Off-Road Vehicle Construction Plans, Quality Parts & Kitsets

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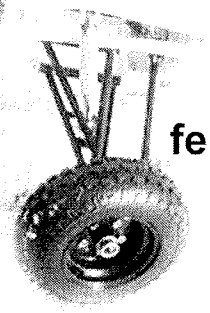
OFF-ROAD VEHICLES

ST2

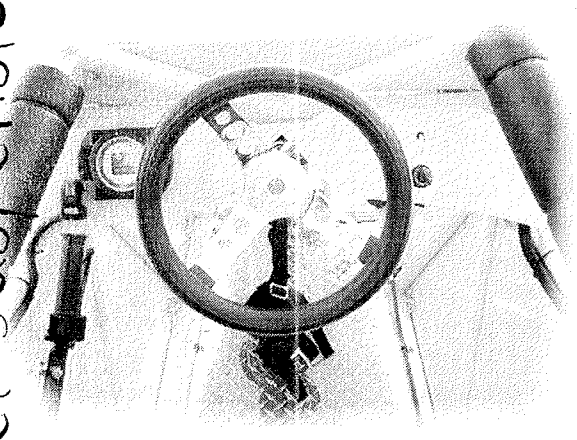
long travel

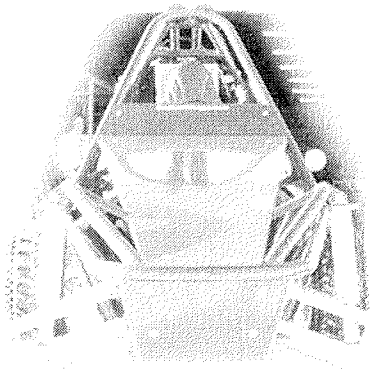
This booklet shows how to build this off-road vehicle FROM SCRATCH!



Long Travel Suspension featuring Fox Racing Shocks

Long Travel Suspension





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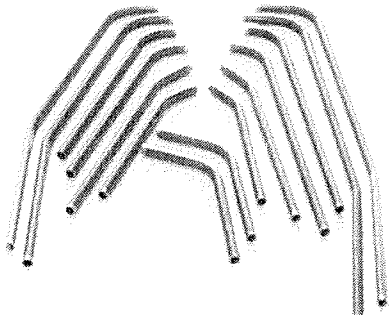

Pre-Bent Tube Kits Now Available!

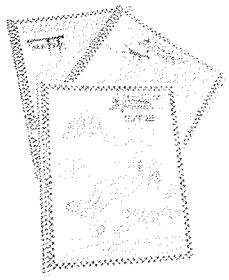

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TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS

Introduction

Welcome to the world of Badland Buggy, your number one source for premium off–road vehicle construction plans, quality parts & kitsets.

Thank you for purchasing this construction plan set. This booklet was developed over several years of feedback from our customers located all over the world. We use the feedback we receive from our customers to refine our products to make them easier to construct by the average home buggy builder, just like yourself.

We also fabricate & prototype all our products in our own fabrication & assembly shop. This ensures all our products, including our plans, acheive a level of quality & workmanship second to none.

This booklet is divided into sections. Each section starts with it's own materials list followed by a series of step by step drawings which should easily guide you through the whole process of fabricating a top quality off–road vehicle at home with a minimal amount of tools.

Each drawing can be easily identified with a unique "drawing number" located in the bottom right hand corner of the drawing's title sheet. This drawing number can be useful when you wish to label or identify your own parts at home.

Getting Started

Like any sports coach would tell you, a good game plan is the key to success. Start your buggy project correctly by first establishing a game plan. Plan your project. Think about the project as a whole then divide it down into managable tasks which fit your budget & time schedule.

A sports team usually practices their skills in preparation for the big game. You may need practice too. Ever MIG weld before? Yes, great! Get a few practice welds in before you jump right into the final welding. Never MIG welded before? No problem. Take a welding course or have a friend show you how to weld. Remember the old saying – practice makes perfect.

Establish your budget. How much do I want to spend? How much do I want to build by myself vs. purchasing pre–fabricated parts? How long do I want this project to take? What do I want to spend on the engine?

These are the core questions to ask yourself now instead of later. The average home buggy builder can reasonably fabricate just about every single part shown in this booklet. Some people have more skills, experience & patience than others. This will affect your preliminary decision making process regarding your budget & planning.

Engine Selection

Now is the right time to consider what type & size of engine you intend to install into your buggy. We have outlined some of the pro's & con's of each major engine type so you can make an informed decision.

Snowmobile Engines:

Most snowmobile engines are 2 strokes. A 2 stroke engine has fewer mechanical parts than a 4 stroke engine making them easier to repair & less expensive to maintain.

2 stroke engines have a different exhaust system than 4 strokes. 2 strokes are generally louder & rely on the dimensions of the expansion chamber section of the exhaust pipe to achieve maximum horsepower. If you have to cut & reweld the exhaust pipe for a 2 stroke you may want to consider giving this work to a professional to ensure the correct dimensions of the expansion chamber are met.

If reverse gear is a consideration, then a snowmobile engine is a good choice. Some snowmobile engines utilize a reverse gear box which has an upper input shaft & lower output shaft. Reverse is engaged by moving a mechanical lever. Some later model snowmobile engines are now using an electronic reverse. This system temporarily stops the engine, advances the engine timing & then electronically fires the engine in reverse. This eliminates the reverse gear box which translates to overall vehicle weight reduction & less mechanical resistance in the driveline.

When it comes time to instqll the snomobile engine, you will want to reposition the jackshaft (or layshaft) from behind the engine to forward the engine. There is information located in this booklet to show how this is done in real life.

Do you want a liquid cooled or air cooled engine? By far, liquid cooled is the more reliable method of keeping engine temp's down, however, your climate may allow you to use an air cooled (or fan assisted) snowmobile engine even during the heat of the summer months. Snowmobile engines are available in both liquid or air cooled so be sure what type of engine you need.

Local emissions & noise pollution controls. Check with your local authorities as there are noise & emission regulations by province, state, etc... The type of engine you select could be determined by what you are legally permitted to use in your local area.

We recommend a minimum of 400cc (or 40hp) & a maximum of 1000cc (or 180hp).

Engine Selection (continued...)

Street Motorcycle Engines:

Most street motorcycle engines come with electric start & are 4 strokes. The two most common street motorcycles are twin cylinders (or v-twins) & inline 4 cylinders. Both engine types will fit into the dimensions of the engine bay of the ST2 buggy, however, you may have to make some modifications to either the chassis frame or rear a-arm suspension to accomodate larger engines.

Being 4 strokes, modifying the exhaust pipe(s) of a street motorcycle engine is somewhat less techincal when compared to modifying the expansion chanber of a typical 2 stroke engine.

The three most popular reasons why people choose a street motorcycle engine over a snowmobile engine are:

1. Gearing – street motorcycle engine have a geared transmission which you activate by moving a shift lever to change gears. This is excellent for the best accelleration & hill climbing abilites of your buggy.

2. Horsepower – you can typically get more horsepower from a street motorcycle engine than a snowmobile plus there are a huge selection of aftermarket companies who offer horsepower upgrades for street motorcycle engines.

3. Availability – obviously, if you live in an area where snowmobiles just aren't available then your decision to use a street motorcycle engine is easy.

Having a reverse gear is more difficult to install & costly if using a street motorcycle engine, though not impossible. Quaife (www.quaife.com) manufactures a tidy reverse gear box suited exactly for use with mini-buggies with street motorcycle engines. There are also several other manufactures of purpose built reverse gear boxes availble worldwide. You will have to do your own research for parts & sources in your local area.

If using a street motorcycle engine, you will have fabricate a shift lever which allows you to shift gears remotely from the driver's cockpit.

Street motorcycle engines are typically less noisy than a snowmobile engine, especially at idle.

Fuel System Considerations

Now is also the right time to consider how the fuel system is going to work & where the fuel tank will be located.

The type of engine you select will significantly contribute to the location of the fuel tank. Some engines rely on a gravity feed fuel delivery to the engine. If this is the case, you will likely want to mount the fuel tank ABOVE the engine. This may mean more modifications to the chassis frame even before you start. A gravity feed fuel system is the easiest & fastest to install.

If your engine requires vacuum or electric fuel pump to deliver fuel to the engine then you have more options available to you when it comes time to locate the position of the fuel tank.

You can locate your fuel tank above the engine, below the engine, behind the engine or even at the front of the buggy near the rack & pinion. Just make sure the placement of the fuel tank is functional & practical with your engine type.

Think safety. Do NOT locate your fuel tank in an unsafe location. Externally mounted fuel tanks (outside the chassis frame) are not recommended. Only use approved materials for the fuel tank. We recommend using an approved racing fuel cell which is designed with a foam pad inside to minimize sloshing of the fuel during aggressive driving. Fuel cells also have to pass minimum safety features which ultimately makes for increased driver safety.

Avoid the risk of a fire in the driver's compartment by logically positioning the fuel tank in a sensible place. You do not want the fuel tank to be punctured by a rock, thus, a guard may also be required.

If practical, consider fabricating a firewall between the driver & the fuel source and/or the engine. Driver safety should always be your first & foremost consideration when laying out the fuel system & engine.

Consider a master fuel cut-off. This can be as simple as a petcock valve which ppositively shuts off the fuel flow to the engine. Some racing manufacturers have more sophisitcated fuel shut off system available also which can be activated by the driver while sitting in the driver seat. Your budget may determine how this is considered.

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Chassis Steel Selection

Steel selection is an important decision you will need to make at the very start of your buggy project.

Your chassis should be constructed from mild steel or commonly known as carbon steel. Mild steel will provide sufficient strength to the chassis frame & rollcage to allow the vehicle to run for years to come. In the event of a severe rollover or hard impact, the inherent properties of mild steel will allow the rollcage to bend slightly while still providing protection to the driver.

We do not recommend using aluminum as a chassis material. The properties of aluminum do not suit race cars or chassis frames because in the event of a rollover or accident, aluminum will have a tendency to fracture or break rather than bend, like mild steel. This may put the driver at risk. Your first & foremost consideration when building any vehicle should always be driver safety.

Piping is typically measured by the outside diameter (o.d.) & it's wall thickness.

Tubing is typically measured by the inside diameter (i.d.) & it's wall thickness.

Either piping or tubing can be used to construct your chassis. Generally speaking, piping has a greater wall thickness, thus, weighs more than tubing. This adds weight to your whole vehicle. The concept behind the design of our off-road vehicles is to keep the overall weight of the vehicle to a minimum.

Lower vehicle weight has many advantages. First, and probably the most notable is the lower the vehicle's weight then the greater the power-to-weight ratio between the vehicle's engine & it's mass. Simply divide the horsepower of the engine you intend to you use by the overall estimated weight of the vehicle including the mass of steel, driver, all parts, tires, rims, fuel, etc... The greater this ratio, the greater your power-to-weight ratio. This allows your vehicle to have improved acceleration & shorter braking distances.

Second, steel is typically sold and/or priced by weight. The lighter your purchased steel weighs usually means you will pay less.

Obviously, you should not make your chassis steel too thin either. This could weaken the overall strength of the chassis frame making the frame more susceptible to twisting under a load or more dangerously, could make the rollcage more likely to bend in the event of a rollover which could cause injury to the driver.

Confused yet? Don't worry, through our years of fabrication experience & building of off-road vehicles, we have found a type & size of round mild steel that seems to provide you with an optimal balance between chassis strength & the lightest, safest vehicle weight.

For the main chassis frame, we recommend you use what is called Hollow Structural Round Tube. This type of tubing has a welded seam running it's full length.

Don't be confused by the word "tube" either. Round Tube is actually measured the same as piping, meaning it is measured by it's outside diameter (o.d.) & by it's wall thickness.

1" Round Tube measures 1.315" o.d. x 0.100" wall
¾" Round Tube measures 1.050" o.d. x 0.100" wall

Why is this important? The size of your tubing directly relates to the type & size of bending die you will require to perform all of the bending steps to construct the chassis frame. The topic of "bending" is discussed in further detail in this booklet.

The size of your tubing also is important when fitting parts to the inside (or i.d.) of your tubes. Our drawings recommend specific parts & part numbers based on the ¾" & 1" Round Tube sizes. If you use a different size of piping or tubing then take into consideration the adjustments which may have to be made elsewhere in your project.

Badland Buggy also offers specific sizes of polyurethane bushings which are designed to fit inside the Round Tube. Polyurethane bushings are needed to make the vehicle's suspension pivot up & down. When you change the size of the chassis steel, then you also affect the size of bushing required to make your suspension work.

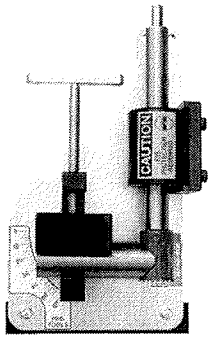
The drawings in this booklet will also show you specific information for "tube adapters" which fit snugly within the i.d. of the ¾" Round Tube. Again, changing the piping or tubing size you choose to use will affect the size of the tube adapters.

The first material list you will see in this booklet will show you exactly what size & lengths of Round Tube you will require to construct both the chassis frame & all of the tubular suspension components. There is approximately 10-15% extra material which allows for some mistakes or over/under cuts from time to time.

Tools

We have listed examples of just some of the core tools you will need to successfully fabricate your buggy. You will also need all of the appropriate mechanics tools, wrenches, sockets, pliers, etc...

Tubing/Piping Notcher



Part #HSN-500
www.pro-tools.com

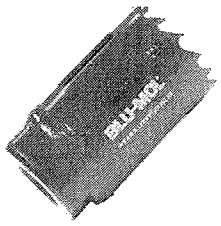
This tool is required if you want to have tight fitting tube joints.

This tool consists of a T-handled clamp which holds the tubing in place while you cut a semi-circle profile with a bi-metal hole saw.

An electric drill is attached to the end of the shaft holding the hole saw.

The tube notcher can be clamped or bolted to a table top or secured using a bench vise. You can also rotate the T-handle clamp assembly at different angles to create compound or angular profiles on the ends of your tubing.

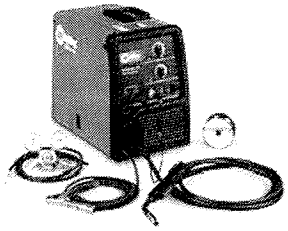
Bi-Metal Hole Saw



Size 1 5/16" Part #TL0001
Size 1 1/8" Part #TL0002
www.badlandbuggy.com

The bi-metal hole saw is affixed to the end of the shaft of a tube/pipe notcher. It is plunged through the tube to create a semi-circle profile for fitting one round tube to another round tube.

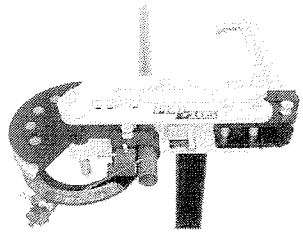
MIG Welder



Part #MILLERMATIC 175
www.millerwelds.com

MIG welding is probably the easiest & fastest welding process to learn. MIG stands for Metal Inert Gas welding. We suggest 0.030" solid core wire & a mixture of CO2/Argon shielding gas.

Tube/Pipe Bender

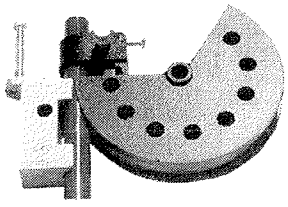


Part #Model-105
www.pro-tools.com

A tube bender is used to create the radius corners in round metal tubing. The tube bender typically consists of a bending mechanism, a handle (or hydraulic cylinder), a bending die & a degree ring indicator.

There is a discussion later in this booklet about the procedures involved in how to bend tubing accurately using this model of tubing bender. You can also use just about any other make or model of tube bender.

Correct Size of Bending Die

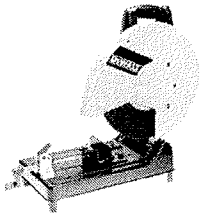


240° 1" Pipe Die
www.pro-tools.com

If you use the exact size of metal tubing we suggest for the main chassis frame (1" ERW tube) then you will need a 1" pipe die (for tube or pipe measuring 1.315" o.d.) We suggest a 5" centerline radius in the die.

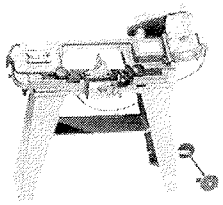
TOOLS

Abrasive Cut–Off Saw



The cut–off saw uses an abrasive circular disc to cut through steel. Be sure to wear hearing, eye & hand protection when using this tool.

Metal Band Saw

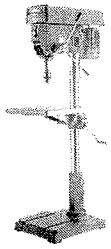


Though not essential, a metal cutting bandsaw will increase your productivity & drastically reduce the harmful dust generated from cutting steel with other tools while also minimizing your material waste.

Bench Grinder

This commonly used tool will help you debur metal filings from the ends of your round tubes plus 1000+ more uses. We like to attach a wire brush wheel to one side which helps in removing mill scale from round tubes prior to welding.

Drill Press

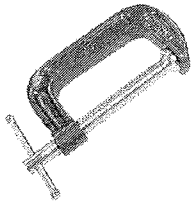


A drill press is the best tool to achieve the roundest holes in metal while making your drill bits last longer when compared to just using a hand operated drill. You will also require a variety of sizes of metal cutting drill bits. Cobalt or titanium bits work best & last the longest when drilling in metal.

Air Compressor & Air Tools

Again, not an essential tool, the air compressor & a variety of air tools will greatly improve the overall productivity in your shop by making repetitive tasks faster.

C–Clamps & other clamping devises

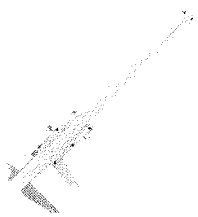


You can never have too many clamping devices. As a general rule, it is always better to clamp a part than to attempt to hold it with your hands. Make sure you always have on hand a variety of metal c–clamps, bar clamps, vise grips, drilling clamps, etc...

Safety Glasses

Nothing is more important than your personal safety. Protect your eyes with appropriate safety glasses or full face shields. Use hearing protection for all tools. Use leather palmed gloves when handling freshly cut metal and/or hot steel to aviod burns & cuts. Keep a First Aid Kit & a fire extinguisher on hand also. Think & work safely.

Measuring Devices



Measure twice – cut once. It's an old saying but it's still true today. Use the appropriate measuring tools for the right job. Machined surfaces require different measurement tools than other parts.

HOW TO BEND ROUND TUBES

How to Bend Round Tubes

The successful & accurate bending of the round tubes for the chassis frame is an important step in the construction of off–road vehicle. This section will show you methods we have used in our own fabrication shop to successfully fabricate numerous vehicles. The methods shown are intended to be used as a guide for the home buggy builder who has little or no experience with bending round tubes.

The methods shown are also based on using a rotary draw type bender, or more specifically, a Model #105 Bender from Pro–Tools (www.pro–tools.com).

First, you must obviously purchase your chassis steel. We have found it is best if you keep the original full lengths of round tubes to optimize your cut lengths & reduce your waste. Most steel suppliers will provide either 20' (6.1m) or 24' (7.3m) lengths of steel tubing.

Once you have your steel ready, consider how to optimize the most amount of your steel with the minimal amount of waste. To do this, we typically start with the longest cut lengths first then you have shorter cut lengths remaining for other phases of the project.

If you have never bent round tubing before, we recommend you purchase 1 additional length of 1" ERW tube to use for practice bends prior to bending the final members.

Templates & Cut Lengths

Before bending any round tubes, you will need a "template" to compare your bent tube with. Purchase a 4'x8' (1.2m x 2.4m) sheet of plywood or medium density fibreboard (MDF) to draw your full scale bending templates on.

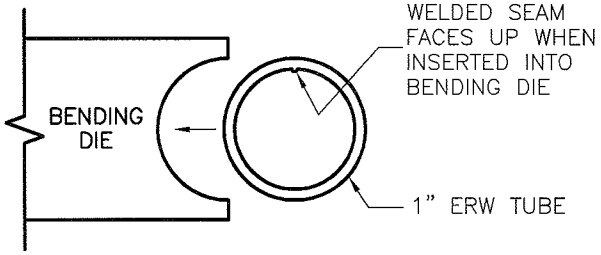
Carefully draw 7 full size templates of tubes marked "TA" through "TH", as detailed in Section "A" of the Chassis section.

Next, prepare the slightly over–sized cut lengths of all 14 tubes, as detailed in Section "A" of the Chassis section. These cut lengths are slightly longer than necessary & will be trimmed to length later.

Each tube should now be clearly labelled as "TA", "TB", "TC" and so on.

Orientation of Seam

ERW tube has a welded seam running it's full length. This welded seam needs to be oriented on the sidewall of the bend. See diagram.



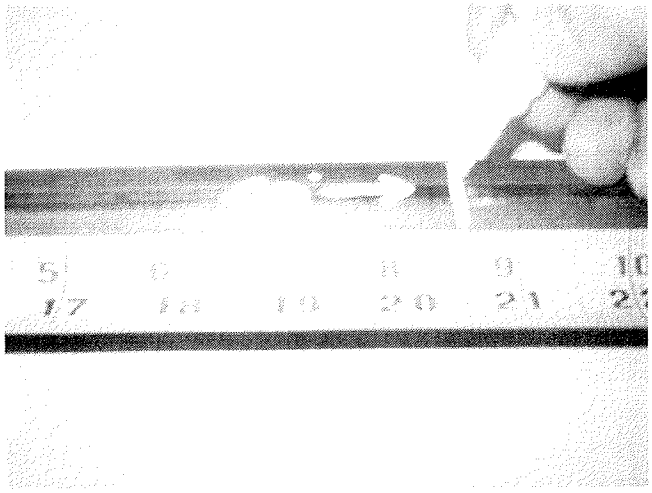
The correct orientation of the welded seam in the round tube will help prevent cracking or tearing of the tubing material as it undergoes a change in length during the bending process. This results in higher quality bends, a stronger chassis frame & less wear & tear on your bending dies.

Marking the Cut Lengths

You need to place markings on the cut length of round tube to identify 3 pieces of information:

1. start of bend
2. direction of bend
3. angle of bend

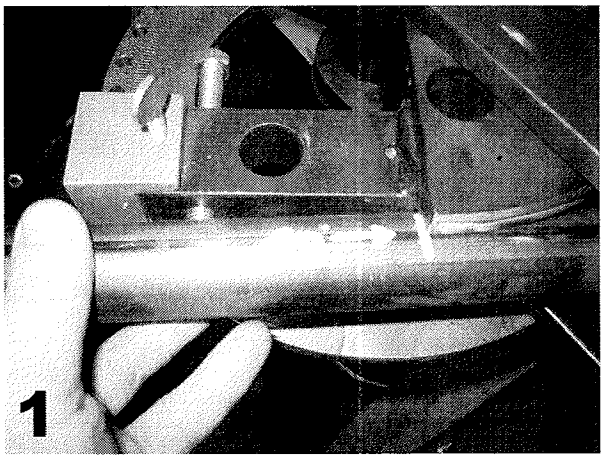
The following photo shows an example of these markings on a round tube.



HOW TO BEND ROUND TUBES

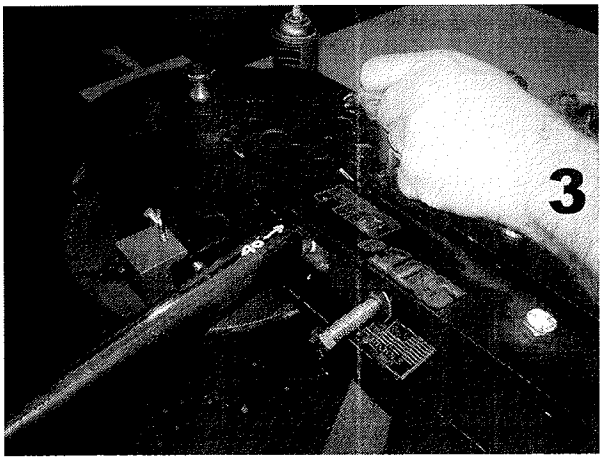
Using the Bender

The next step is to insert the marked tube into the bender. Be sure to orient the tube's welded seam correctly. Align the start line with the end of the bending die.

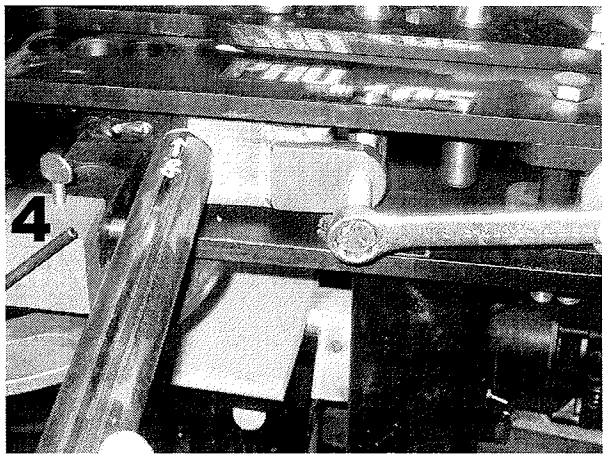


Lubricate the backing block using white lithium grease only. This allows for easier removal of the bent tube & helps prevent scarring on the follower block.

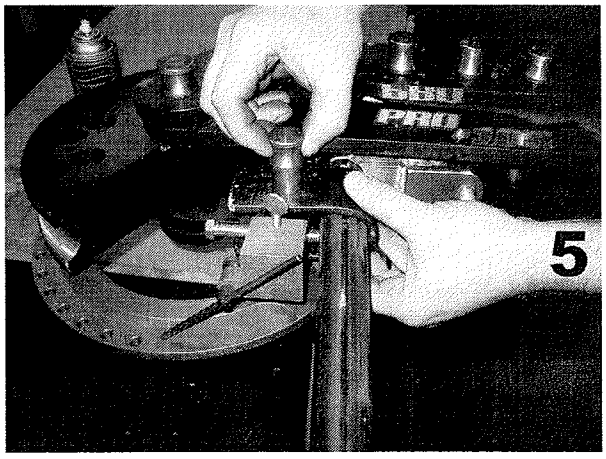
Insert the backing block into the bender & lock it in position using the round dowel pin.



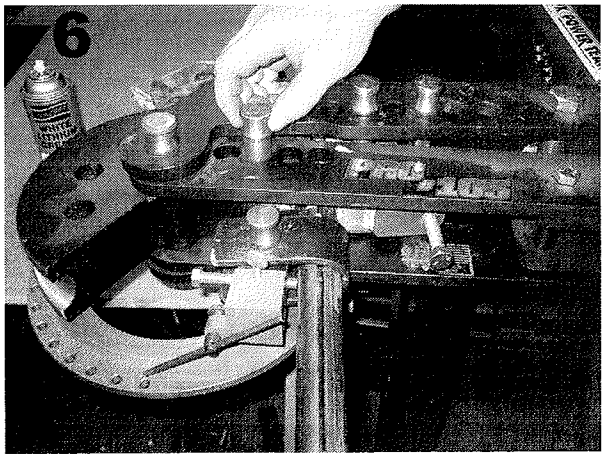
The backing block must sit snugly against the round tube. Use a wrench to tighten the bolt which places pressure against the pipe & the bending die. Tighten until all slack is taken out of bolt.



Install the U shaped collar & pin.

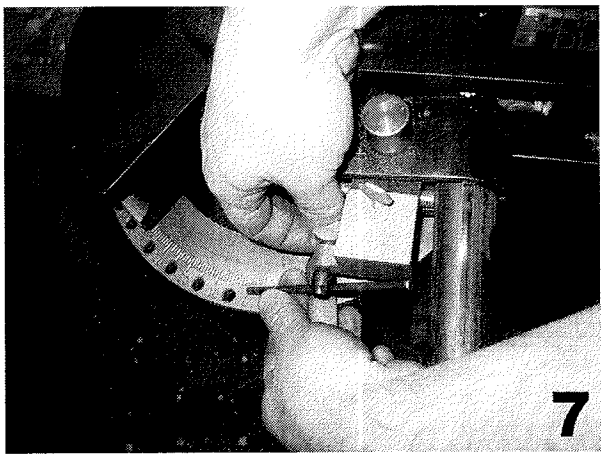


Insert the pin to lock the bending die to the bender's rotating arm.

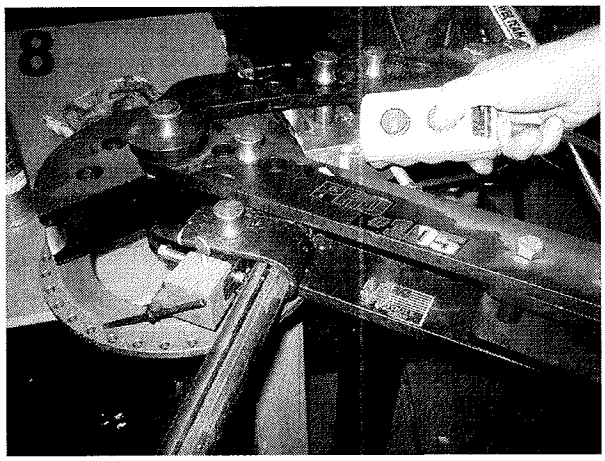


HOW TO BEND ROUND TUBES

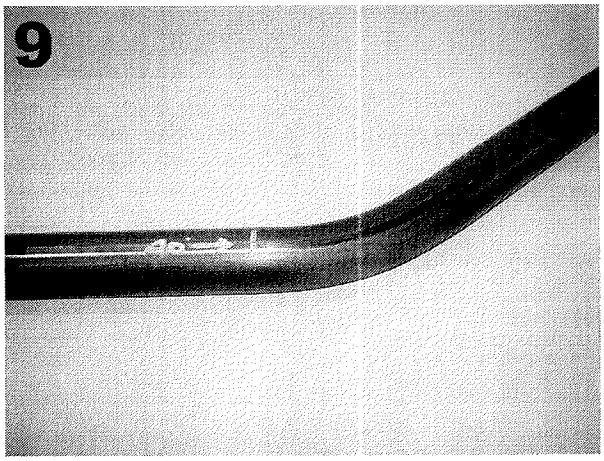
Set the degree pointer to 0°.



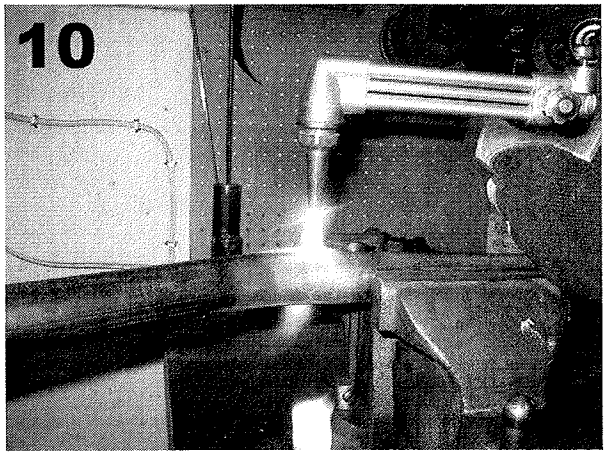
Bend the tube to desired angle. You can use either a mechanical operated bender with a handle or a hydraulic type bender as shown here.



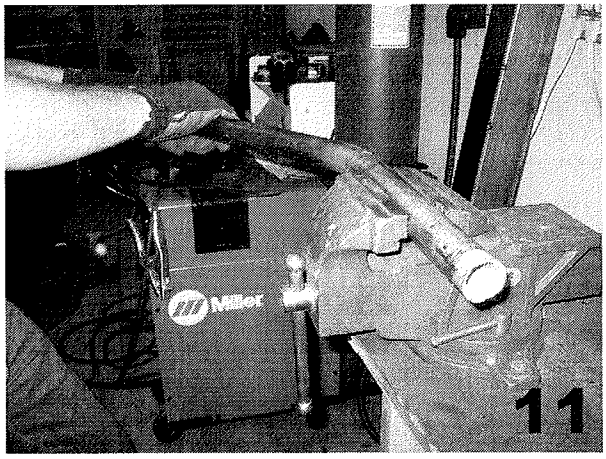
Remove the tube from the bender. Clean off the white lithium grease & check tube against template.



If the bend angle is slightly off when compared with the template then simply use an acetylene torch to apply heat to the bend.



Once the tube is red hot, apply force in the direction you wish to make the slight change in bend angle. Remove & recheck against the template.



Use the template to mark the final cut lengths of each end of the bent tube. Debur the ends. If required, notch the ends to fit the chassis framing.

SECTION "A"

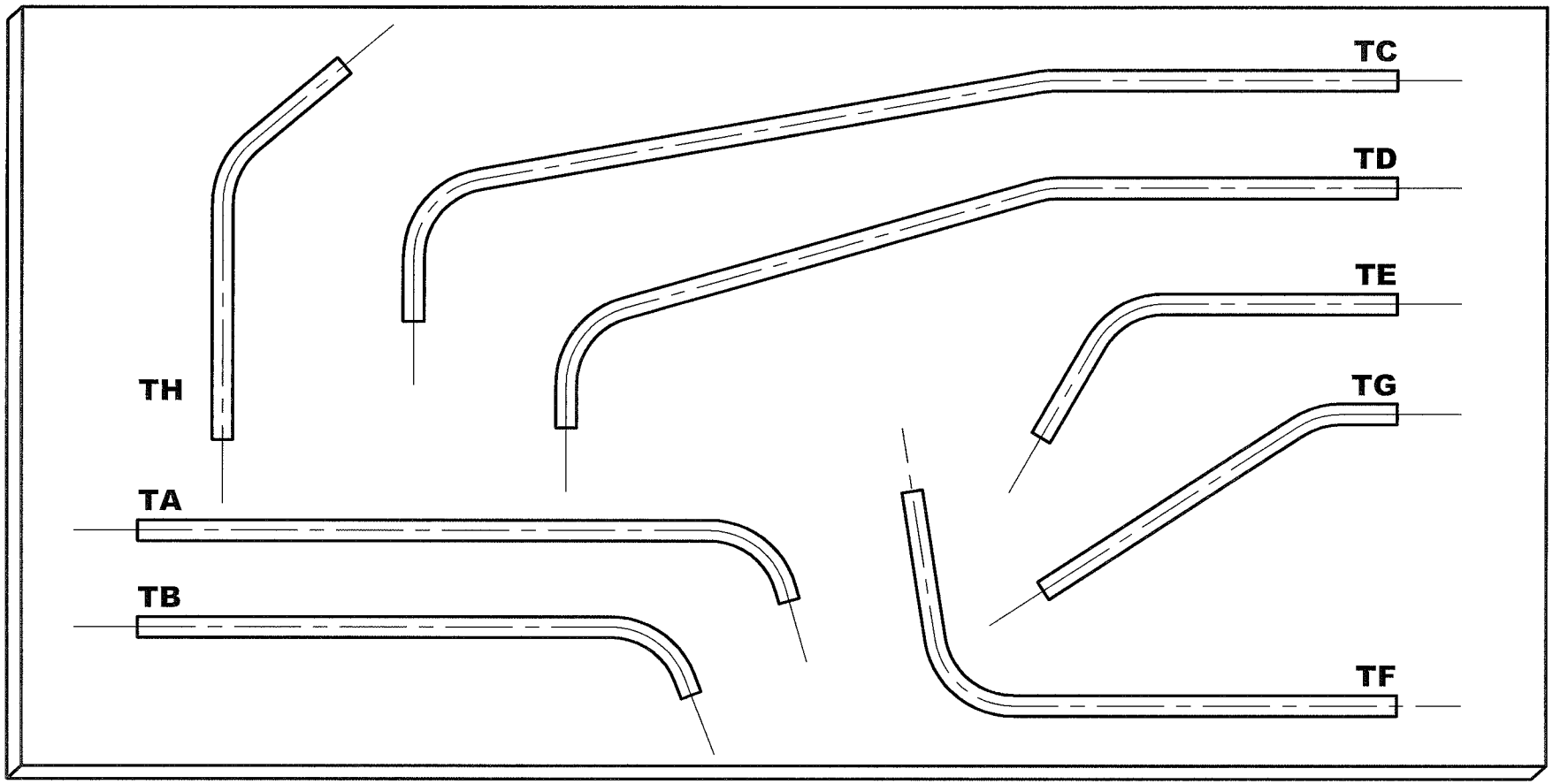
BUILDING THE CHASSIS FRAME

MATERIAL LIST

ITEM No.	DESCRIPTION	QUANTITY	
1	3/4" ROUND TUBE, 1.050"o.d. x 0.100" WALL	1 pc @ 24' 0"	(ENOUGH STEEL FOR FRONT & REAR SUSPENSION A-ARMS ALSO)
2	1" ROUND TUBE, 1.315"o.d. x 0.100" WALL	6 pcs @ 24' 0"	
3	¾" ERW SQUARE TUBE, ¾" x ¾" x 0.065" WALL	1 pc @ 24' 0"	
4	1½" ERW SQUARE TUBE, 1½" x 1½" x 0.065" WALL	1 pc @ 24' 0"	
5	PLATE #PL0005, ⅛" MILD STEEL PLATE	6 pcs	
6	PLATE #PL0006, ⅛" MILD STEEL PLATE	1 pc	
7	PLATE #PL0016, 3/16" MILD STEEL PLATE	2 pcs	
8	PLATE #PL0017, 3/16" MILD STEEL PLATE	1 pc	
9	PLATE #PL0018, 3/16" MILD STEEL PLATE	2 pcs	
10	PLATE #PL0019, 3/16" MILD STEEL PLATE	4 pcs	
11	PLATE #PL0020, 3/16" MILD STEEL PLATE	4 pcs	
12	ANGLE 1¼" x 1¼" x ⅛"	2 pcs @ 18 1/8"	
13	⅛" DIAMOND PLATE ALUMINUM, 15 15/16" x 34 5/16"	1 pc	

TITLE: SECTION "A" BUILDING THE CHASSIS FRAME

DWG No. A01



Making the Template Board

Start with a full 4'x8' sheet of ¾" thick plywood or medium density fibreboard (MDF).

Use the dimensions & details shown on the next series of drawings to create full size templates for each bent tube as shown above.

You will need 2 tubes of each template (16 bent tubes total). Each tube is identified by a unique label (ie: TA, TB, etc...). This helps in locating where the tubes will be placed on the chassis frame later.

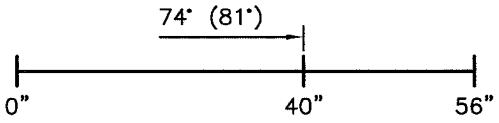
Place this template board on top of a table or saw horses to give you a good working surface while doing your tube bending.

TITLE

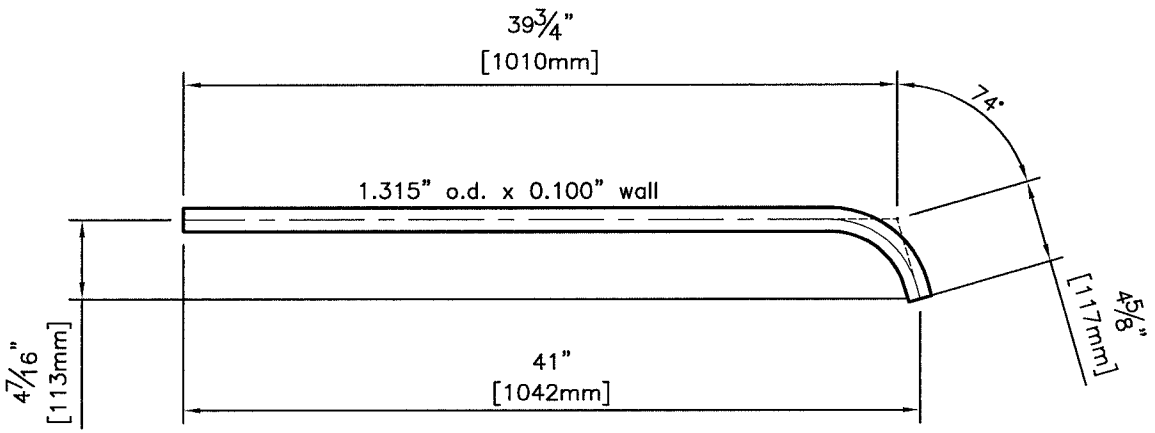
TEMPLATE BOARD FOR ALL BENT CHASSIS TUBES

DWG No.

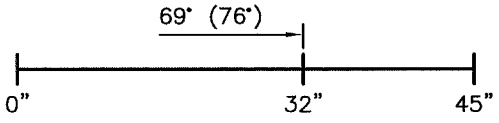
A02



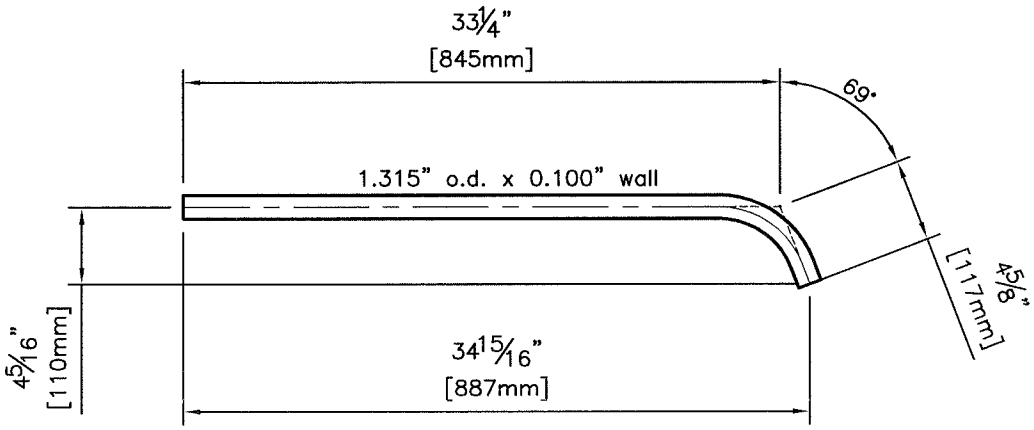
MARKING DETAILS FOR TUBE "TA"



BENDING TEMPLATE FOR TUBE "TA"



MARKING DETAILS FOR TUBE "TB"



BENDING TEMPLATE FOR TUBE "TB"

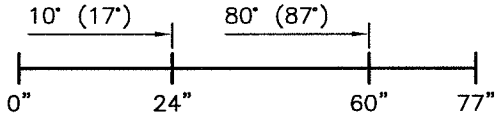
BADLAND BUGGY.COM
OFF-ROAD VEHICLES

TITLE

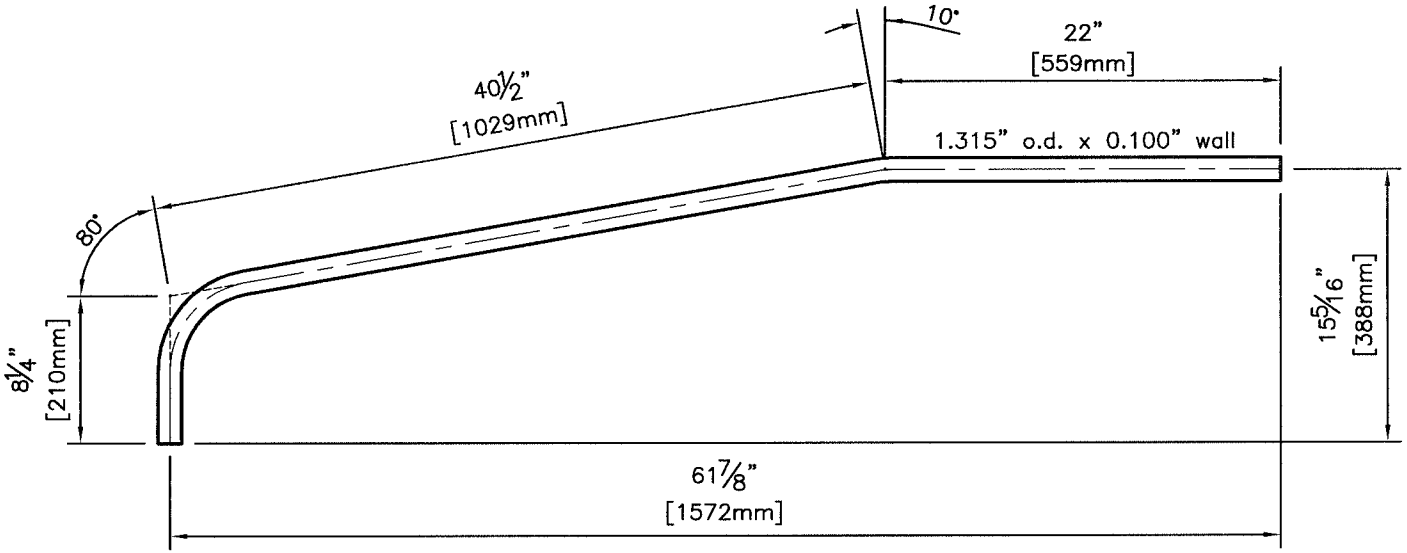
BENDING DETAILS
TUBES "TA" & "TB"

DWG No.

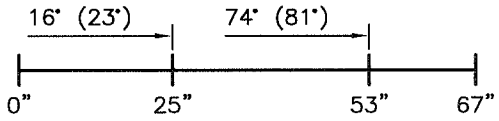
A03



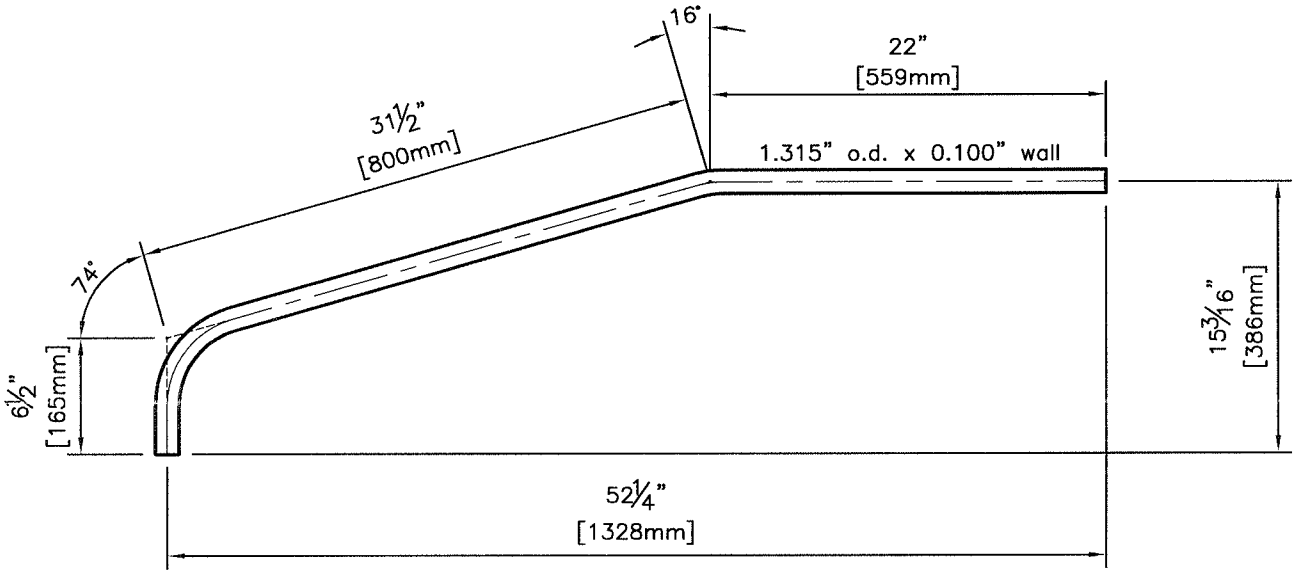
MARKING DETAILS FOR TUBE "TC"



BENDING TEMPLATE FOR TUBE "TC"



MARKING DETAILS FOR TUBE "TD"



BENDING TEMPLATE FOR TUBE "TD"

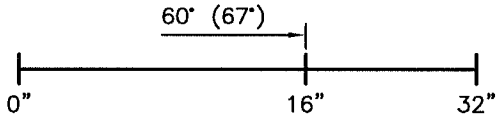
BADLAND BUGGY .COM OFF-ROAD VEHICLES

TITLE

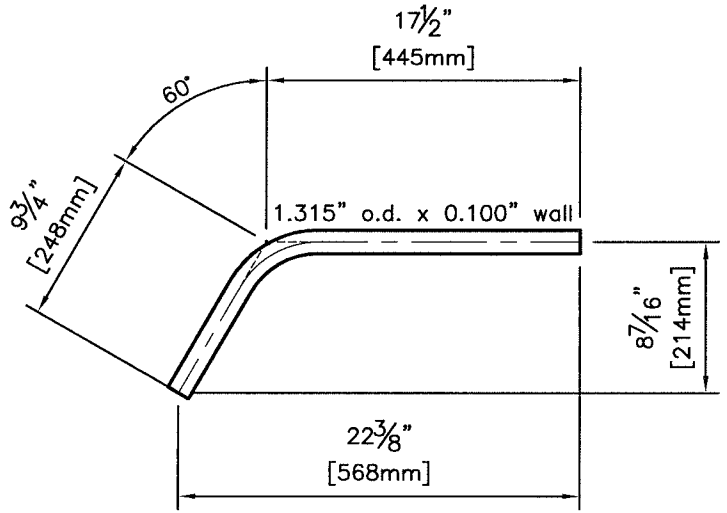
BENDING DETAILS
TUBES "TC" & "TD"

DWG No.

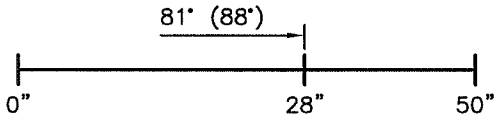
A04



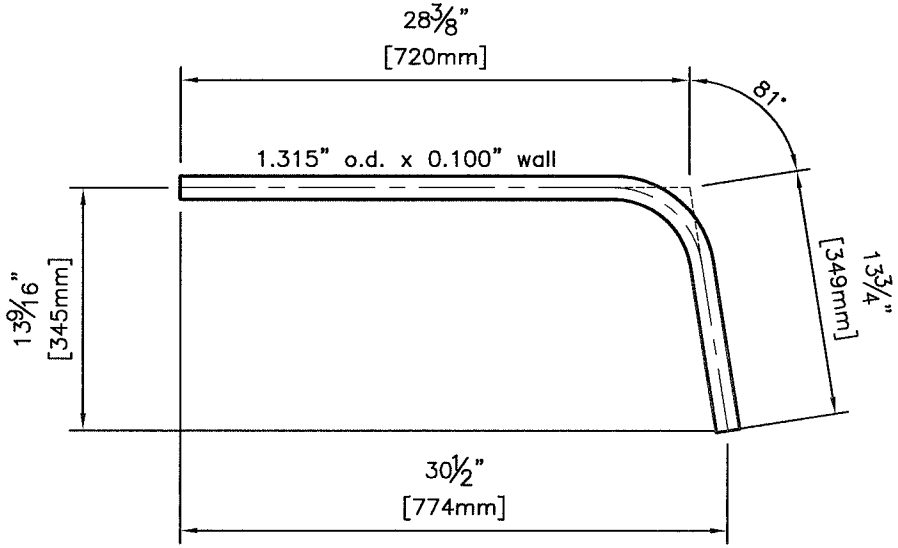
MARKING DETAILS FOR TUBE "TE"



BENDING TEMPLATE FOR TUBE "TE"



MARKING DETAILS FOR TUBE "TF"



BENDING TEMPLATE FOR TUBE "TF"

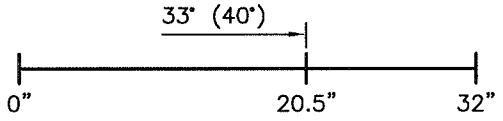
BADLAND BUGGY.COM
OFF-ROAD VEHICLES

TITLE

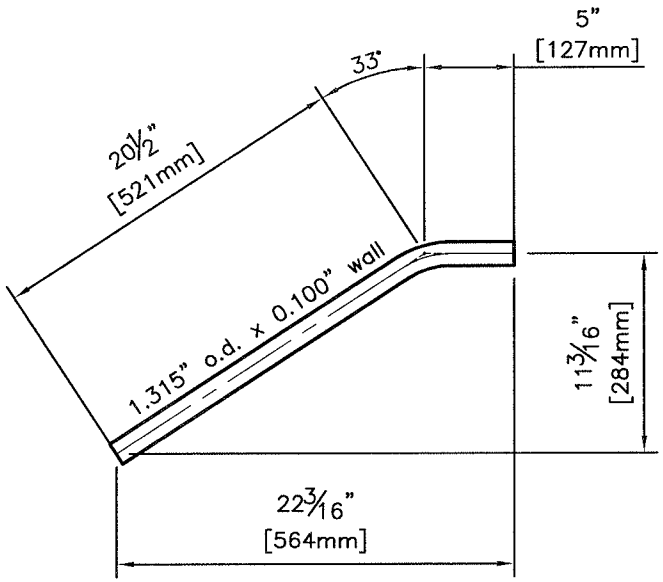
BENDING DETAILS
TUBES "TE" & "TF"

DWG No.

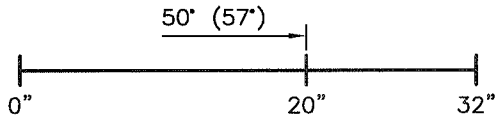
A05



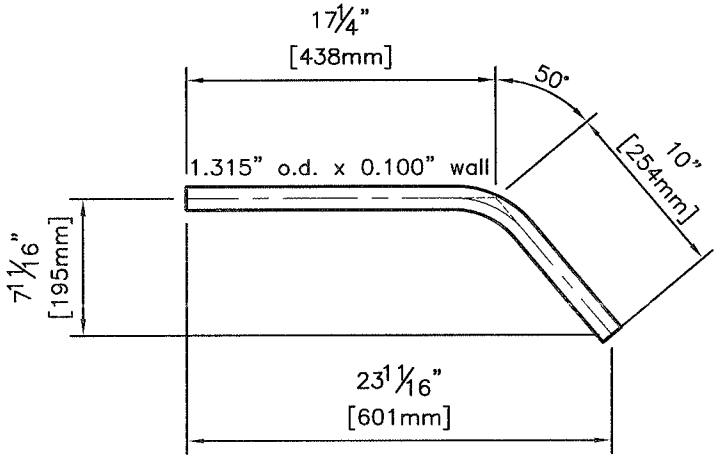
MARKING DETAILS FOR TUBE "TG"



BENDING TEMPLATE FOR TUBE "TG"



MARKING DETAILS FOR TUBE "TH"



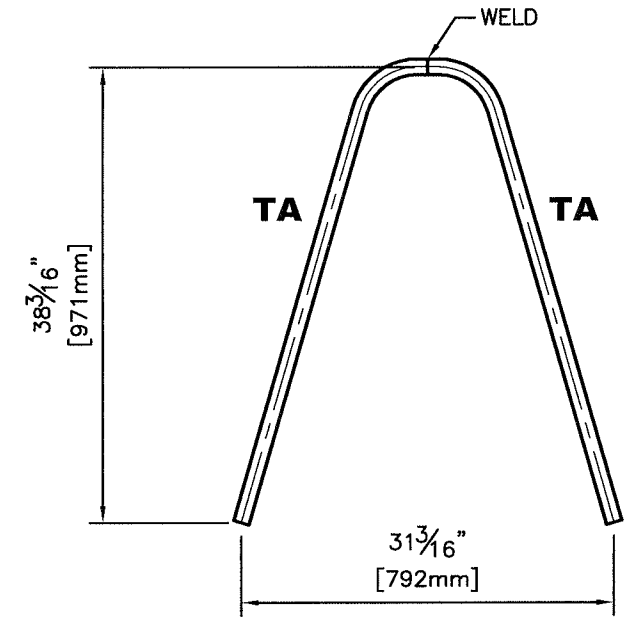
BENDING TEMPLATE FOR TUBE "TH"

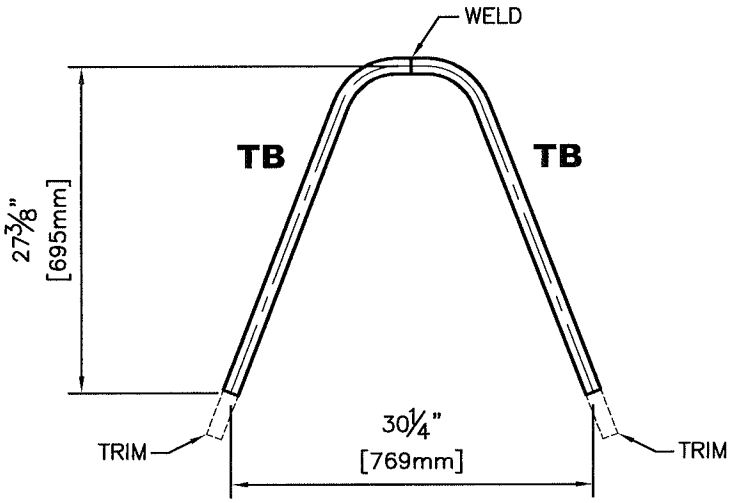
TITLE

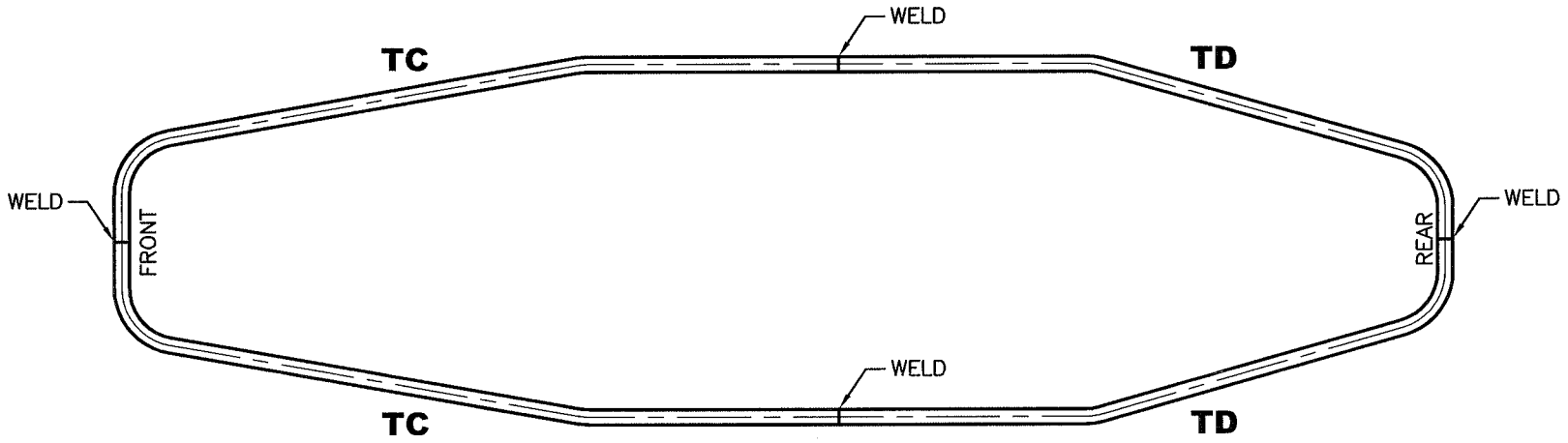
BENDING DETAILS
TUBES "TG" & "TH"

DWG No.

A06







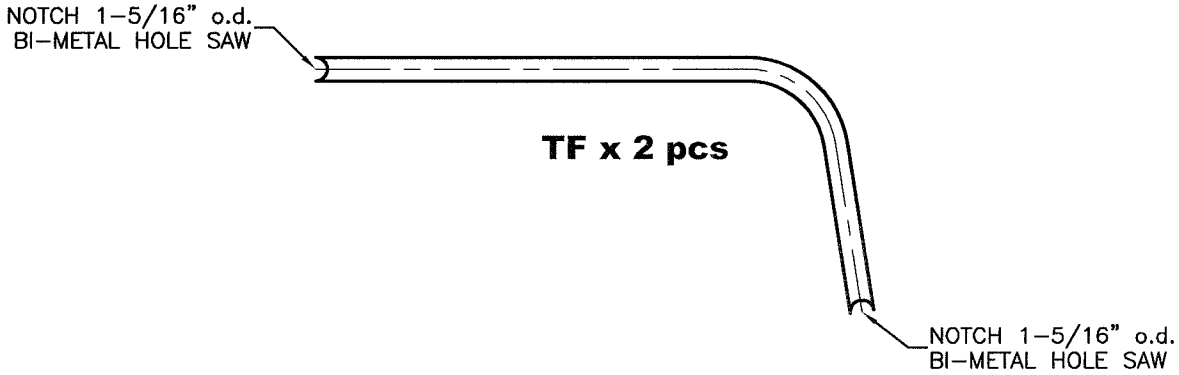
BADLAND BUGGY.COM
OFF-ROAD VEHICLES

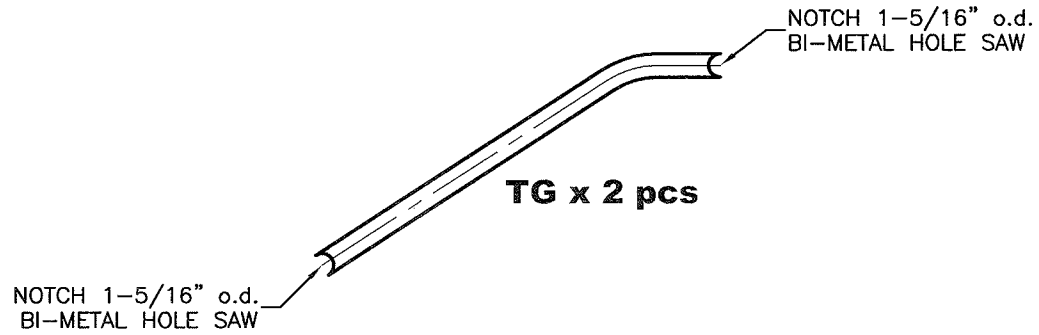
TITLE

PRE-ASSEMBLY OF BENT TUBES

DWG No.

A07



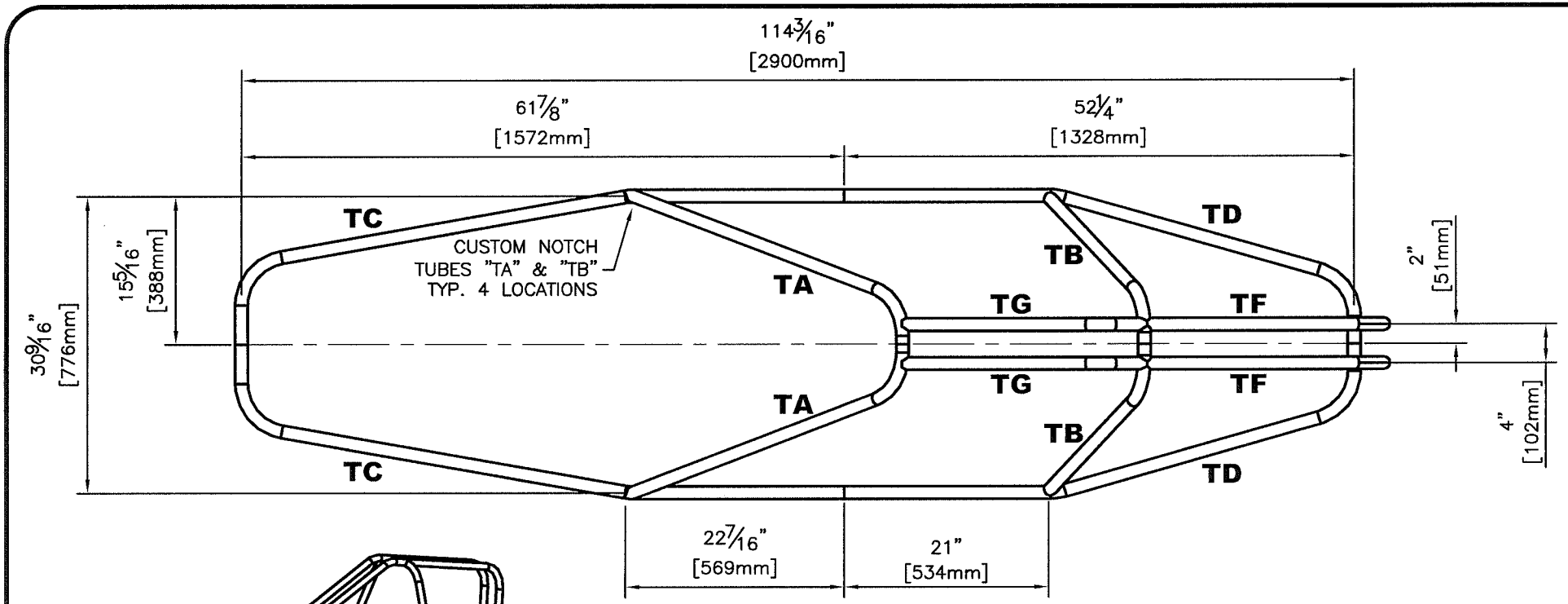


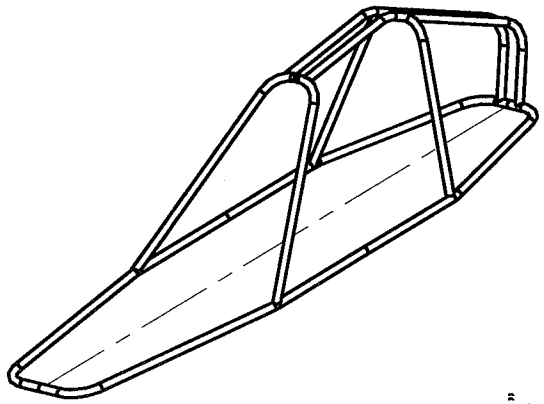
TITLE

NOTCHING OF TUBES "TF" & "TG"

DWG No.

A08





3D VIEW OF ASSEMBLED
UPPER ROLLCAGE

BADLAND BUGGY.COM
OFF-ROAD VEHICLES

TITLE

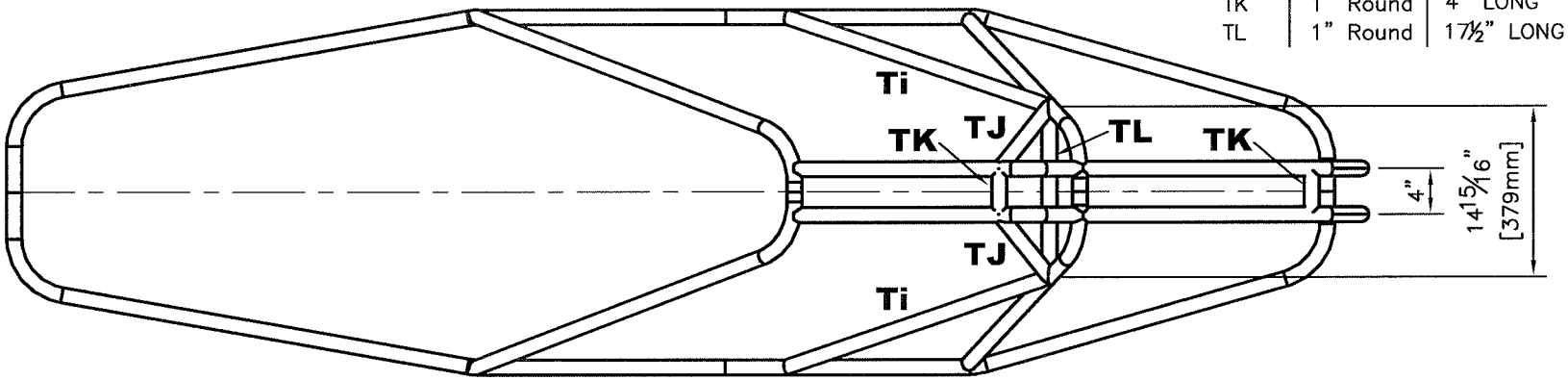
ASSEMBLY OF UPPER ROLLCAGE

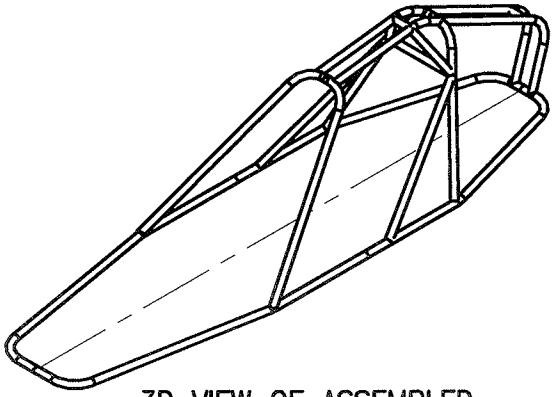
DWG No.

A09

TUBING SIZES & CUT LENGTHS

TUBE	SIZE	LENGTH	QUANTITY
Ti	1" Round	31" LONG	2 pcs
TJ	1" Round	11½" LONG	2 pcs
TK	1" Round	4" LONG	2 pcs
TL	1" Round	17½" LONG	2 pcs





3D VIEW OF ASSEMBLED
UPPER ROLLCAGE

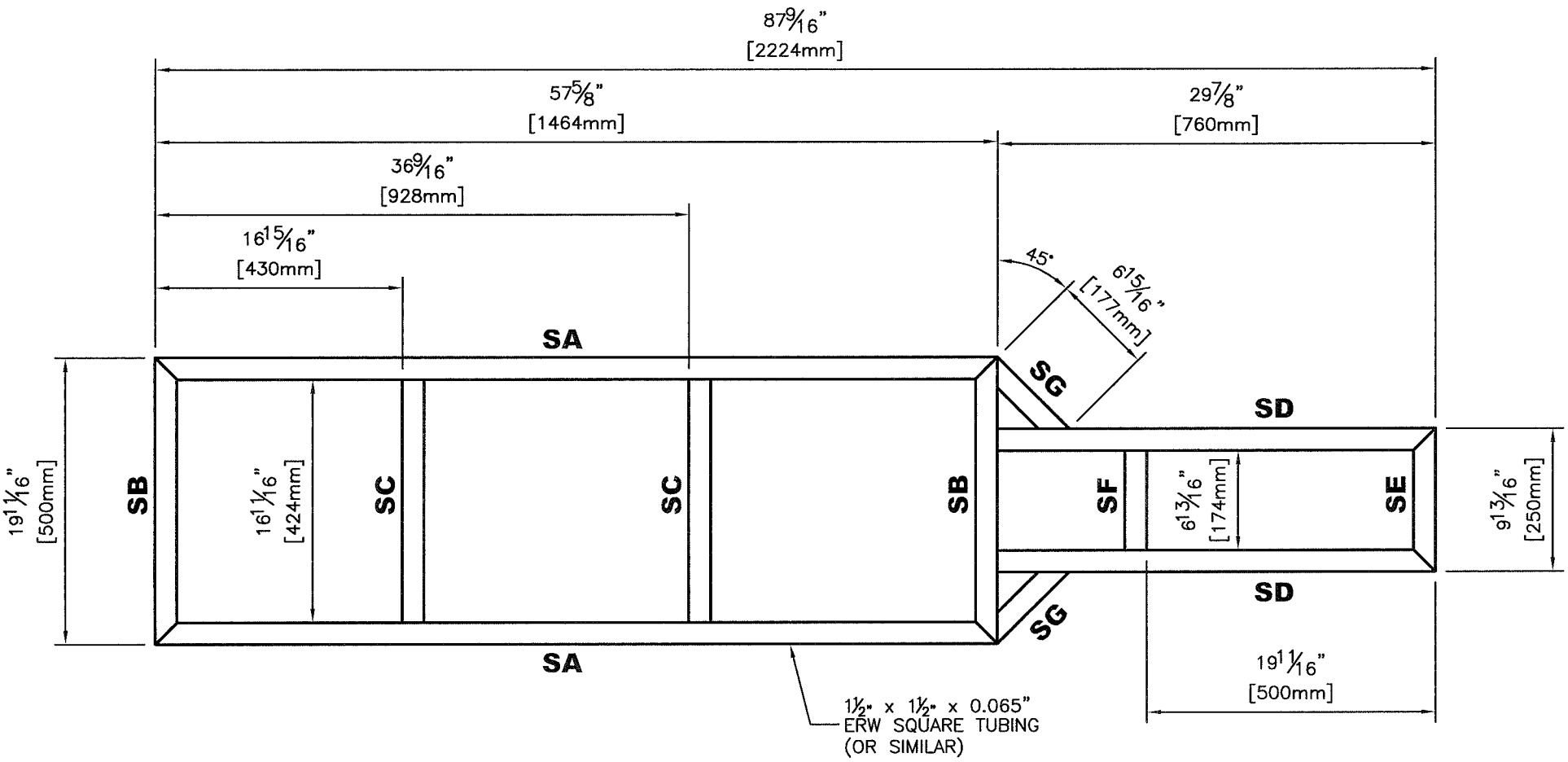
BADLAND BUGGY.COM OFF-ROAD VEHICLES

TITLE

ADDING REINFORCING TUBES TO UPPER ROLLCAGE

DWG No.

A10



BADLAND BUGGY.COM
OFF-ROAD VEHICLES

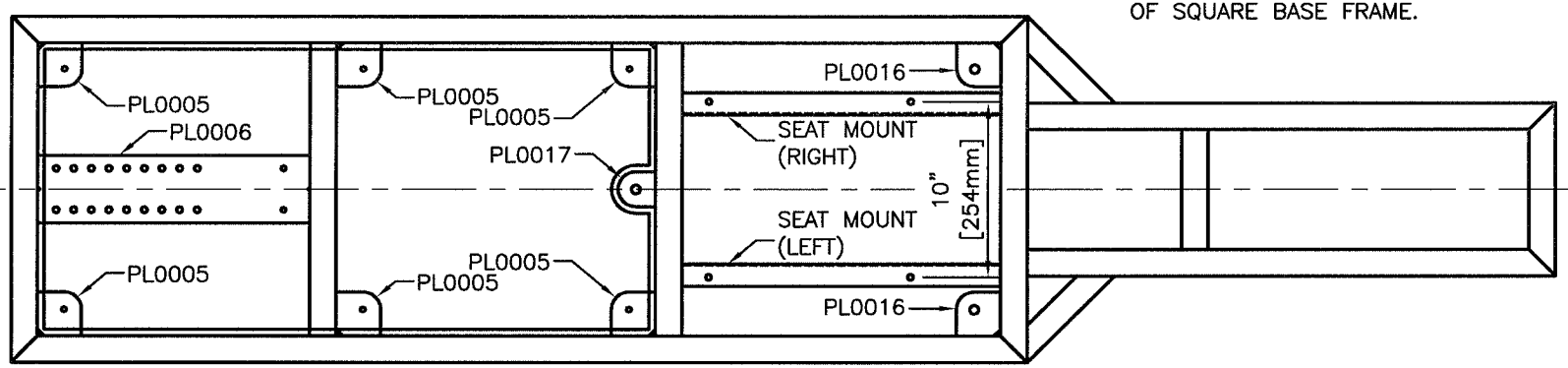
TITLE

LOWER SQUARE TUBE BASE FRAME DETAILS

DWG No.

A11

ALL PLATES & SEAT MOUNTS WELD TO TOP OF SQUARE BASE FRAME.



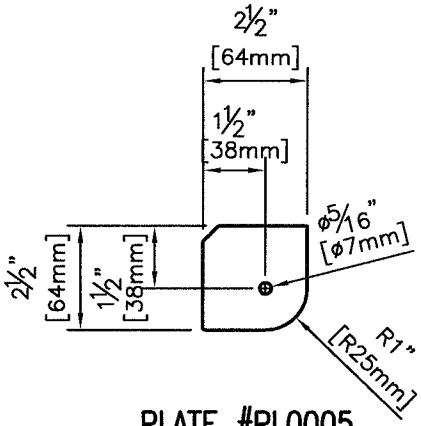


PLATE #PL0005

1/8" THICK MILD STEEL, 6 REQ'D
FLOOR PLATE MOUNTS

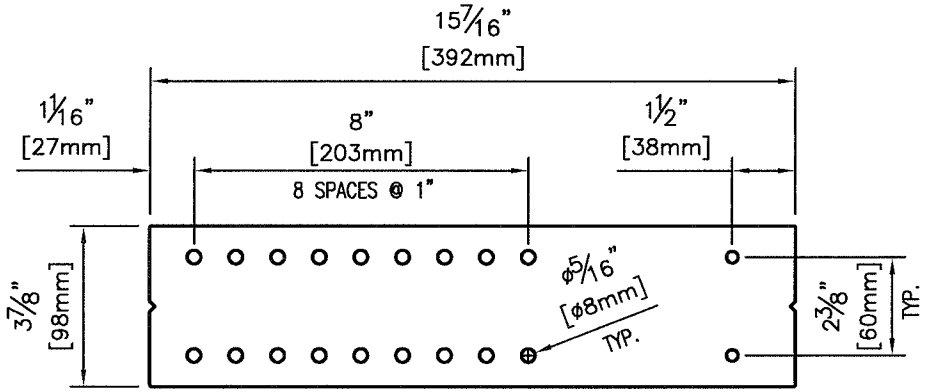


PLATE #PL0006

1/8" THICK MILD STEEL, 1 REQ'D
FOOT PEDAL BOX MOUNT

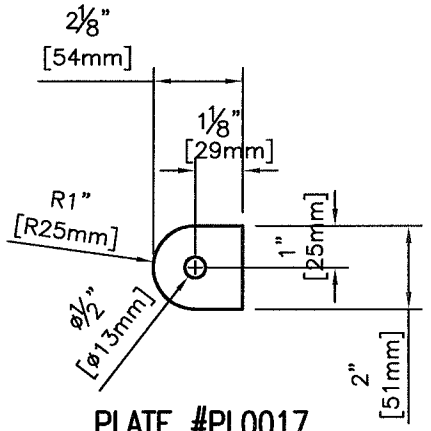
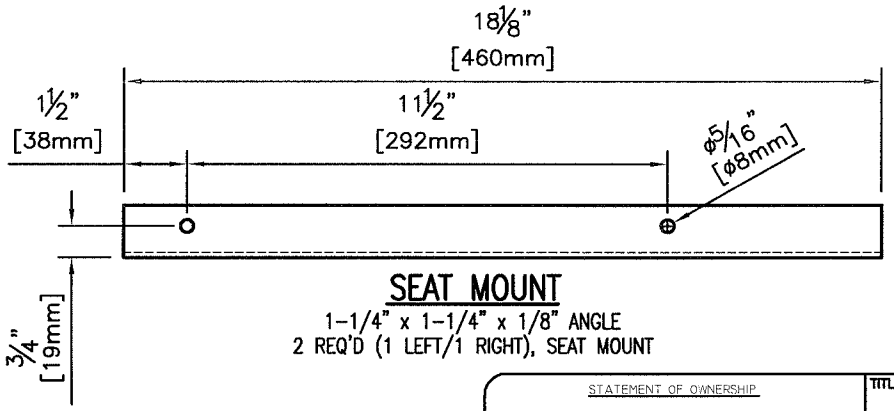


PLATE #PL0017

3/16" THICK MILD STEEL, 1 REQ'D
SEAT BELT MOUNT



SEAT MOUNT

1-1/4" x 1-1/4" x 1/8" ANGLE
2 REQ'D (1 LEFT/1 RIGHT), SEAT MOUNT

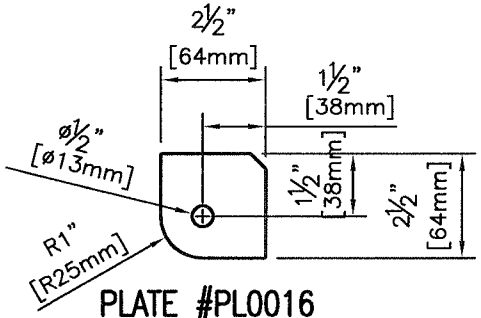


PLATE #PL0016

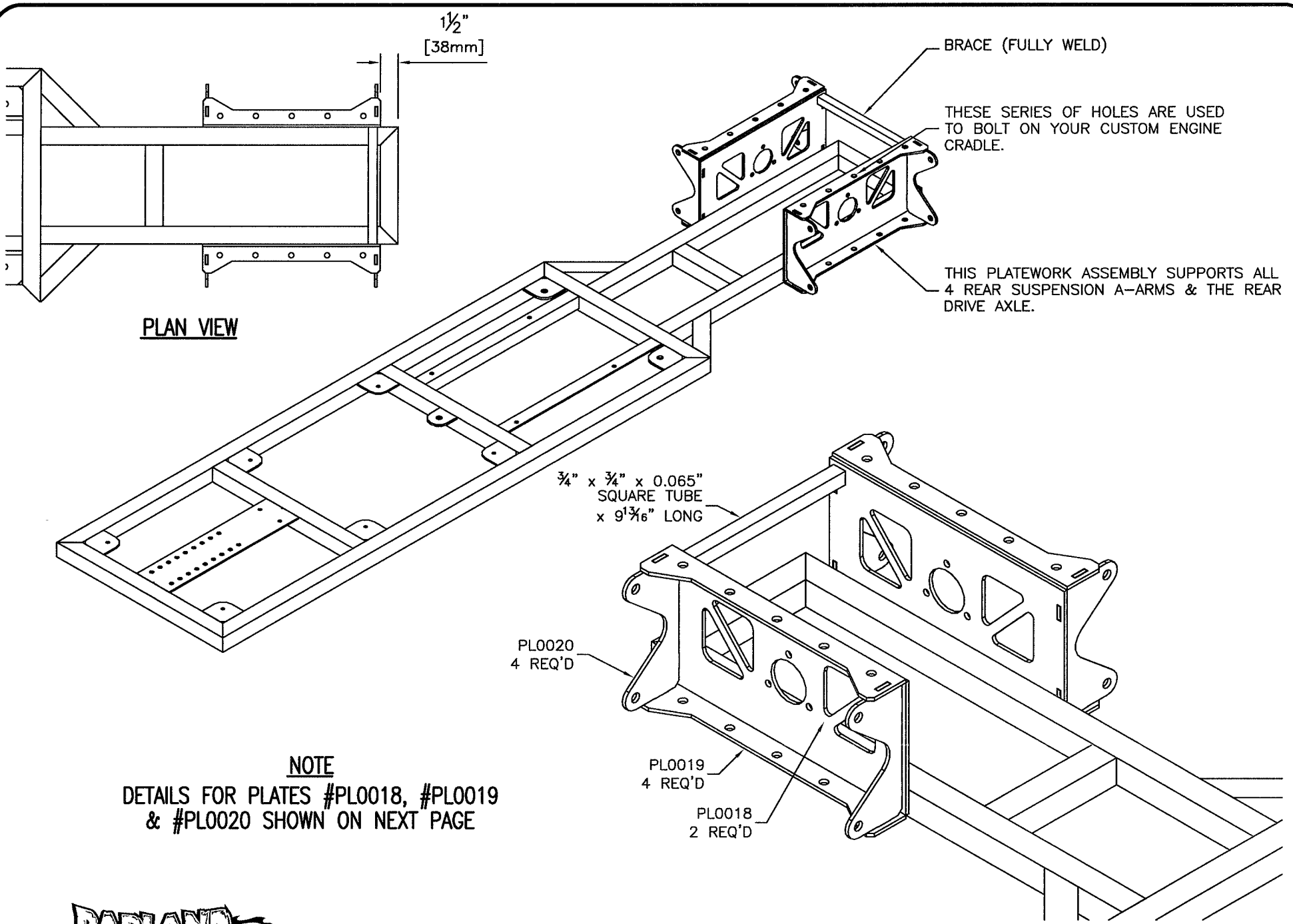
3/16" THICK MILD STEEL, 2 REQ'D
SEAT BELT MOUNTS

TITLE

WELDMENTS TO SQUARE BASE FRAME

DWG No.

A12



NOTE

DETAILS FOR PLATES #PL0018, #PL0019 & #PL0020 SHOWN ON NEXT PAGE

TITLE

WELDMENTS TO SQUARE BASE FRAME

DWG No. A13

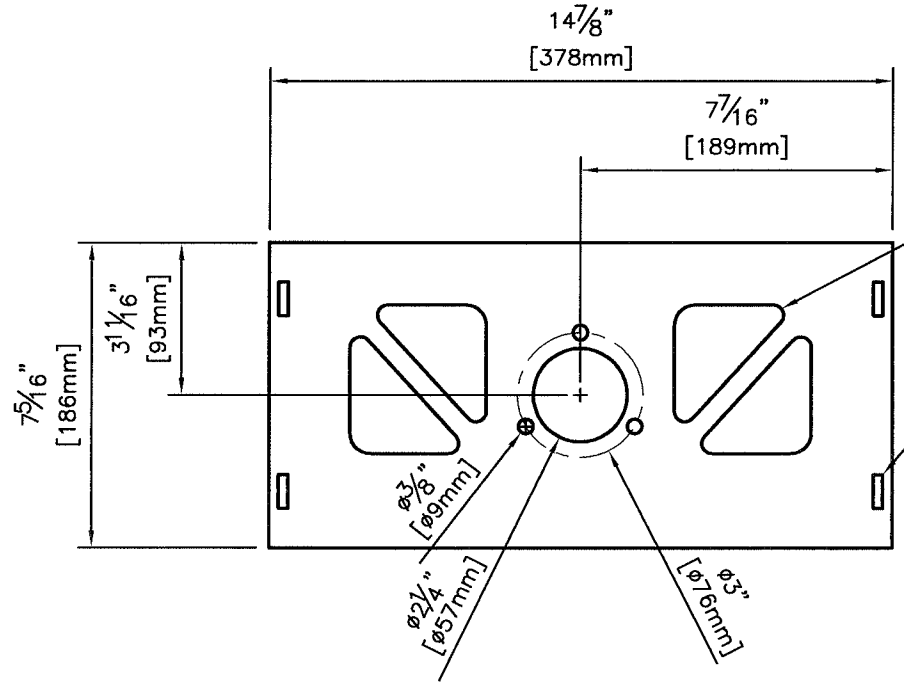


PLATE #PL0018

3/16" THICK MILD STEEL, 2 REQ'D
REAR A-ARM & DRIVESHAFT MOUNTS

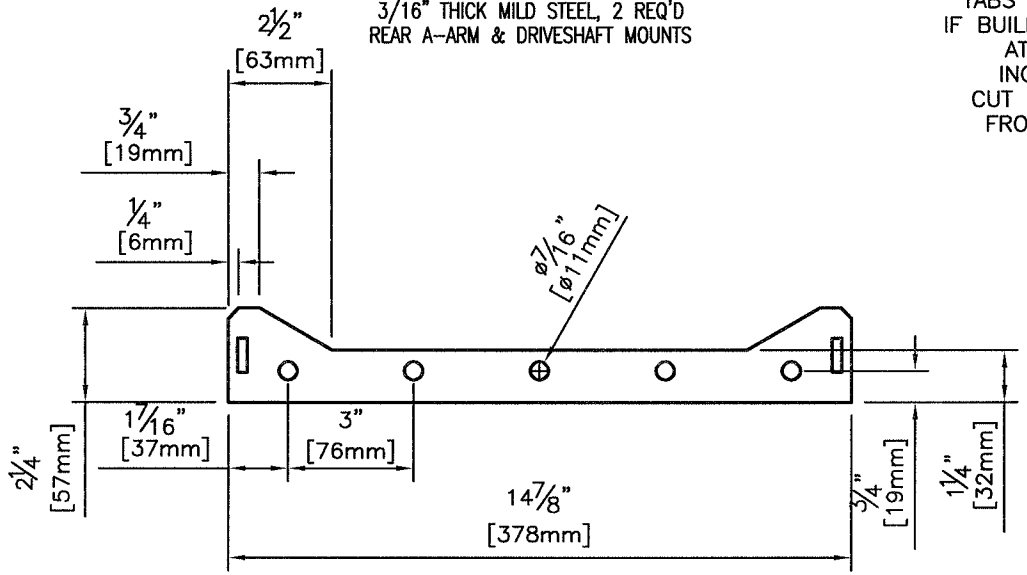


PLATE #PL0019

3/16" THICK MILD STEEL, 4 REQ'D
REAR A-ARM & DRIVESHAFT MOUNTS

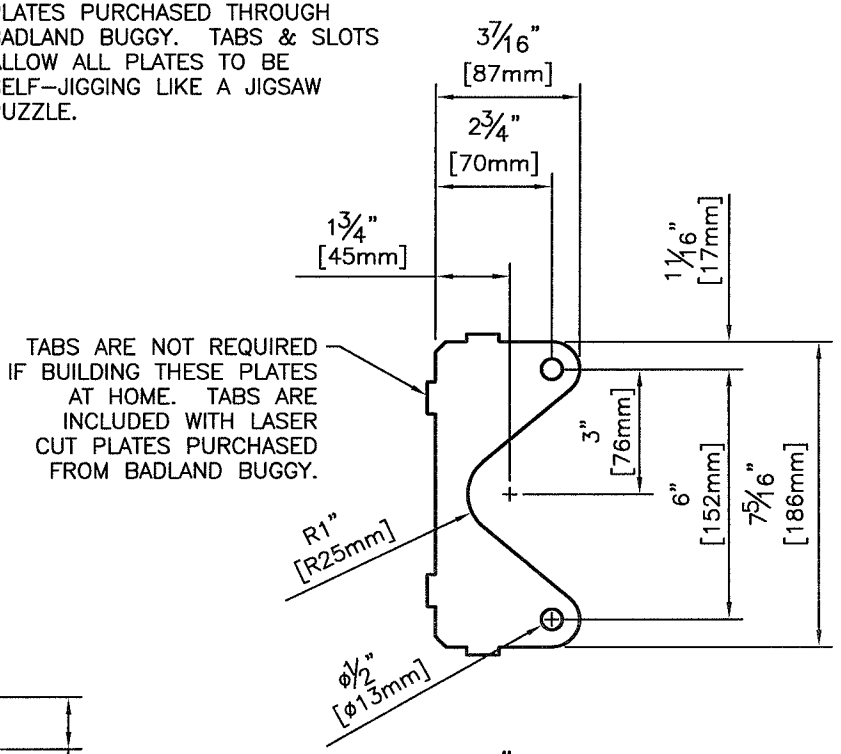


PLATE #PL0020

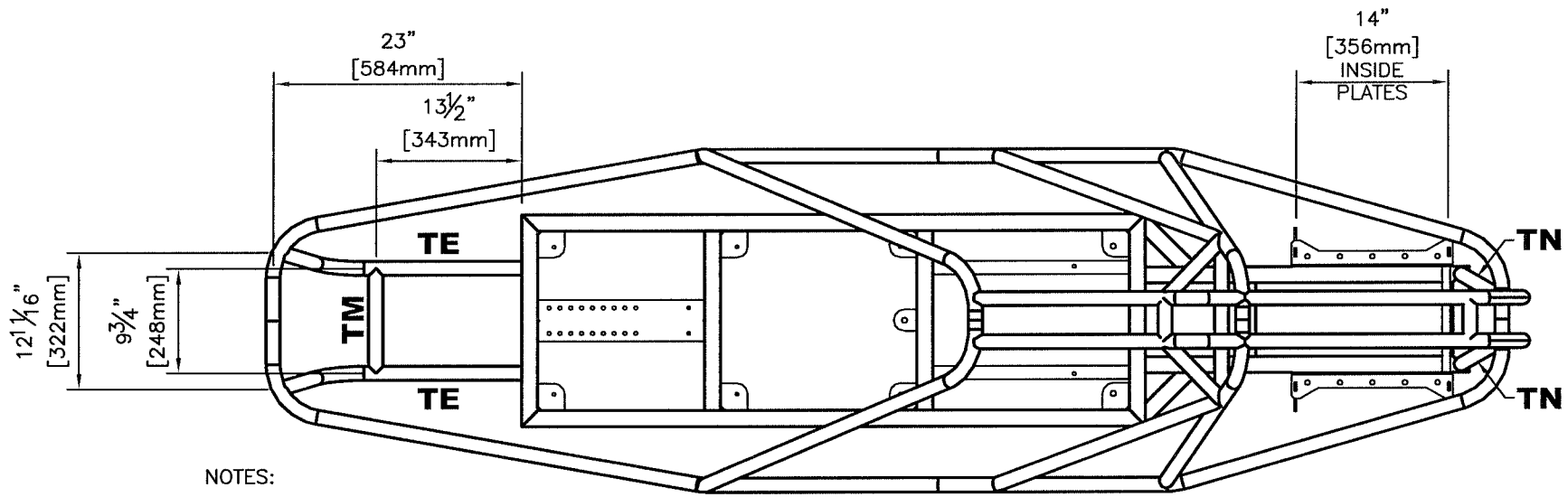
3/16" THICK MILD STEEL, 4 REQ'D
REAR A-ARM & DRIVESHAFT MOUNTS

BADLAND BUGGY.COM
OFF-ROAD VEHICLES

TITLE

DETAILS FOR PLATES PL0018, PL0019 & PL0020

DWG No. A14



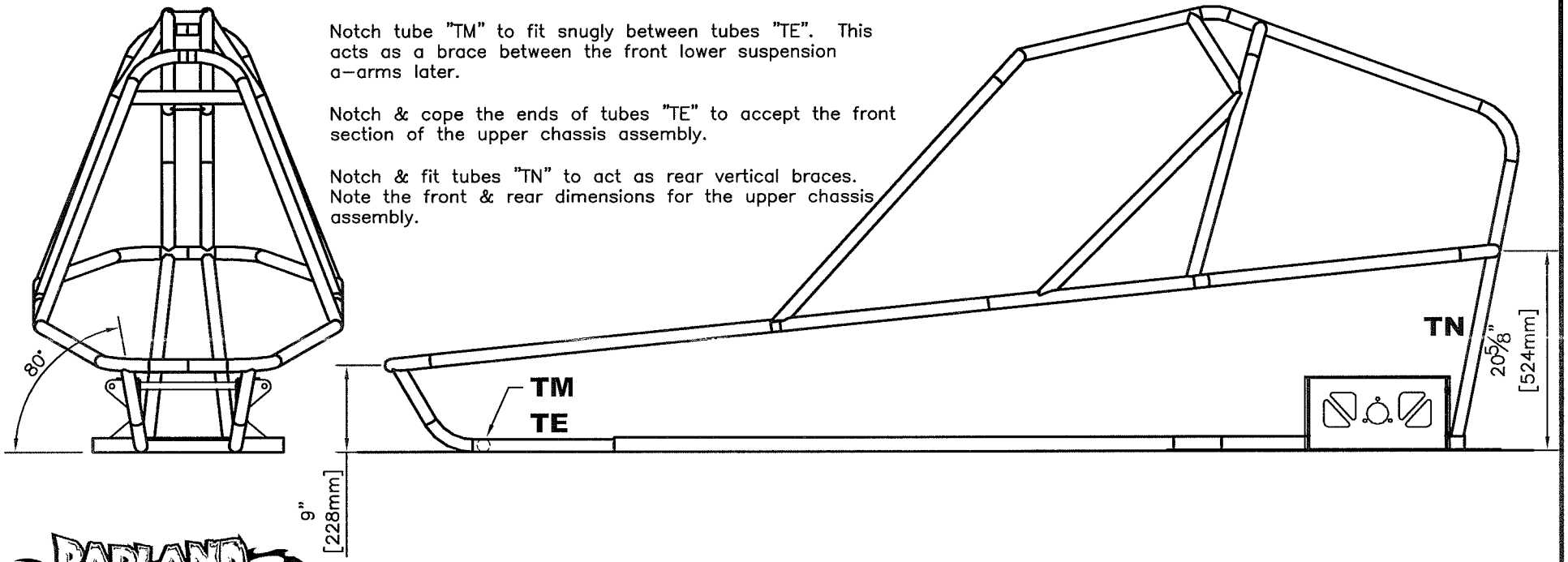
NOTES:

Ensure tubes "TE" are positioned at the 80° angle shown. This aids in the alignment on both the upper & lower front suspension a-arms later.

Notch tube "TM" to fit snugly between tubes "TE". This acts as a brace between the front lower suspension a-arms later.

Notch & cope the ends of tubes "TE" to accept the front section of the upper chassis assembly.

Notch & fit tubes "TN" to act as rear vertical braces. Note the front & rear dimensions for the upper chassis assembly.



STATEMENT OF OWNERSHIP

TITLE

MARRYING THE UPPER & LOWER CHASSIS ASSEMBLIES

DWG No. A15

BRACING CUT TABLE

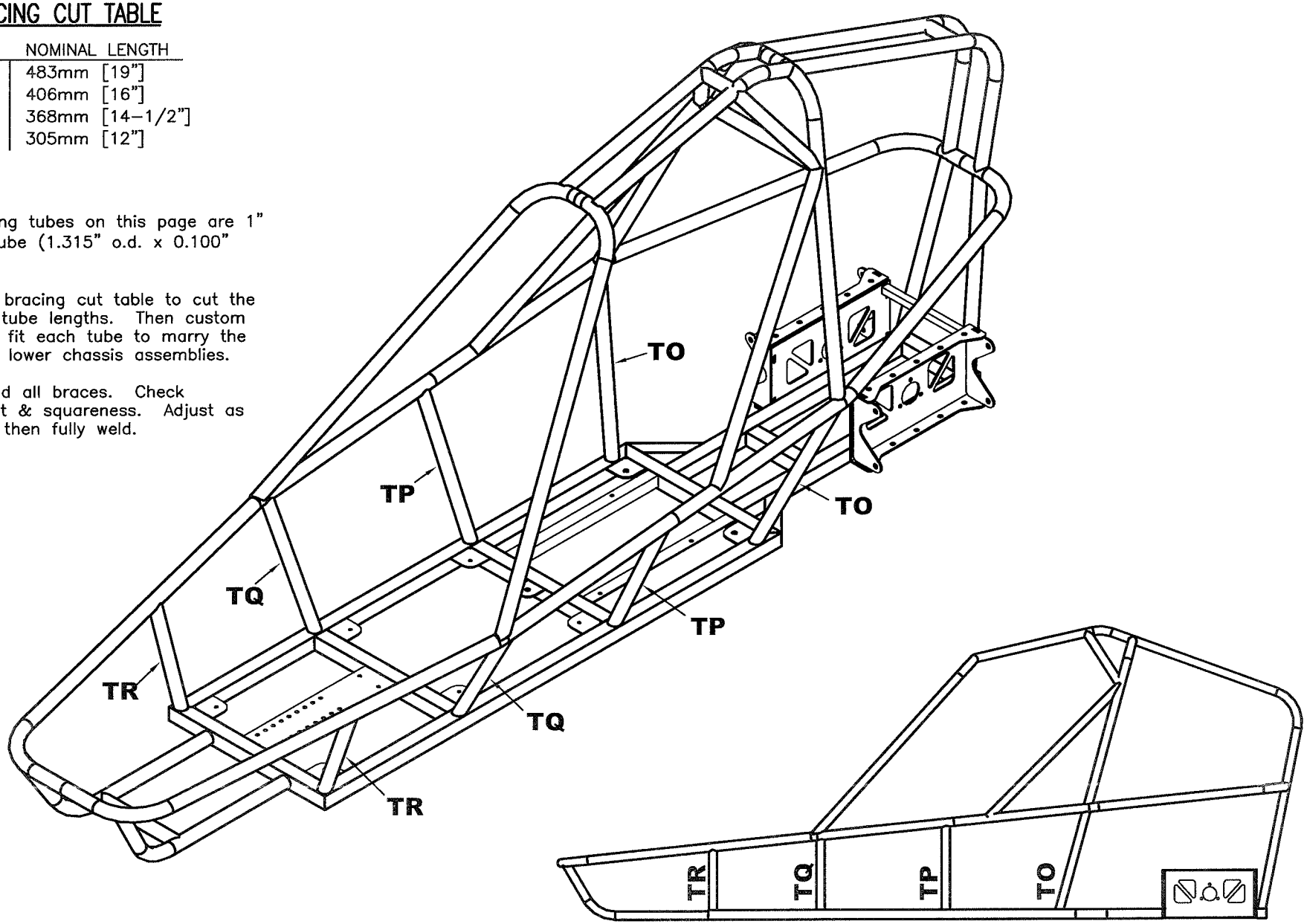
TUBE	NOMINAL LENGTH
to	483mm [19"]
tp	406mm [16"]
tq	368mm [14–1/2"]
tr	305mm [12"]

NOTES:

All bracing tubes on this page are 1" Round Tube (1.315" o.d. x 0.100" wall).

Use the bracing cut table to cut the nominal tube lengths. Then custom notch & fit each tube to marry the upper & lower chassis assemblies.

Tack weld all braces. Check alignment & squareness. Adjust as required then fully weld.



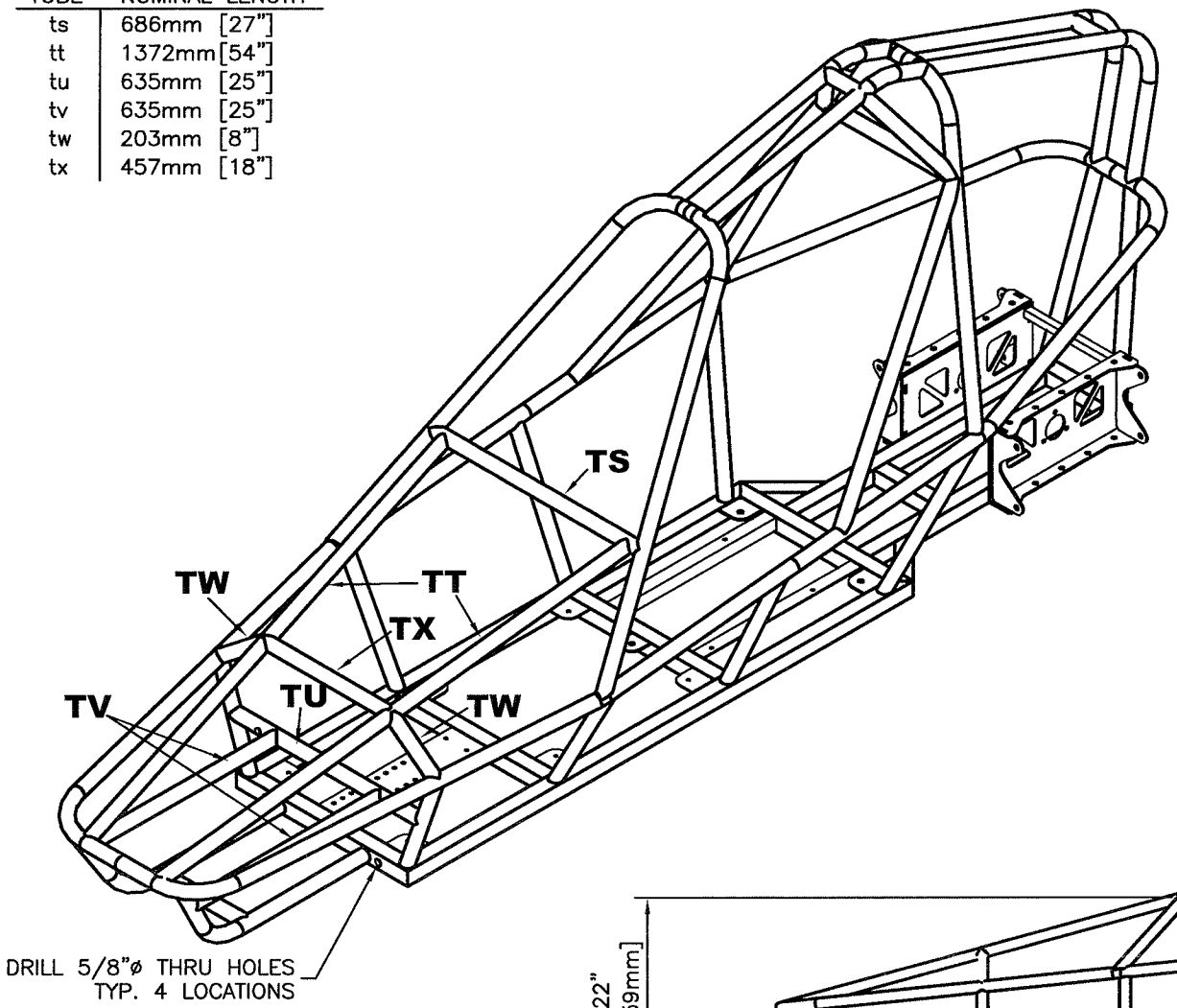
TITLE

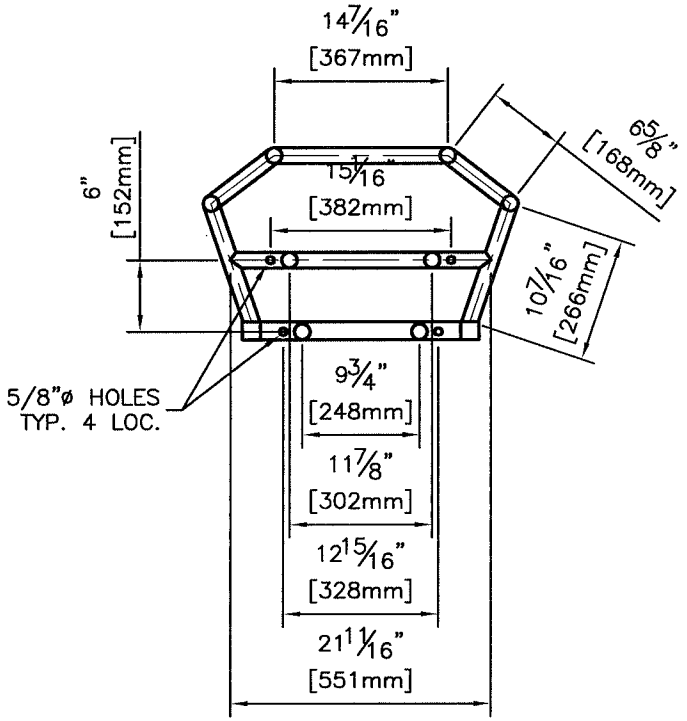
INSTALLING THE VERTICAL CHASSIS BRACING

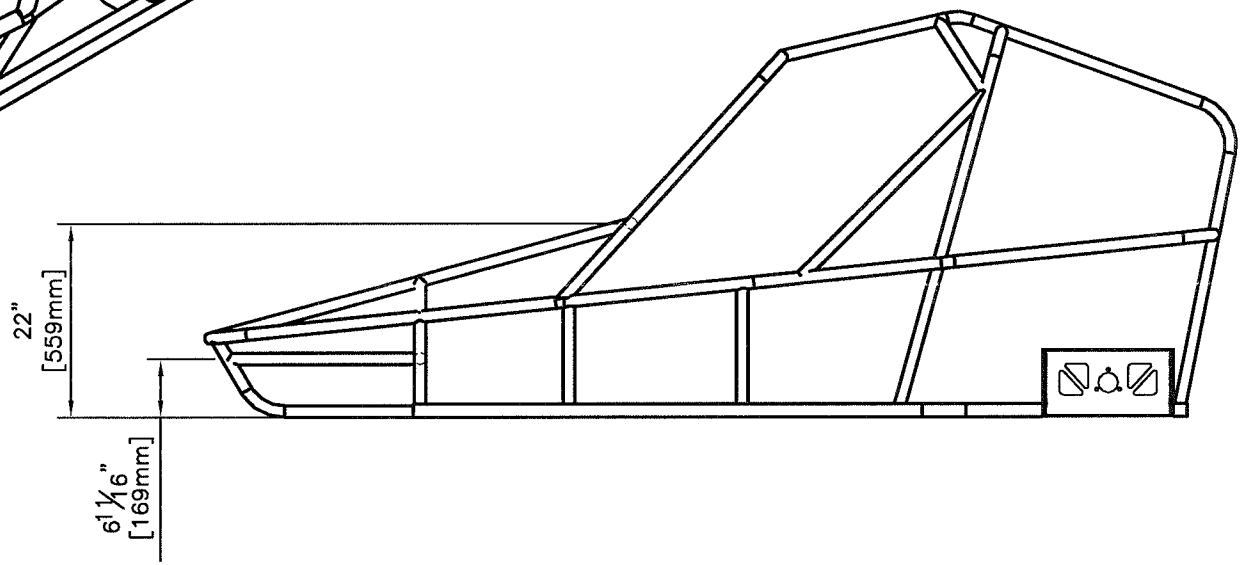
DWG No. A16

BRACING CUT TABLE

TUBE	NOMINAL LENGTH
ts	686mm [27"]
tt	1372mm [54"]
tu	635mm [25"]
tv	635mm [25"]
tw	203mm [8"]
tx	457mm [18"]







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OFF-ROAD VEHICLES

TITLE
INSTALLING THE BONNET BARS & FRONT END TUBES

DWG No.
A17

BRACING CUT TABLE

TUBE	NOMINAL LENGTH
ca	762mm [30"]
cb	660mm [26"]
cc	559mm [22"]
cd	254mm [10"]

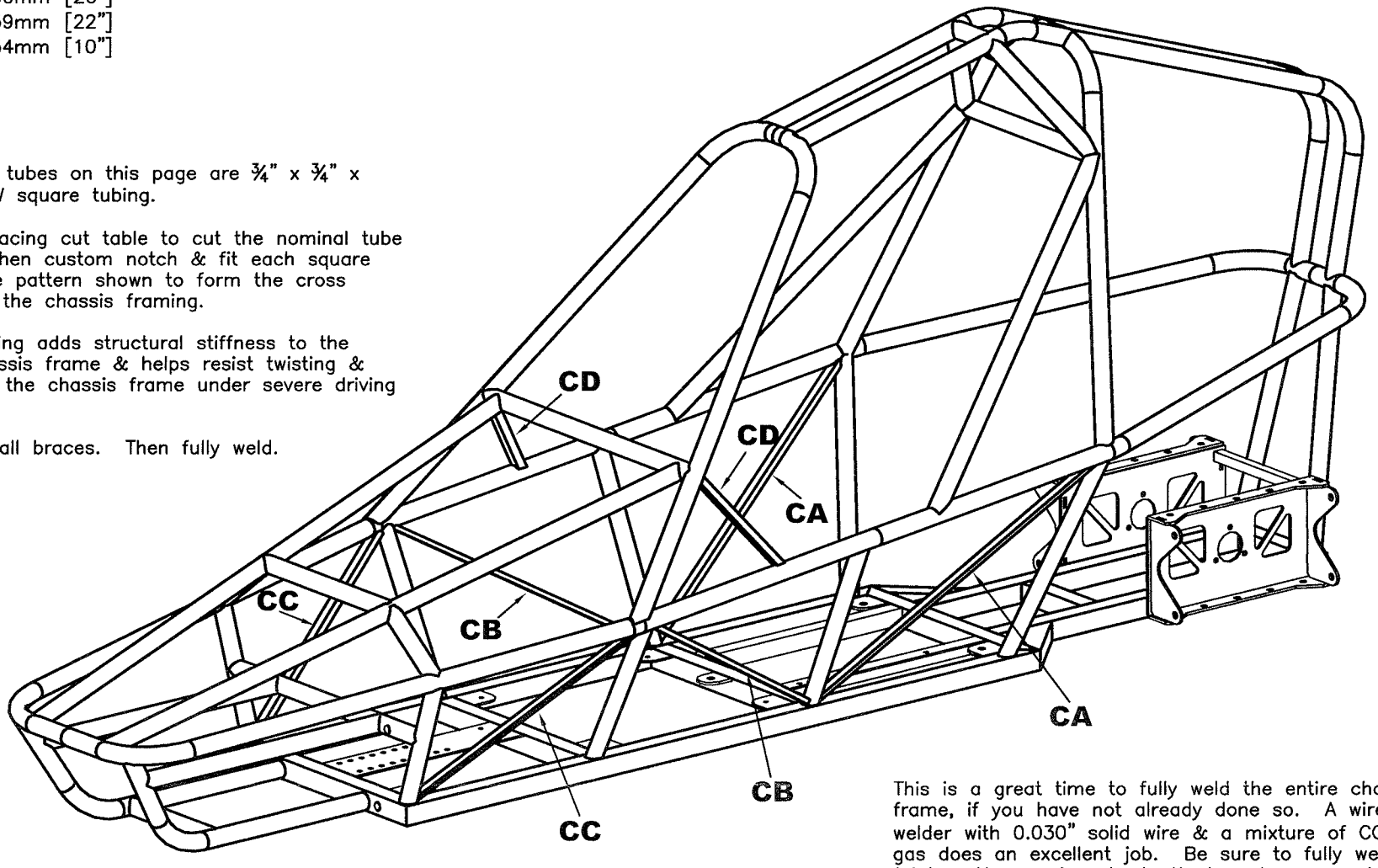
NOTES:

All bracing tubes on this page are ¾" x ¾" x 0.065" ERW square tubing.

Use the bracing cut table to cut the nominal tube lengths. Then custom notch & fit each square tube in the pattern shown to form the cross bracing of the chassis framing.

Cross bracing adds structural stiffness to the overall chassis frame & helps resist twisting & warping of the chassis frame under severe driving conditions.

Tack weld all braces. Then fully weld.



This is a great time to fully weld the entire chassis frame, if you have not already done so. A wire feed MIG welder with 0.030" solid wire & a mixture of CO2/Argon gas does an excellent job. Be sure to fully weld ALL joints. Use a wire wheel attachment on your hand held grinder to clean all welding joints & to clean any welding spatter that has accumulated during the welding process. Resist the urge to grind your welds flush. A strong weld will actually be raised & will penetrate the steel well.

TITLE

INSTALLING THE CROSS BRACING

DWG No.

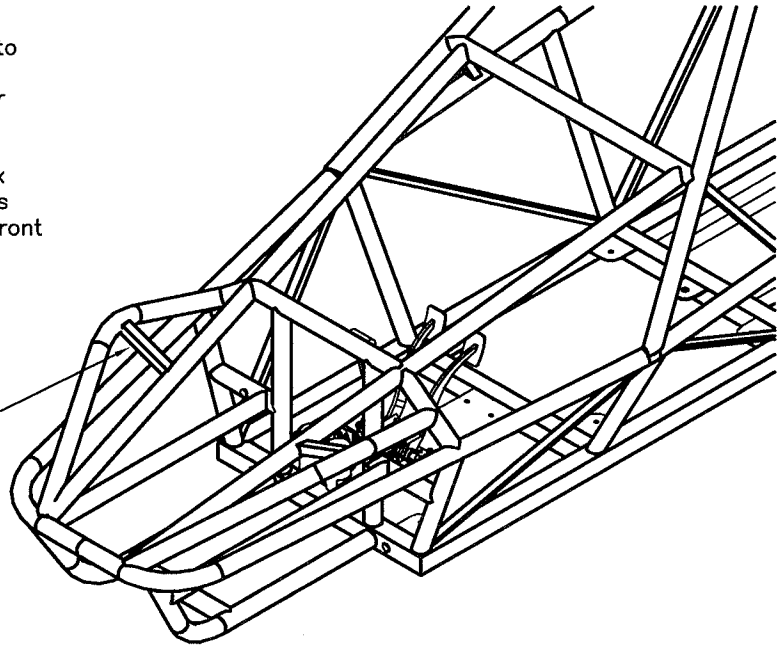
A18

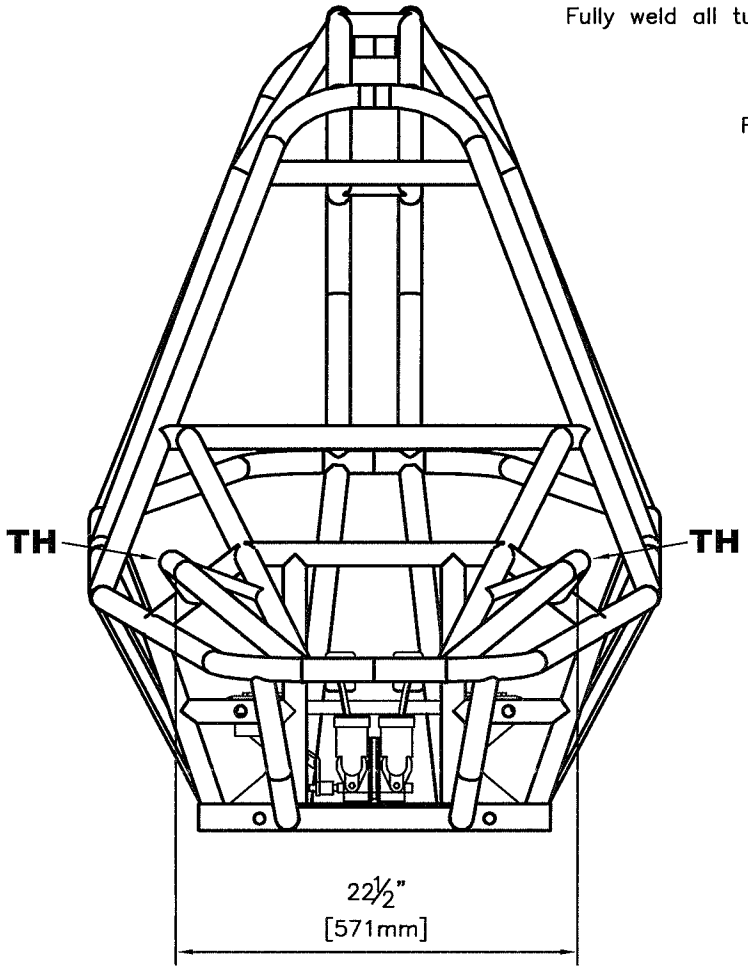
NOTES:

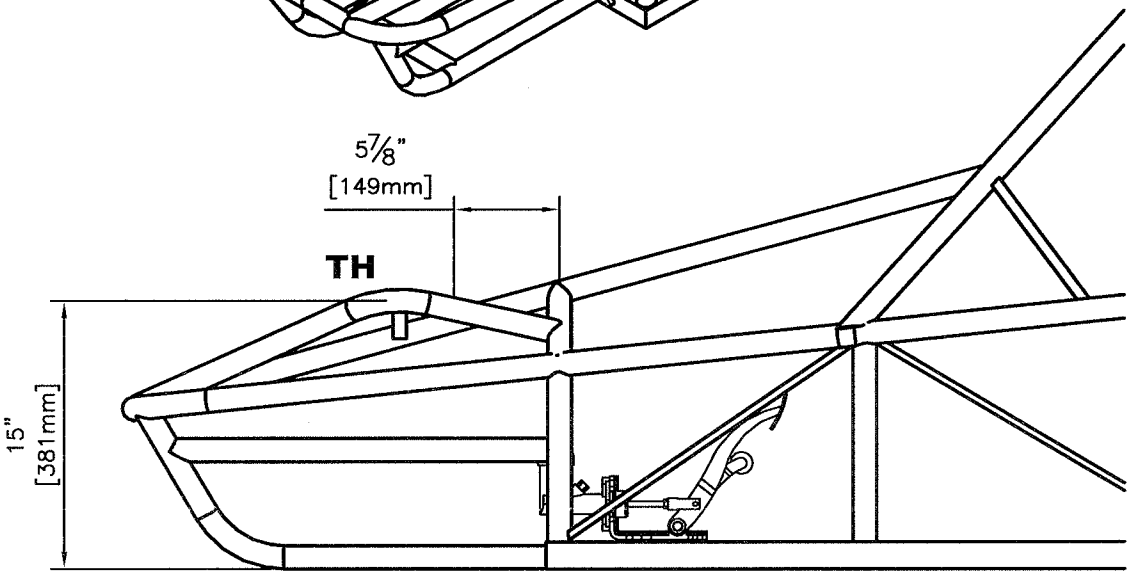
Notch ends of tube "TH" to fit into positions as shown to form the eyebrow shape for the front upper shock towers.

Cope & fit sections of ¾" x ¾" x 0.065" square tube in positions as shown to act as braces for the front shock towers.

Fully weld all tubes.







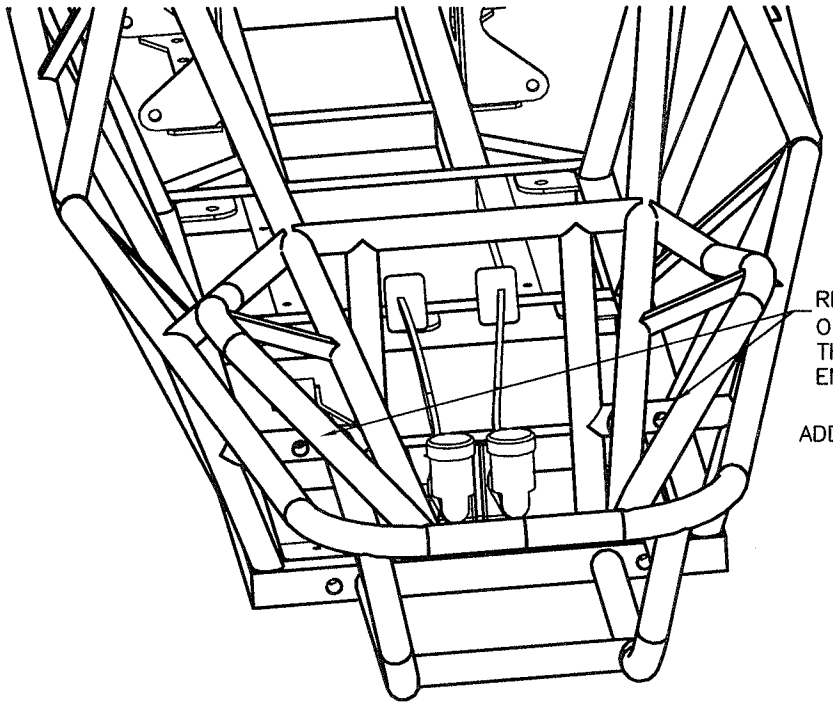
BADLAND BUGGY.COM
OFF-ROAD VEHICLES

TITLE

FRONT UPPER SHOCK CHASSIS TUBE

DWG No.

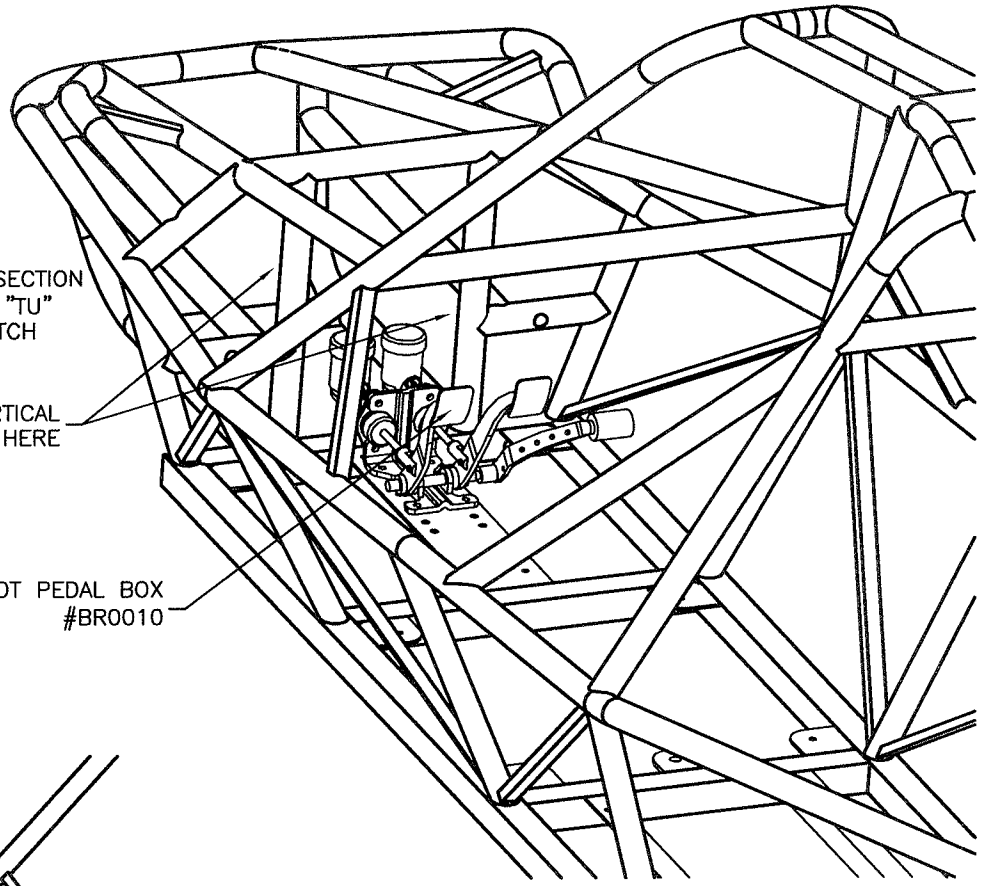
A19



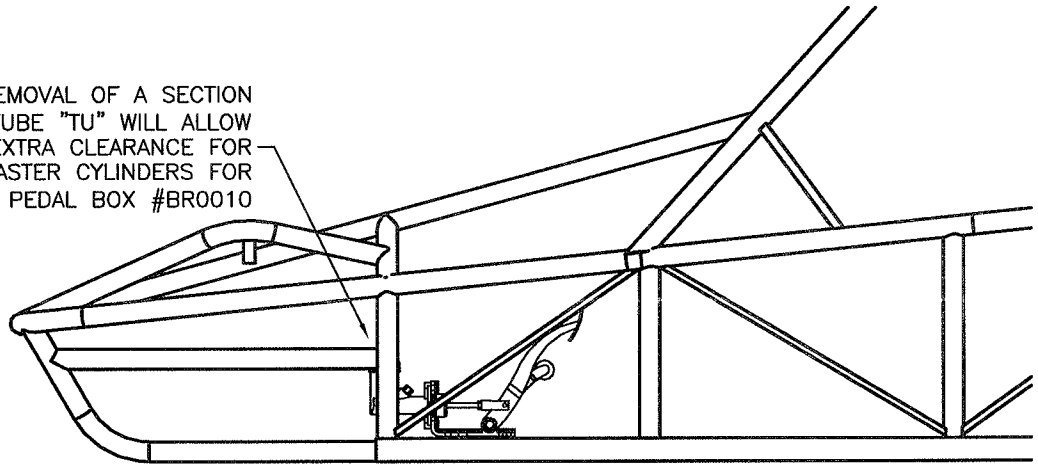
REMOVE SECTION OF TUBE "TU" THEN NOTCH ENDS

ADD 2 VERTICAL TUBES HERE

FOOT PEDAL BOX #BR0010



REMOVAL OF A SECTION OF TUBE "TU" WILL ALLOW EXTRA CLEARANCE FOR MASTER CYLINDERS FOR FOOT PEDAL BOX #BR0010



Foot Pedal Box #BR0010 can be purchased through Badland Buggy.

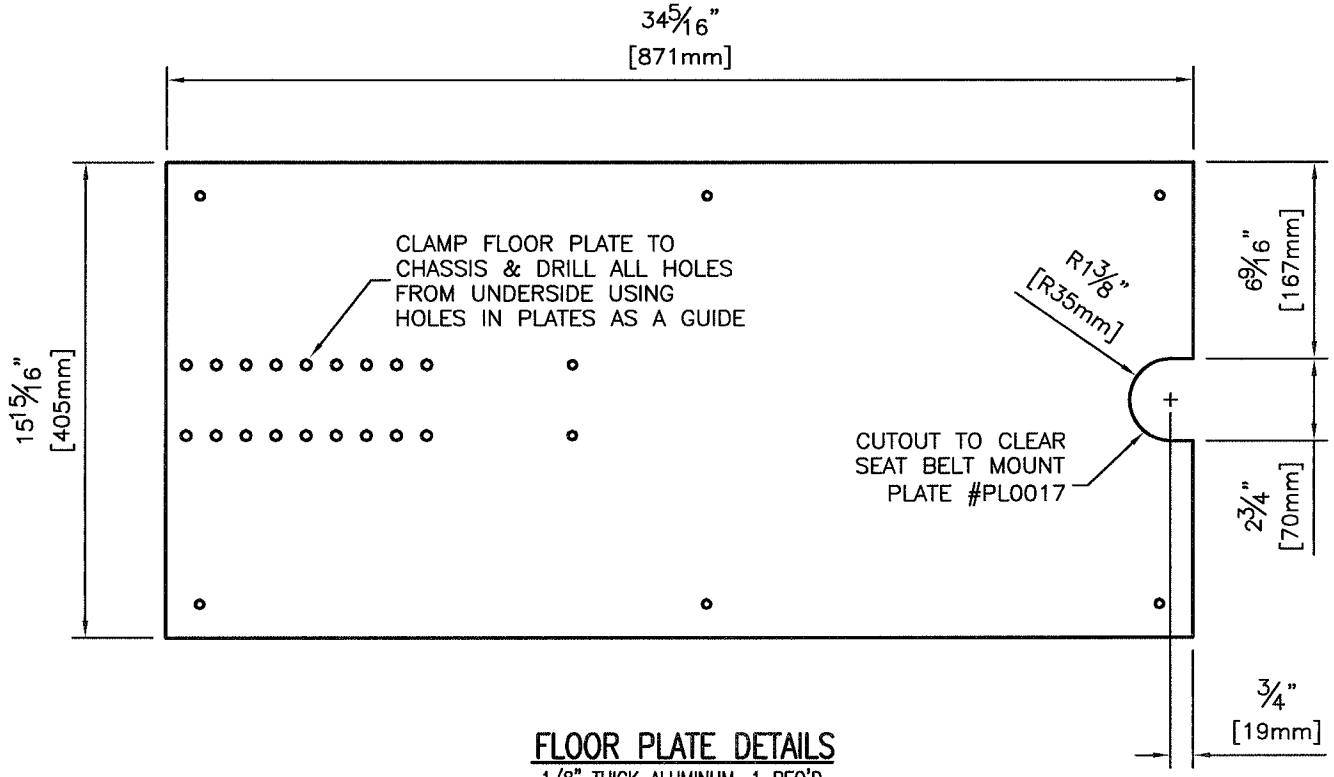
BADLAND BUGGY.COM OFF-ROAD VEHICLES

TITLE

ADDING A CUTOUT FOR THE FOOT PEDAL BOX

DWG No.

A20



FLOOR PLATE DETAILS

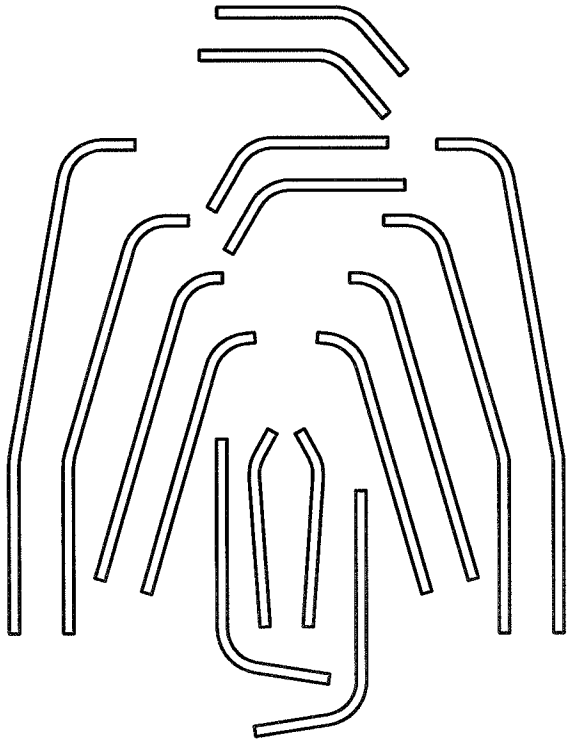
1/8" THICK ALUMINUM, 1 REQ'D

TITLE

ALUMINUM FLOOR PLATE DETAILS

DWG No.

A21



PRE-BENT TUBE KIT #CHK002

16 pcs OF PROFESSIONALLY BENT CHASSIS TUBES

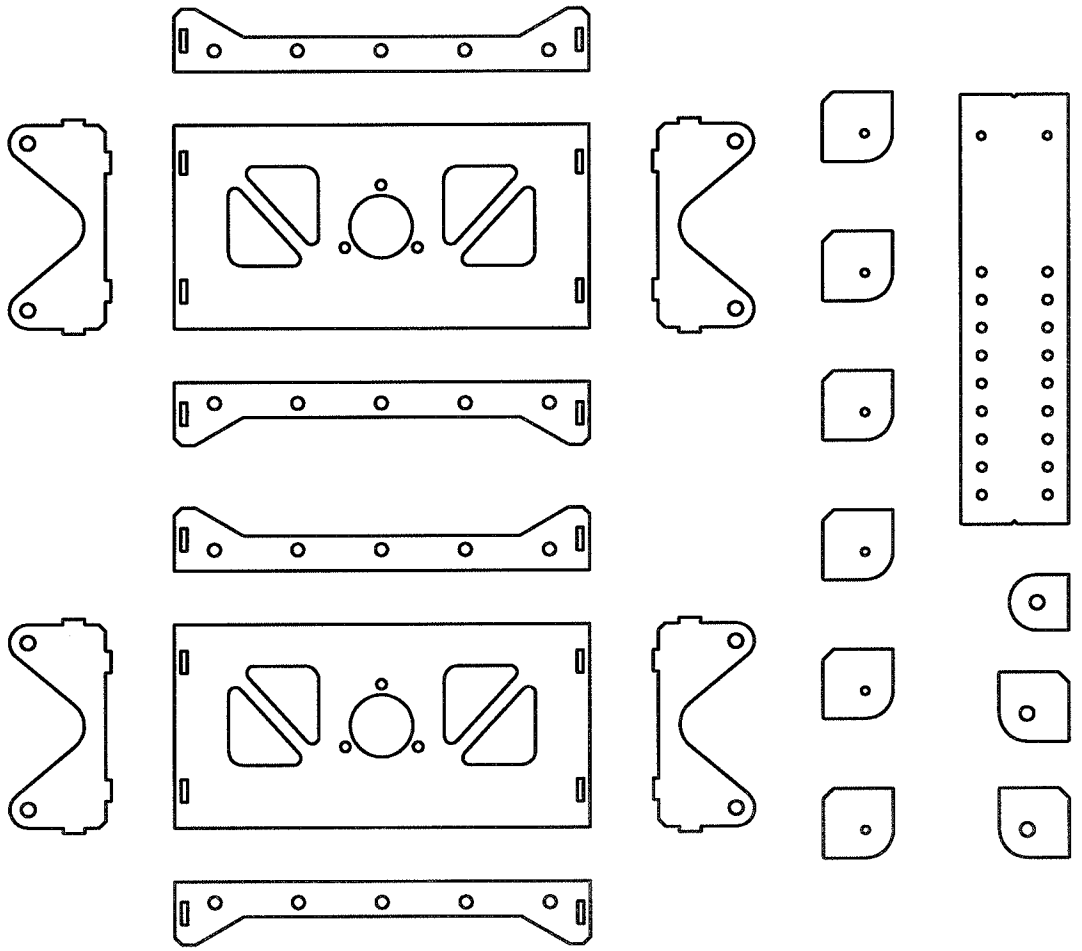


PLATE KIT #PLK004

20 pcs OF LASER CUT STEEL PLATES

BADLAND BUGGY.COM OFF-ROAD VEHICLES

TITLE

KITSETS AVAILABLE FOR SECTION "A"

DWG No.

A22