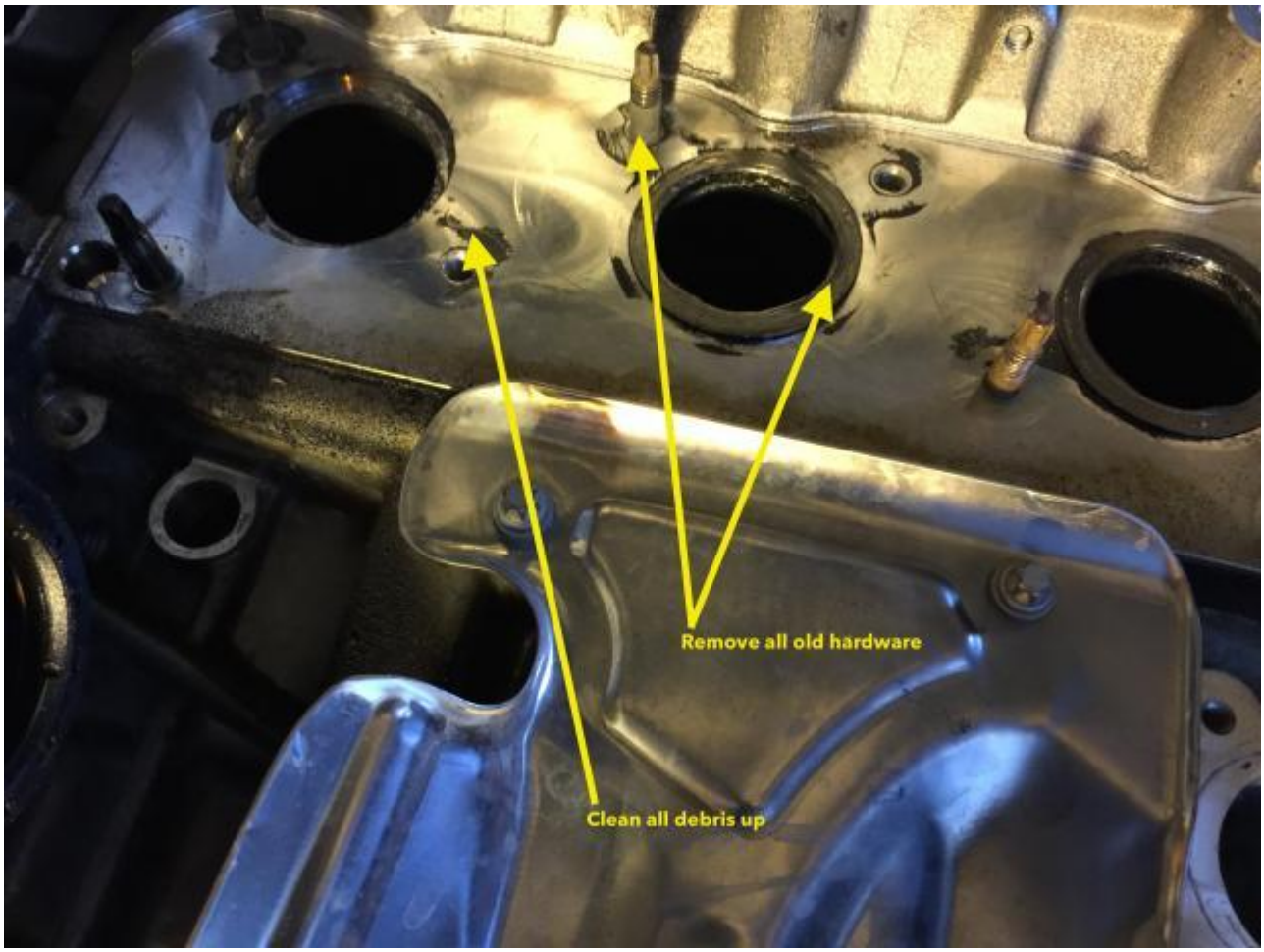

Remove manifold nuts from block (8 per turbo)


Remove bolts for coolant supply line and remove
Tools: T30
Torque: 7 ft. lbs.

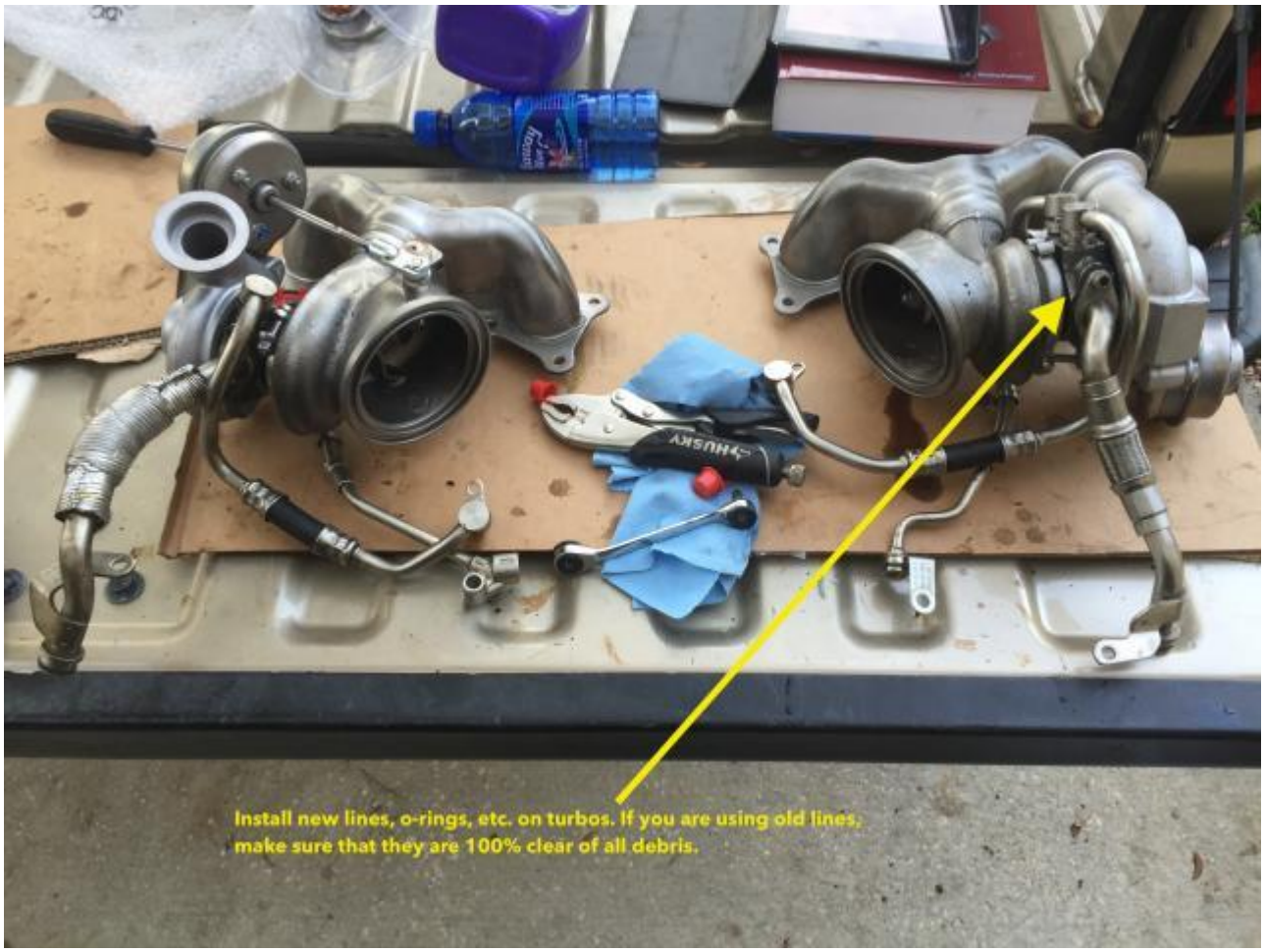

Remove heat shields


My front turbine shaft had roughly 1/2 inch in play, causing considerable oil loss. I was losing roughly one quart every 400 miles.
Old turbos out

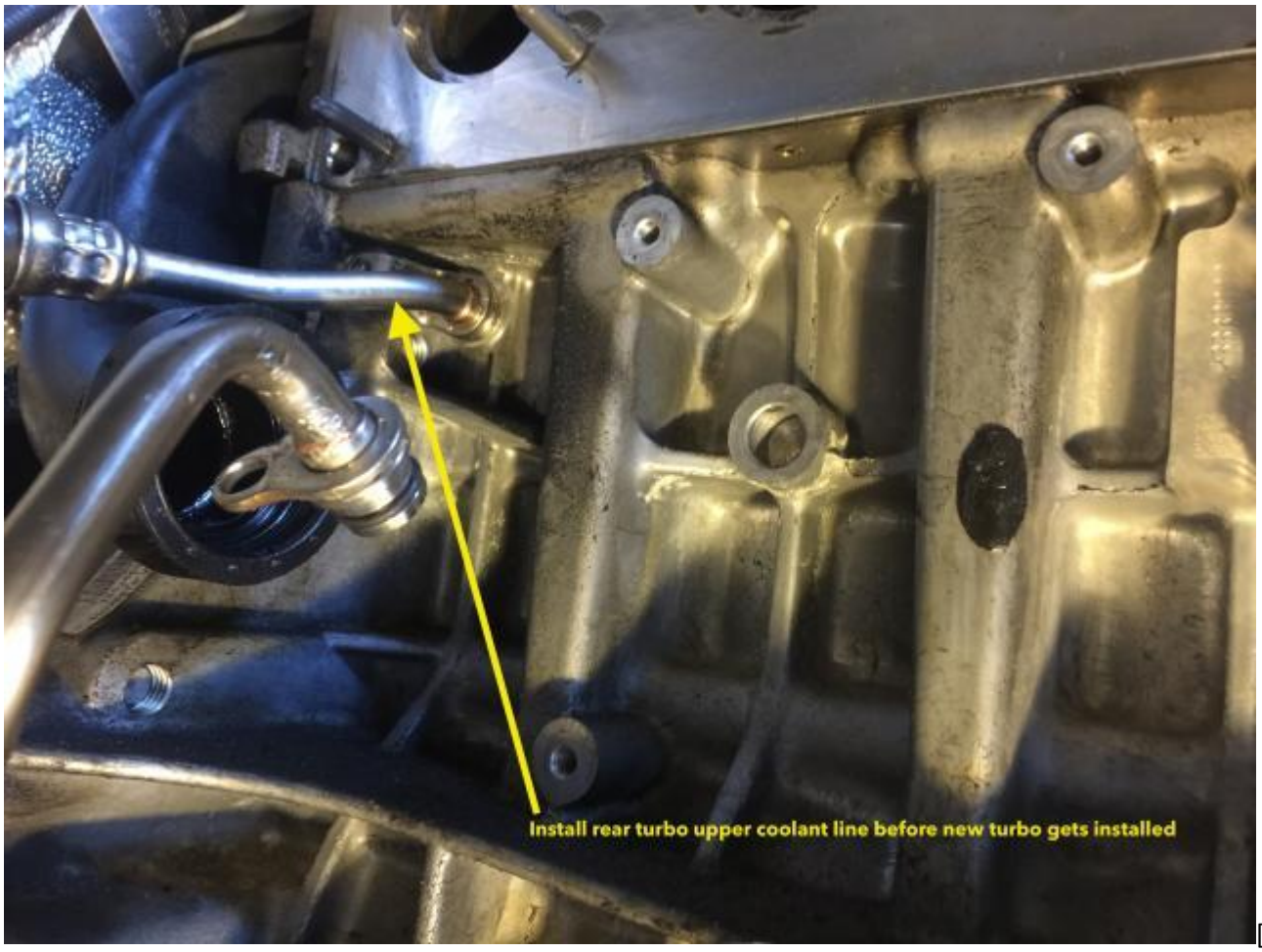

Gunk clogged up in old turbo



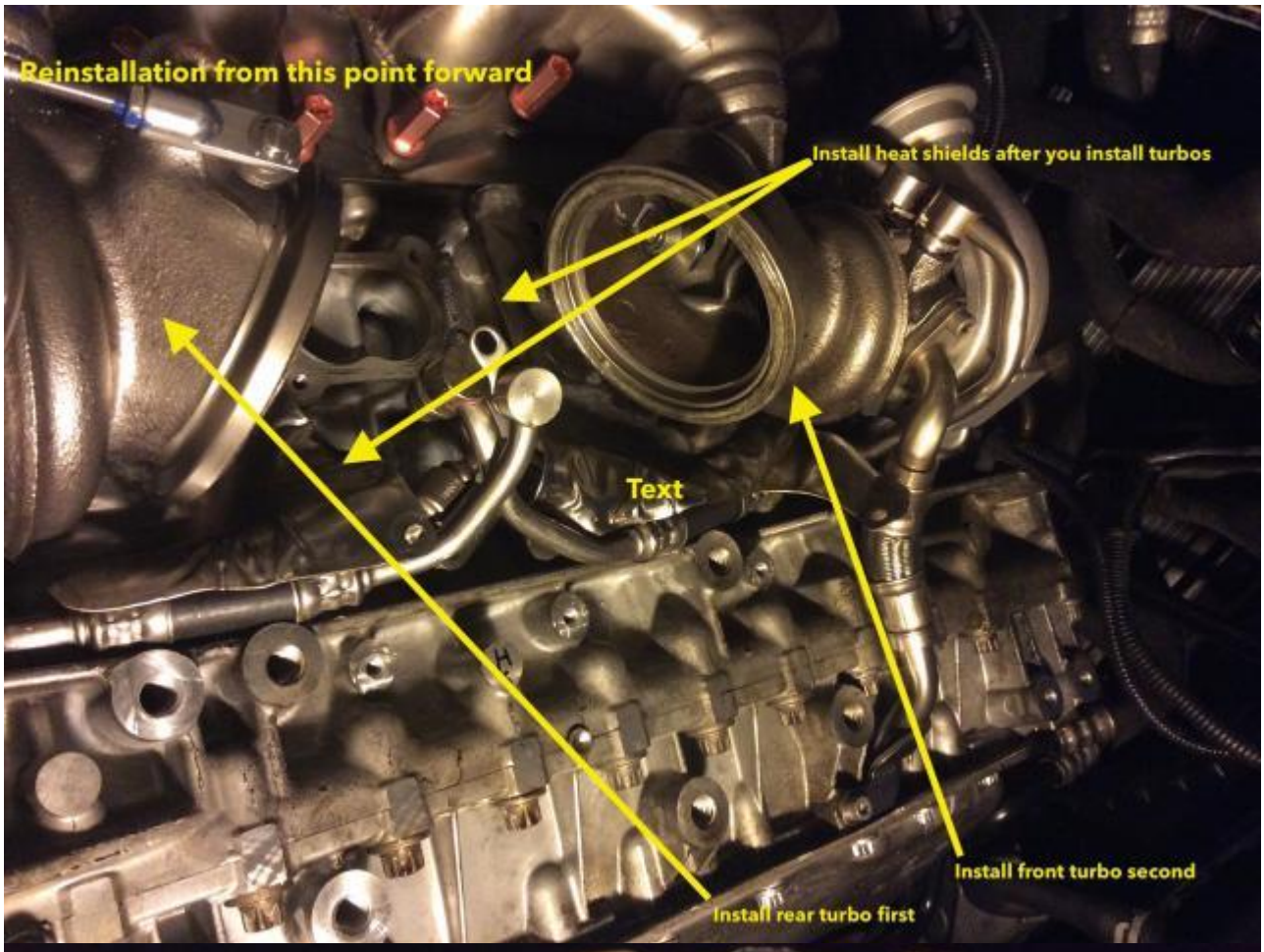
[url=http://s659.photobucket.com/user/rbeermann/media/22TurboInstall1.jpg.html]

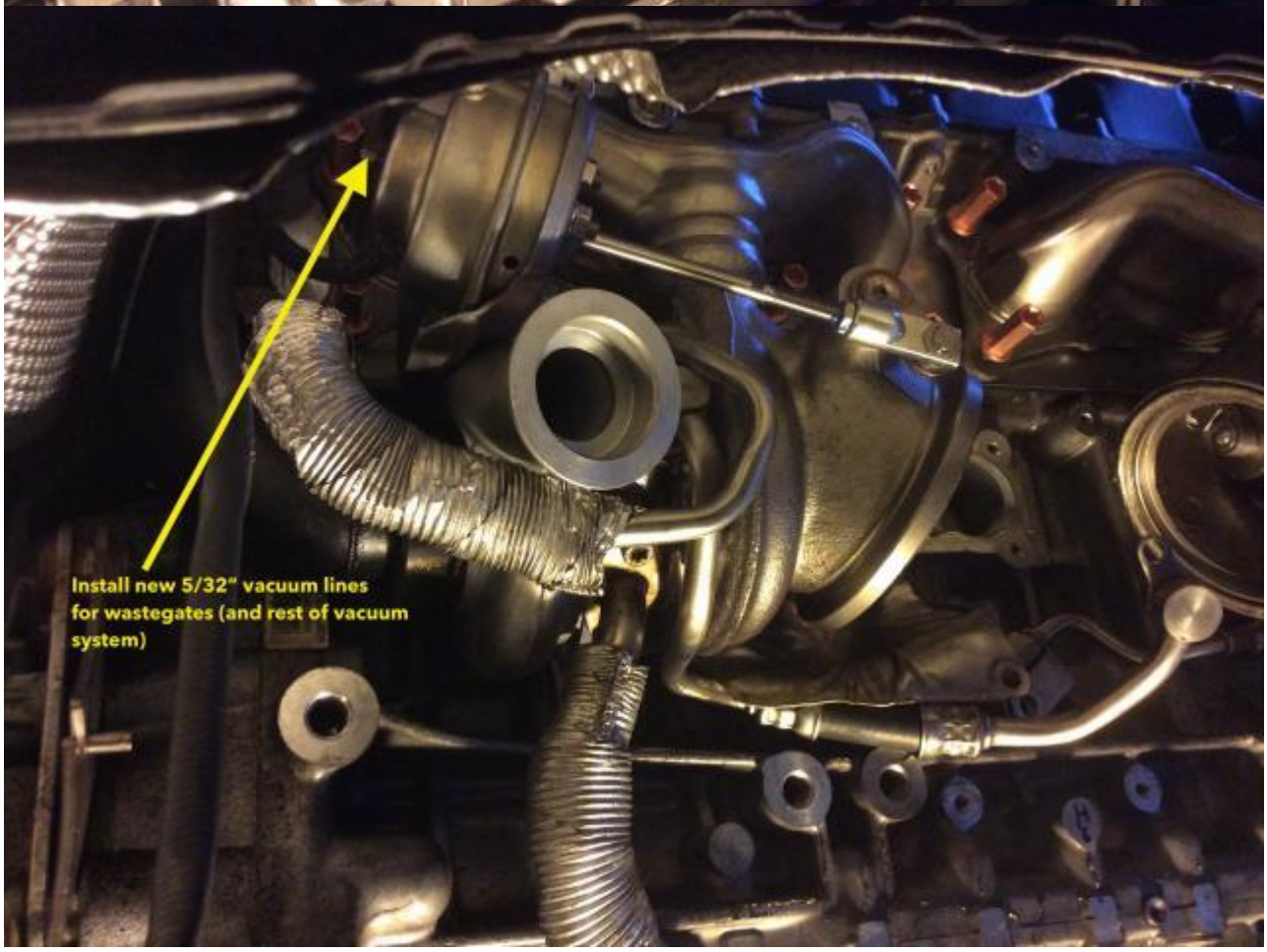


[/URL[url=http://s659.photobucket.com/user/rbeermann/media/22TurboInstall2.jpg.html]

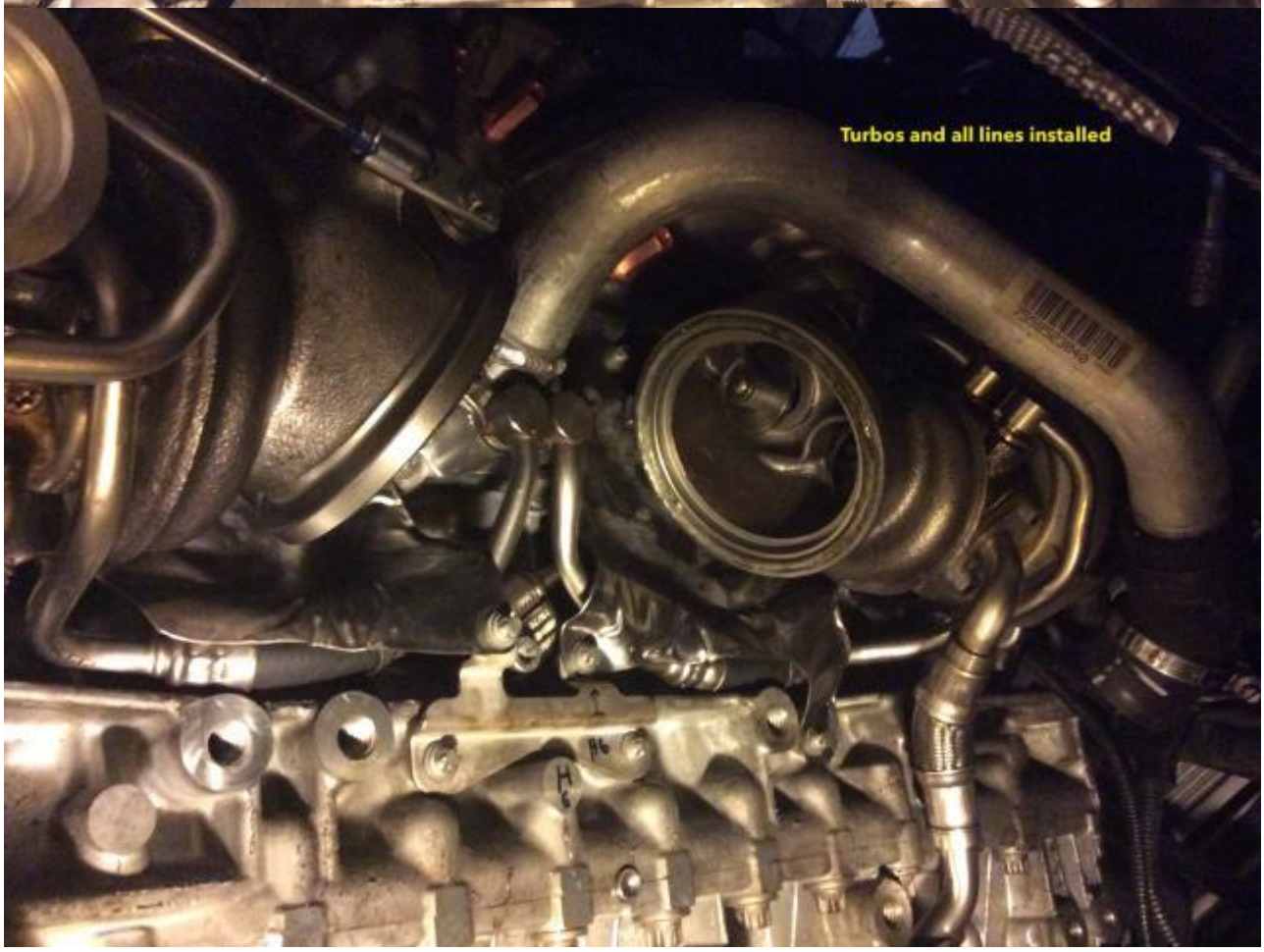

Install rear turbo upper coolant line before new turbo gets installed
[/URL

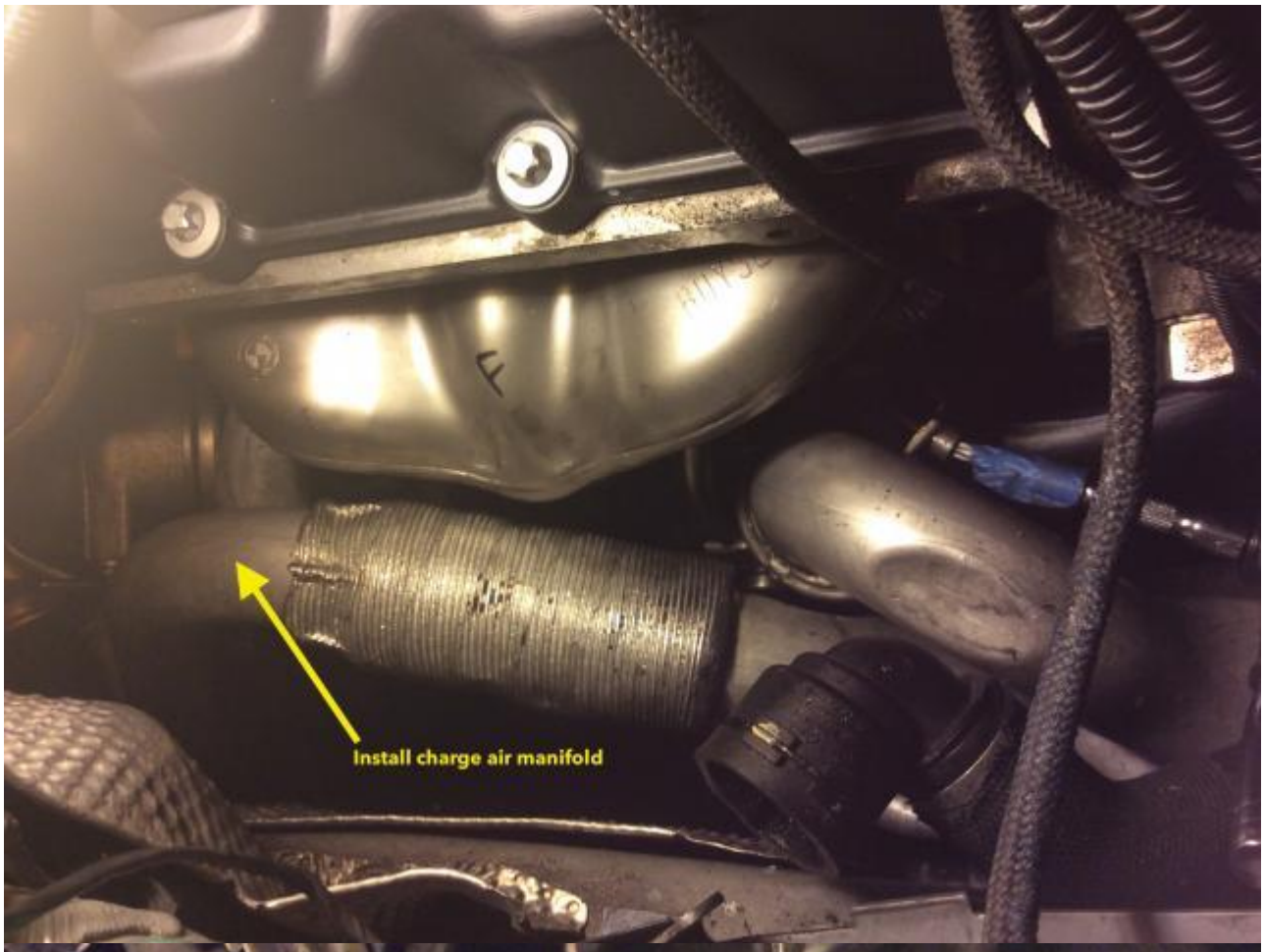

Before the new turbos go on, install the upper
coolant lines to the block for the front and rear turbos


Reinstallation from this point forward
Install heat shields after you install turbos
Text
Install front turbo second
Install rear turbo first

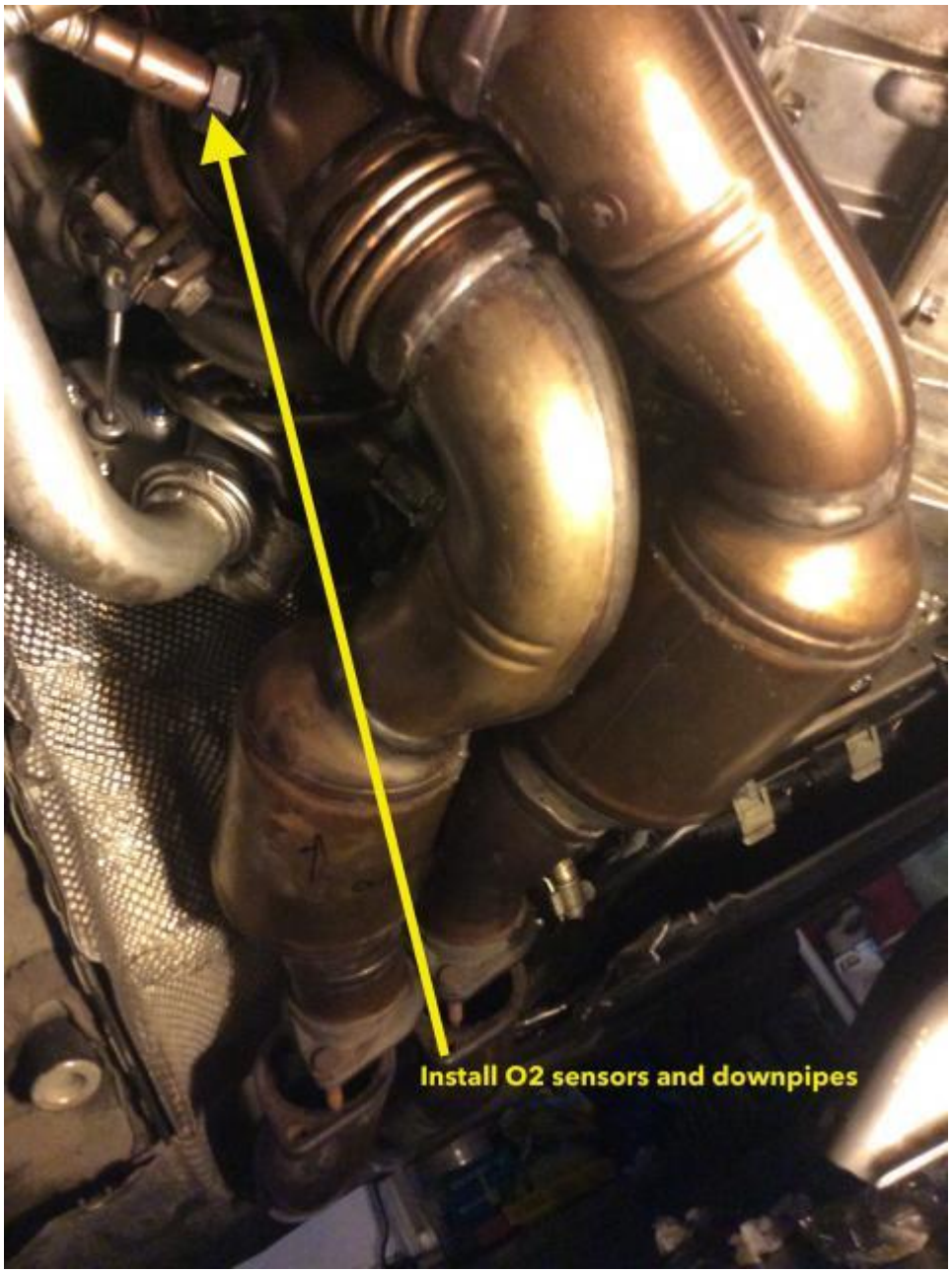

Install new 5/32" vacuum lines
for wastegates (and rest of vacuum
system)


Reinstall coolant supply line

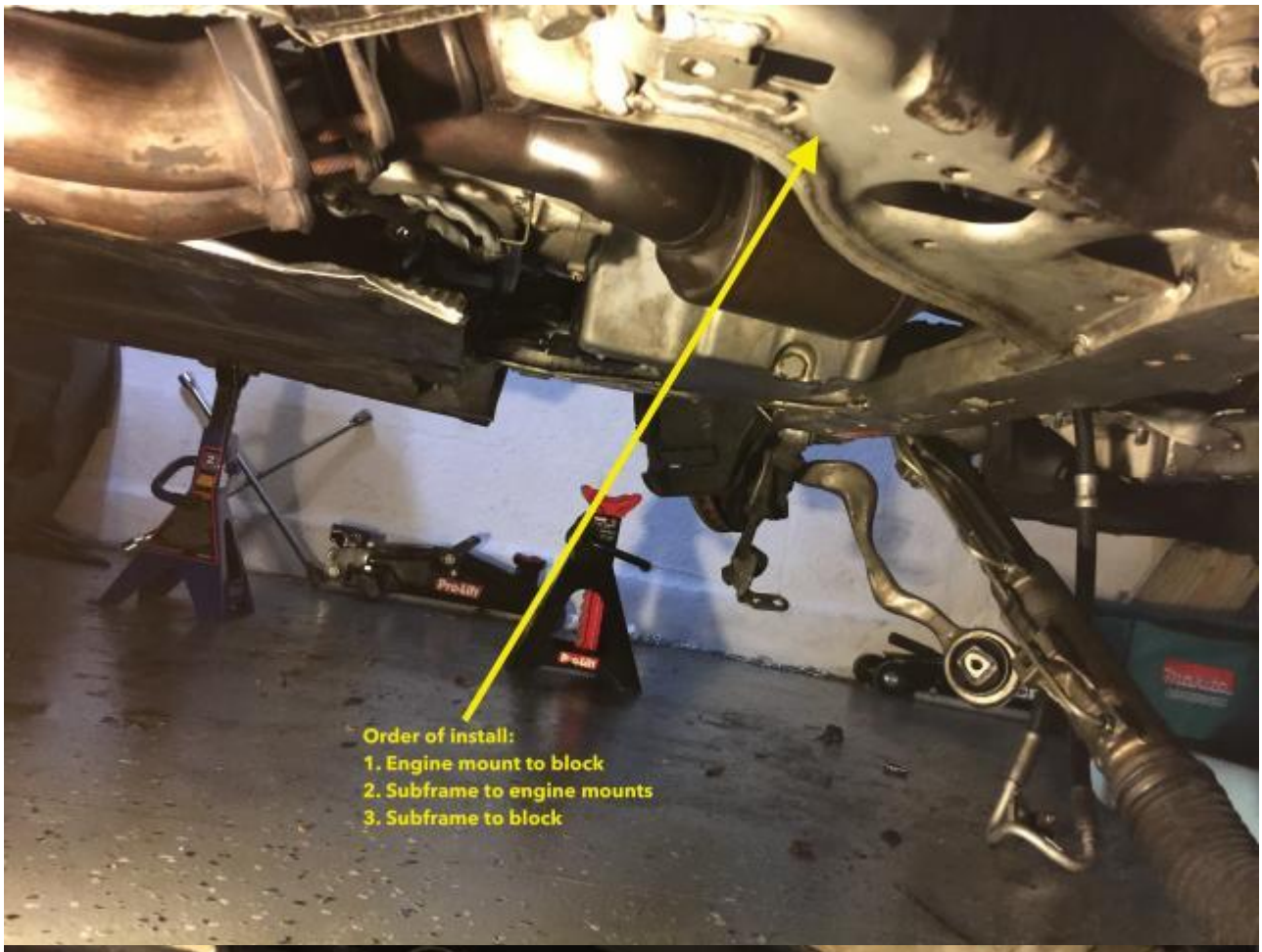

Turbos and all lines installed


Install charge air manifold

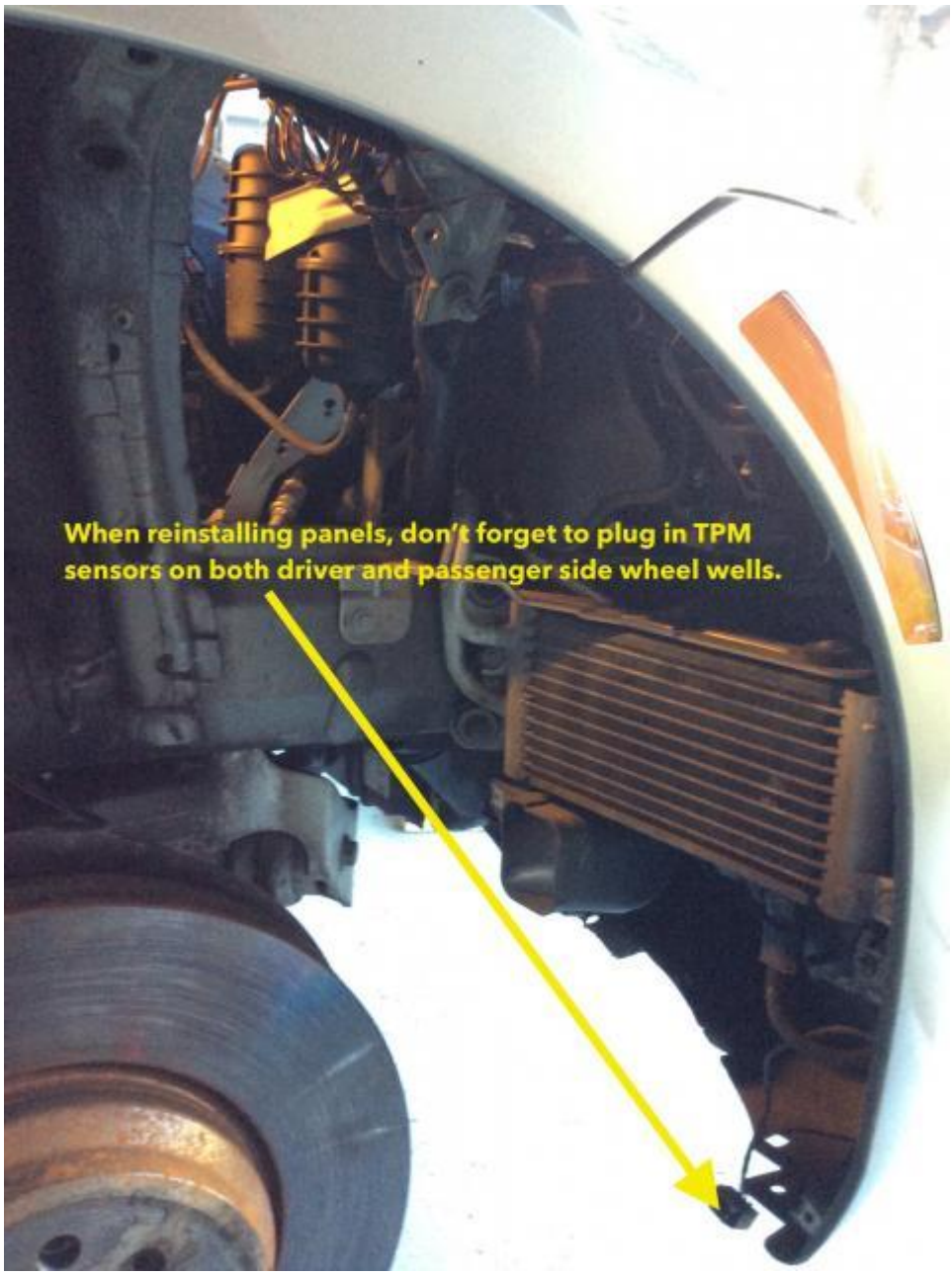

Install thermostat and water pump


Install O2 sensors and downpipes


OUTER
Connect after the subframe is installed


Order of install:
1. Engine mount to block
2. Subframe to engine mounts
3. Subframe to block


Order of Reinstall:
1. Upper and lower control arm
2. Sway Bar
3. Coolant line on subframe
4. Steering rack


When reinstalling panels, don't forget to plug in TPM sensors on both driver and passenger side wheel wells.